

Impact of Public Education Expenditure on Income Inequality in Pakistan

Muhammad Nawaz¹, Tilawat Shah²

ABSTRACT

The aim of the study was to investigate how public expenditure on education affects income inequality in Pakistan by analyzing time series data covering the years 1975 to 2018. To accomplish this, the autoregressive distributed lag model (ARDL) was used, as the data was stationary at different levels. The F-Bound co-integration test indicated the presence of a long-term relationship amid government expenditure on tutoring and income inequality. The results of long-term ARDL model revealed that public expenditure on education, GDP growth, and tertiary student enrollment have a damaging and substantial impact on income disparity. In addition, the ECM value suggested that there is a 7.3% rate of adjustment between the dependent and independent variables in successive years. These findings indicate that increasing funds allocated to education and reducing unemployment rates are crucial policy options for the government to reduce income inequality and improve income distribution in Pakistan.

Keywords: Education Expenditure, Income Inequality, Time Series, Bound Test, ARDL Bound Test

INTRODUCTION

Education has an imperious share in the progress of a country, and it is considered as a foremost agent in the determination of economic development. On one hand, it accomplishes its purpose by providing qualitative and quantitative labor, requisite for the development process while on the other hand, with its invention and diffusion of knowledge function, it inspires countries to follow and develop recent industrial skills and to transfer them to the production procedure. Similarly, underdevelopment of any country is largely, connected with the less output of labor, due to their lack of education. Human resource has a main role in endogenous growth, while education improves human capital and contributes to their earnings (McMahon, 1998). Government expenditure on the social sector plays important role in reducing income inequality (Jamal, 2006).

Education brings more political awareness and leads to extensive and encouraging economic impacts for the nation's development (Glaeser, 2007). Thus, policy regarding education receives more attention in both advanced and developing nations.

¹ Assistant Professor of Economics, Govt. Postgraduate College Mardan, **Corresponding Author's Email: nawazeco70@gmail.com**

² Assistant Professor of Economics, Government Postgraduate College Mardan

Education opens a gateway of employment for the masses (Ahmad & Batul, 2013). Education can increase productive skills of the labor, which will improve labor productivity (Benos & Zotou, 2014).

As exterior effects of education are allied with increasing returns, however it will be observed after a period. Yet another view says that by adopting technologies with a faster speed, the external benefit of education can be achieved (Nelson & Phelps, 1966).

Education is also important factor affecting income inequality. Provision of educational facilities can moderate problems like income inequality and poverty (Kakar, 2014). Education's expansion brings two types of effect on income distribution, initially it rises the income inequality however as time passes the income inequality is reduced (Knight & Sabot, 1983). Thus, increasing the working capacity of humans as a way to reduce the income disparity and through increasing expenditure on education this may be achieved (Schultz, 1961).

Education is a tool of controlling disparities in the society. It encourages social & financial progress and thus speeds up the social changes. Therefore, it is a traditional view that government should provide education to the people.

In public sector education, every student receives same opportunities however if the marginal production of education decreases then education will be financed through private sector (Tamura, 1991). Through state intervention in education, its external benefits will be availed and the coordination failures may be reduced. Kayet and Mondal (2015) argued that increasing government spending on education can exhibit a crucial role in improving the education level for all individuals. With better education, the poor can have more opportunities for higher education and better job prospects, leading to an increase in their income and a reduction in earnings inequality amongst the rich and underprivileged class.

However, due to scarcity of resources and horizontal expansion in education institutes, it is becoming difficult for governments to finance education sector. Since 1970, a large literature has been written regarding the allocation of government funds to education, as there are other sectors, which are deemed important for the society's betterment.

The debate whether government or the private sector would carry the burden of education is still under discussion, nations that adopt the Keynesians-type policies favor government's contribution for the provision of education to the masses. However, after the economic crisis of 1970 (Tilak, 2006) Keynesians policies decayed and the dogmas of neo-liberal economists were introduced. The neo-liberal reforms happened mostly in developing countries and international financial bodies like World Bank, International Monetary Fund (IMF) and many others encouraged the de-nationalization of educational institutes in these countries. The neo-liberal believes "Any aspect associated to Government is unproductive and at the same time all matters related to Private sector is more productive and appropriate" (Tilak, 2006, pp. 271). However, researchers have a consensus that education is advantageous for the country.

In Pakistan, Article 25 –A of the constitution compels government to offer free and mandatory education to the children ages from 05- 16 years (Ullah, A. (2013). The education structure in Pakistan usually alienated in six levels:

- i. Pre School level (from age 3 to 5 years)
- ii. Primary level
- iii. Middle school level
- iv. Secondary School level
- v. Intermediate level
- vi. Higher Education/ College/University Education

However, due to underinvestment and lack of determination to implement five-year plan, Pakistan's education sector suffered a lot. The economic survey (2018-19) reveals that for fiscal year 2018-19 government spending on education is 2.4 % of its GDP. Although, federal government contribute little (less than 3%) to education, the provincial governments spare a large portion of their budgetary allocation to education which increases the overall allocation. The budget documents of the different provinces shows that Khyber Pakhtunkhwa and Azad Jammu & Kashmir spending more on education than other Provinces i.e. 28 % and 26 % respectively.

Furthermore, gross domestic production of a country and its income distribution collectively define its life standards, so the purpose of growth should be perfection in the living standards not just economic growth. Kuznet (1955) argued that income inequality deteriorates during the preliminary stages of economic growth but recovers as the economy develops further. However, it does not mean that Kuznet curve can be applied to every nation as governments always take steps to reduce or at least control the increase in wages inequality.

