Literacy, Poverty and Trade Openness in Pakistan: An Empirical Investigation

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ARTICLE DETAILS

ABSTRACT

Purpose: Education plays a vital role in improving the standard of living of the masses by providing them with better job opportunities and future earnings. This study has attempted to investigate the impact of the literacy rate on poverty in Pakistan.

Methodology: This study is based on secondary data and has employed the Johansen Cointegration and VECM technique for empirical investigation. Headcount ratio is a dependent variable, employed as a proxy for poverty. In the present study, explanatory variables are literacy rate, trade openness, FDI and inflation rate.

Findings: The empirical findings from the study show that literacy rate and trade openness show a negative relationship with poverty in Pakistan. However, inflation shows a positive relationship with poverty.

Policy Implications: The study suggests that policymakers should initiate suitable measures to improve the education system in Pakistan. There is a dire need of increasing the enrolment rate at the primary level and special check on the drop-out ratio in public schools.

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Introduction

Poverty is a multi-dimensional phenomenon, it involves the absence of basic health services, a high scale of illiteracy, inadequate income and deficiency of fundamental rights of life safety (Khan et al., 2009). Eradication of poverty is the leading aim and target of every developing country. Halved the world’s population living in absolute poverty was the main target of Millennium Development Goals (MDGs). Elimination of hunger and provision of schooling is the top planned motivation in Millennium Development Goals (MDGs) [Mahmood et al., 2014].
Poverty in any country of the world reflects the hunger and malnourishment of people, as for Pakistan most people of the country are suffering the disease of poverty which is creating hunger and undernourishment situation (Pervez and Rizvi, 2014). Many factors affect poverty but literacy, corruption, inflation and employment levels are more important factors that affect it.

Education has a prominent role in economic growth and development. Education helps to increase the efficiency and productivity of every nation. Literacy and poverty have become prominent issues for discussion and research since the 1960s (Chaudhry et al., 2010). Literacy, trade openness and a high level of employment have a strong relationship with each other and play a vital role to remove poverty. Education also diminishes income inequalities and poverty and these have strong associations between them (Khan et al., 2015).

Literacy is the basic key for economic development and reduction of poverty. Literacy creates a highly moral and transparent society and provides the chance of a high level of job opportunities. Literacy is an enormous challenge in the world especially in the areas of south and west Asia, the Arab states and sub-Saharan Africa (Mapping the Global Literacy Challenge). Literacy is usually considered the base of society and generally plays a task as a base of humanity, which brings economic achievement, social affluence and political stability (Ahmad and Batual, 2013).

Trade openness is also an important economic variable that brings massive productivity and overall stability to society. Trade openness is the key factor that plays a vital role in the reduction of poverty (Pervez and Rizvi, 2014). Pakistan is a country that has a low level of literacy, low export earnings, massive unemployment and a high rate of inflation along with a soaring level of poverty. Inequality in the distribution of income and poverty has become new issues that economists seek to understand due to shocks, global crises and revolutions in Arab countries (Khemili and Belloumi, 2018). Literacy, trade openness and a low rate of inflation are the main sources of poverty reduction.

In the last two decades, many economists have tried to examine the relationship between the above-mentioned variables and poverty empirically. So, there is a strong link between these variables (Gelaw, 2009). Education is the most important factor which can diminish poverty. It is observed that if the rank of education is far above the ground, then the level of income inequality will be near to the ground and vice versa (Khan et al., 2015). The objective of the present study is to shed light on the impact of the literacy rate on poverty in Pakistan. In the first section, the introduction of the study has been presented. The review of the literature is present in the second section. Data and methodology are present in the third section. The fourth section presents the results and interpretation. The fifth section presents the conclusion of the study along with the policy implications.

