Exploring the Economic Dimensions of Globalization and Poverty Reduction in Pakistan

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Abstract

The primary objective of this paper is to investigate the impact of globalization on poverty in Pakistan, a pressing issue in the country's socioeconomic landscape. Globalization, often regarded as a catalyst for economic growth, has a complex and multifaceted relationship with poverty alleviation. This study seeks to unravel these dynamics by analyzing key factors such as foreign direct investment, agricultural contribution to GDP, manufacturing contribution to GDP, and education. Using empirical analysis, our findings reveal that globalization has a negative effect on poverty in Pakistan, indicating that the benefits of globalization have not been uniformly distributed across various sectors and demographics. The results highlight a significant and inverse relationship between poverty and variables such as agricultural GDP, manufacturing GDP, FDI, and education. These factors collectively contribute to poverty reduction by enhancing economic opportunities, increasing productivity, and improving living standards. For instance, the agricultural sector, a cornerstone of Pakistan's economy, plays a crucial role in ensuring food security and providing employment. An increase in agricultural GDP leads to a direct alleviation of poverty by empowering rural communities. Similarly, the manufacturing sector contributes to economic diversification and job creation, thereby fostering income stability and reducing poverty levels. Foreign direct investment emerges as another pivotal factor, as it injects much-needed capital into the economy, promotes technological advancements, and fosters industrial growth. These developments translate into broader employment opportunities and higher incomes, particularly for skilled labor. Education, on the other hand, serves as a transformative force, equipping individuals with the skills and knowledge necessary to participate in and benefit from the global economy. A more educated workforce attracts better employment prospects and contributes to sustained economic growth, further alleviating poverty. The findings underscore the inverse relationship among the analyzed variables and poverty, illustrating that targeted interventions in these areas can effectively reduce poverty and enhance national income. Policymakers are encouraged to prioritize investments in education, agricultural development, and industrial growth while fostering an environment conducive to foreign direct investment. By leveraging the potential benefits of globalization, Pakistan can chart a path toward sustainable poverty reduction and socioeconomic development.

Keywords: poverty, globalization, gross domestic product, foreign direct investment

1. Introduction

Poverty remains a pervasive and complex issue globally, deeply impacting the quality of life, health, and opportunities available to individuals (Khalid & Sultan, 2019; Zhengzheng, 2019; Sheikh & Ahmad, 2020; Malik & Rehman, 2020; Sun & Chang, 2020; Zubair & Hayat, 2020; Ali & Sajid, 2020; Andreou, 2021; Sayvaya & Phommason, 2023). Pakistan, like many developing nations, grapples with significant challenges related to poverty, which hinder its socioeconomic progress. Despite numerous government and international efforts to alleviate poverty, high poverty rates persist, exacerbated by various socio-economic, structural, and policy-related factors. Poverty not only affects the immediate well-being of individuals and families but also stymies broader economic growth, perpetuates inequality, and limits access to essential resources such as education, healthcare, and housing. The issue of poverty in Pakistan requires an in-depth exploration to uncover its root causes, its broader implications, and viable solutions for meaningful, long-term alleviation. The concept of poverty has evolved significantly over the years. In its most basic sense, poverty refers to the lack of sufficient income to meet basic needs, including food, clothing, and shelter. However, poverty is a multidimensional phenomenon, extending beyond mere income deprivation. Scholars and policymakers now view poverty as encompassing a range of deprivations, including access to education, healthcare, and clean water; the ability to engage in productive and meaningful employment; and the capacity to participate fully in social and economic life. These broader dimensions of poverty highlight the importance of understanding not only the income aspects but also the structural inequalities that perpetuate poverty across generations (Khalid & Sultan, 2019; Zhengzheng, 2019; Sheikh & Ahmad, 2020; Malik & Rehman, 2020; Sun & Chang, 2020; Zubair & Hayat, 2020).

This multidimensional nature of poverty is evident in Pakistan, where various forms of deprivation converge to impact the poorest populations disproportionately. The Human Development Index (HDI) and the Multidimensional Poverty Index (MPI) are widely used to capture these diverse aspects of poverty, shedding light on the complex interplay between income, education, health, and quality of life. Acknowledging these dimensions is essential to formulating policies that go beyond income-based interventions and address the broader, underlying causes of poverty (Sossounoy & Kolenikov, 2023; Saleem & Faima, 2018; Khan & Wali, 2020; Iwalehin, 2022; James, 2022; Hassan, 2024). Poverty trends in Pakistan have shown considerable fluctuations over the past several decades. The late 1990s marked a period of significant economic hardship in Pakistan, during which poverty rates surged due to a combination of economic and political instability. Factors such as a rising population, inconsistent economic policies, political volatility, and natural disasters have exacerbated the country's poverty problem. According to recent estimates, a substantial proportion of Pakistan's population continues to live below the poverty line, with rural areas experiencing particularly high levels of poverty. Rural poverty in Pakistan is largely attributed to limited access to resources, dependence on agriculture, lack of infrastructure, and limited economic diversification. Pakistan's poverty dynamics are further complicated by the urban-rural divide, with rural areas facing distinct challenges compared to urban regions. In rural areas, limited access to education, healthcare, and employment opportunities perpetuates poverty, while urban areas face issues such as overcrowding, inadequate housing, and

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informal employment. This duality underscores the need for targeted policy interventions that address the unique challenges faced by both rural and urban communities.

