

## **IMPACT OF EXTERNAL DEBT ON POVERTY IN PAKISTAN**

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**ABSTRACT**-The key objective of this study is to evaluate the relationship between external debt and poverty in Pakistan. Time series data is taken from 1981 to 2015. The dataset is collected from the World Bank of World Development Indicators (WDI) data of Pakistan and various editions of the Economic survey of Pakistan. Poverty headcount ratio (HCR) is taken as dependent variable while percentage of debt services, percentage of total debt to GDP ratio and real wages are taken as independent variables. Johansen Co integration technique is applied because all the variables are stationary at first difference by the unit roots testing. The result shows that long run relationship exist between poverty head count ratio and all other explanatory variables. We suggest that government should reduce burden of foreign debts and spend this money on development projects of the country.

**Key words:** Poverty, external debt, real wages, debt-to-GDP ratio.

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## **1. INTRODUCTION**

In the beginning of twenty first century, developing countries face two major interrelated problems heavy external debt and the incidence of poverty. Both these factors have important implication for growth possibilities. The typical theoretical models quit on the possible transmission mechanism between poverty and high external debt. In the same way, empirical model on poverty reduction is not well explained. Usually all the empirical and theoretical literature covers the debt problems with respect to economic growth, but it does not always explicitly link to poverty and human development. Overall economic growth plays a vital role for poverty alleviation. Public debt and poverty are related issues closely linked with the problem of external debt.

Malik and Siddiqui (2002) determined the eight different indicators to suggest that debt ratio in Pakistan is significantly higher than an average of other South Asian and other Least developed countries (LDCs). For example, debt to export ratio in 1997 was 342.9% as compared to 174.5% of South Asia and 141% in LDCs. External Debt to GDP ratio in Pakistan was 58.3% as compared to 28.4% in South Asia and 40.5% shows in LDCs and the ratio of debt servicing to export in Pakistan was 28.3% as compared to South Asia and 4.3% Least Developed Countries. All the indicators point to the brutality of the problem which Pakistan is facing.

Anwar and Chaudhary (2002) used Laffer curve and explained that the Pakistan's external debt burden was not so much high rate as the indicators could write off. This study indicates that Pakistan has the potential to pay the debt. Due to these reasons, in Pakistan large number of population is sleeve behind the availability of basic needs. People are not self-sufficient in

nutrition, education and health facilities and their productivity decrease sharply.

### **1.1. Problem Statement**

Naeem and Sherbaz (2016), Alam and Shiekh (2013), Emerah, *et al.* (2013), Ngerebo (2014), and Hakimi and Zaghdoudi (2017) studied the relationship between external debt and poverty in the developing countries such as Zimbabwe, Nigeria, Bangladesh, and Pakistan etc. Through review of the previous literature, therefore it can be seen that there is few studies concerning about the relationship between external debt and poverty in Pakistan in the long run. This research will examine that external debt effects on poverty in Pakistan in the long run as well as in the short run.

### **1.2 Objectives of the Study**

The objectives of study are outlined in the followings: -

- To explore long run relationship between External debt and Poverty in Pakistan.
- To discuss short run dynamics of External debt and Poverty in Pakistan.
- To describe the role of government of debtor country to finance the external debt servicing requirements.
- To recommend some policy suggestions based on findings.

### **1.3 Significance of Study**

The present research is significant because its results will contribute to the knowledge about the two burning issues of Pakistan both external debt and poverty. Additionally, this study will provide the evidence for the ongoing debate regarding the direction and types of relationship between external debt and poverty in the long run and short run. This study will employ relationship

of external debt and poverty in the short run dynamics from the long run. This will help to understand the impact of external debt on poverty in the Pakistan.

## **2. LITERATURE REVIEW**

Alam and Sheikh (2013) discovered that outside debt servicing and external debt revamp poverty stage inside the Pakistan. The length of the external debt servicing and overall outside debt on the poverty proved tremendous and statistically significant. Total outside debt and debt services decrease the trades, which resulted to the reduction of the spending of the development projects. The spending discount in development projects caused to increase poverty.

Amassoma (2011) studied the causal association between domestic debt, external debt and economic performance in Nigeria by using time series data of 1970 to 2009. Vector autoregressive and Vector error correction model employed to find the association among the variables. The study concluded that external debt significantly affected the economic performance in Nigeria.