Various indices are used to measure income disparity, these includes Theil's entropy measure, Gini Coefficient, Lorenz Curve, Atkinson index, Tekeyama index, Sen's Index. However, most of the researchers use Gini Coefficient and Lorenz curve for estimating changes in income distribution. Similarly, governments consider these measures/values for policymaking. In Pakistan, the Survey i.e Household Integrated Expenditure (HIES) & Pakistan Integrated Household Survey (PIHS) are far and wide used for estimating income inequality.

Anwar (2005) calculated consistent Gini coefficient series by using community household income data and concluded that due to their diversified skills and the income of self-employed individuals, more income inequality can be found in urban labor.

Factors like asset distribution, transfer payments and incidence of tax are considered responsible for creating imbalance in income distribution in Pakistan.

LITERATURE REVIEW

Sylwester (2002) empirically tests the end of schooling's spending on income inequality in the fellow countries of organization of economic cooperation and development (OECD) for era from 1970-2000 and finds that with the rise in expenditure on education income inequality will fall.

Sylwester (2003) conducted an empirical analysis to probe the rapport between enrollment of students in advanced level education and income-inequality. The study found that as the number of graduate students increased, income inequality was reduced. The results showed an inverse liaison between higher education enrollment and inequality in income.

Jose-De-Gregorio (2003) analyzed time series data for 25 countries from 1960-1990 and demonstrated that educational attainment takes a major leading role in making the distribution of income more equivalent. JO, A and AB, A. (2005) analyzed the linkage between government expenditure on education and enrollment of students at higher education with unemployment and GDP growth and concluded that the availability of funds for education is unpredictable and enrollment of students and employment rate has a sharp contrast in Nigeria.

Jamal (2006) studied the bonds of income inequality, economic growth and poverty level of people in Pakistan. Study utilized data of different macro-economic variables for the period of 1979 to 2002 and found that GDP and income inequality have negative relationship. Similarly, it was also explored that Government expenditure on social sectors like education, health and social security play important role in reducing income inequality.

Rehme, G. (2007) examined the waves of education on growth and income inequality. It was concluded that with an upturn in education does not tip to a reduction in income disproportion, when the Lorenz curve is used to measure inequality. However, when Gini coefficient is used as a degree of inequality, results indicate that income inequality and growth increase in the initial stages with an increase in education, followed by a decrease. Additionally, this effort establish a no-consistent pattern between development and income inequality.

Babones, Felmet & Hwang (2007) conducted research on the lag correlation between education and income inequality. They used cross-sectional data from 1960-2000 for 87 countries and found that lagging the data of education did not show any effect on income disparity. Despite strong theoretical arguments for lagging education data, their study found no such impact.

Duman (2008) studied the effect of Public education spending on income inequality and concluded that the limited spending of public with a growing private spending will not decrease the income inequality in different social groups.

Shahbaz and Islam (2011) examined the linkage of financial growth in Pakistan in income inequality by using annual data from 1971 to 2005 while implementing ARDL model. Finding indicates that income inequality can be reduced through financial development and is aggravated with financial instability. Furthermore, it was also concluded that economic growth and trade openness deteriorates the income distribution.

According to a meta-regression analysis by Abdullah, Doucouliagos & Manning (2011) that reviewed 64 empirical studies on education spending, education impacts the tails of the income distribution by reducing the income share of upper breadwinners and increasing the income of low earners, but it has no effect on the mid class.

Erdem and Tugcu (2012) investigated the co-integration amongst higher education graduates and jobless people in Turkey. Results indicate that number of graduates in Turkey is a significant factor of high rate of unemployment. The study also recommends that Turkish Government should not invest in education more than the economy can accommodate, as the high population of graduates will create more unemployment.

Iqbal and Khaleek (2013) conducted a study to find out the causes of unemployment among graduates in Pakistan by using qualitative and quantitative techniques of research and found that nepotism, required experience; corruption and lack of required capabilities of graduates are the main causes of graduate's unemployment.

Dabla-Norris, et al., (2015) examined the causes and consequences of income inequality across the countries and found that income inequality is high in developed countries; however; it has a mixed trend in emerging market and developing economies. Although some countries have declining trend in income inequality, however, it is pervasive in access to education and health facilities. The study suggests that as income inequality has different nature in different countries, therefore, policy makers should adopt policies as per their ground requirements.

Khan, Rehman & Rehman (2015) analyzed several factors that determine the effect of education, poverty and physical capital in the country on economic progression. For this, using the interpretative phenomenological approach and found that with the high level of education, a country will receive low-level income inequality.

Kayet and Mondal (2015) investigated the consequence of Nation's Expenditure on income distribution while using the data of fifteen Indian states from 1983 to 2012 and determined that civic expenses on learning reduces income inequality and endorsed that allotting extra resources to education will help to moderate income inequality in India.

Goldrick-Rab, Kelchen, Harris & Benson (2016) Goldrick-Rab, Kelchen, Harris & Benson (2016) conducted research to scan effects of financial grants provided to higher education institution on the income inequality. He clinches that need-based grants provided to financially disadvantaged students increased their likelihood of attaining a degree, thereby reducing income inequality.

Deyshappriya, N. P. (2017) conducted a study to analyze the relationship between macroeconomic variables and income inequality in Asian countries. The research revealed an inverted U-shaped relationship between GDP growth and income inequality, with inflation rate, terms of trade (TOT), political risk, and unemployment rate positively impacting income inequality. The study also acknowledged that official developmental assistance, level of education, and labor force involvement had a negative impact on income inequality.

