POVERTY, NATURAL DISASTERS AND CONFLIFTS IN PAKISTAN: IS THERE A CASUAL RELATIONSHIP?

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ABSTRACT

Poverty has been remaining one of the pressing issues for humanity. In this study, we attempt to determine whether national poverty estimates are also valid for all the provinces of Pakistan. In addition, efforts are made to comprehend the causes and determinants of Pakistan's declining poverty trend. To this end, panel data analysis was carried out on different point of times from 2001 to 2018. The random effect model was applied after Hausman specification test. The result confirmed that natural disasters and terrorism incidences are positively associated with poverty head counts. Terrorism and natural disasters incidence increase poverty by 2.2 and 6 percent respectively. Social protection decrease poverty by 27.7 percent. Current expenditures, both provincial and federal, respond to decline poverty at the rate of 6.9 and 25.2 percent, respectively. Industry can help by providing more goods for a better life standard. Government should make functional the non-functional industrial units at Gaddon and Hattar industrial estates. Rashakai economic zone which is part of the China Pakistan Economic Corridor (CPEC) be developed on priority basis. Trade with neighboring countries should be given more priority. The loopholes in safety net programs should be overcome and duplication of beneficiaries from different safety net strategies be avoided. Forestation and reduced deforestation can help to minimize natural shocks and disasters. Climate shocks can be mitigated by closely monitoring forestation drives such as the billion-tree tsunami and enforcing strong penalties for forest removal.

Keywords: Natural Disaster, Pakistan, Poverty, Terrorism
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I. Introduction

Poverty continues to be a persistent issue faced by developing nations. The main concern of economic policies is to devise poverty reduction strategies. To understand the problem of poverty, one needs to recognize the regions in which it appears and to dig out its definition, concept, measurement, and causes (Bourguignon and Chakravarty, 2003). Different researchers explain poverty differently. It is vigorous due to its diverse classifications which include different approaches for measurement. This can lead to an appreciation of different people and communities because different steps were required for poverty reduction (Laderchi *et al.*, 2003). In a broad sense, poverty is insufficiency, lack of resources, or people who lack a certain quantity of material, assets, or money. It is a multidimensional perception which composes of economic, social, and political components.

The analysis of poverty is a difficult task because different practices are there to measure poverty based on its definitions. The first classification used the nature of basic information which could be called objective and subjective poverty based on the scale used to set the thresholds. Absolute poverty and relative poverty are carried out by applying an objective focus. Absolute poverty is precise as such circumstances where a person's basic needs are not achieved or there is a shortage of basic goods and facilities usually related to food, sheltering, and clothes (Thorbecke, 2013). Relative poverty pinpoints the happening of poverty in the community. From this recognition, a man is considered to be poor if he faces distraught circumstances whether it is financially and socially as compared to other people in the community (Alkire and Foster, 2011). A relative approach to developing poverty thresholds identifies the public nature of economic shortage and provides an approach to set an updated poverty line with whole economic

deviations in a society (Ravallion, 2008). Another concept termed multidimensional poverty is proximately related to social rejection. It is related to deficiency or the dearth of access to certain goods and accommodations quantified as required for society either it is a fundamental need or not. Scarcity is quantified with nonmonetary variables and deprivation indicators by utilizing analyses of such indicators to quantify poverty. This multidimensional deprivation is also called rigorous poverty (Clark and Hulme, 2005). Poverty is a multidimensional concept but it generally unnoticed by important money metric measures of poverty. Multidimensional Poverty Index (MPI) identifies similar deprivations as the Human Development Index (HDI) i.e. education, health, and living standard (UNDP, 2010).

The official measurement of poverty in Pakistan has previously relied upon a single dimension, i.e. consumption-based income approach while recent developments in literature highlighted serious limitations on this poverty measure (Naveed and Tanveer, 2012). The government resetting the poverty estimates and has announced a new poverty threshold of Rs. 3250.28 per adult per month or less than Rs. 107 per day by adopting a new approach for effective measurement of poverty. In Pakistan, there were 20 million poor as per the old poverty line of Rs. 2259 per month per adult whereas the figure now reached 54 million after the introduction of new thresholds. It is worth mentioning that the new worldwide poverty line is set at $1.90 using the 2011 Purchasing Power Parity (World Bank, 2015). According to the government, the new methodology of poverty measurement would be useful for the policy makers and the researchers as well in the country. Due to prudent cost-effective strategies of the government, the poverty line has been showing a downward tendency. According to the planning commission of Pakistan, it will further decline to the minimum level in near future. The government is actively pursuing economic growth and employment opportunities to achieve macroeconomic stability.