Afzal et al. (2008) investigated mathematically evaluation of the relationship among Export, monetary growth and external debt services of Pakistan. Vector Autoregressive (VAR) and Vector Error Correction (VECM) technique of causality advanced by using Toda and Yamamoto (1995) became used. The end result of the look at advised that both long run and brief run consistent state succeed amongst those 3 variables, whereas, unidirectional Granger Causality exist among Debt-servicing and GDP.

Asghar (2016) tested the effect of Pakistan external debt on economic increase with the aid of using yearly time series records of 1986-2015. Ordinary least rectangular econometric technique was developed. Economic performance measured in terms of gross domestic product used as the defined

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variable while external debt stocks, gross capital formation and gross domestic saving because the explanatory variables. The observation of study concluded that the heavy outside debt negatively has an effect on the gross domestic product.

Ahmad and Ludlow (1989) predicted the pattern of increase of public policy in relation to a number of the exogenous shocks (oil shocks of the 1970) that modified the dwelling general of various sections of society for the year 1976-77, 79 and 1984-85 the use of family profits and expenditure statistics of numerous years. The observation used special poverty lines to examine the sensitivity of the reduce points. The examination offered the study of Sen Index for both city and rural areas of Pakistan. It evaluated that the sustained boom pattern because the early 1960 surely had an effect on trendy of residing, in this recognize inexperienced revolution performed its part. The public regulations determined the achievement of the brand new technology with heavy investment in infrastructure and subsidized goods.

Akmal et al. (2007) studied the connection of trade liberalization and poverty discount in Pakistan in the quick run and longer term. They look at measured liberalization by the economic openness, public involvement within the kingdom and widespread indices openness. While head count ratio (HCR) became used for the size of poverty in the examined. Error correction method (ECM) and Johansen co-integration model hired to find the fast and long run dating. The study decided that the change liberalization performed a big role for the alleviation of poverty in the long-run but now not within the brief-run in Pakistan. Low taxation and high foreign direct funding brought about to reduce poverty specifically within the quick run.

Ali and Qureshi (2010) deliberated the effect of public debt burden on financial increase of Pakistan by the usage of time series data of the period of 1981-2008. To examine the impact between public debt burdens with economic growth increase of Pakistan.

Amjad and Kemal (2002) designed Macroeconomics policies and impact on poverty fall within the Pakistan. Time series data of the technology 1963-1993 used of the household income and expenditure survey (HIES) for each ruler and urban localities of Pakistan. The look at analyzed the impact of Macroeconomic guidelines in addition to the structural adjustment applications (SAP) agreed among the Government of Pakistan and the World Bank and IMF which covered the publish 1988 length on the degrees of poverty. It tested the have an impact on of some elements i.e. phrases of trade for agriculture quarter, agriculture growth, economic growth, and industrial area, employment charge of inflation, wages, tax structure and remittances. The examine concluded that the policies of SAP elevated poverty degree, because of decrease in boom prices, lower in employment, abandonment of the subsidies on agriculture input and consumptions, boom within the oblique taxes and flip down of the public expenditure on the social region. The take a look at cautioned that except the safety nets for the lower segment of society, the employment applications and the merchandising of casual sector played obligatory position for poverty discount.

### **3.DATA AND METHODOLOGY**

#### **3.1 Augmented Dickey Fuller and Philips Peron Unit Root Test**

Before applying the estimation of model in the time series data, stationary of variables is checked. If the model is non-stationary, the regression analysis of the variables can generate spurious regression and

results of research may not be reliable. Augmented Dickey Fuller and Philips Peron unit root tests are applied to check the stationarity of each variable separately. In ADF and Philip Peron tests, null hypothesis is that there is non-stationary of the variable and the alternative hypothesis is that there is stationary of the variable. In Table 3, Augmented Dickey Fuller Unit Root test is applied by using the Schwarz info criterion at intercept and trend and intercept at level and at 1st difference and in table 4, Philip Peron Unit Root test is applied at level and at 1st difference. The results of Augmented Dickey Fuller and Philip Peron Unit Root tests conform that all variables are non-stationary at level while stationary at first difference.

### 3.2 Johansson-Co-Integration Approach

When the order of integration of the available data set are same and one i.e. 1(1) we apply Johansson co-integration tests, 1<sup>st</sup> is Trace test and 2<sup>nd</sup> is Maximum Eigen value, both calculated value will be compared with cross ponding critical value, if calculated value is greater than cross ponding critical value, we will reject  $H_0$  and accept  $H_1$ . We will conclude that there exists long run relationship between dependent and independent variables.