Qazi, Raza, Jawaid & Karim (2018) investigated how improvement in higher education sector of a country can affect income distribution. For this purpose, time series data from 1973-2012 was analyzed. The study endorsed the presence of a long run link of college education and income variation and recommended that the expansion of higher education sector would be an imperative choice to control income inequality for policy makers.

Abrigo, Lee & Park (2018) conducted an empirical study using data from the National Transfer Accounts to investigate sound effects of education spending on pecuniary growth, income inequality and budgetary equilibriums of certain Asian countries. The results revealed that investing in human capital has an overall positive impact on economic growth, equality, and fiscal variables in Asia.

On the other hand, Coady and Dizioli (2018) examined the relationship between years of schooling and income inequality and found a significant positive association in emerging economies and older allies. However, they also found a positive relationship between income inequality and years of schooling for young cohorts. The study suggests that education expansion will continue to play a role in reducing income inequality. Nonetheless, this role will decrease as countries develop.

Bashir and Amir (2019) conducted a study on the fitting of education spending and per capita income in Pakistan using ARDL long-run approach. The study found both short-run and long-run connections between government expenditure on education and per capita income.

On the other hand, Young (2019) investigated the effect of economic growth on poverty reduction in Nigeria using the co-integration bound test approach. The study revealed that policies aimed at promoting income equality are more effective in reducing poverty than policies solely focused on increasing GDP.

Abdullah and Yien (2019) studied the role of government spending and oil export receipts on the Human Development Index of Saudi Arabia while using data from 1996 to 2016 and confirm that government spending and oil exports have a significant impact on HDI of Saudi Arabia. The study further endorses that spending on education has major input in the Development of Human Development Index.

Vo, Nguyen & Tran (2019) conducted a study on the relationship between income inequality and economic growth in low-income countries using Granger causality test and General Movement Approach. The results indicate a negative causal relationship between income inequality and growth.

Trabelsi (2019) used the Structural Threshold Regression (STR) method to examine the impact of government spending on education on income inequality in countries that meet a certain threshold for government institutional performance. The study shows that education spending improves income distribution in countries that are above the average institutional performance level.

Nwosa (2019) investigated the relationship between economic progression and income inequality in the country of Nigeria, using a lag model. The study found a direct

but insignificant relationship between economic growth and income inequality and recommends a pro-poor budget preparation by the government.

Acerenza and Gandelman (2019) analyzed household spending on education in 12 Latin American countries and the USA and found that urban and educated households spend more on education.

Onuoha and Moses (2019) examined the impact of public education expenditure on unemployment levels in India and also analyzed impact of defense expenditure on unemployment. The work bring into being that education expenditure reduces unemployment while defense expenditure increases unemployment.

Theoretical Structure

Keynesian economists favor government role in economy, as they argue that full employment will be attained with episodic increase in government expenditure. Similarly, Barro (1990) conducted a study and found that government spending directly affects private production. The Solow-growth model postulates that with the advancement of technology labor’s productivity will enhance.

$$Y_t = F(K_t, A_t L_t) \dots \dots \dots 1.1$$

In Solow model labor and education entered in multiplicative usage thus, AL is an effective labor. A constant rate of increase in “A” will enhance the productivity of labor. Consequently, the marginal production of labor will increase. Furthermore, the classical economists believed that in perfect market situation nominal wages are equal to the value of marginal production of labor

$$VMPL = W$$

Therefore, investment on human will increase their productivity and their earnings will grow. The Cobb-Douglas model of production also consists of technology, which has positive impact on the productivity of labor and capital.

$$Y = A(K^\alpha L^{1-\alpha})$$

The Solow growth model allows for a persistent increase in economy due to technological progress but is silent towards the source of technical progress occurrence. The following model of endogenous growth explains the technological progress

$$Y = AK$$

Where Y, the dependent variable, K is capital and A representing the production capability of capital which remains the constant in the given time.

The assumption of constant rather than diminishing returns to capital is more satisfying if one can define capital more broadly. The finest case is to exhibit knowledge/technology is a capital and it is less usual to assume that education exhibit decreasing returns. Furthermore, the increasing pace of scientific and technological invention led some economist to claim that there is increasing returns to knowledge.

Dalton (1965) submitted that management should intensify its expenditure in order to balance the disadvantage of taxes so there will be a cycle in which money will be collected from the people and will be re-distributed on them in the form of state spending. Thus, the role of government spending is to provide maximum welfare to the society.

Similarly, when industrialization took place, public sector activity also increases, as government will provide education, public health, old age pension, insurance and other social welfare packages to society.

The present study is also an effort to enrich existing research work in Pakistan in order to better appraise the subject issue.

RESEARCH METHODOLOGY

The focus of this study is income inequality, which is measured using the Gini coefficient. The Gini coefficient is a statistical measure that was first developed by the Italian statistician Corrado Gini in 1912. It is used to describe the distribution of income in a population, with values ranging from zero to one. A Gini coefficient of zero (0) represents perfect equality, while a coefficient of one (1) represents perfect inequality. The Lorenz curve is a graphical representation of the Gini coefficient. To create a Lorenz curve, the population percentile is plotted on the horizontal axis, and the cumulative share of income is plotted on the vertical axis. Mathematically, the Gini index calculated with the following formula

$$G = (n + 1) - 2 \left(\frac{\sum_{i=1}^n (n + 1 - Y)}{\sum_{i=1}^n y} \right)$$

Wherein Y represents the average income of people from the population or sample and “n” is size of population. Furthermore, there are other indices (percentile ratio, Theil index, Lorenz curve), which are used for the measurement of income unfairness. However, the Gini index is the most regularly used method to calculate income inequality. For this particular study, data of dependent variable is taken from multiple sources i.e. WIID, WID, (Anwar, 2005), (Unnisa, Rahman, & Ali, 2016). Besides, for missing values the technique of interpolation was used.