**Literature Review**

Kausar (2007) examined the link of education with economic progress in Pakistan during 1980-2007. The objective of the study was to investigate the effects of some main macro variables on Pakistan’s economic progress. Different levels of school enrollment, basic health unit, exports and overall labor force participation, etc were investigated for empirical results. The study used a simple Ordinary Least Squares (OLS) technique to estimate the growth functions from 1980 to 2007. The result of the study has concluded that the growth of real GDP was completely connected to the initial school enrollment and labor force ratio. The study showed that basic school was an imperative requirement for speeding up growth and building a strong foundation stone for economic development in Pakistan. The study suggests that education has a strong effect on economic prosperity.
Naveed and Islam (2010) analyzed poverty and its determinants in Pakistan. Education, housing, health, assets and access to safe drinking water are major factors that have a strong influence on poverty. The findings of the study concluded that education was the main tool to eradicate poverty. The study used HIES data from 1998 to 2002. The technique of logistic regression model was used by the study for empirical investigation. The study came to the result that there was an opposite relationship between educational attainment and poverty. It also suggested non-conventional ways to increase literacy to eradicate poverty.

Niazi and Khan (2010) investigated the impact of education on multidimensional poverty in various areas of Punjab. The study included both rural and urban regions and employed advanced techniques for the classification of poor in several dimensions. For this purpose, the study used education, health and housing & services for finding out several dimensions of poverty rather than income. The study suggested that Government should frame economic reforms for the improvement of education and health facilities in rural and urban regions along with fair disbursement programs like Zakat. The study suggested that there was a dire need to improve educational facilities for the betterment of the poor and reduction of poverty in Punjab. Improvement in the literacy rate will improve the well-being of the poor class and will give more enjoyment and better livelihood opportunities.

Awan et al. (2011) investigated the contribution of learning in the reduction of poverty. The study has been based on the secondary data collected from the Household Integrated Economic Survey (HIES) and employed the logistic regression technique for the econometric analysis. The data was obtained from the Federal Bureau of Statistics (FBS) for the years 1999 and 2002. The impact of diverse levels of learning on poverty was figured out by the study. The study used different stages of education and experience of skill on poverty. The study concluded that all the learning stages and skills show a negative relationship with poverty. The findings of the study concluded that schooling success and practice were negatively connected with poverty, in both years. That study estimated that selected years individually verify this reality that as schooling achievements increases, the poverty has been diminished. Therefore, that study determined that learning and schooling were the reasons for poverty reduction.

Afzal et al. (2011) investigated the relationship between education, poverty and economic growth in Pakistan from the period of 1971 to 2010. That study used the latest econometrics techniques like ARDL approach for econometric analysis. The study has employed the secondary time series data to investigate various factors like education, real gross domestic product, poverty and physical capital. The result of the study concluded that there existed bi-directional causality between education and real gross domestic product (RGDP). The study suggested that there is a need for the provision of education facilities for the masses in Pakistan.

Chani et al. (2011) examined the role of economic growth and inflation on poverty in Pakistan. The author collected the secondary data during the year 1972-2008 using the ARDL technique for empirical investigation. The results of the study concluded that in the long and short-run inflation shows a negative relationship on poverty and economic growth has a negative effect on poverty. The study investigated the reasons for the high level of the inflation rate and concluded that liberalization policies accelerate the inflation rate in Pakistan. The study suggested that policymakers should not permit the prices to rise beyond certain limits otherwise it will adversely affect the welfare and development of a country.

Cheema and Sial (2012) investigated the relationship between income disparity, poverty and economic development in Pakistan. The authors have collected secondary pooled data from household income and expenditure surveys of different eight years. i.e., from1992-03 to 2007-08, employed fixed and random techniques. The findings of the study conclude that the growth
elasticity of inequality is higher in urban areas than in rural areas. The findings of the study revealed that growth significantly helps in reducing poverty, keeping inequality constant, then the latter does to increasing poverty, holding the former constant. The study recommended that for reduction of poverty Government should execute strategies especially growth direction and should take special steps towards bettering income distribution.

Ahmad and Batul (2013) explored and analyzed the relationship between poverty, education spending and education status in Pakistan. The authors collected time series secondary data during the year 1961 to 2011 and employed Johanson Cointegration Test, Vector Error Correction Model (VECM) and Wald Test for empirical estimation. The findings of the study concluded that there was a strong causal bi-directional relationship exists between education status and poverty with each other. Moreover, there is no long-run relationship exists between education expenditure and poverty rates. The study suggested increasing budgetary share for the funding of the education sector and poverty reduction. It also stressed that adequate policies should be implemented for the enhancement in the level of adult literacy.