According to the Planning Commission of Pakistan, official poverty estimates show a continuous downward tendency. In 2001, 2004, 2005, 2007, 2010, 2011, 2014, 2015 and 2018 poverty rates were 64.3, 51.7, 50.4, 44.1, 36.8, 36.3, 29.5, 24.3 and 21.9 percent, respectively. Poverty estimates of the Planning Commission of Pakistan are for the whole nation which hides many issues on provincial and sub-region levels in the provinces. The provinces of Pakistan are not homogenous in terms of development and economic activity. Further, poverty correlates like terrorism, natural disasters, public policy, economic growth rate, and foreign direct investment have different effects in different regions and sub-regions in Pakistan. Therefore, it is of utmost importance to understand the discrepancies about the measures and correlates of poverty at the national and provincial levels. The present study will try to answer that whether national poverty estimates are also valid for the regions/provinces and sub-regions of Pakistan. It is argued in this study that different provinces of Pakistan are having different levels of economic development and economic activity because of the different basic structures of the economies of these areas and the different forces of development and under-development active therein. This raises the question that whether national correlates of poverty are valid for the regions provinces of Pakistan and whether correlates of poverty across these areas are the same.

The basic research question regarding the officially estimated poverty line is that why the new poverty line is negatively sloped without any upward fluctuation during 2001-2018. During this period, economic activity at the national and sub-national levels has been affected by the energy crisis, slower economic growth, internal conflict and terrorism, floods, and draughts earthquakes, etc. This downward trend of poverty might be due to some methodological issues or it might be due to some other factors like Foreign Direct Investment (FDI), economic growth, remittances, urbanization, and growth in the informal economy as also mentioned by the Planning Commission of Pakistan. Therefore, there is a critical need to validate the national estimates and correlates of poverty at the regional and provincial levels. The present study will help the policy makers to make appropriate policies at the national and sub-national levels for alleviating poverty in Pakistan. It is, therefore, indispensable to analyze impact of terrorism incidence, natural disasters incidence, remittances, GDP, federal current expenditure, federal development expenditure, provincial current expenditure, social protection percent to GDP, and public spending on poverty in all provinces of Pakistan. The current study comprising on five sections i.e. Section-I introduction of the issue discussed, Section-II present the previous studies related to the selected variables of the study. Section-III of the present study present materials and methods used whereas Section-IV illustrate results and discussion of the study however recommendations & conclusion placed in Section-V, respectively.

II. Review of Literature

Poverty reduction is one of the most serious issues prevailing in every society. To reduce poverty, it is necessary to understand its base and effects. Various perspectives and ideologies have developed with time to understand poverty and endeavored to give a far-reaching comprehension of the different ideas and clarifications of poverty. These speculations have shaped the premise of approaches created, and techniques executed to combat poverty. These ideas and clarifications have made the basis of developing policy and implementing strategies to eliminate poverty.

Regional realization is very important to understand the prevalence, depth, and severity of poverty across different regions of the world. Asia is the largest amongst the 7 continents of the world in both size and population comprising 48 countries having three borders with oceans i.e. Indian, Pacific, and Artic. The Asian content is abundant in natural resources like silver, copper, forests, petroleum, gas, rice, fish, and water. Many of the European industries operationalized their companies in Asian countries due to the cheap and unskilled labour supply in this region. Asian economy remains the main growth-oriented economy being a growth rate of 5.4 percent (IMF, 2018) a 0.2 percent decrease comparatively in 2018 due to the adoption of contraction policy by several economies and international oil prices. Inequality in the region increased from 33.5 percent to 38.4 percent. According to Dabla-Norris *et al.,* 2015; Ostry and others, 2014, a negative relationship exist between inequality and growth. Asia and Pacific economies reduce inequality with increase globalization (Berg *et al.,* 2012; Berg and Ostry, 2011) however global financial crises in the year 2007 slow down the economic process which eventually increased the inequality for a couple of years in the region. Global trade and value chain products are the major parts of the Asian economy however relaxation in tariffs between the Asian countries will boost the growth rate (Kumar-De and Imdadul, 2016). Besides the problems of inequality, poverty and unemployment mostly natural disasters occurred in Asia and the Pacific due to surrounding Indian, Pacific, and Artic oceans. In 2018, a total of 315 natural disasters occurred in the world which displaced 68.5 million people and 11804 people lost their lives whereas on the average $132 US billion economics losses tolerate the world however 76.3 percent displaced, 79.8 percent died people and 42.1 percent of the economic losses belong to Asia and Pacific (World Bank, 2019). Between the Asian countries, multilateral liberalization is beneficial however plurilateral is another beneficial option for these countries.