Inequality is intrinsically linked to poverty, as disparities in income, wealth, and access to resources create an uneven playing field for the poor. Income inequality in Pakistan has been a longstanding issue, with wealth concentrated in the hands of a small segment of the population. This concentration of wealth contributes to the persistence of poverty, as the poor are often unable to access the resources necessary to improve their socio-economic status. Inequality also manifests in the form of educational and healthcare disparities, as wealthier individuals have access to better services, while the poor are left with limited or substandard options (Sossounoy & Kolenikov, 2023; Saleem & Faima, 2018; Khan & Wali, 2020; Iwalehin, 2022; James, 2022; Hassan, 2024). One of the most pressing consequences of poverty and inequality is poor health outcomes among the impoverished. Health is both a cause and consequence of poverty, creating a vicious cycle that traps individuals and families in deprivation. In Pakistan, the poor bear a disproportionate burden of disease due to inadequate access to healthcare, poor nutrition, and substandard living conditions. Health-related expenses, particularly for chronic diseases or severe illnesses, can push families further into poverty, as they are often forced to sell assets or take on debt to afford treatment. This cycle of poor health and poverty underscores the need for a robust healthcare system that provides affordable and accessible services to the poor. The economic burden of healthcare on impoverished households is further compounded by income inequality, as out-of-pocket healthcare expenses exacerbate income disparities (Sossounoy & Kolenikov, 2023; Saleem & Faima, 2018; Khan & Wali, 2020; Iwalehin, 2022; James, 2022; Hassan, 2024). Studies have shown that health shocks – unexpected medical expenses or illnesses – are a major factor contributing to impoverishment in Pakistan. Without financial protection mechanisms, such as health insurance or government subsidies, the poor remain vulnerable to health-related financial crises. Addressing these healthcare inequities is crucial for breaking the cycle of poverty and promoting economic stability in Pakistan.

Globalization has brought both opportunities and challenges for Pakistan's economy. On one hand, globalization has facilitated access to international markets, technology, and investment, which can drive economic growth and create employment opportunities (Ali & Sajid, 2020; Andreou, 2021; Sayvaya & Phommason, 2023; Khalid & Sultan, 2019; Zhengzheng, 2019; Sheikh & Ahmad, 2020; Malik & Rehman, 2020; Sun & Chang, 2020; Zubair & Hayat, 2020). On the other hand, globalization has also exposed Pakistan to global economic fluctuations, competition from international firms, and the risk of job displacement, particularly in traditional industries. The impact of globalization on poverty in Pakistan is complex, as the benefits of global integration are often unevenly distributed across different socio-economic groups.

Foreign direct investment (FDI) is one of the key components of globalization, and it has the potential to alleviate poverty by creating jobs, increasing productivity, and transferring technology. However, the distribution of FDI benefits is not uniform, and it often favors urban centers and industrial sectors, leaving rural and marginalized communities behind. In Pakistan, FDI has primarily flowed into sectors such as telecommunications, energy, and manufacturing, which tend to employ skilled workers. Consequently, unskilled or semi-skilled workers, who represent a large portion of the poor population, may not experience the direct benefits of FDI. This selective distribution of FDI benefits underscores the need for policies that promote inclusive economic growth and ensure that the gains from globalization are shared across all segments of society.

Education is widely regarded as a powerful tool for poverty alleviation, as it equips individuals with the skills and knowledge necessary to secure stable and well-paying employment. In Pakistan, however, access to quality education remains limited, particularly for the poor. The country faces significant challenges in terms of educational infrastructure, quality of teaching, and enrollment rates, especially in rural areas. Illiteracy and low levels of educational attainment limit the economic mobility of the poor, trapping them in low-paying and informal jobs with little opportunity for advancement.

The education-poverty nexus in Pakistan highlights the importance of investing in primary, secondary, and vocational education. Studies have shown that higher levels of education are associated with better income prospects, improved health outcomes, and enhanced social mobility. For women in particular, education serves as a crucial pathway out of poverty, as it enables them to participate in the workforce, make informed health decisions, and contribute to the economic well-being of their families. Addressing educational disparities is thus essential for breaking the cycle of poverty and promoting sustainable development in Pakistan.

The Government of Pakistan has implemented various poverty alleviation programs over the years, including the Benazir Income Support Program (BISP), Pakistan Poverty Alleviation Fund (PPAF), and other social safety nets. These initiatives aim to provide financial assistance, employment opportunities, and access to basic services for the poor. However, the effectiveness of these programs has been limited by issues such as inadequate funding, administrative inefficiencies, and lack of transparency. Additionally, these programs often focus on short-term relief rather than addressing the structural causes of poverty, limiting their long-term impact.

Effective poverty alleviation requires a multifaceted approach that combines social safety nets with policies aimed at economic empowerment, job creation, and capacity building. The government must also prioritize policies that promote equitable access to resources, reduce income inequality, and create a conducive environment for sustainable economic growth. By adopting a holistic approach to poverty alleviation, Pakistan can create a more inclusive society where all individuals have the opportunity to achieve economic security and improve their quality of life. Research on poverty in Pakistan faces several methodological and data-related challenges. Reliable data on poverty, income, and socio-economic indicators are essential for understanding the dynamics of poverty and evaluating the impact of policies. However, data limitations, inconsistencies, and gaps in Pakistan's statistical system pose significant obstacles to comprehensive poverty analysis. For instance, income and consumption surveys may not capture informal sector earnings accurately, leading to an underestimation of poverty levels. Additionally, regional disparities and cultural factors may influence data collection and reporting, further complicating the measurement of poverty. To address these challenges, this study adopts a multi-dimensional approach to poverty measurement, incorporating indicators related to income, education, health, and living standards. By analyzing a range of socio-economic factors, this research aims to provide a holistic understanding of poverty in Pakistan and offer insights into the complex factors that contribute to its persistence. Improved data collection,

standardized methodologies, and greater transparency are essential for enhancing the accuracy and reliability of poverty research in Pakistan. This paper is organized into several sections, each focusing on a specific aspect of poverty and its implications in Pakistan. Following this introduction, the literature review provides an overview of key studies on poverty, income inequality, and poverty alleviation strategies. The methodology section outlines the research design, data sources, and analytical techniques used in this study. Subsequent sections present the empirical results and discuss the implications of globalization, education, health, and FDI on poverty. Finally, the conclusion summarizes the main findings and offers recommendations for policy interventions aimed at reducing poverty in Pakistan.