Government’s expenditure on education, unemployment rate, growth of gross domestic product and rate of student’s enrollment in higher education are taken as explanatory variables. Data for education expenditure has taken from WID 2018, Pakistan Bureau of Statistics. Similarly, data for the other variables collected from WID 2018.

In the present study, the Gini coefficient is taken as dependent variable and government expenditure on education, enrollment of students in higher education, unemployment rate and GDP growth are taken as independent variable. The literature, (Nwosa, 2019, Trabelsi, 2019, Sylwester, 2002, Sylwester, 2003) favor the dependence/independence of these variables. Similarly, taking Gini coefficient as a dependent variable and GDP growth as the independent variable is in agreement with the work of (Sylwester, 2002) ,(Jamal, 2006). Furthermore, (Park, 1996), (Mocan, 1999),

(Martínez, Ayala & Ruiz-Huerta, 2001) take unemployment and enrollment ratio as independent variables in their studies.

After the in-depth analysis of theories about the variables and empirical work, following regression model is designed to reconnoiter the impact of Communal education’s expenditure on income inequality. Similarly, data analysis conducted through Eviews-2009 package.

$$GC_{it} = \beta_0 + \beta_1GEE_{it} + \beta_2SE_{it} + \beta_3GDP_{it} + \beta_4UE_{it} + \epsilon \dots\dots\dots 3.1$$

DISCUSSIONS AND ANALYSIS

Prior to start, empirical analysis of data, a comprehensive statistical investigation has conducted. Our data set contains data of forty-four years i.e. from 1975 to 2018. The imaginative statistics showed in table 4.1, indicates, the arithmetic mean of GDP growth is 4.93% and standard deviation (S.D) is 2.02. Similarly, for Gini coefficient the same average and standard deviation is 0.35 and 0.036 respectively. Furthermore, descriptive statistics as shown in Table 4.1 indicates that average value of government expenses on education is 2.39% with the standard deviation of 0.31%. Similarly, enrollment growth rate and unemployment rate has shown the mean value of 4.48% and 3.79% respectively while their standard deviation are recorded as 2.722% and 2.06%. The value of skewness and kurtosis confirms that variable are skewed towards right and plato-kurtic.

The Jarque–Bera test illuminates that the residual of enrollment are not normally distributed while all other variables are normally distributed.

Summary Statistics of Variables

	GC	GEE	GDP	EN	UEM
Mean	0.352044	2.397017	4.932466	4.483560	3.795373
Median	0.350500	2.417715	4.846451	3.142655	3.970000
Maximum	0.427000	3.022300	10.21570	10.37038	7.830000
Minimum	0.287000	1.837820	1.014396	2.074400	0.397700
Std. Dev.	0.036402	0.310115	2.024485	2.722891	2.066639
Skewness	0.019997	0.019983	0.225366	1.072061	0.125932
Kurtosis	1.862974	2.039521	2.794470	2.626890	2.297618
Jarque-Bera	2.373118	1.694214	0.449905	8.683528	1.020757
Probability	0.305270	0.428653	0.798554	0.013014	0.600268
Observations	44	44	44	44	44

Source: Author’s Estimation

A Test of Stationarity:

In order to apply regression analysis, it is compulsory to examine whether data has unit root or not. To enquire stationarity in variables, Fischer Augmented Ducky Fuller (ADF) test is used. The Null Hypothesis for Stationarity is “Data is not stationary” or

“variable has unit root”. Table 4.2 shows outcomes of ADF test at level and at difference. The results display that the Gini coefficient, government expenditure on education, growth of gross domestic production are stationary on level and at first difference as the “P” value is less than 0.05. Similarly, enrollment of students in higher education and unemployment rate are not stationary at level; however, at first difference I (1) both are stationary.

ADF Test result

Variables/ Unit root Test	Fischer ADF test at level, I(0)	Fischer ADF test at 1st Difference I(1)
GC	0.00010	0.000
GEE	0.0366	0.000
GDP	0.0031	0.000
EN	0.7900	0.0003
UEM	0.3536	0.000

Source: Author’s Estimation

Bound Test:

The Bound Test is a statistical method used to detect co-integration between variables. It measures whether there is a long-run relationship between variables by comparing the F-calculated value with the upper and lower bounds. If the F-value exceeds the upper bound, it indicates the presence of a long-term relationship. If the F-value falls below the subordinate bound, it suggests, a no long-term link. If the F-value cascades sandwiched between the upper and lower bounds, the results are inconclusive. In this study, the F-Bound Test value of 5.06, as shown in Table 4.5, is more than the upper bound value at a 5% significance level. Therefore, it confirms the existence of a long-term relationship between the variables.