$H_0$ : there is no co-integration relationship between dependent and independent variables.

### 3.3 Estimation Model

The dependent variable of the model is poverty. The work will show the effect different variables such as % External Debt to GDP ratio and Real wages.

$$\text{HCR} = \beta_1 + \beta_2(\text{DS}) + \beta_3(\text{TD}) + \beta_4(\text{RW}) + \mu$$

Where,

HCR = It is used as the proxy of poverty.

DS = Debt servicing

TD=Total Debt to GDP ratio

RW = real wages

$\mu$  = error term

### **3.4 Source of Data**

This paper includes the data of poverty which is taken from WDI and economic survey of Pakistan for period 1981 to 2015.

### **3.5 Methodology**

The research scholar is interested to explore the impact of this model. After checking the descriptive statistics, the stationarity of the data by using ADF and Philips Person unit root, will be find out, then structural breaks of the data will be checked by using ADF structural break unit root test and Zivot-Andrews unit root test will be applied. Integration orders are I(1) so we apply Johansson Co-integration technique.

## **4. RESULTS AND DISCUSSIONS**

### **4.1 Descriptive Statistic**

The results of descriptive statistics are given in Table 1.

**Table 1: Descriptive statistics**

|                     | <b>LNHCR</b> | <b>LDS</b> | <b>LNTD</b> | <b>LNRW</b> |
|---------------------|--------------|------------|-------------|-------------|
| <b>Mean</b>         | 3.150315     | 2.997121   | 2.035453    | 3.571899    |
| <b>Median</b>       | 3.114623     | 3.104774   | 2.124291    | 3.565289    |
| <b>Maximum</b>      | 3.489819     | 3.589237   | 3.009937    | 3.686376    |
| <b>Minimum</b>      | 2.996232     | 2.067277   | 1.069573    | 3.50255     |
| <b>Std. Dev.</b>    | 0.132412     | 0.448787   | 0.490083    | 0.047864    |
| <b>Skewness</b>     | 0.939355     | -0.67901   | -0.37258    | 0.723294    |
| <b>Kurtosis</b>     | 2.988968     | 2.369984   | 2.362864    | 2.979917    |
| <b>Jarque-Bera</b>  | 4.706235     | 2.988183   | 1.28162     | 2.790697    |
| <b>Probability</b>  | 0.195072     | 0.224452   | 0.526865    | 0.247747    |
| <b>Sum</b>          | 100.8101     | 95.90787   | 65.1345     | 114.3008    |
| <b>Sum Sq.</b>      |              |            |             |             |
| <b>Dev.</b>         | 0.543525     | 6.243702   | 7.445625    | 0.071018    |
| <b>Observations</b> | 32           | 32         | 32          | 32          |

The descriptive results show that the p-value of log form of all variables such as external debt services (DS), total external debt (TD), Real wages (RW) and Head Count Ratio (HCR) are greater than 0.10. We can conclude that overall data is normally distributed.

#### 4.2 Coefficient of Correlation and VIF

The results of coefficient of correlation and VIF are shown in table 2.

**Table 2: Results of correlation and VIF**

| Variables    | <b>LNHCR</b>    | <b>LNDS</b>     | <b>LNTD</b>     | <b>LNRW</b> |
|--------------|-----------------|-----------------|-----------------|-------------|
| <b>LNHCR</b> | -               | -               | -               | -           |
| <b>LNDS</b>  | <b>1.038748</b> | -               | -               | -           |
| <b>LNTD</b>  | <b>2.023847</b> | <b>1.128582</b> | -               | -           |
| <b>LNRW</b>  | <b>1.036511</b> | <b>1.495486</b> | <b>1.023205</b> | -           |

According to the rule of thumb if the result of correlation and VIF are less than 10 then there is no problem of multicollinearity. According to results LNHCR and LNDS are (1.038748), LNHCR and LNTD are (2.023847), LNHCR and LNRW are (1.036511), LNDS and LNTD are (1.128582), LNDS and LNRW are (1.495486), LNTD and LNRW are (1.023205). All values are less than 10, so there is no problem of multicollinearity.