The territories like Pakistan, India, Bangladesh, Sri Lanka, Nepal, Maldives, Bhutan, and Afghanistan belong to the subregion of Asia and Pacific i.e. South Asia. The subregion is the most populist in Asia and the Pacific with 1.913 billion populations almost 24.8 percent of the global population with a 1.17 percent population growth rate (UNICEF, 2013). Southern Asia gains US$ 3.461 trillion nominal GDP and US$ 2000 per capita GDP with 5.4 and 4.1 percent growth rates, respectively. The greater share of 85 percent economy has its place in the Indian economy i.e. US$2.957 trillion (World Bank, 2019) whereas Bangladesh has an economy of $314.656 billion and expected to grow with a rate of 7.2 and India by 7.4 percent in the year 2020 which is the highest growth rate in Asia and Pacific. The GDP growth rate in Pakistan and Sri Lanka is 4.1 percent (World Bank, 2019) however the growth rate in Bhutan, Maldives, and Nepal is quite higher i.e. 6.4, 6.3, and 5.4 percent, respectively whereas the lowest growth rate of the subregion is Afghanistan which is 2.8 percent. Various developments in trade policy have recently influenced South Asia by imposing trade restrictions and increase the tariff to protect domestic industries whereas some countries gain from reforms and lowering import tariffs (Kathuria, 2018; Suresh and Gautam, 2015). South Asia has witnessed an increase in imports than exports in the year 2017 in all countries (World Bank, 2018) however imports and exports take a turn in 2018 whereas Indian export performance increased from 1.5 to 16.6 percent in the last quarter (Artuc *et al.,* 2019) while in case of Pakistan, the imports growth rates seems a declining tendency and exports grew due to imposition of imports tariff on luxuries goods seems an increase in exports earnings (Freund *et al.,* 2018; Gould, 2018; Abbas and Waheed, 2015). The export and import growth seems to an increase from the last two years (World Bank, 2019). Keeping given rapid GDP and economic growth along with export earnings, however, the South Asian region facing problems like economic, social, and natural. In the following paras, three factors i.e. economic, social, and natural are going to be discussed in the context of South Asia. Economic factors including income inequality, unemployment, public spending, and poverty, etc. whereas social factors consist of terrorism, crime, violence eruption, political instability, ethnicity, religious conflicts, etc. while the natural factors including disasters like floods, earthquakes, volcanic, tsunami, droughts and calamity.

According to Kuznets (1955) and Lewis (1955) growth is sometimes responsible for inequality in the country. Inequality rises if rich people benefited more from the cost of poor inhabitants (Sen, 1976). However, during crises like the world oil crises 1973 and 1979 and the world financial crises in 2007/08, the inequality seems to decline especially in Asia and Pacific as illustrious by Wan, 2001. In term of inequality, the South Asian subregion is counted as a moderate inequality (Rama *et al.,* 2014) Apart from the leading economy and high GDP growth rate of India in South Asia, the problem of inequality also exists i.e. 42.28 Gini index (UNU-WIDER, 2018) whereas the top 10 percent rich people have more than 81 percent of the total income of the country however this trend is growing in an upward direction every year. Due to continued economic development and growth, the most benefited groups are upper and middle-income people as their income grows rapidly than poor peoples and all this comes in the first phase of growth (Kuznets, 1955). All this happened due to the industrialization process i.e. shifting rural labour to urban or agriculture sector to industrial sector and capital intensive manufacturing where illiterate and unskilled labour earn minimum wage (Rama *et al.,* 2014). Unemployment, underemployment, tax evasion, and high inflation rates have counted as the causes of inequality in India. Inequality, on the one hand, increases unemployment and underemployment due to which people agree to work at a low wage rate and on the other hand it increases poverty in the country. According to the Asian Development Bank (ADB), 21.9 percent of people in India living below the poverty line i.e. below the purchasing power of $1.90 per day (Majchrowska, 2019). Sri Lanka is the lowest poverty rate in the sub-region i.e. 4.1 percent of people are living below the poverty line followed by Bhutan with an 8.2 percent poverty rate whereas Nepal, Bangladesh, and Pakistan, and India are the highest poverty rates i.e. 25.2, 24.3, 24.3 and 21.9 percent, respectively. Education is one of the most key indicators to combat unemployment and poverty in any country. In India, the education rate is 74.04 percent of the total population whereas the public spending on education is 3.84 percent of its total GDP (World Bank, 2019). However, in South Asia, the highest literacy rates come from the Maldives and Sri Lanka i.e. 99 and 92 percent, respectively whereas Afghanistan followed by Pakistan literacy rates are the lowest rates i.e. 31 and 57 percent, respectively (Hasnat *et al.,* 2018). Despite economic evils like inequality, unemployment, illiteracy, and poverty in South Asian countries, terrorist activities in the subregion also dramatically increased in the last two decades.