Pervez and Rizvi (2014) examined the determinant of poverty in Pakistan. The authors collected secondary time series data of 31 years from 1980 to 2010 and employed the Johanson Cointegration technique to study the long-run relationship between the variables. The study has also applied an error correction mechanism for the empirical results. The results of the study revealed that agriculture output, trade openness, worker’s remittances, agricultural labor force and FDI show a negative relationship with poverty. The study also concludes that inflation shows a positive relationship with poverty. The study suggested that Government should make the policies of social programs relating to microfinance and skill development which can improve education level and reduce the poverty.

Mahmood et al. (2014) examined literacy, educational facilities and food safety in Punjab. It was a district-level analysis. The study observed the association between education, infrastructures, literacy rate and food security in the Punjab province of Pakistan. The authors collected cross-sectional secondary data from various sources for empirical investigation. That study suggested that provincial and district governments have to frame structural modification in the education systems by giving attention to school infrastructure to increase literacy rates to achieve the goals of food security.

Pervez (2014) analyzed the effect of education on poverty in Pakistan. The authors collected secondary time-series data during the year from 1972 to 2006. The study employed the ADF unit roots test and Johansen & Juselius co-integration methodology to ensure the existence of the relationship between education and poverty. The result of the study showed that literacy rate and enrollment (secondary) had the opposite effect on poverty in the long run. The results from the study have concluded that education played an essential role in the lessening of hunger and increasing economic prosperity. The study suggested that investment in schooling was the basis for prosperity. Literacy provides support in diminishing hunger and uplifting the socio-economic situation of developing countries like Pakistan.

Khan et al. (2015) analyzed the relationship between education, income inequality and poverty in Pakistan. The various dimensional aspects of the education and earning disparity in the country were used by the study. That study explained different types of inequalities like geographical inequality, human capital inequality, agricultural sector inequality, education inequality, gender inequality and feudalism inequality, etc.. The study was based on the different quality of society which explored the various aspects of learning and earning disparity at the national level. The
findings of the study concluded that a high level of education (literacy rate) will reduce the poverty and income inequality.

Babaci-Wilhite and Geo-Jaja (2016) analyzed the educational system to market liberalization in Africa. The study illustrated the shortcomings in the education system along with the lack of internal and external efficiency of scholars. The study examined the social realities of contemporary Africa and its challenges. The study concluded that education policy had created inequalities and appalling poverty in Africa due to improper reforms in the continent. The study suggested the need for an adequate education to follow the agenda of human rights, social protection, poverty reduction and social justice.

Khemili and Belloumi (2018) investigated the relationship between growth, inequality and poverty in Tunisia. The study examined the cointegration relationship between growth, inequality and poverty in Tunisia. The study selected the data of the period of 1970-2013. The authors collected time-series data and used the ARDL bound testing approach for cointegration and the Toda Yamamoto approach of the Granger causality test. The findings of the study revealed that in long run, there was a positive relationship between income disparity and poverty. In the short run, it was observed that there was also a positive link between income disparity and poverty.

**Data and Methodology**

The present study has attempted to investigate the impact of the literacy rate on poverty in Pakistan during the period 1988 to 2018. The secondary data has been collected from various sources including World Development Indicators (WDI). The dependent variable is poverty in the present study. The headcount ratio is used as a proxy of poverty in the model. The independent variables are literacy rate, trade openness, foreign direct investment, and inflation rate.

**Variables Justification of the Model**

**Literacy**

As the literacy rate increases, it provides the masses with better chances for job opportunities and future earnings. Literacy helps people to live a life with their freedom. The link between poverty and literacy can be examined at the national and household level. Owing to their illiteracy or lower level of literacy rate, people are forced to live in a low-income and without other necessities of life. Literacy and poverty have a negative relationship and a higher level of education leads to a reduction in poverty (Pervez and Rizvi, 2014). Education brings knowledge and skill that are supportive in getting the advanced level of salaries ultimately which will decrease the poverty. Higher levels of education are expected to have a strong link with a higher level of job opportunities. Firstly, education leads to the accumulation of skills and experience that make workers more efficient and productive. Secondly, educated workers are more quickly hired than uneducated and illiterate workers. Thirdly, an educated person has more ethical characteristics in his personality. So, these factors come due to literacy which gives more chances for earning and jobs, ultimately it will reduce the poverty in Pakistan.