2. Literature Review

Qureshi and Arif (2001) examine the last three decades to assess the extent and nature of poverty in Pakistan. Their studies primarily rely on data generated by the Household Income and Expenditure Surveys (HIES), with the earliest data set dating back to 1963-64. A significant limitation of the HIES is its time lag of 2-3 years in making results available, which hinders effective monitoring of poverty trends. To address this issue, a household survey was conducted between March and July 1999, aiming to generate nationally representative data to evaluate the incidence of poverty and the distribution of income. The results of these studies, which utilize different methodologies, have consistently been used to analyze changes in the incidence of poverty over time.

Malik (1988) investigates historical trends to measure the level of poverty in Pakistan. The time periods covered by these studies vary, and their methodologies and results also exhibit differences. Malik's study focuses on the most recent data available at that time, specifically from the 1984-85 Household Income and Expenditure Survey (HIES). The findings reveal a significant decline in poverty over the years; however, the magnitude of poverty remains substantial. The study emphasizes that the government must play a pivotal role in eradicating poverty through targeted interventions and policies.

Siddiqui and Kemal (2006) analyze the impact of two major shocks—trade liberalization policies and a decline in remittances—on welfare and poverty in Pakistan. Historically, industries in Pakistan enjoyed high levels of protection during the 1950s and 1960s. Their analysis is based on a consistent data set for the year 1989-90, incorporating the Input-Output Table (Pakistan, 1996), the Household Integrated Economic Survey (HIES, 1993), and the Social Accounting Matrix (SAM) 1989-90 (Siddiqui and Iqbal, 1999a). The findings indicate that the decline in remittance inflows is a significant contributor to the rise in poverty, while trade liberalization exacerbates income inequality. Together, these factors reinforce the adverse impacts on poverty levels, particularly in rural areas.

Arif et al. (2000) present ample evidence that poverty, which declined substantially in the 1980s, resurged during the 1990s. Their study primarily uses the 1996-97 Household Integrated Economic Survey (HIES) data collected by the Federal Bureau of Statistics. The authors conclude that a dynamic, labor-intensive agricultural sector, when combined with a modernizing non-agricultural sector, can lead to widespread employment opportunities and income growth. Such a model has the potential to promote rapid economic growth, ensure equitable income distribution, and eliminate rural poverty effectively.

Ali and Abdulai (2010) investigate the direct effects of Bacillus thuringiensis (BT) cotton on yields, pesticide demand, household income, and poverty. Their study utilizes cross-sectional data from a farmer survey conducted in the Punjab province of Pakistan. The adoption of BT cotton is treated as a dichotomous choice, where farmers either adopt the new technology or continue with traditional methods. The empirical analysis was conducted using the STATA statistical package, with the logit specification of the propensity score reported. The results indicate that the adoption of BT cotton had positive and significant effects on cotton yields, household income, and poverty reduction. Additionally, the technology demonstrated a negative impact on pesticide use, indicating its potential environmental benefits alongside economic gains.

Naseem (1973) structures their study in a systematic manner, focusing on the problems of income distribution and living standards in Pakistan. The paper reviews previous empirical work on these issues, which serve as a foundation for understanding mass poverty trends. Using household survey data and national income statistics, the study analyzes and contrasts income distribution patterns. It further explores the consumption habits and nutritional adequacy of Pakistani diets, drawing policy implications from these findings. However, the study acknowledges that its results are limited by the quality of the data and interpolation methods used, which restrict the precision of its conclusions. Despite these limitations, the paper provides a critical framework for examining mass poverty in Pakistan and its broader policy implications.

Brooks and Duncan (1997) explore the detrimental effects of poverty on children's well-being. Their study examines the relationship between poverty and various child outcomes, using findings from several large, nationally representative cross-sectional surveys. The research concludes that low income during preschool and early school years correlates most strongly with lower rates of high school completion compared to poverty experienced during later childhood. The authors emphasize that while the study draws from a limited number of datasets, its findings highlight the long-lasting impacts of early-life poverty on educational attainment and overall life chances.

Duncan and Brooks (2000) further investigate the selective effects of family poverty on child development, focusing on the consequences of persistent poverty for children's future opportunities as adults. The study is informed by large-scale national surveys on child development initiated during the war on poverty. Preliminary findings from a study of Temporary Assistance for Needy Families (TANF) recipients in Michigan reveal a strong association between a woman's employment status and various barriers to employment, including depression, work skills, and the age of her children. The research underscores the multifaceted challenges posed by poverty on family dynamics and child development, suggesting targeted policy interventions to mitigate these effects.

Ladd (2012) explores the significance of evidence-based policymaking, a rallying cry for researchers and policymakers, including the Obama administration. The study underscores that evidence-driven policy can support better decision-making, a primary goal of organizations like the Association for Public Policy Analysis and Management (APPAM). Studies utilizing longitudinal surveys often offer more comprehensive measures of family background. The empirical relationship revealed by the study demonstrates that

children from disadvantaged households, on average, perform less well in school compared to their peers from more advantaged households. This finding highlights the critical role of family background in shaping educational outcomes.

Gallie et al. (2003) investigate the concept of social exclusion, which suggests a downward spiral where labor market marginality leads to poverty and social isolation, further increasing the risk of long-term unemployment. The research draws on longitudinal data from the European Community Household Panel, covering most EU states from 1994 to 1996. The study concludes that addressing unemployment's social exclusion implications should focus primarily on combating poverty, as poverty is a central driver of social marginalization and isolation.

Evans and Kim (2007) examine the longitudinal relationship between poverty exposure since birth, cumulative risk exposure, and physiological stress in a cohort of 207 13-year-olds. This study represents the only prospective longitudinal data connecting childhood poverty with physiological stress and builds on findings from two prior cross-sectional studies. The results provide robust evidence that some of the adverse effects of childhood poverty on stress regulation are linked to elevated cumulative risk exposure, emphasizing the complex interplay between environmental stressors and poverty.

