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What are the Factors Affecting Poverty in Pakistan?

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Abstract

Objective of this research was to find out determinants of poverty in Pakistan. Auto regressive distributed lag (ARDL) bound testing was used to study the drivers of poverty in Pakistan. The annual data was used during the period 1990-2020 that was taken from the Economic Survey of Pakistan and World Bank's World Development Indicators (2020). Relationship between GDP growth and poverty is negative. Inflation affected poverty negatively and insignificantly. Relationship between trade and poverty is positive but insignificant. Population and poverty are related negatively and significantly. Results further show that no serial correlation, no autoregressive conditional heteroscedasticity (ARCH) and no heteroscedasticity were found out. Normal distribution of stochastic disturbances was observed when normality test was applied. Best fitness of estimation models was also observed. Overall results showed satisfactory residual properties of error correction model. Stability tests of short and long run estimations confirmed the stability of estimates having no structural breaks. Government should discourage the factors that are enhancing the poverty. Inflation should be controlled to one digit. GDP should be enhanced. Development expenditures should be increased. Exports should be encouraged and imports should be decreased. Population should be provided technical education particularly to youngsters. Exports should be encouraged and imports should be decreased. Population should be provided technical education particularly to youngsters.

Keywords: *Poverty, GDP, Inflation, Trade, Population.*

Introduction

Poverty has been defined as income poverty in conventional sense. In economic terms, poverty is defined as a country, area, or household with an extremely low per capita income. Many countries are grappling with poverty. Although the government has implemented various programs to relieve poverty but the problem of poverty remains unresolved (Singer, 2006). Poverty is now measured on a multi-dimensional scale. The World Bank's definition of poverty expresses this plainly (Poverty, 2001). Hunger is the same as

poverty. Poverty is basically lack of shelter. Sickness and inability to see a doctor are the symptoms of poverty. Poverty is characterized as a lack of access to education and the inability to read. Poverty is characterized as an employment shortage, uncertain future, and day to day living. Death of children due to sickness spread by unclean water is also poverty. Poverty is defined as a lack of control, depiction, and liberty.

Poverty comes in many forms, but relative and absolute poverty are the two most terrible. Relative poverty is defined as a person's inability to maintain the lowest level of living in a given society. The government determines a person's low income based on where he lives. Food, water, clothing, housing, health and education are examples of basic human necessities that are often in short supply. Simply, persons who earn less than two dollars are considered and measured as being in absolute poverty. Determinates of poverty remained and can stay the foremost examined subject within the history of monetary matters. Which factors determine poverty? What alternative arrangement government must take after to reduce poverty within the country? These are the basic questions for researchers to conduct research on the specific topic.

The basic aim of the study is to figure out what determinants lead to poverty in Pakistan. The novelty of this research is that we estimated autoregressive and distributive lag(ARDL) to seek out the short run and long run determinants of poverty in Pakistan with help of latest time series data. No such study was found out that collected relevant determinants of poverty from existing empirical literature to estimate relationship between poverty and its determinants. There is debate among different institutions about poverty reduction. It was necessary to estimate the relationship between poverty and its relevant determinants with latest data. Organization of the study is as introduction is in section one, material and methods are in section two, section three deals with results discussion and conclusion is in section four.

Literature Review

Awan et.al., (2011) investigated the impact of human capital characteristics on poverty. They utilized a binomial logistic regression model. They used primary data for period (1998-2008) to check the determinants of poverty in Sargodha city. Gender (female, male), human capital, years of schooling were considered as determinants of poverty. They concluded that all educational variables have negative effect on poverty.

Khatun (2015) investigated the micro-level factors affecting the poverty in case of Bangladesh. She used log linear multiple regression model and used primary data for period (1995 - 2010) to estimate different indicators of poverty like size of household, earning of the household, education of the household, landholding of the household, assets of the household and occupation of household. She concluded that some demographic factors in micro or household level are playing significant role in determining the poverty status. Size of household, education of household and assets of household have a positive effect on poverty while landholding of the household, earning of the household have a negative effect on poverty in Bangladesh.