### 4.3 ADF Unit Root Test

Table 3: Results of ADF's Unit Root Test

| ADF Unit Root Test        |          |         |                     |          |         |
|---------------------------|----------|---------|---------------------|----------|---------|
| At Level                  |          |         | At First Difference |          |         |
| Variables                 | t – Test | P-Value | Variables           | t – Test | P-Value |
| LNHCR                     | -1.58984 | 0.4757  | DLNHCR              | -4.32899 | 0.0019  |
| LNDS                      | -1.58005 | 0.4805  | dLNDS               | -7.10354 | 0.0000  |
| LNTD                      | -2.28824 | 0.1818  | dLNIR               | -6.05314 | 0.0000  |
| LNRW                      | -1.99973 | 0.2854  | dLNRW               | -5.97887 | 0.0000  |
| ADF Test critical values: |          |         |                     |          |         |
| 1% level                  |          |         | -3.626784           |          |         |
| 5% level                  |          |         | -2.945842           |          |         |
| 10% level                 |          |         | -2.611531           |          |         |

\*MacKinnon (1996) one-sided P-values.

**At level:** Calculated value of ADF unit root test, at level, of all variables are greater than the critical values (-2.611531) and the probability values of all variable are insignificant, so we accept  $H_0$  and according to  $H_0$ , series has unit root problem.

**At 1<sup>st</sup> difference:** Calculated value of ADF unit root test of all variables are less than the critical values (-2.611531) and the probability values of all variable are significant, so we reject  $H_0$  and conclude that series is non-stationary.

Table 4: Results of PP Unit Root Test

| PP Unit Root Test        |          |           |                     |          |         |
|--------------------------|----------|-----------|---------------------|----------|---------|
| At Level                 |          |           | At First Difference |          |         |
| Variables                | t – Test | P-Value   | Variables           | t – Test | P-Value |
| LNHCR                    | -1.80368 | 0.3718    | dLNHCR              | -4.32846 | 0.0019  |
| LNDS                     | -1.491   | 0.5248    | dLNDS               | -7.15571 | 0.0000  |
| LNTD                     | -2.47302 | 0.1315    | dLNIR               | -6.05584 | 0.0000  |
| LNRW                     | -1.93277 | 0.3137    | dLNRW               | -6.442   | 0.0000  |
| PP Test critical values: |          |           |                     |          |         |
| 1% level                 |          | -3.621023 |                     |          |         |
| 5% level                 |          | -2.943427 |                     |          |         |
| 10% level                |          | -2.610263 |                     |          |         |

\*MacKinnon (1996) one-sided p-values.

**At level:** Calculated value of PP unit root test, at level, of all variables are greater than the critical values (-2.611531) and the probability values of all variable are insignificant, so we accept  $H_0$  and according to  $H_0$ , series has unit root problem.

**At 1<sup>st</sup> difference:** Calculated value of PP unit root test of all variables are less than the critical values (-2.611531) and the probability values of all variable are significant, so we reject  $H_0$  and accept  $H_1$ . According to  $H_1$ , series has not unit root problem.

#### 4.4. Lag Length Criteria

The results of Lag Length Criteria are shown in table 5 on next page.

Table 5: Results of Lag Length criteria

**Lag Length Criteria**

| Lag | Log-L     | LR        | FPE       | AIC        | SC         | HQ         |
|-----|-----------|-----------|-----------|------------|------------|------------|
| 0   | -56.40269 | NA        | 9.13E-07  | 3.120135   | 3.37347    | 3.211731   |
| 1   | 204.8257  | 431.0268* | 1.20e-11* | -8.141284* | -6.367961* | -7.500107* |

Optimal lag length for the selected functional form have found by using the above criteria which are LR, FPE, AIC, SC & HQ and the majority of the criteria suggest that the optimal lag for selected functional form are 1. The conclusion is derived on the basis of minimum value of any criterions among the majority of the criteria's.