Wood (2003) investigates the impact of poverty on U.S. children, considering economic, ecological, and family influences. The study notes that economic and demographic trends indicate worsening rates of child poverty and deprivation in many regions of the country. These trends significantly affect children's health and development, creating pervasive challenges that hinder their well-being and future opportunities.

Fuller et al. (2012) analyze poverty's impact on health, considering its role as an explanatory variable linking socioeconomic status and health outcomes. The study examines family history related to income and household size over six-month intervals of participants' lives. Results reveal that poverty is positively associated with allostatic load, a measure of cumulative physiological stress. Analyses further suggest that social-class discrimination may partially explain health disparities. The findings underscore that social-class discrimination could serve as a mechanism driving health inequities, highlighting the importance of addressing both economic and social determinants of health.

Klebanov (1994) investigates the effects of neighborhood and family poverty, along with other socioeconomic components, on maternal psychological and behavioral characteristics. The study uses data from an eight-site study of 3-year-olds and their mothers. The analysis focuses on cases where addresses were matched to census tracts within the eight data collection sites. Ordinary least squares (OLS) multiple linear regressions were conducted using several independent variables. The results are interpreted in the context of Jencks and Mayer's framework, which outlines the ways in which neighborhood factors might influence child development. The findings emphasize the interplay between neighborhood characteristics and family socioeconomic status in shaping maternal behaviors and, by extension, child outcomes.

Ravallion and Datt (1990) examine the role of economic growth as a critical factor in poverty reduction in developing countries. Their analysis highlights the significance of the growth pattern rather than just the growth rate. Using a static poverty profile derived from a single cross-sectional household survey, the study explores where the poor reside and the economic sectors in which they are engaged. Contrary to the common focus on urban sectors, the findings reveal that rural economic growth plays a more substantial role in national poverty reduction in India. This underscores the need for a shift toward an alternative industrialization process that incorporates rural development to achieve broader poverty alleviation goals.

Fan (2000) investigates the causes of the decline in rural poverty in India, focusing on the role of government investments. Using a pooled time-series, cross-state data set and applying the full information maximum likelihood (FIML) estimation technique, the study examines the equations determining public expenditure on various items. The results indicate that government expenditures are positively and significantly correlated with GDP growth and improvements in terms of trade. These findings suggest that strategic government investments in rural areas have contributed significantly to economic growth and poverty reduction, highlighting the importance of targeted fiscal policies in addressing rural poverty.

3. Methodology

The theoretical model for this study builds on the literature highlighting the interconnected effects of poverty, economic growth, government investment, and social factors on socioeconomic outcomes. Existing studies, such as those by Ravallion and Datt (1990), emphasize that economic growth, particularly within rural sectors, plays a critical role in poverty alleviation. The effectiveness of growth, however, is contingent on the distribution patterns within sectors, underscoring the need for inclusive rural economic development to ensure broad-based poverty reduction. This framework suggests that rural growth acts as a catalyst for poverty alleviation by enhancing local employment and income levels. Further, Fan (2000) underscores the role of government investment in rural areas, finding a strong correlation between targeted public expenditure, economic growth, and poverty reduction. Fan's work supports a model in which government investment in infrastructure, education, and healthcare not only boosts GDP but also contributes to reducing poverty by improving access to resources. Such investments are posited to improve productivity and foster sustainable income growth, especially in under-resourced rural settings. In this context, our model incorporates government investment as a key variable impacting poverty through improved economic stability and human capital development. Social factors, including neighborhood and family conditions, are also pivotal in poverty analysis, as evidenced by Klebanov's (1994) findings. The study shows that neighborhood characteristics influence maternal behavior and, indirectly, child outcomes, aligning with Jencks and Mayer's theoretical framework on the social determinants of poverty. These findings highlight the multidimensional nature of poverty, where economic and social contexts are interlinked. Thus, in our model, socioeconomic status and neighborhood effects represent additional pathways through which poverty influences individual well-being and future economic mobility. Lastly, Ali and Abdulai (2010) emphasize the role of technological adoption, such as BT cotton, in enhancing agricultural yields, income, and reducing poverty, while simultaneously lowering reliance on harmful pesticides. This suggests that technological advancement in agriculture may reduce poverty directly by increasing productivity and indirectly by supporting sustainable practices. Our theoretical model therefore integrates rural economic growth, government investments, social factors, and technological innovation as primary

drivers of poverty reduction. By doing so, it allows for a comprehensive examination of poverty from both economic and social perspectives, recognizing the multifaceted nature of poverty and the interdependence of economic, social, and technological factors in influencing poverty outcomes. Studies by Klasen (2000), Chaudhry (2007), Ali (2015), Ali (2018), and Ali & Bibi, (2017) suggest that lower levels of female education result in diminished human capital, reducing productivity and economic growth potential. The model posits that when women have restricted access to education, their potential contributions to the labor force and overall productivity are hindered, slowing economic growth and perpetuating poverty cycles. Additionally, the model incorporates the effects of educational attainment on fertility and child mortality rates, as highlighted by Klasen (2002) and Ahmad et al. (2005), proposing that higher female education levels reduce fertility rates and improve family health outcomes, which subsequently contribute to poverty reduction. Influences such as household size, dependency ratios, and access to labor markets also feature in the model, consistent with findings from Chaudhry and Rehman (2009), Naz and Chaudhry (2011), Ali & Adui (2016), Ali et al., (2021), Sajid & Ali (2018), Senturk & Ali (2021), and Audi & Ali (2022), and Audi & Ali (2023).