Meo et. al., (2020) used ARDL model to find out the impact of governance and employment on poverty in Pakistan. They used data period from 1984 to 2016 by applying a nonlinear ARDL approach. Unemployment and governance were considered as determinants of poverty. They concluded that governance (quality of institution) has negative and unemployment has positive effect on poverty in Pakistan.

Model and Methodology

The most time series data is not stationary in nature, and using ordinary least squares (OLS) techniques to analyze it may produce erroneous results. This data necessitates the establishment of integration I(0) or I(1) before applying any estimation technique. The study examined the time series qualities of the data by

employing the Augmented Dickey–Fuller and Phillips–Peron tests (Dickey & Fuller (1981), Phillips (1988). The study employs an error correction based autoregressive distributed lag (ARDL) modelling to assess the link between poverty and its economic determinants.

Model

Before employing ARDL estimation technique unit root tests ADF and PP were applied to check stationarity of data. To investigate the link between independent and dependent variables, we utilized simple regression models.

$$pov = gdp + inf + gexp + trd + pop + u \quad (1)$$

The cointegration among variables under consideration was calculated as under through eq. (2):

$$\Delta \text{pov}_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta \text{pov}_{t-2i} + \sum_{i=1}^{q} \alpha_{2i} \Delta \text{gdp}_{t-i} + \sum_{i=1}^{q} \alpha_{3i} \Delta \text{inf}_{t-i} + \sum_{i=1}^{q} \alpha_{4i} \Delta gexp_{t-i} + \sum_{i=1}^{q} \alpha_{5i} \Delta \text{trd}_{t-i} + \sum_{i=1}^{q} \alpha_{6i} \Delta \text{pop}_{t-i} + \beta_1 \text{pov}_{t-1} + \beta_2 gdp_{t-1} + \beta_1 \text{inf}_{t-1} + \beta_1 \text{gexp}_{t-1} + \beta_1 \text{trd}_{t-1} + \beta_1 \text{pop}_{t-1} + u_t \quad (2)$$

Schwarz Criterion(SC) and Akaike Information Criterion (AIC) were employed to select optimal lag levels (p, q). After establishing the cointegration, long run association was estimated through eq. (3)

$$\text{pov}_t = \beta_1 \text{pov}_{t-1} + \beta_2 gdp_{t-1} + \beta_1 \text{inf}_{t-1} + \beta_1 \text{gexp}_{t-1} + \beta_1 \text{trd}_{t-1} + \beta_1 \text{pop}_{t-1} + u_t \quad (3)$$

Following error correction model is used to estimate short run dynamic relationship among variables of interest through eq. (4).

$$\Delta \text{pov}_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta \text{pov}_{t-2i} + \sum_{i=1}^{q} \alpha_{2i} \Delta \text{gdp}_{t-i} + \sum_{i=1}^{q} \alpha_{3i} \Delta \text{inf}_{t-i} + \sum_{i=1}^{q} \alpha_{4i} \Delta gexp_{t-i} + \sum_{i=1}^{q} \alpha_{5i} \Delta \text{trd}_{t-i} + \sum_{i=1}^{q} \alpha_{6i} \Delta \text{pop}_{t-i} + \lambda \text{ect}_{t-1} + u_t \quad (4)$$

Where pov stands for poverty, gdp is for gross domestic product, inf is for inflation rate, $g\,\text{exp}$ is for government expenditures, trd is for trade, and pop is for population. Small "t" shows that data is time series and variables written in small alphabets indicates that all variables in log form. $\alpha_0 - \alpha_6$ are short run coefficients, $\beta_0 - \beta_6$ are coefficients used for long run coefficients, Δ is difference operator, $\sum$ is used as summation operator and u is used for error term.

Data

Time series data was collected from "World Bank's World Development Indicators (WDI; 2021)" for the period 1990-2020. Determinants of poverty to be tested were collected from existing empirical literature.