**4.5 Johansson-Co-Integration Test**

Table 6: Results of Johansson Co-Integration Test

**Johansson Co-Integration Test**

| Unrestricted Co-integration Rank Test (Trace)                 |            |           |          |        | Unrestricted Co-integration Rank(Maximum Eigenvalue)                    |            |           |          |        |
|---|------------|-----------|----------|--------|---|------------|-----------|----------|--------|
| No. of CE(s)  | Eigenvalue | Statistic | C-Value  | Prob.* | No. of CE(s)  | Eigenvalue | Statistic | C-Value  | Prob.* |
| None *  | 0.855927   | 132.6686  | 95.75366 | 0.0000 | None *  | 0.855927   | 58.12315  | 40.07757 | 0.0002 |
| At most 1   | 0.613010   | 74.54547  | 69.81889 | 0.0199 | At most 1   | 0.613010   | 28.48067  | 33.87687 | 0.1922 |
| At most 2   | 0.502039   | 46.06479  | 47.85613 | 0.0730 | At most 2   | 0.502039   | 20.91702  | 27.58434 | 0.2813 |
| At most 3   | 0.410498   | 25.14777  | 29.79707 | 0.1562 | At most 3   | 0.410498   | 15.85433  | 21.13162 | 0.2335 |
| Trace test indicates 2co-integrating eq.(s) at the 0.05 level |            |           |          |        | Max-eigenvalue test indicates 1 co-integrating eq.(s) at the 0.05 level |            |           |          |        |
| * denotes rejection of the hypothesis at the 0.05 level       |            |           |          |        | * denotes rejection of the hypothesis at the 0.05 level                 |            |           |          |        |
| **MacKinnon-Haug-Michelis (1999) p-values                     |            |           |          |        | **MacKinnon-Haug-Michelis (1999) p-values                               |            |           |          |        |

All variables have same order of i.e. I (1), so we can apply Johansson Cointegration. In this Cointegration we have table which are Cointegration Rank Test (Trace) and Cointegration Maximum Eigenvalue, both tables show

that there are Cointegration equations. When statistic value is greater than critical value: we conclude that there is Co integration equation. Trace test indicates two co integration equations and Maximum Eigen value indicates one co integration equation.

#### 4.6 Long Run Relationship

Table 7: Results of long run relationship

##### Normalized Long-run Coefficients based on Johansen Approach

| Variables | Coefficients | St. Error | T-stat |
|-----------|--------------|-----------|--------|
| DS        | 1.647482     | 0.29315   | 5.62   |
| TD        | 0.446280     | 0.10184   | 4.39   |
| RW        | -1.25208     | 0.26687   | -4.69  |

Source: Authors Calculations

**External Debt Services:** If External Debt Services (DS) increases 1% then Poverty will increase by 1.647482%, so External Debt Services and Poverty is positively related. External Debt Services (DS) and Poverty have significant impact.

**Total External Debt:** If Total external debt (TD) increases 1% then Poverty will increase by 0.446280%, so Total external debt (TD) and Poverty is positively linked. Total external debt (TD) and Poverty have significant impact.

**Real Wages (RW):** If Real Wages (RW) increases 1% then poverty will decrease by 1.25208%, so Real Wages (RW) and poverty is negatively linked. Real Wages (RW) and poverty have significant impact.

## 4.7 Short-Run Relationship

Table 8: Results of short-run relationship

### Adjusted Short-run Coefficients based on Vector Error Correction Estimates

| Variables | Coefficients | St. Error | T-stat |
|-----------|--------------|-----------|--------|
| d(DS)     | 0.45336      | 0.05579   | 8.13   |
| d(TD)     | 0.108264     | 0.06312   | 4.41   |
| d(RW)     | -0.185453    | 0.17377   | -1.067 |
| Ect t-1   | -0.356279    | 0.04288   | 8.3087 |

Source: Authors Calculations

**External Debt Services:** If External Debt Services (DS) increase 1% then Poverty will increase by 0.45336%, so External Debt Services and Poverty is positively linked. External Debt Services (DS) and Poverty are insignificant impact.

**Total External Debt:** If Total external debt increases 1% then Poverty will increase by 0.108264%, so total external debt and Poverty is positively linked. Total external debt and Poverty have insignificant impact.

**Real Wages (RW):** If Real Wages (RW) increases 1% then Poverty will in decreases by 0.185453%, so Real Wages (RW) and Poverty is negatively linked. Real Wages (RW) and poverty has insignificant impact in short run.

And the value of ECM t-1 is negative and significant, which shows that if there is temporary disequilibrium due to administrative or political instability, the model will converge to long run equilibrium in 2.80 years.