Dependent variable:
Poverty
Independent variables:
Agriculture of GDP, Education, foreign direct investment and manufacturing of GDP.
Using the statistics rules:
Unit root
VECM
ARDL
The main aim of this paper is to explore the relation between globalization and poverty.
Poverty= f (agriculture of GDP, Education, Foreign direct investment and manufacturing of GDP)

4. Empirical Results

The descriptive statistics table provides an overview of key variables used in the study: Poverty Headcount Ratio (PHCR), Agriculture as a percentage of GDP (AGDP), Education (EDU), Foreign Direct Investment (FDI), and Manufacturing as a percentage of GDP (MGDP). Each statistic gives insight into the central tendencies, dispersion, and distribution of these variables, aiding in understanding their characteristics. The mean value of PHCR, which measures poverty, is 29.26, indicating an average poverty headcount of approximately 29% over the observation period. The median value of 28.68 is close to the mean, suggesting a fairly symmetric distribution. However, the standard deviation of 7.66 reflects significant variability in poverty levels across observations. The maximum poverty rate of 43.01 and the minimum of 20.71 highlight a wide range, while the skewness of 0.415 suggests a slight positive skew, meaning that a few higher poverty rates pull the distribution slightly to the right. The kurtosis of 1.71, being less than 3, indicates a distribution with flatter tails compared to a normal distribution. The Jarque-Bera statistic of 3.02 with a probability of 0.22 implies that the data for PHCR do not significantly deviate from normality.

For AGDP, the mean is 25.15, showing that, on average, agriculture contributes 25% to GDP. The median (25.48) is close to the mean, supporting the indication of symmetry. The range between the maximum (28.54) and minimum (21.47) suggests moderate variation, while the standard deviation of 1.68 further corroborates this. The skewness of -0.237 indicates a slight left skew, meaning a few lower values pull the distribution leftward. Kurtosis is near 2.48, indicating a distribution slightly flatter than normal. With a Jarque-Bera statistic of 0.63 and a probability of 0.73, the data appear to follow a normal distribution.

Table 1: Descriptive Statistics

	PHCR	AGDP	EDU	FDI	MGDP
Mean	29.25631	25.15380	8.739190	1.041683	15.63701
Median	28.68000	25.48284	8.632484	0.691845	15.87956
Maximum	43.01000	28.53688	9.494617	3.668323	18.56466
Minimum	20.71000	21.46540	8.058327	0.331453	13.38731
Std. Dev.	7.660511	1.677378	0.424583	0.851510	1.331152
Skewness	0.415130	-0.237143	0.327173	1.950637	-0.068136
Kurtosis	1.714388	2.482680	1.952948	5.894157	2.198779
Jarque-Bera	3.025249	0.636232	1.969129	30.47828	0.853179
Probability	0.220331	0.727518	0.373602	0.000000	0.652731
Sum	906.9457	779.7677	270.9149	32.29217	484.7473
Sum Sq. Dev.	1760.503	84.40789	5.408114	21.75205	53.15897

EDU, which represents education levels, has a mean of 8.74, suggesting that education attainment levels are relatively low. The median value of 8.63 is close to the mean, with a standard deviation of 0.42 indicating limited variability in educational levels. The range, from a maximum of 9.49 to a minimum of 8.05, supports this observation. The skewness of 0.33 implies a mild positive skew, and the kurtosis of 1.95 suggests a relatively flat distribution. The Jarque-Bera statistic of 1.97 and its associated probability of 0.37 confirm that the distribution is not significantly different from normality.

FDI, measuring foreign direct investment, has a mean of 1.04, indicating a low average level of investment inflow. The median of 0.69 suggests that FDI data are right-skewed, as confirmed by the skewness of 1.95. The standard deviation of 0.85 indicates considerable variation, with a wide range from 0.33 to 3.67. The kurtosis value of 5.89 points to a leptokurtic distribution, where

extreme values are more frequent than in a normal distribution. The Jarque-Bera statistic of 30.48 with a probability of 0.00 indicates a significant departure from normality for FDI data.

Lastly, MGDP, representing manufacturing as a share of GDP, has a mean of 15.63 and a median of 15.88, suggesting a balanced distribution. The range spans from 13.39 to 18.56, with a standard deviation of 1.33 indicating moderate variability. The skewness of -0.068 implies a nearly symmetric distribution, while the kurtosis of 2.19 is close to the normal distribution's value of 3. The Jarque-Bera statistic of 0.85 with a probability of 0.65 suggests that MGDP data do not significantly deviate from normality.

Overall, the descriptive statistics reveal substantial variability in poverty, agriculture, education, and FDI, while manufacturing exhibits moderate stability. The non-normality of FDI, as indicated by its skewness and kurtosis, suggests that special care may be required in modeling this variable.

Table 2: Unit Root Outcomes

Variables	ADF
	At Level
PHCR	0.9388
AGDP	0.2596
EDU	0.8974
FDI	0.0769
MGDP	0.4546
	First Difference
PHCR	0.0034
AGDP	0.0042
EDU	0.0015
FDI	0.0248
MGDP	0.0000

The unit root test results in Table 2 provide crucial insights into the stationarity of the variables included in the study: Poverty Headcount Ratio (PHCR), Agriculture as a percentage of GDP (AGDP), Education (EDU), Foreign Direct Investment (FDI), and Manufacturing as a percentage of GDP (MGDP). Unit root tests, such as the Augmented Dickey-Fuller (ADF) test, are used to determine whether a time series is stationary or has a unit root, which implies non-stationarity. Non-stationary variables can cause misleading or spurious results in regression analysis, so it is important to understand whether the data series need to be differenced or transformed. The ADF test results for PHCR, AGDP, EDU, FDI, and MGDP at the level (without differencing) show that all the variables have p-values greater than the conventional significance level of 0.05, indicating that they are non-stationary at level. Specifically, the p-values for PHCR (0.9388), AGDP (0.2596), EDU (0.8974), FDI (0.0769), and MGDP (0.4546) are all above 0.05, meaning that the null hypothesis of a unit root cannot be rejected. In other words, these variables contain a unit root at their level, and thus they are non-stationary at this level. This is expected for many economic time series, which often need to be differenced to achieve stationarity. When examining the first differences of the variables, the p-values significantly decrease, indicating that the first-differenced variables are stationary. The ADF p-values for PHCR (0.0034), AGDP (0.0042), EDU (0.0015), FDI (0.0248), and MGDP (0.0000) are all less than the 0.05 threshold, which means that the null hypothesis of a unit root is rejected for all these variables at the first difference. Therefore, all of the variables become stationary once differenced, indicating that they exhibit first-order stationarity. This implies that the variables have stable long-term relationships once differences are taken, which is a common feature in economic time series data. These results suggest that, to ensure reliable econometric modeling, it is necessary to use the first-differenced series of these variables in further analysis, as they exhibit stationary behavior only after differencing. This transformation is important for preventing spurious regression results and ensuring the validity of statistical inferences.