Results

Unit root Test

Findings relating to ADF test are shown in table-1 and table-2 shows results of Philips Perron (PP) test. Some variables are stationary at level and some are at first difference in both tables and there was nothing like second differenced variable in both tables.

Table 1: Unit Root (ADF Test)

Variables	Level		1st Difference	
	Intercept	'Trend and Intercept'	Intercept	'Trend and Intercept'
pov_t	-1.958	-1.043	-3.923*	-3.104
gdp_t	-3.197**	-3.192	-6.404*	-6.330*
inf_t	-2.492	-4.461*	-6.549*	-6.474*
trd_t	-1.686	-2.388	-5.409*	-5.307*
pop_t	-2.34	-5.016*	-2.364	-3.104
1 % critical values	-3.679	-4.297	-3.679	-4.309
10 % critical values	-2.639	-3.218	-2.622	-3.222

Note: pov, gdp, inf,trd, and Pop represent the poverty, gross domestic product, inflation, trade, and population respectively. Variables with two ** are stationary at the ten percent significance level, while variables with one * are stationary at the one percent level.

Table 2: Unit Root (PP Test)

Variables	Level		1st Difference	
	Intercept	Intercept& Trend	Intercept	Intercept& Trend
pov_t	-1.178	-1.456	-3.951**	-3.790**
gdp_t	-3.071**	-3.105	-7.942*	-7.311*
inf_t	-2.594	-2.572	-6.563*	-6.488*
trd_t	-1.690	-2.388	-5.431*	-5.314*
pop_t	-1.037	-1.915	-3.670**	-2.367
critical values of 1%	-3.670	-4.297	-3.679	-4.309
critical values of 10%	-2.621	-3.218	-2.622	-3.221

Note: pov, gdp, inf,trd, and Pop represent the poverty, gross domestic product, inflation, trade, and population respectively. Variables with two ** are stationary at the ten percent level of significance, while variables with one * are stationary at the one percent level.

ARDL is then used to check for the presence of a long-run cointegrating relationship between the variables. Other approaches for doing cointegration analysis include the Residual Johansen test (Johansen (1991), Johansen, S. (1995) the maximum likelihood-based Johansen-Juselius test (Johansen, S., & Juselius, K. (1990). However, because of the poor power and other difficulties (non-linearities, heteroscedasticity, noise in the independent variables, outliers, and so on) associated with non-auto regressive distrusted lag techniques of cointegration, the autoregressive distributed lag (ARDL) approach has gained popularity.

Although evaluating time series characteristics of variables is not required for autoregressive distributed lag, it is vital to do so to ensure that none of the variables are second differenced stationary. The ARDL approach is utilized in the following situations (Pesaran et. al., 2001).

- It is not essential to test the variable's integrating order.
- Even small sample size can be used with this method.
- If the lag length is known, the model can be estimated using ordinary least squares.
- Both short and long-term relationships are estimated.

Before estimating the poverty equation through ARDL, information criteria are used to choose the optimum lag length.

Lag Selection

Schwarz Bayesian criterion and Akaike Information Criterion are widely used to identify the appropriate lag selection before estimating an ARDL model. Because AIC is useful for small sample sizes, it is applied to select the optimal lag selection (Nigusse et al., 2019). Now a days almost all E.Views versions(E.Views 10 and latest versions) have the facility to select lag length automatically.

The F-statistic is calculated initially by taking the 2 lags that were recommended by Akaike Information Criterion automatically. We can see in table-3 that calculated F-statistics is greater than upper bound 1 % critical values, providing confirmation for rejecting the null hypothesis of no cointegration between poverty and its determining variables.

Table 3: Calculated F-statistics

Calculated F. Statistic	26.34	
Level of Significance		
	L.B	U. B
1 %	3.81	4.92
5 %	3.05	3.97
10 %	2.68	3.53

Note: LB is used for lower bound and UB is used for upper bound critical values, respectively. Authors' own Calculation.