Terrorism has been overwhelmed for decades in South Asia and has become one of the main obstacles to regional development, FDI (Tingbani *et al.,* 2019), and economic stability in South Asia. As far as terrorism is concerned, the main factors contributing to terrorist activities including religion, traditions, and nationalism (Arif and Suleman, 2017). Most South Asian countries have rebel movements as the level of these are different but many of these conflicts have been highly classified e.g. in Sri Lanka the Tamil Tiger separatist movement by an ethnic group whereas Kashmir discussed the situation and political instability in India and Pakistan while the government of Nepal obstructs by the socialist movement and in Bangladesh the religious extremism (Kumar, 2019). In South Asia 3,137 attacks take place due to which 5,949 precious lives are lost and the most impacted countries including Pakistan and Afghanistan (Alfaro, 2022). No doubt that Afghanistan has the probable to adverse the economic growth and stability as the economic growth and stability is faraway in Afghanistan due to the wars of 1980s with Russia and involvement of 9/11 terrorist activity. South Asia is the worst hit terrorist region in the world (Bagchi and Jomon, 2018) as all countries are involved in terrorist networks whereas each country suffers from varying degrees of uprising terrorism (Gaibulloev and Todd, 2009). Afghanistan and Pakistan both are the leading countries of South Asia in terms of terrorist activities. In Pakistan, since 2001 roundabout 70 thousand people lost their lives in terrorist attacks due to participation in the war on terror after the incidence of 9/11. However, for a couple of years, Pakistan witnesses a smooth and sharp decline in terrorist activities but due to internal political scenario, the FDI dropped by 51.7 percent in 2019 i.e. from 2.849 to US$1.376 (GoP, 2018-19). Due to international trade tension, Pakistan's export dramatically tends to rise as compared to the previous years. The current government's objective is to improve the investment climate to attract foreign investment to the country as the government of Pakistan has recently signed an agreement of gas pipeline with Russia as well as Saudi Arab shows their interest in the oil refinery industry on Gwadar Port which is expected to increase foreign investment in Pakistan. Terrorist events disrupt the economic activities in South Asian countries however they are also highly vulnerable to natural disasters like floods, earthquakes, droughts, etc. and from the last three decades, more than 900 such like incidence took place which cost an approximately 45 billion dollar along with 2.3 million deaths and affected more than 750 million people around the sub-region.

Natural disasters interrupt economic activity with direct and indirect damages e.g. the direct damages followed into two forms i.e. loss of work due to death, fatal injuries, and disability and the second is the capital loss such as tangible assets like house, factory, etc. which decrease the productivity of both agriculture and industrial sector (Panwar, 2019; Cunado and Farreira, 2014). The loss of jobs and damages to the agriculture and industrial sector due to natural disasters decrease the productivity of labour which has an indirect impact on economic growth and GDP (Loayza *et al.,* 2012). Before a couple of years, large-scale monsoon floods occurred in the countries of South Asia in Bangladesh, India, Nepal, and Pakistan in 2017 and affect more than 41 million people. In the last decade, the monsoon rains caused the heavy flood in Pakistan whereas the Indus River stretch by thousands beyond its bank which killed more than 2000 people and affected about 20 million during the year 2010 (Shabnam, 2014). In the year 2005, more than seventy-three thousand people lost their lives due to a ruinous earthquake (Memon, 2012).