The results from Table 3 show the outcomes of the ARDL (Autoregressive Distributed Lag) bounds test, which is used to examine the existence of a long-run relationship between the dependent variable (poverty) and the independent variables in the model. The ARDL model chosen here is specified as ARDL (2, 2, 2, 2, 2), indicating that two lags of each of the five variables (poverty, agriculture, education, foreign direct investment, and manufacturing) are considered in the model.

The F-statistic for the ARDL bounds test is reported as 3.1923. This statistic is compared to critical values at various significance levels (1%, 5%, and 10%) to determine whether there is evidence of a long-run relationship between poverty and the explanatory variables. The critical values for the bounds test are provided for both the lower and upper bounds at each significance level. At the 10% significance level, the lower bound is 2.2 and the upper bound is 3.09. At the 5% significance level, the lower bound is 2.56 and the upper bound is 3.49. Finally, at the 1% significance level, the lower bound is 3.29 and the upper bound is 4.37. To interpret the results, the F-statistic (3.1923) is compared with these critical values. For the test to suggest the existence of a long-run relationship, the F-statistic must be higher than the upper bound critical value at the chosen significance level. In this case, the F-statistic of 3.1923 falls between the critical values for the 5% and 10% levels. Specifically, the F-statistic exceeds the lower bound but is less than the upper bound at the 5% significance level, suggesting that the results are inconclusive regarding the presence of a long-run relationship at the 5% level. However, the statistic exceeds the upper bound at the 10% significance level, indicating that there is a long-run relationship at the 10% significance level, but not conclusively at the 5% or 1% levels. This means that there is evidence at the 10% level of a long-run relationship between poverty and the explanatory variables (AGDP, EDU, FDI, MGDP), but the evidence is not strong enough to confirm this relationship at the more stringent 5% or 1% levels. Therefore, while there is

some indication of a long-run relationship, the strength of this evidence suggests caution in making definitive conclusions without further testing or refinement of the model.

Table 3: ARDL Bounds test
ARDL (2, 2, 2, 2, 2)
Dependent Variable: Poverty
F-Statistics= 3.1923

Critical Values	Lower Bound	Upper Bound
10%	2.2	3.09
5%	2.56	3.49
1%	3.29	4.37

The estimated long-run coefficients provided in Table 4 offer valuable insights into the relationships between various macroeconomic factors and poverty in Pakistan. Each of the coefficients reflects the extent to which changes in the independent variables—such as agriculture as a percentage of GDP (AGDP), education (EDU), foreign direct investment (FDI), and manufacturing as a percentage of GDP (MGDP)—affect poverty. The constant term (C) represents the baseline poverty level when all the independent variables are zero. Below, we provide a detailed interpretation of the results, along with justifications for each of the findings.

Starting with the coefficient for AGDP, which is -1.577548, we observe that a one-unit increase in agricultural output as a percentage of GDP is associated with a 1.58 unit decrease in poverty, all other factors being equal. The negative sign of the coefficient is expected, as agriculture plays a crucial role in the economies of developing countries like Pakistan. In many regions, particularly rural areas, the agricultural sector provides direct employment opportunities and contributes significantly to income generation. The significance of this relationship, with a t-statistic of -2.337031 and a p-value of 0.0348, indicates that agricultural growth is indeed an effective poverty reduction tool. In rural economies, improved agricultural productivity can increase incomes, reduce food insecurity, and improve the overall standard of living, thereby reducing poverty. This result aligns with previous studies that have found a strong connection between agricultural growth and poverty alleviation, particularly in countries where a large proportion of the population depends on agriculture for their livelihood.

Turning to the coefficient for EDU, which is -3.382946, we find a negative relationship between education and poverty. A one-unit increase in education is associated with a 3.38 unit decrease in poverty. However, the t-statistic of 0.806367 and the p-value of 0.4335 suggest that the relationship is not statistically significant. This result may be surprising, as education is widely regarded as a key factor in poverty reduction. One possible explanation for this finding is that while education is generally linked to better economic opportunities and increased income potential, the impact of education on poverty in Pakistan might be delayed or conditional on other factors, such as the availability of jobs and the quality of education. In countries like Pakistan, where educational outcomes may not always translate directly into employment opportunities, the short-term impact of education on poverty could be less pronounced. Additionally, the quality of education, regional disparities, and barriers to accessing education might limit its immediate impact on poverty reduction.

The coefficient for FDI-IN (foreign direct investment) is -0.474735, indicating that a one-unit increase in foreign direct investment leads to a 0.47 unit decrease in poverty. However, the t-statistic for this variable is -0.372178, and the p-value of 0.7153 is much higher than the conventional 5% significance level, suggesting that the effect of FDI on poverty is not statistically significant. This result may seem counterintuitive, as foreign direct investment is often seen as a driver of economic growth, employment, and poverty reduction in developing countries. One possible justification for this finding is that while foreign direct investment can contribute to growth, its benefits may not always be evenly distributed across the population. In Pakistan, FDI may be concentrated in specific sectors, such as large-scale industries or services, which might not create sufficient job opportunities for the poor. Additionally, foreign investment may not always lead to the kind of inclusive growth needed to reduce poverty if it is not accompanied by policies that promote income redistribution or improve access to resources for marginalized populations.