Bound Test Results

F- Bound Test Calculated Value	Level of Significance	Lower Bound	Upper Bound
5.06	5%	2.85	3.9

Source: Author’s Estimation

ARDL Long Run Analysis:-

After estimating the bound test regarding the presence of long run co-integration as showed in Table 4.5. ARDL long run and short run relationship between the variables is calculated. Table 4.6 displays the fallouts of long run ARDL assessments. Public expenditure on education has significant and inverse impact on income dissimilarities. If administration increases its spending on education by 1% the value of Gini coefficient will decrease 0.018375 i.e 1.87%. The result is in line (Abrigo, 2018), (Goldrick-Rab, 2016), (Jamal, H. (2006), (Kayet, 2015). Similarly, enrollment of students in higher education and GDP growth has also opposite and significant impact on income disparity at the long run. These results are similarly to (Bashir, 2019), (Sylwester, K. (2003), (Jose-De-Gregorio,

2003), (Vo-H, 2019). The results also confirm that unemployment has direct and noteworthy effect on income differences in Pakistan. A 1% increase in unemployment rate, income inequality will increase 1.4%, the result is matching with (Mocan, 1999), (Martínez, 2001).

ARDL Long Run Analysis

Variable	Coefficient	Std. Err	t-statistics	Prob.
GDP	-0.01318482	0.004447	-2.964880	0.004935
EN	-0.022533	0.004435	-5.081148	0.0001
UE	0.014098	0.002978	4.734633	0.0001
GEE	-0.018375	0.006085	--3.019721	0.004253

Source: Author's Estimation

Short Run Analysis using ARDL:-

In Table 4.7, the short run analysis and error correction model results are presented. The negative and significant value of ECM (error correction model) indicates the speed at which unstable variables adjust to their equilibrium level. Specifically, the negative value of ECM (-0.0730258) suggests that the speed of correction from the previous year's income inequality disequilibrium to the following year is about 7.3%. Furthermore, the adjusted R² value of 72.98% signposts that the independent variables account for 73% of the deviation in the dependent variable.

ARDL short run analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.648155	0.089890	7.210511	0.0000
@TREND	-0.010803	0.001583	-6.823202	0.0000
D(GC(-1))	0.324890	0.153549	2.115869	0.0471
D(GDP)	-0.010404	0.002236	-4.654053	0.0002
D(GDP(-1))	0.001151	0.002446	0.470648	0.6430
D(GDP(-2))	-0.006869	0.002519	-2.726747	0.0130
D(GDP(-3))	-0.006905	0.002124	-3.251478	0.0040
D(EN)	-0.027411	0.008135	-3.369488	0.0016
D(EN(-1))	-0.028093	0.007274	-3.861907	0.0010
D(EN(-2))	-0.025900	0.006838	-3.787353	0.0012
D(EN((-3))	-0.049597	0.009925	-4.997086	0.0001
D(UEM)	0.010774	0.003606	2.987922	0.0073
D(UEM(-1))	-0.025323	0.004137	-6.120614	0.0000
D(UEM(-2))	-0.015393	0.003904	-3.942338	0.0008
D(GEE)	-0.04366161	0.016568	-2.640078	0.1166
ECM(-1)*	-0.0730258	0.0235814	-7.337372	.00344
R-squared	0.833770	Mean dependent var	-0.000325	

Adjusted R-squared	0.729876	S.D. dependent var	0.042647
S.E. of regression	0.022165	Akaike info criterion	-4.491421
Sum squared resid	0.011791	Schwarz criterion	-3.815870
Log likelihood	105.8284	Hannan-Quinn criter.	-4.247163
F-statistic	8.025209	Durbin-Watson stat	2.352227

Prob(F-statistic) **0.000005**

Source: Author's Estimation

Granger Causality Test:-

Granger causality test has used to inspect direction of relationship between the variables. Table 4.5 shows the results of pairwise granger causality tests between the variables i.e GC, GEE, GDP, EN, UEM. The result indicates that there is unidirectional relationship between GC and EN, GDP, GEE, UEM and direction of causality runs from EN, GEE, GDP and UEM to GC in Pakistan. Furthermore, the relationship between GDP, GEE, EN, UEM are bi-directional. The table also shows a uni-directional relationship between EN and UEM.

Results of Granger Casulity Test

Null Hypotheses (Ho):	observ	F-Stat	Prob:
UEM does not Granger Cause GC	40	1.81605	.033052
GC does not Granger Cause UEM		1.03036	0.4072
GEE does not Granger Cause GC	40	2.20641	.007676
GC does not Granger Cause GEE		0.63570	0.6409
GDP does not Granger Cause GC	40	1.85469	0.0286
GCdoes not Granger Cause GDP		0.45083	0.7710
EN does not Granger Cause GC	40	1.78094	0.0379
GC does not Granger Cause EN		2.86565	0.0695
GEE does not Granger Cause UEM	40	2.16546	0.0089

UEM does not Granger Cause GEE		1.78551	0.0370
GDP does not Granger Cause UEM	40	2.50912	0.0025
UEM does not Granger Cause GDP		1.83087	0.0312
EN does not Granger Cause UEM	40	4.21114	0.0077
UEM does not Granger Cause EN		2.84993	0.0403
GDP does not Granger Cause GEE	40	1.82240	0.0209
GEE does not Granger Cause GDP		2.40706	0.0306
EN does not Granger Cause GEE	40	0.28117	0.0479
GEE does not Granger Cause EN		0.44408	0.0058
EN does not Granger Cause GDP	40	0.91218	0.0191
GDP does not Granger Cause EN		0.25671	0.0363

Source: Author's Estimation

Serial Correlation:-

The ARDL approach requires checking for serial correlation in the estimation process. In Table 4.9 Breusch-Godfrey Serial Correlation results LM Test to test for serial correlation. For this H0 assume the absence serial correlation in the residual terms. The outcomes express that probability of chi-square is larger from 0.05, indicating that we admit the null hypothesis that there is no serial correlation present.