**Trade Openness**

Trade openness increases the export and import activities of a country. It will increase the investment within the country. Trade will accelerate the economic activities inside the country. All these will create better earnings and job opportunities for the masses. Ultimately trade openness helps in reducing poverty in the country. Trade openness leads to an increase in domestic technology and productivity and it will increase the production of all sectors of the country. trade openness helps in improving growth rates and reducing poverty (Pervez and Rizvi, 2014).
Inflation Rate
Reduction in inflation is the main objective of every government. It directly affects the
purchasing power of the people, especially the low and middle-income class of the country. The
rise in the inflation rate deprives poor people of using the necessities of life. An increase in the
inflation rate will reduce the standard of life of the low-income class. Inflation decreases the
living standard of the people and it will increase poverty (Pervaz and Rizvi, 2014).

Foreign Direct Investment (FDI)
FDI increase the economic activities in the host country, but ultimately major profit will shift to
the mother country. This is the major cause of the outflow of capital from the host country. FDI
affects poverty. So, due to its importance, the study selects it as the independent variable.

Table 1: Description of the Variables Utilized in the Present Study

| Variables                  | Description of the Variables:                                                                 |
|----------------------------|------------------------------------------------------------------------------------------------|
| **Dependent Variable**     |                                                                                                 |
| Poverty (POV)              | The headcount ratio is the dependent variable in the present study. It is employed as a proxy for poverty. The data of headcount ratio is obtained from WDI. |
| **Independent Variables**  |                                                                                                 |
| Literacy Rate (LR)         | Literacy rate (%) of the total population from 1988 to 2018.                                     |
| Trade Openness (TOP)       | Data on the trade openness of Pakistan is obtained from World Development Indicators. It is in percentage to the GDP of Pakistan. It is the ratio of imports plus export, divided by GDP (Perviz and Rizvi, 2014). |
| Foreign Direct Investment (FDI) | Data of FDI as a percentage to GDP of Pakistan obtained from WDI.                        |
| Inflation Rate (INF)       | Data on the inflation rate of Pakistan is also obtained from WDI.                                |

The econometric model of the present study is as follows:

Operational Model:

\[
\text{Pov} = f(\text{LR, TOP, INF, FDI}) \\
\text{Poverty} = \beta_1 + \beta_2 (\text{LR}) + \beta_3 (\text{TOP}) + \beta_4 (\text{INF}) + \beta_5 (\text{FDI}) + \mu
\]

Result and Discussion

ADF Unit Root Test

Table 2: Results of ADF Unit Root Test

| Variable     | Test statistic | 1% Critical value | 5% Critical value | 10% Critical value | P-value | Decision |
|--------------|----------------|-------------------|-------------------|--------------------|---------|----------|
| Poverty      | -1.58          | -3.68             | -2.97             | -2.61              | 0.491   | I(d)     |
| Literacy Rate| -0.59          | -3.68             | -2.97             | -2.19              | 0.871   | I(d)     |
| Trade openness| -7.05          | -3.69             | -2.97             | -2.61              | 0.443   | I(d)     |
| FDI          | -1.93          | -3.68             | -2.97             | -2.61              | 0.316   | I(d)     |
| Inflation    | -2.49          | -3.68             | -2.97             | 2.61               | 0.117   | I(d)     |

Note: significance at 1%, 5% and 10% using the t-stat approach of ADF.