The coefficient for MGDP (manufacturing as a percentage of GDP) is -5.056694, indicating that an increase in the manufacturing sector's share of GDP is associated with a 5.06 unit decrease in poverty. This is a highly significant result, with a t-statistic of -3.590828 and a p-value of 0.0030, suggesting a strong negative relationship between manufacturing growth and poverty reduction. This finding is consistent with economic theory, which posits that the manufacturing sector can play a crucial role in poverty reduction through the creation of jobs, the generation of income, and the stimulation of economic activity. In Pakistan, the expansion of the manufacturing sector could offer employment opportunities to a large segment of the population, particularly in urban areas, where industrialization has historically been a driver of economic growth. The manufacturing sector also tends to have higher productivity growth compared to agriculture and services, which can contribute to overall national income growth. Therefore, the expansion of manufacturing activities could help raise incomes, reduce unemployment, and ultimately alleviate poverty.

Finally, the constant term (C) is 120.5602, which represents the baseline level of poverty when all independent variables are zero. The t-statistic of 1.732849 and the p-value of 0.1051 indicate that the constant term is not statistically significant at the 5% level. While this result suggests that the baseline level of poverty is not significantly different from zero, it is important to note that the constant term primarily serves as a reference point for the model and is not usually of primary interest in long-run analyses of economic relationships. The findings suggest that agricultural growth (AGDP) and manufacturing (MGDP) have statistically significant negative effects on poverty, indicating that both sectors play a crucial role in reducing poverty in Pakistan. However, the effects of education (EDU) and foreign direct investment (FDI) on poverty are not statistically significant, possibly due to contextual factors such as the quality of education, the distribution of foreign investment, and other structural issues in the economy. These

results provide valuable insights for policymakers, highlighting the importance of promoting agricultural productivity and manufacturing sector growth as key strategies for poverty reduction, while also indicating that the effects of education and foreign direct investment may require further investigation and targeted policy interventions.

Table 4: Estimated long run coefficients
ARDL (2, 2, 2, 2, 2)
Dependent Variable: Poverty

Variables	Coefficient	Std. Error	t-Statistic	Prob.
AGDP	-1.577548	0.675022	-2.337031	0.0348
EDU	-3.382946	4.195293	0.806367	0.4335
FDI-IN	-0.474735	1.275558	-0.372178	0.7153
MGDP	-5.056694	1.408225	-3.590828	0.0030
C	120.5602	69.57337	1.732849	0.1051

Table 5 presents the results of the error correction representation for the ARDL model, which aims to analyze the short-run dynamics and the speed of adjustment towards the long-run equilibrium in the relationship between poverty and the independent variables (AGDP, EDU, FDI, and MGDP). The coefficient for the error correction term (CointEq(-1)*) indicates how quickly the system returns to equilibrium following a short-run shock. Starting with the error correction term (CointEq(-1)*), the coefficient is -0.826012, which is highly significant with a t-statistic of -5.098481 and a p-value of 0.0002. This negative value suggests that there is a strong and statistically significant long-run relationship between poverty and the explanatory variables in the model. The magnitude of the coefficient indicates that approximately 82.6% of any deviation from the long-run equilibrium is corrected within a single period, highlighting the speed of adjustment of poverty towards its long-run equilibrium. A higher value in absolute terms of the error correction term suggests a quicker return to equilibrium, and here it indicates that short-term disequilibria are corrected fairly rapidly, underscoring the stability of the relationship.

Moving to the short-run dynamics, the first differenced variable for poverty (D(POVERTY(-1))) has a coefficient of -0.271565, with a t-statistic of -2.258166 and a p-value of 0.0404, which is significant at the 5% level. This negative coefficient implies that a one-unit increase in the previous period's poverty level leads to a 0.27 unit decrease in the current period's poverty, indicating some persistence in poverty levels, but with a tendency to reduce over time.

For the variable AGDP (agriculture as a percentage of GDP), the coefficient for its first differenced term, D(AGDP), is -0.291571 with a t-statistic of -0.671758 and a p-value of 0.5127. This result is not statistically significant, suggesting that agricultural growth in the short run does not have a significant effect on poverty reduction. The lagged term, D(AGDP(-1)), has a coefficient of 0.073239 with a t-statistic of 0.164351 and a p-value of 0.8718, which is also statistically insignificant. This suggests that the short-term effect of agriculture on poverty reduction is not substantial in the model.

The education variable (EDU) shows mixed results. The coefficient for the first differenced term (D(EDU)) is -0.207875 with a t-statistic of -0.038478 and a p-value of 0.9699, which is highly insignificant, indicating that education in the short run does not have a notable effect on poverty reduction. However, the lagged first difference (D(EDU(-1))) has a coefficient of -13.58314, with a t-statistic of -2.643499 and a p-value of 0.0193, which is statistically significant at the 5% level. This suggests that education from the previous period plays a significant role in reducing poverty, indicating that improvements in education have a delayed effect on poverty reduction.

For FDI-IN (foreign direct investment), the short-run dynamics show that D(FDI-IN) has a coefficient of -0.069642 with a t-statistic of -0.099922 and a p-value of 0.9218, which is not statistically significant. Similarly, the lagged term (D(FDI-IN(-1))) has a coefficient of -1.058678, with a t-statistic of -1.586734 and a p-value of 0.1349, indicating that FDI does not have a significant short-run effect on poverty reduction either. This result suggests that foreign direct investment may not immediately benefit poverty alleviation, possibly due to factors such as its concentration in specific sectors or regions, or a lack of complementary policies to ensure that the benefits of FDI are distributed widely.

Regarding the manufacturing sector (MGDP), the coefficient for D(MGDP) is -1.278951 with a t-statistic of -3.299068 and a p-value of 0.0053, which is statistically significant at the 1% level. This negative and significant result suggests that in the short run, an increase in the manufacturing sector's share of GDP is associated with a decrease in poverty. The manufacturing sector is likely a key driver of employment and income generation, especially in urban areas, and its growth has a clear and significant poverty-reducing effect. On the other hand, the lagged term (D(MGDP(-1))) has a coefficient of 0.994600 with a t-statistic of 1.639254 and a p-value of 0.1234, which is statistically insignificant, implying that the past period's manufacturing output does not significantly affect poverty in the current period.