Long Run Cointegration

The estimated coefficients of the long-run cointegration vector is shown in Table-4. Relationship between GDP growth and poverty is negative and significant that is according to the theory that poverty reduces as GDP increases. Unemployment reduces as a result of increasing GDP and poverty reduces as a result of reducing the unemployment. Inflation affected poverty negatively and insignificantly. Relationship is not according to the theory that poverty reduces in case of increasing inflation.

Relationship between foreign trade and poverty is positive but insignificant and impact of trade on poverty is only seven percent. It can be justified that contribution of exports is less than imports in trade, so economy is facing loss in trade activities. Population and poverty are related negatively and significantly. It means when population increases, poverty decreases. Justification of this relationship is that poverty is reduced as a result of increasing earning capacity of increasing population. More population earns more.

Table 4: Long-run Estimation			
Variables	Coefficient	t-statistic	p. value
Gdp	-0.11	-8.57	0.003
Inf	-0.033	-2.27	0.108
Trd	0.077	0.811	0.477
Pop	-2.143	-10.922	0.001

Note: pov, gdp, inf,trd, and Pop represent the poverty, gross domestic product, inflation, trade,and population respectively.

Short Run Cointegration

The error correction version of the ARDL model yielded approximations of short run dynamic relationships in Table-5. In a dynamic model, the error correction term (ect(-1)) measures how quickly corrections are performed to convergence. Negative and significant estimate (-2.916) recommends the convergence to long run equilibrium. No serial correlation, no autoregressive conditional heteroscedasticity (ARCH) and no heteroscedasticity were found out. Normal distribution of stochastic disturbances was observed when normality test was applied. Best fitness of estimation models was also observed by R^2. Overall results showed satisfactory residual properties of error correction model.

Table 5: Model for Error correction			
Variable	Coefficient	t-statistic	p. value
ect(−1)	-2.916	-20.529	0.000
Diagnostic Tests(F. Statistics)			
LM Test	18.62		0.151
ARCH Test	0.003		0.950
White Test	1.104		0.522
J-B Test	1.507		0.470
R^2	0.971		

Note: pov, gdp, inf,trd, and Pop represent the poverty, gross domestic product, inflation, trade, and population respectively.

Both the model's short and long run estimations are tested by using cumulative sum of recursive residuals (CUSUM) and cumulative sum of square of recursive residuals (CUSUMSQ). This test reveals that parameters are not stabile if the cumulative sum exceeds the 5% critical bounds (Dao, P. B. (2021). Stability tests of short and long run estimations confirmed the stability of estimates having no structural breaks.

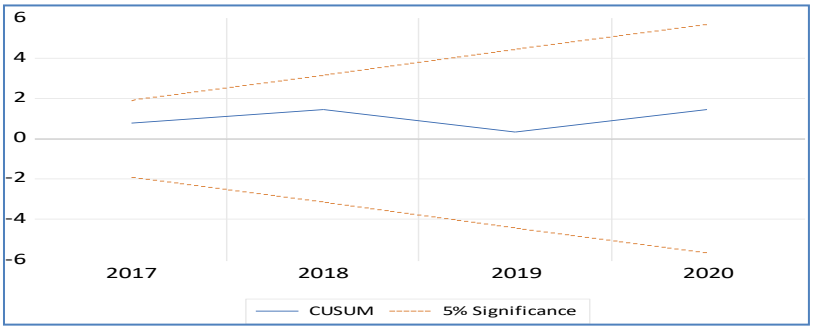

Figure 1: Cumulative Sum of Recursive.