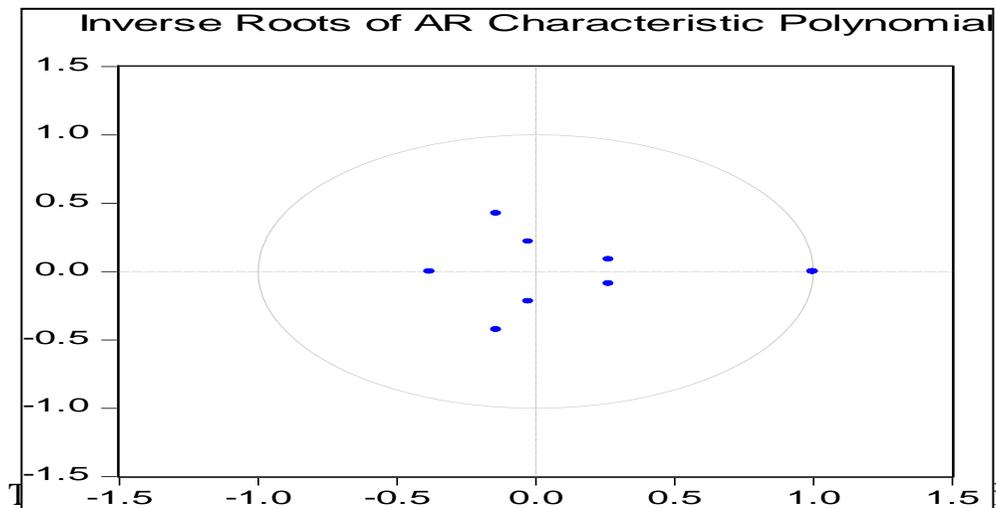
### 4.8 Diagnostic Test

Table 9: Results of diagnostic test

|  |                      |
|--|----------------------|
| <b>VEC Residual Normality Tests using Joint Jarque-Bera</b>        | 13.13352<br>(0.3594) |
|  | <b>For Lag 1</b>     |
| <b>VEC Residual Serial Correlation LM tests</b>                    | 39.59912<br>(0.3125) |
|  | <b>For Lag 2</b>     |
|  | 37.90801(0.3823)     |
| <b>VEC residual Heteroskedasticity test: Joint chi-square test</b> | 268.6053(0.8534)     |

### 4.9 Stability test: AR-roots graph

Figure 1: Stability test results



the model and table show that the probability value of Normality test using Jarque-Bera approach, for serial correlation using LM test & as well as for Heteroskedasticity using joint chi-square test, the probability value of all test shows insignificancies and accepting  $H_0$ . In other word, we can claim that

model is normally distributed. There is no serial correlation and there is no problem of Heteroskedasticity. We also show the graphical presentation of A-R-root test, which presents the stability of estimated coefficient with time periods. We can say our model is reliable.

## **5. CONCLUSIONS**

The study examined the impact of external debt on poverty in Pakistan. Poverty is taken as a dependent variable while total external debt (TD), debt services and Real wages (RW) are taken as independent variables. We used time series annual data for the period from 1981 to 2015. This study uses Johansen-Cointegration approach to estimate the long-run relationship between variables. In addition, the study also applied vector error correction model to check the short run relationship between variables. External Debt Services (DS) and Poverty have positive and significant relationship which means if volume of external debt increase it will likely to increase level of poverty. Real Wages (RW) and Poverty have negative and significant relationship. Total External Debt (TD) and Poverty have positive and significant relationship with dependent variable poverty and it means that increase total stock of debt and volume of debt services increase will likely to increase poverty level in Pakistan.

## **6. Policy implications**

On the basis of our results we would like to make the following policy recommendations: -

► External Debt Services and Poverty have positive and significant relation. The share of External Debt Services should be reduced in term of reducing poverty.

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- ▶ Before taking additional loan, the government should consider its repayment capacity.
  - ▶ Government of Pakistan should negotiate with the international financial institutions to get changed its hard term loans to soft term loans.
  - ▶ Real Wages (RW) and Poverty have negative and significant relations. The Real Wages should be increased in order to reduce poverty. Increasing real wages leads to increase the productivity and reduce poverty level.
  - ▶ Total External Debt (TD) and Poverty have positive and significant relation. The share of External Debt should be reduced in order to reduce debt services. By reducing external debt, we can use surplus resources for development projects.

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## CONTRIBUTION OF AUTHORS AND CONFLICT OF INTEREST

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This research work was carried between collaboration of four authors.

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All authors read the manuscript carefully and declared no conflict of interest with any person or institution.

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