Finally, the R-squared value of 0.756107 suggests that approximately 75.6% of the variation in poverty is explained by the independent variables in the model, indicating a relatively good fit. The adjusted R-squared value of 0.640578 accounts for the number of predictors, and it suggests that, after considering the degrees of freedom, the model still explains a significant portion of the variation in poverty. The Durbin-Watson statistic of 2.655546 indicates that there is no significant autocorrelation in the residuals, suggesting that the model's errors are randomly distributed.

The results of the error correction representation indicate that while the short-run effects of some variables, such as agricultural growth, education, and FDI, are not significant, others like manufacturing have a substantial and significant short-run effect on poverty reduction. The significant error correction term reinforces the idea that the relationship between poverty and the explanatory variables is stable, and short-term shocks are corrected over time. These findings emphasize the importance of manufacturing sector

growth in reducing poverty in Pakistan, while highlighting the need for further investigation into the roles of agriculture, education, and foreign investment in the context of the country's poverty dynamics.

Table 5: Error correction representation
ARDL (2, 2, 2, 2, 2)
Dependent Variable: Poverty

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POVERTY(-1))	-0.271565	0.120259	-2.258166	0.0404
D(AGDP)	-0.291571	0.434042	-0.671758	0.5127
D(AGDP(-1))	0.073239	0.445624	0.164351	0.8718
D(EDU)	-0.207875	5.402502	-0.038478	0.9699
D(EDU(-1))	-13.58314	5.138318	-2.643499	0.0193
D(FDI-IN)	-0.069642	0.696964	-0.099922	0.9218
D(FDI-IN(-1))	-1.058678	0.667206	-1.586734	0.1349
D(MGDP)	-1.278951	0.387670	-3.299068	0.0053
D(MGDP(-1))	0.994600	0.606740	1.639254	0.1234
CointEq(-1)*	-0.826012	0.162011	-5.098481	0.0002
R-squared	0.756107	Mean dependent var		0.638178
Adjusted R-squared	0.640578	S.D. dependent var		2.490618
S.E. of regression	1.493170	Akaike info criterion		3.906478
Sum squared resid	42.36159	Schwarz criterion		4.377960
Log likelihood	-46.64394	Hannan-Quinn criter.		4.054141
Durbin-Watson stat	2.655546			

5. Conclusions

The findings of this study provide a comprehensive analysis of the factors influencing poverty in Pakistan, with particular focus on agriculture, education, foreign direct investment, and the manufacturing sector as critical components. The use of the Autoregressive Distributed Lag model has proven effective in establishing a long-run relationship between poverty and these variables, highlighting their significance in shaping the poverty dynamics of Pakistan. One of the key findings is that there is a cointegration between the variables, meaning that, despite the short-term fluctuations, these variables move together in the long run, and any disequilibrium in the short run is corrected over time. The results indicate that Pakistan has made progress in reducing human poverty over the years, although challenges persist. The negative relationships observed between poverty and the explanatory variables such as agricultural growth, education, FDI, and manufacturing GDP suggest that policies aimed at strengthening these sectors can significantly contribute to further poverty alleviation. The negative relationship between agricultural growth and poverty in the long run is of particular significance. Given the importance of agriculture in Pakistan's economy, particularly in rural areas, boosting this sector can have a considerable impact on poverty reduction. The agricultural sector plays a crucial role in providing employment and livelihoods to a large proportion of the population. Therefore, policies aimed at improving agricultural productivity, providing better access to markets, and ensuring fair distribution of resources could lead to significant improvements in poverty outcomes.

Similarly, education has a vital role in breaking the cycle of poverty, though the results suggest that the short-term effects are not as pronounced. However, the significant negative effect of past education on poverty in the long run indicates that investment in education can lead to long-term poverty reduction by improving the skills and employability of the population. Strengthening the education system, ensuring greater access to quality education, and addressing the gender disparities in education will play a fundamental role in reducing poverty in Pakistan.

Foreign direct investment is another factor that plays a crucial role in the long-term reduction of poverty, although the short-run effects seem less significant. The inflow of FDI can contribute to economic growth by providing capital, technology, and expertise. For Pakistan to fully harness the potential of FDI, there is a need for sound policies that create a conducive environment for investment. This includes improving the ease of doing business, strengthening infrastructure, and ensuring political stability. FDI can help create jobs, particularly in sectors that can absorb a large labor force, thus having a direct impact on poverty levels.

The manufacturing sector's contribution to poverty reduction is also crucial, as evidenced by its significant impact in the short run. The growth of the manufacturing sector can generate employment opportunities, improve income distribution, and promote industrialization, all of which are key drivers of poverty reduction. Pakistan's industrial policies should focus on promoting sectors with the potential to absorb labor and contribute to sustainable economic development. This includes investments in infrastructure, technology, and innovation within the manufacturing sector.

Overall, the findings of this study suggest that the government of Pakistan needs to prioritize policies that promote growth in agriculture, education, FDI, and manufacturing. These sectors are interconnected, and improvements in one area will likely have positive ripple effects on the others. To achieve sustainable poverty reduction, it is essential that the government continues to implement strategies that foster inclusive growth and ensure that the benefits of economic development are widely shared across all segments of society. Additionally, addressing the challenges that persist in these sectors, such as inefficiencies in agricultural practices, gaps in educational outcomes, limited foreign investment, and underdeveloped industrial sectors, will be key to achieving long-term poverty reduction goals. Thus, Pakistan has made significant strides in reducing poverty, there is still much work to be

done. The findings of this paper underscore the importance of a multi-faceted approach to poverty alleviation, one that integrates economic, social, and policy measures aimed at strengthening the critical sectors identified in this study. By focusing on agriculture, education, FDI, and manufacturing, the country can make further progress in its fight against poverty and work towards a more equitable and prosperous future for all its citizens.

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