According to economic theory, various factors are responsible for the change in the poverty status of the people. Some of the important factors are economic growth, terrorism, natural disasters, remittances, and urbanization. Decreasing poverty is very essential for development and growth as well (Nellist, 2007). The term poverty is not a straightforward measure. By adopting the right methodology one can figure out its characteristics (Costanza *et al.,* 2009). To understand poverty one should know the theory and practice regarding poverty as well as the interconnections between theory and practice (Moore, 1989). Economic growth is one of the most important factors for poverty alleviation and better quality of life. Economic growth decreases poverty by raising the purchasing power of the people and by providing them with more employment opportunities (Dahlquist, 2013; Zaman and Khilji, 2013; Cheema and Sial, 2010; Mawdsley, 2007; Glewwe and Jacoby, 2004; Bourguignon, 2002; Kakwani, 2000; Roemer and Gugerty, 1997). However, economic growth in Pakistan saw many episodes of ups and downs through time and it did not remain stable. Besides, economic growth also hides the distributional aspect of income among individuals as well as regions. If economic growth is concentrated in the specific sectors of the economy or the specific regions of the country, so it would benefit some people while excluding others. Remittances are important also for reducing poverty. Remittances build human capital and increase the per capita income of the recipient households. However, remittances might be received by a minority group of households in specific regions and sub-regions of the country. Further, the people who manage to go abroad for earnings belong to those households which are already having some asset base in terms of human and physical capital. The poorest of the poor are usually excluded from the opportunities for finding jobs abroad. Urbanization reduces poverty through more access to health and education facilities and by availing more job opportunities (Bouiyour *et al.,* 2016; Cali and Menon, 2013; Brauw and Harigaya, 2007; Ravallion *et al.,* 2007; Adams and Page, 2005; Bertineli and Black, 2004). However, urbanization increases pressure on the already strained capacity and resources of the cities in developing countries like Pakistan. Most of the migrants from rural areas live in slums and shantytowns and engaged in the informal sector. Pressure on educational and health facilities, infrastructure, and sanitation, etc. cause pollution and result in epidemics like dengue in Lahore, Peshawar, and other cities of the country. This study argues that though economic growth, remittances, and urbanization might have played some role in the reduction of poverty in some of the regions of Pakistan. However, in other regions like KP, Baluchistan, South Punjab, and interior Sindh, terrorism, natural disasters, and public policy might be the most important factors behind poverty.

Some of the already underdeveloped regions of Pakistan are facing internal conflict and terrorism for the last few decades. It caused huge human and physical losses in the country. It is argued in this study that these incidents of terrorism and internal conflict have increased the incidence of poverty in the already underdeveloped regions of the country (Das, 2019; Ismail and Amjad, 2014; Kriegger and Meierrieks, 2011; Ali, 2010; Ahmad, 2010; Freytag *et al.,* 2011; Goldstein, 2006). Disasters affect everyone but in the case of poor people and poor regions, their effects are worse than for the rich people and developed regions. Poor people and underdeveloped regions have a low capacity to cope with natural disasters. Natural disaster affects individuals directly by inflicting injuries, deaths and asset losses upon them and brings them below the poverty line. Natural disasters destroy physical and human capital and disrupt economic activity (Kurosaki, 2015; Noy, 2009; Cuaresma *et al.,* 2008; Toya and Skidmore, 2007; Ullah and Kurosaki, 2007; Skidmore and Toya, 2002). This we can observe in KP, Baluchistan, South Punjab, and interior Sindh during the earthquake of 2005 and the flood in 2010. Public policy in the form of public social sector spending plays an important role in the reduction of poverty. Public social sector spending includes expenditures incurred on education,

health, and on the general welfare of the people (Kudebayeva and Barrientos, 2017; Gangal and Gupta, 2013; Dahmardeh and Tabar, 2013; Azevedo *et al.,* 2013; Fan *et al.,* 2004; Fan *et al.,* 2000).

III. Materials and Methods

In economic development, poverty is not a new issue as there has been considerable research available on the problem of poverty and its long-term social and economic impact in both developed and underdeveloped countries. A huge volume of studies has also been conducted to measure different types of poverty in Pakistan as well. In this study, an attempt was made to find the casual relationship between poverty, terrorism and natural disasters in Pakistan.

III.A Correlates of Poverty:

The identification of correlates is essential in analyzing and combating poverty because identifying who is poor is insufficient but one must examine why they are poor. Calculating poverty in depth is more important to understand such factors which expose poverty (World Bank, 2000). Correlates of poverty consists of microeconomic and macroeconomic determinants. Microeconomic determinants of poverty comprise on regional level characteristics associated with poverty, for example, lowest purchasing power, weak communication, fragile infrastructure facilities, less developed markets, and lowest purchasing power contributed more in poverty however on part of macroeconomic good economic and political policies, foreign direct investment with better security at the regional and national level, better governance, market orientation, and free judiciary systems are most important factors to alleviate poverty. To analyze the contribution and impact of such factors on poverty one can need to assess poverty through empirical techniques.