Table 3: Results of ADF Unit Root Test

| Variable     | Test statistic | 1% Critical value | 5% Critical value | 10% Critical value | P-value | Decision |
|--------------|----------------|-------------------|-------------------|--------------------|---------|----------|
| Poverty      | -5.35          | -3.73*            | -2.99             | -2.62              | 0.000   | I(d)     |
| Literacy Rate| -6.62          | -3.69*            | -2.97             | -2.62              | 0.000   | I(d)     |
| Trade openness| -6.96          | -3.69*            | -2.97             | -2.62              | 0.000   | I(d)     |
| FDI          | -3.86          | -3.69*            | -2.97             | -2.62              | 0.002   | I(d)     |
| Inflation    | -7.05          | -3.69*            | -2.97             | -2.62              | 0.000   | I(d)     |
Notes: significance at 1% using the t-stat approach of ADF

**Determination of Lags**
The study uses the lowest SBIC values as the primary concern. Table 4 shows the lag-order selection statistics.

| Lag | LogL | LR | df | p  | FPE | AIC   | HQIC | SBIC |
|-----|------|----|----|----|-----|-------|------|------|
| 0   | -378.07 | NA |     |     | 372.53 | 24.71 | 24.79 | 24.94 |
| 1   | -273.58 | 208.98 | 25  | 0.000 | 226.23* | 19.58 | 20.03* | 20.97* |
| 2   | -251.38 | 44.40 | 25  | 0.000 | 310.67 | 19.76 | 20.59 | 22.31 |
| 3   | -221.05 | 60.65 | 25  | 0.000 | 324.71 | 19.42 | 20.62 | 23.12 |
| 4   | -184.86 | 72.38* | 25  | 0.000 | 395.79 | 18.70* | 20.28 | 22.55 |

Table 4: Lag-order Selection Criterion

| Maximum rank | Eigenvalue | Trace statistic | Critical value (5%) |
|--------------|------------|----------------|--------------------|
| 0            | -0.73      | 82.28          | 68.52              |
| 1            | -0.45      | 34.44*         | 47.21              |
| 2            | -0.34      | 18.59          | 29.68              |
| 3            | -0.12      | 4.55           | 15.41              |
| 4            | -0.007     | 0.24           | 3.76               |

The cointegration rank can be tested with the maximum Eigenvalue and trace statistics. The results from Table 5 show the following hypothesis. The trace statistic either rejects the null hypothesis of no co-integration among the variables or does not reject the null hypothesis that there exists a co-integration relation between variables. Testing starts from H: r =0. So, it rejects the null hypothesis. H: r=1 so null hypothesis and test is not rejected. The study stops further testing and the value of r is commonly used to estimate the number of co-integrating relations between variables. In the study after testing, H: r =1 is not rejected at a 5% level (34.44)<47.21). It is further explained that in the study, the trace test does not reject the null hypothesis. It shows that all the above five variables in the model are not cointegrated. The number of cointegrated vectors finally is with two lags which is equal to one, (i.e.) rank number is one. When rank is equivalent to one which is more than zero and less than the number of variables, it shows that series in the study have to cointegrate among the variables. It is clear evidence that the study will proceed to estimate the VECM model.

Table 5: Results of Co-integration Test

| Variables       | Coef. | Std.Err. | z      | p>│ z│ | (95% conf. Interval) |
|-----------------|-------|----------|--------|-----|------|----------------------|
| Literacy        | -1.72 | 0.42     | -4.07  | 0.000 | -2.54 | -.89                 |
| Trad openness   | -6.64 | 1.23     | -5.37  | 0.000 | -9.07 | -4.22                |
| Foreign D I     | 2.03  | 3.27     | 0.62   | 0.53 | -4.37 | 8.45                 |
| Inflation       | 4.97  | 0.672    | 7.39   | 0.000 | 3.65  | 6.28                 |
| C               | 232.16|          |        |      |       |                      |

Table 6: Vector Error Correction Model for Long-Run

**Identification:** beta is exactly identified
Johansen normalization restriction imposed

(Effect of Literacy, Trade Openness, Foreign Direct Investment and Inflation on Poverty)

**Vector Error Correction for Long-Run Model**
The presence of cointegration among variables suggests a long-run relationship among the variables. Then the study applied the Vector Error Correction Model. The long-run relationship among the poverty, literacy, trade openness, foreign direct investment and inflation for one
Cointegrating vector for Pakistan for the period of 1988-2018 is shown below in the shape of standard errors parenthesis.