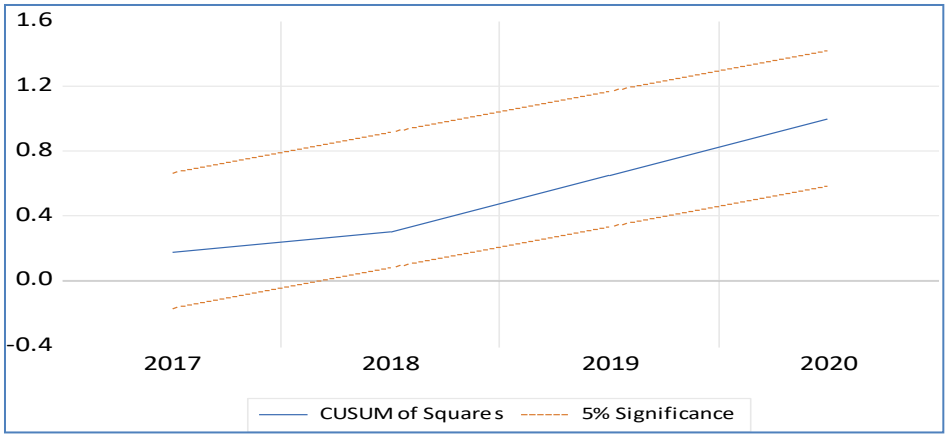

Figure 2: Cumulative Sum of Square of Recursive Residuals

Conclusion

The study found out the determining factors impacting poverty in Pakistan. Relationship between GDP growth and poverty is negative but insignificant that is according to the theory that poverty reduces as GDP increases. Inflation affected poverty negatively and insignificantly. Relationship between trade and poverty is positive but insignificant. Population and poverty are related negatively and significantly. In the analysis, no serial correlation, no autoregressive conditional heteroscedasticity (ARCH) and no heteroscedasticity was found out. Normal distribution of stochastic disturbances was observed when normality test was applied. Best fitness of estimation models was also observed by R^2. Overall results showed satisfactory residual properties of error correction model. Both the model's short and long run estimations are tested by using cumulative sum of recursive residuals (CUSUM) and cumulative sum of square of recursive residuals (CUSUMSQ). This test reveals that parameters are not stable if the cumulative sum exceeds the 5% critical bounds. Stability tests of short and long run estimations confirmed the stability of estimates having no structural breaks. Government should discourage the factors that are enhancing the poverty. Inflation should be controlled to one digit. GDP should be enhanced. Exports should be encouraged and imports should be decreased. Population should be provided technical education particularly to youngsters. Further researchers should include qualitative factors affecting poverty as independent variables.

References

Awan, M. S., Iqbal, N., & Muhammad, W. (2011). The impact of human capital on urban poverty: The case of Sargodha city. 143-144

Dao, P. B. (2021). A CUSUM-based approach for condition monitoring and fault diagnosis of wind turbines. *Energies*, *14*(11), 32-36.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: journal of the Econometric Society*, 1057-1072.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: journal of the Econometric Society*, 1551-1580.

Johansen, S. (1995). *Likelihood-based inference in cointegrated vector autoregressive models*. OUP Oxford.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, *52*(2), 169-210.

Khatun, R. (2015). The impact of micro-level determinants of poverty in Bangladesh: A field survey. International Journal of Research in Management & Business Studies (IJRMBS 2015), 2(2).9-13.

Meo, M. S., Kumar, B., Chughtai, S., Khan, V. J., Dost, M. K. B., & Nisar, Q. A. (2020). Impact of unemployment and governance on poverty in Pakistan: a fresh insight from non-linear ARDL co-integration approach. Global Business Review, 0972150920920440.

Nigusse, T., Tadesse, T., & Melaku, T. (2019). Supply and Demand Side Determinants of Inflation in Ethiopia: Auto-Regressive Distributed Lag Model (ARDL). *International Journal of Commerce and Finance*, *5*(2), 8-21.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Phillips, P. (1988). Testing for unit roots in time series regression. *Biometrika*, *71*, 599-607.

Poverty, A. (2001). World Development Report 2000/2001. *Ravi Kanbur and Nora Lustig, Eds*.

Singer, A. E. (2006). Business strategy and poverty alleviation. *Journal of Business Ethics*, *66*(2), 225-231.