Breusch-Godfrey test

F-statistic	1.041162	Prob. F(4,35)	0.4000
Obs*R-squared	4.678826	Prob. Chi-Square(4)	0.3219

Source: Author's Estimation Using Eviews 2009

Stability of the model

To assess the stability of the model, the researchers conducted a Cumulative Sum of Square (CUSUM) test and a CUSUM Square test. The former detects systematic variation in the regression coefficients, while the latter identifies changes in the constancy of the regression coefficients. The results of the CUSUM and CUSUM Square tests are presented in Figures 4.1 and 4.2. The findings indicate that the statistics of both tests fall

within the interval bands at a 5% confidence level, suggesting that there is no structural instability in the equation of Gini coefficient.

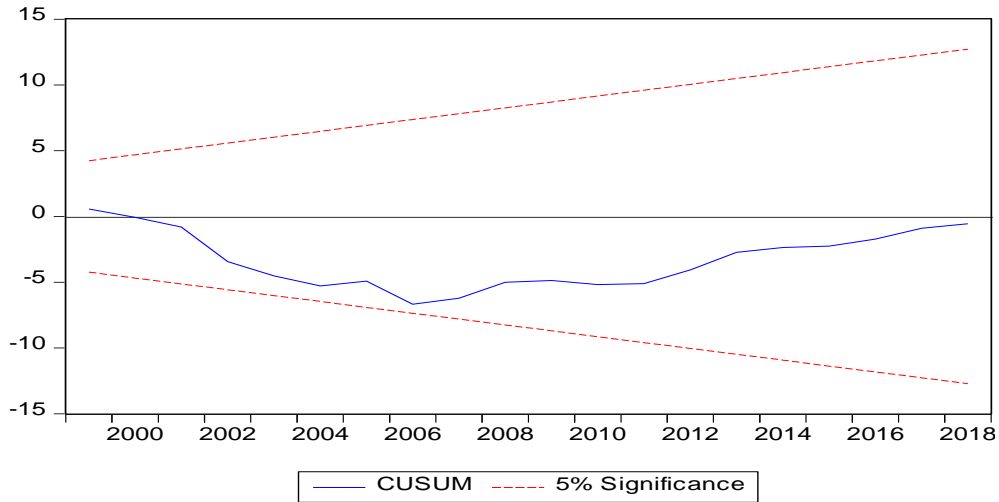


Figure 4.1: CUSUM test

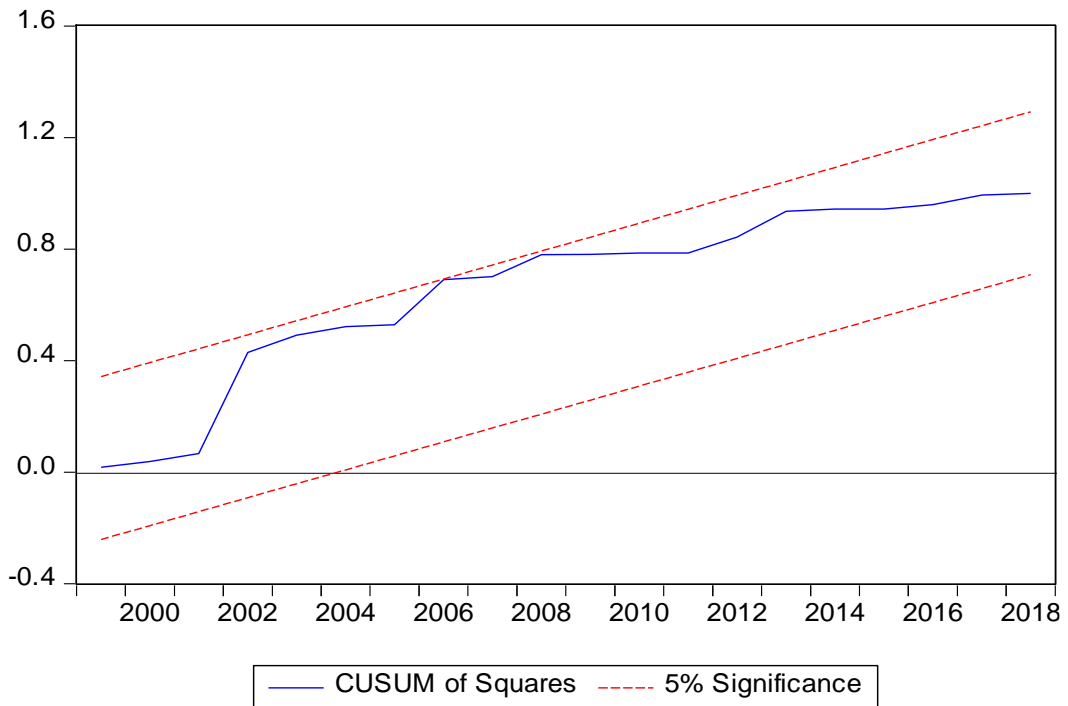


Figure 4.2: CUSUM Squares test

CONCLUSION

The purpose of this study was to determine a kind of communal return from the expenditure on education in Pakistan. Therefore, it was hypothesized that an increase in spending on education would negatively affect the income inequality “Education can increase productive skills of the labor, which will improve their productivity” (Benos & Zotou, 2014). It was also assumed that GDP growth, student’s enrollment will register negative impact on income inequality while unemployment rate will record positive relationship with income disparity. The empirical results, of the study support these hypotheses and confirm that education expenditure have undesirable and significant control on income inequality in both short and long run. The results reveal that a 01 % increase on spending on education will reduce income disparity by 1.8%. These results are similar to the findings of Abrigo (2018), Goldrick-Rab, (2016), Jamal (2006) and Kayet, (2015).