III.B Panel Analysis:

Panel data is the combination of cross-section and time-series data. In cross-section data, we undertake the data for a single period while time-series data must be in continuous series. In a situation when the cross-section data is available for different periods then the panel data analysis will be the most appropriate model for measurements. In the present study, panel data analysis will be carried out at different points in times (Boukhattem, 2016). Using panel data analysis, two models for example Fixed Effect Model (FEM) and Random Effect Model (REM) are commonly used. The FEM is a special case of balanced data where time and cross-sections in data are equal. The unbalanced REM panel model will be employed to see the effects of terrorism, natural disasters, and public policy on poverty. Mathematically we can express the panel model as: -

$$Y_{it} = \alpha_i + \beta X_{it} + u_{it} \quad \text{.....1}$$

In FEM equation (1), "α_i" allow the individual specific effect and must be correlated with regressors X which is the basic assumption of FEM or in other words, these individual's specific effects would be the leftover variation in the dependent variable that cannot be explained by regressors. The individual-specific effect will be covered after estimation

$$\hat{\alpha}_i = \bar{Y}_i - \hat{\beta}\bar{X}_i \quad \text{.....2}$$

Equation (2) remove the time effect from both dependent and independent variables whereas time dummies may be included as a regressor to check individual effect and equation (1) then called Least Square Dummy Variable Model (LSDV) however the inclusion of so many dummies may cause dummy variable trap, loss of more degree of freedom and multi-collinearity and the estimated result will inconsistent and misleading. The LSDV model is given as: -

$$Y_{it} = \alpha_i + \alpha_i D_i + \beta X_{it} + u_{it} \quad \text{.....3}$$

A side effect of the characteristics of fixed-effect models is that they cannot be used to investigate the fixed causes of dependent variables. It is designed to investigate the causes of deviations contained by a person or country. If we do a random effect model instead of a fixed-effect model, it better knows the individual specific effect because the "α_i" that is fixed in the fixed effect model takes the random effect model as an independent variable. In such case equation (1) will be expressed mathematically as:

$$Y_{it}=\alpha_i+\beta X_{it}+u_{it} \quad \text{.....4}$$

$$\therefore \alpha_i = \alpha + \varepsilon_{it}$$

$$Y_{it}=\alpha+\beta X_{it}+\varepsilon_{it}+u_{it} \quad \text{.....5}$$

$$Y_{it}=\alpha+\beta X_{it}+z_{it} \quad \text{.....5}$$

$$\therefore z_{it} = \varepsilon_{it} + u_{it}$$

However, it is difficult to decide which model is appropriate, the Hausman test will be used in the selection of the model.

III.C Appropriate model

The panel regression model will be used to check the effect of Terrorism, Natural Disasters, and Public Spending on poverty at the provincial level.

$$Pov_{it} = \alpha_0 + \beta_1(Terr)_{it}+\beta_2(N.D)_{it}+\beta_3(F.D.Exp)_{it}+\beta_4(F.C.Exp)_{it}+\beta_4(P.C.Exp)_{it} +\beta_5(S.Prot)_{it}+\beta_6(GDP)_{it}+\beta_7(Remit)_{it}+\alpha_1 D_{it}+\varepsilon_{it} \quad \text{.....6}$$

Where

i used for different cross-section units and *t* for different point of times i.e. 2001-02, 2004-05, 2006-07, 2008-09, 2010-2011, 2012-2013, 2014-15 and 2017-18. The dependent variable is *Pov* represent poverty at different point of times, *N.D* represent Natural Disasters, *F.D.Exp* used for Federal Development Expenditure, *F.C.Exp* for Federal Current Expenditure, *P.C.Exp* for Provincial Current Expenditure, *S.Prot* for Social Protection % of GDP, *GDP* for Gross Domestic Product, *Remit* for Remittances and *Dit* is the dummy variable where *i* represent regions like urban and rural and provinces like Khyber Pakhtunkhwa, Punjab, Sindh, and Balochistan whereas *t* shows different points of time.

IV. Results and Discussion

In econometrics, longitudinal or panel data represent multidimensional information that includes measurements over time and contains the number of times it happened to the same group or individuals over a period of time. The panel data analysis was carried out to see the effects of terrorism, natural disasters, and public policy on poverty out for the different points of times (Boukhattem, 2016).

IV.A Descriptive analysis

The initial and utmost step is to comprehend the behavior of selected variables for the model. First, it passes descriptive analysis to understand the behavior of variables in the model. Descriptive statistics have been considered an important part of any research to understand and visualize the variables. Through such statistics, data normalization can be observed by mean and standard deviations and to explain the changes amongst the indicators on different waves. It is important to estimate the standard error of such variations so that one can determine whether the observed variations are statistically significant or not (Bashir & Idrees, 2018; Alper & Berger, 2015). Brief descriptive / summary statistics are given as under: -