\[
\text{Poverty} = 232.16 - 1.72(\text{Literacy}) - 6.64(\text{Trade openness}) + 2.03(\text{FDI}) + 4.97(\text{Inflation})
\]

\begin{align*}
&\text{Poverty} & 0.001 & 0.03 & 0.973 \\
&\text{Literacy} & 0.09 & 0.36 & 0.722 \\
&\text{Trade openness} & 0.46 & 1.62 & 0.106 \\
&\text{FDI} & -0.13 & -2.17 & 0.30 \\
&\text{Inflation} & -0.12 & -3.2 & 0.001
\end{align*}

In the above equation, all the coefficients were significant except foreign direct investment at a 1% level of significance. The coefficient value of the literacy rate is -1.72 and it is showing a negative relationship between poverty and literacy rate, statistically significant. It show that one percent increase in literacy rate will reduce the poverty by 1.72 percent. These results are similar to the findings of these studies [Khan et al., (2009), Niazi and Khan (2010), Awan et al., (2011) and Erum et al., (2015)]. The value of trade openness is negative and it is -6.64, which states that a one percent increase in trade openness will reduce poverty by 6.64 percent, statistically significant. This result supported the findings of Pervaz and Rizvi (2014). The value of the foreign direct investment coefficient is 2.03. It means that one percent of foreign direct investment increases, then poverty will increase by 2.03 percent. Lastly, the value of the inflation coefficient is 4.97. It means one percent of inflation increases then poverty will increase 4.97 percent and vice versa. Signs of all variables are according to expectation, except foreign direct investment.

**Vector Error Correction for Short Run**

The results of model for short run are not according to expectation and \( P \) values are not satisfactory but the results of long run about coefficient values of variables of both models along with \( P \) value are satisfactory. So, the results of long run are more reliable than short run.

**Impulse Response Function (IRF)**

As an additional check of the cointegration, the present study uses the Impulse Response Function (IRF) for tests findings. It was firstly used by Order and Fisher (1993). It provides a meaningful interpretation of the model. The recursive structure assumes that variables appearing first contemporaneously influence the latter variables but not vice versa. It is important to order of most important exogenous variables earlier than the most endogenous-looking variables. Impulse Response Function (IRF) is shown in Figure 1. According to the figure, all independent variables have a stronger impact on the dependent variable (poverty) short run and long run and the model is stable.
Roots of the Companion Matrix
For the fitness of the model, the study applies a diagnostic test for the model. For this purpose, Roots of Companion Matrix is used. Based on Vector Error Correction Model estimations this diagnostic test is very suitable. The figure of this test shows the stability of the model and the fitness of the data. “If the visibility of the dot exists inside the circle” model is stable and fit (Enders 2008). In Figure 2, the dot is in the circle which confirms the stability of the model and fitness of the data. After this, it is specified about VECM and it is not miss specified and co-integrating vector is specified.
Conclusion and Policy Implication
This study has attempted to investigate the impact of the literacy rate on poverty in Pakistan. Time series secondary data was collected from various sources, during the year 1988 to 2018, using the Cointegration and VECM technique. The study concluded that literacy rate and trade openness are essential for poverty alleviation. An increase in the literacy rate will increase the quality of human capabilities of the economies like Pakistan. A high level of literacy rate is can only be achieved with improved enrollment rates and the completion of schooling. Expenditure on education is like an investment. This investment in education accelerates the process of economic growth. For this purpose, resources must be allocated efficiently for the promotion of the education facilities. This will help us in reducing poverty in Pakistan. Furthermore, it will improve the socio-economic status of the economy. The study suggests that for improvement of literacy rate, budget allocation for education should be increased. In the context of Pakistan, literacy can play a significant role in uplifting and improving the living standard of the people of Pakistan and it will decrease poverty. The study suggests that policymakers must take suitable measures to improve the education system in Pakistan. There is a dire need of increasing the enrolment rate at the primary level and special check on the drop-out ratio in public schools.

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