Moreover, the results of the empirical analysis indicate that higher enrollment rates in higher education and GDP growth also devour a negative influence on income inequality. The study suggests that a 1% increase in both GDP and enrollment rate would lead to a 1.3% and 2.2% decrease in income inequality, respectively. These findings are supported by the research of Bashir (2019), Sylwester (2003), Jose-De-Gregorio (2003) and Vo-H (2019). Similarly, the study found that a one (1%) increase in unemployment would increase income inequality by 1.4%. This direct relationship between unemployment and income inequality is also consistent with the conclusions of Mocan (1999) and Martínez (2001). Despite the fact that Pakistan's education system faces challenges compared to developed countries, the study shows that public expenditure on education in Pakistan has a significant negative impact on income inequality.

However, income inequality in Pakistan is multi –featured. Pakistan still bears landlordism wherein, a property owner not only controls agriculture and industry of the country but the executive positions comes under his control (Khan, 2015). Similarly, variables like corruption index, inheritance laws, effectiveness of Govt. institutions, and type of government also affect performance of education towards socials reforms. Therefore, it is, recommended that studies may be conducted that how reforms in land and in inheritance law will reduce income inequality.

Furthermore, it is, also recommended that the impact of education expenditure on health care, crime rate, women empowerment and other socio-economic variables may be examined.

REFERENCES

- Abdullah, A.J., Doucouliagos, H., & Manning, E. (2011). Education and income inequality: A Meta regression analysis. Unpublished manuscript, Dakin University.
- Abdullah, H., Yien, L. C., & Khan, M. A. (2019). The Impact of Fiscal Policy on Economic Growth in Asean-5 Countries. *Int. J Sup. Chain.Mgt Vol, 8(1)*, 754.

- Abdulsalam, M.I.H., & Khan, M. R. (2019). Saudi Arabia: Role of oil production and government expenditure in improving Human Development Index.
- Abrigo, M. R., Lee, S. H., & Park, D. (2018). Human capital spending, inequality, and growth in middle- income Asia. *Emerging Markets Finance and Trade*, 54(6), 1285-1303.
- Acerenza, S., & Gandelman, N. (2019). Household education spending in Latin America and the Caribbean: Evidence from income and expenditure surveys. *Education Finance and Policy*, 14(1), 61-87.
- Ahmad, Z., & Batul, T. (2013). Relationship among Poverty, Education Expenditure, and Education Status: Empirical Evidence from Pakistan. In Proceedings of the World Congress on Engineering, 1, 3-5.
- Akram, M., & Khan, F. J. (2007). Public provision of education and government spending in Pakistan (No. 2007: 40). *Pakistan Institute of Development Economics*.
- Ali, Syed. (2019, June 11). Share of indirect taxes increases to 60.9 percent. The PakRevenue.com
- Anwar, T. (2005). Long-term Changes in Income Distribution in Pakistan: Evidence Based on Consistent Series of Estimates. CRPRID. Islamabad. (Discussion Paper No. 3).
- Aziz, N. (2019). UNDP report on human development 2018: trends and indexes in the world and Russia. Russia and the moslem world, (1 (303)).
- .Barro, R. J. (1990). Government spending in a simple model of endogenous growth. *Journal of political economy*, 98(5, Part 2), S103-S125 Data set for a panel of 138 countries
- Bashir, A., & Amir, A. (2019). Relationship between government expenditure on education and GDP per capita in Pakistan: an ARDL approach to co-integration, *Advances and Applications in Statistics*, 1 (55), 77-103
- .Benos, N., & Zotou, S. (2014). Education and economic growth: A meta-regression analysis. *World Development*, 64, 669-689
- Bergh, A., & Fink, G. (2008). Higher education policy, enrollment, and income inequality. *Social Science Quarterly*, 89(1), 217-235
- Brown, R. L., J. Durbin, and J. M. Ewans. 1975. "Techniques for Testing the Constance of Regression Relations Overtime." *Journal of Royal Statistical Society*, 37: 149–72

- Coady, D., & Dizioli, A. (2018). Income inequality and education revisited: persistence, endogeneity and heterogeneity. *Applied Economics*, 50(25), 2747-2761.
- Dabla-Norris, M. E., Kochhar, M. K., Suphaphiphat, M. N., Ricka, M. F., & Tsounta, E. (2015). Causes and consequences of income inequality: A global perspective. International Monetary Fund.
- Dalton, G. (1965). History, Politics and economic development in Liberia. *The Journal of Economic History*, 25(4), 569-591
- Deyshappriya, N. P. (2017). Impact of macroeconomic factors on income inequality and income distribution in Asian countries.
- Erdem, E., & Tugcu, C. T. (2012). Higher Education and Unemployment: a cointegration and causality analysis of the case of Turkey. *European Journal of Education*, 47(2), 299-309.
- Glaeser, E. L., Ponzetto, G. A., & Shleifer, A. (2007). Why does democracy need education? *Journal of economic growth*, 12(2), 77-99
- Goldrick-Rab, S., Kelchen, R., Harris, D. N., & Benson, J. (2016). Reducing income inequality in educational attainment: Experimental evidence on the impact of financial aid on college completion. *American Journal of Sociology*, 121(6), 1762-1817.
- Granger CWJ. Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*. 1969; 37 (3):424-438
- Iqbal, M., & Khaleek, S. (2013). Causes of unemployment among the educated youth in Pakistan. *The International Journal of Social Sciences*, 11(1), 170-176.
- .Gregorio, J.D., & Lee, J.W. (2002). Education and income inequality: new evidence from cross-country data. *Review of Income and Wealth*, 48(3), 395-416
- Jamal, H. (2006). Does inequality matter for poverty reduction? Evidence from Pakistan's poverty trends. *The Pakistan development review*, 439-459
- JO, A., & AB, A. (2005). Education allocation, unemployment and economy growth in Nigeria: 1970– 2004.
- Kakar, Z. K., Khilji, B. A., & Khan, M. J. (2011). Relationship between education and economic growth in Pakistan: A time series analysis. *Journal of International Academic Research*, 11(1), 27-32
- Kayet, A., & Mondal, D. (2015). Effects of public school education expenditure on income inequality: Evidence from 15 major States of rural India. *Scholars*