Table No.1 Descriptive Statistics

Variables	Balochistan		Khyber Pakhtunkhwa		Punjab		Sindh	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Poverty	3.948	0.395	3.903	0.318	3.87	0.33	3.957	0.267
Terrorism Incidence	4.415	1.689	4.013	2.578	3.095	0.98	3.947	1.796
Natural Disaster Incidence	0.512	0.319	0.906	0.829	0.621	0.562	0.795	0.415
Federal Development Expenditure	5.094	1.194	5.094	1.194	5.094	1.194	5.094	1.194
Federal Current Expenditure	7.21	0.637	7.21	0.637	7.21	0.637	7.21	0.637
Provincial Current Expenditure	3.852	0.723	4.315	0.807	5.536	0.682	5.051	0.659
Social Protection % of GDP	-0.85	0.06	-0.85	0.059	-0.949	0.067	-0.913	0.065
GDP	5.924	0.052	5.929	0.078	6.618	0.091	6.363	0.083
Remittances	16.281	0.774	18.568	0.977	18.834	1.048	16.539	0.954

Source: *Authors own calculations*

Given above Table No. 1, descriptive statistics indicate the normality of the data as the standard deviation comes almost half of the mean of their respective variable.

IV.B Unit root analysis

The unit root test is assumed to be mandatory when the data is time series by nature which helps to understand the output in a better way. However, testing unit root or stationarity in panel data experience from the subfield in econometrics textbooks by Hsiao (2003), Halaby (2004), Arellano (2005), Cameron and Trivedi (2005), Baltagi (2005), Wooldridge (2010) and Greene (2012). In panel data analysis, several unit root tests were introduced for balanced and unbalanced data i.e. Harris-Tzavalis (1999), Hadri (2000), Breitung (2000), Fisher-type (2001), Levin-Lin-Chu (2002), Lm-Pesaran-Shin (2003). However, in the present study Fisher-type has been used as it allows both balanced and unbalanced data with combined p-values (Choi, 2001). According to Enders (2008) "*having the series with no unit root or to be said as stationary series, the mean-variance and autocorrelation can be well approximated by considerably long time averages based on the single set of realizations*". Such kind of estimations leads to the same variance for each period. Suppose that $y_{it} = \alpha_0 + \beta_1 X_{it} + \mu_{it}$ where y_{it} and X_{it} must be specified say stationary whereas the error μ_{it} has zero mean with a finite-difference. The series in the presence of unit root lead to spurious and misleading results (Granger & Newbold, 1974) like insignificant t-values/probability with a high goodness of fitness (r^2) which has no economic meaning. Unit root test is the best way to escape from such spurious regression results however careful selection of integration's order of each variable is required because the integration of y_{it} and X_{it} at different orders will also lead to the spurious regression result. According to Asteriou (2007) existence of weak stationary in time series exhibits mean reversion i.e. fluctuations exist nearby the long-run relationship. In tables No. 2 through 10 each variable is tested for unit root and all variables are found stationary.

Table No.2 Unit Root Test for Poverty (HCR)

Fisher-type unit-root test for Poverty
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	94.1855	0.0000
Inverse normal	Z	-6.1924	0.0000
Inverse logit t(24)	L*	-12.8417	0.0000
Modified inv. Chi-squared	Pm	21.5464	0.0000

P statistic requires the number of panels to be finite.
Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

Table No.3 Unit Root Test for Terrorism Incidence

Fisher-type unit-root test for Terrorism Incidence
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	41.6982	0.0000
Inverse normal	Z	0.7670	0.7760
Inverse logit t(24)	L*	-1.5081	0.0688
Modified inv. Chi-squared	Pm	8.4245	0.0000

P statistic requires the number of panels to be finite.
Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

Table No.4 Unit Root for Natural Disasters Incidence

Fisher-type unit-root test for Natural disasters Incidence
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	71.9221	0.0000
Inverse normal	Z	-4.4780	0.0000
Inverse logit t(24)	L*	-10.7239	0.0000

Modified inv. Chi-squared	Pm	15.9805	0.0000

P statistic requires the number of panels to be finite.
Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

Table No. 5 Unit Root Test for Provincial Current Expenditure

Fisher-type unit-root test for Current expenditure
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	119.4886	0.0000
Inverse normal	Z	-5.3401	0.0000
Inverse logit t(24)	L*	-14.7665	0.0000
Modified inv. Chi-squared	Pm	27.8721	0.0000

P statistic requires the number of panels to be finite.
Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

Table No. 6 Unit Root Test for Federal Development Expenditure

Fisher-type unit-root test for Federal Development Expenditure
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	30.2596	0.0002
Inverse normal	Z	-1.2288	0.1096
Inverse logit t(24)	L*	-2.7762	0.0052
Modified inv. Chi-squared	Pm	5.5649	0.0000