Journal of Economics Business and Management (SJEBM) ISSN, (23485302).

- .Khan, A. H. & Mahmoud. N (1997). Education in Pakistan: Fifty years of Neglect [with Comments]. *The Pakistan development Review*, 647-667
- Khan, M. Z., Rehman, S., & Rehman, C. A. (2015). Education and income inequality in Pakistan's Management & Administrative Science Review, 4(1), 134-45
- Knight, J.B., & Sabot, R.H. (1983). Educational Expansion and Kuznets effect. *The American Economic Review*. 73 (5), 1132-1136
- Kuznets, S. (1955). Economic growth and income inequality. *The American economic review*, 45(1), 1-28.
- McMahon, W.W. (1998). Education and growth in East Asia. *Economics of Education Review*, 17(2), 159- 172
- Martínez, R., Ayala, L., & Ruiz-Huerta, J. (2001). The impact of unemployment on inequality and poverty in OECD countries. *Economics of Transition*, 9(2), 417-447
- Mocan, H. N. (1999). Structural unemployment, cyclical unemployment, and income inequality. *Review of Economics and Statistics*, 81(1), 122-134
- Mincer, J. (1970). "The Distribution of Labor Incomes: A Survey with special reference to the human capital approach. *Journal of economic literature*, 8(1), 1-26
- Ministry of Finance. (2018). Overview of the Economy. [Online] Available at: http://www.finance.gov.pk/survey/chapters_18/Overview_of_the_Economy.pdf [Accessed 11 Jan. 2019]
- Ministry of Finance. (2019). Overview of the Economy. [Online] Available at: [http://www.finance.gov.pk/survey/chapters_16/ Overview_of_the_Economy](http://www.finance.gov.pk/survey/chapters_16/Overview_of_the_Economy).
- Nelson, R. R. & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. *The American Economic Review, Papers and Proceedings*, 56(1/2), 69-75.
- Nielsen, F. (1994). Income inequality and industrial development: Dualism revisited. *American Sociological Review*, 654-677
- Nwosa, P. I. (2019). Income Inequality and Economic Growth in Nigeria: Implication for Economic Development. *Acta Universitatis Danubius, Economica*, 15(1)

- Onuoha, F. C., & Moses Oyeyemi, A. (2019). Impact of Disaggregated Public Expenditure on Unemployment Rate of Selected African Countries: A Panel Dynamic Analysis. *Journal of Economics, Management and Trade*, 1-14.
- Qazi, W., Raza, S. A., Jawaid, S. T., & Karim, M. Z. A. (2018). Does expanding higher education reduce income inequality in emerging economy? Evidence from Pakistan. *Studies in Higher Education*, 43(2), 338-358.
- Ram, R. (1981). Inequalities in Income and Schooling: A Different Point Of View, *De Economist*, 129 (2): 253- 26.
- Rehme, G. (2007). Education, economic growth and measured income inequality. *Economica*, 74(295), 493-514.1.
- Ram, R. (1989). Can educational expansion reduce income inequality in less-developed countries? *Economics of Education Review*, 8(2), 185-195.
- Strand, P. J. (2010). Inheriting inequality: Wealth, race, and the laws of succession. *Or. L. Rev.*, 89, 453.
- Sylwester, K. (2002). Can education expenditures reduce income inequality? *Economics of education review*, 21(1), 43-52
- .Sylwester, K. (2003). Enrollment in Higher Education and changes in income inequality. *Bulletin of economic research* 55:3.2003, 0307-3378
- Sylwester, K. (2003). Income inequality and population density 1500 AD: a connection. *Journal of Economic Development*, 28(2), 61-82
- .Tamura, R. (1991). Income convergence in an endogenous growth model. *Journal of Political Economy*, 99(3), 522-540.
- Tilak, J.B. (2006). Higher education between the state and the Market. Knowledge, power and dissent: Critical perspective of higher education and research in knowledge society, 235-2
- Trabelsi, S. (2019). The governance threshold effect on the relationship between public education financing and income inequality. *Economics Bulletin*, 39(2), 1057-1075
- Ullah, A. (2013). Right to Free and Compulsory Education in Pakistan after 18th Constitutional Amendment. *South Asian Studies* (1026-678X), 28(2).
- Unnisa, W., Rahman, N., & Ali, S. (2016). Trade, Growth and Poverty: A Case Study of South Asian Region. *Journal of Managerial Sciences*, 10(2).

- Vo, D. H., Nguyen, T. C., & Tran, N. P. (2019). What factors affect income inequality and economic growth in middle-income countries? *Journal of Risk and Financial Management*, 12(1), 40
- Young, A. O. (2019). Does reduction in inequality of income distribution matter for poverty reduction? Evidence from Nigeria's poverty trends. *International Research Journal of Finance and Economics*, 172, 48-72