P statistic requires the number of panels to be finite.
Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

Table No. 7 Unit Root Test for Federal Current Expenditure

Fisher-type unit-root test for Federal Development Expenditure
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	72.8058	0.0000
Inverse normal	Z	-1.7021	0.0444
Inverse logit t(24)	L*	-7.6124	0.0000
Modified inv. Chi-squared	Pm	16.2014	0.0000

P statistic requires the number of panels to be finite.
Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

Table No.8 Unit Root Test for Social Protection to GDP

Fisher-type unit-root test for Federal Development Expenditure
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	72.6383	0.0000
Inverse normal	Z	-1.5242	0.0337
Inverse logit t(24)	L*	-7.4673	0.0000
Modified inv. Chi-squared	Pm	16.1596	0.0000

P statistic requires the number of panels to be finite.

Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

Table No. 9 Unit Root Test for GDP

Fisher-type unit-root test for Federal Development Expenditure
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	33.5131	0.0000
Inverse normal	Z	-2.5645	0.0052
Inverse logit t(24)	L*	-3.8478	0.0004
Modified inv. Chi-squared	Pm	6.3783	0.0000

P statistic requires the number of panels to be finite.
Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

Table No. 10 Unit Root Test for Remittances

Fisher-type unit-root test for Federal Development Expenditure
Based on augmented Dickey-Fuller tests

		Statistic	p-value
Inverse chi-squared(8)	P	30.7822	0.0000
Inverse normal	Z	-3.2678	0.0004
Inverse logit t(24)	L*	-2.2346	0.0068
Modified inv. Chi-squared	Pm	4.4456	0.0000

P statistic requires the number of panels to be finite.
Other statistics are suitable for a finite or infinite number of panels.
Ho: All panels contain unit roots
Ha: At least one panel is stationary

Source: *Authors Own Calculations*

IV.C Hausman (1978) specification test

Hausman test (Hausman 1978) a tests for misspecification of econometric models depend on the comparison of estimators of two different model parameter. Using panel analysis fixed and random effect model are applied for analysis. The Hausman specification test is mandatory for the selection of appropriate model in the panel data. In the present case, according to Hausman test the random effect model is appropriate. Table No. 11 presented that the result of Hausman test indicate that the probability value is high i.e 0.997 suggesting that we cannot reject the null hypothesis so the random effect model is more appropriate in the present study.

Table No. 11 Hausman (1978) specification test

	Coef.
Chi-square test value	0.000
P-value	0.997
H_0: Random Effect Model is appropriate	
H_A: Fixed Effect Model is appropriate	

Source: *Authors Own Calculations*

IV.D Effect of terrorism, natural disasters, and public spending on poverty across the provinces

The overall r-squared value of the model indicate the variation of explanatory variables. Table No. 12 of the current study indicate that 68.7 percent variations were explained by the explanatory variables. Also the higher value of r-squared indicate the goodness of model. The analysis shows that any shock whether man-made like terrorism or natural like a flood, rainstorm devastates the economy. These phenomena not only hinder in the earning capacity but also destroys the capital resources used for generation of income as human needs capital to work

with. Our findings confirm that terrorism and natural disaster are positively associated with poverty status. The country is suffering from widespread poverty, but the post 9/11 terrorist attacks (Sullivan & Beittel, 2016) and natural disasters - drought, earthquakes, and floods - have devastated the country and such factors are the key threats to human security (Jehan & Jan, 2020).

The incidence of terrorism bring instability and disrupt the economic performance which reduces the income level of the people which ultimately increase the poverty headcounts due to more vulnerable population to poverty (Tingbani *et al.,* 2019). The empirical results show that poverty and terrorism have a positive and statistically significant relationship which indicates that people living below the poverty line are easily selected by the terrorist groups for terrorist activities (Krueger & Malečková, 2003). Another reason for such relationship between poverty and terrorism is the income gap between poor and rich people (Shaheen *et al.,* 2017; Enders & Hoover, 2012) however terrorism incidence can be reduced if income inequality (Krieger & Meierrieks, 2016) and regional disparity reduced (Enders *et al.,* 2016; Piazza, 2009; Goldstein, 2006). On the other hand, the living standard of people drops down by terrorist activities in affected areas of Pakistan. Natural disasters such as floods, tsunamis, earthquakes, and other severe disasters bring 26 million people into poverty every year (Rozenberg & Hallegatte, 2016).

Natural disasters increase poverty headcounts in the channels like education, health, and economic growth. In Pakistan, the origin of natural disasters is commonly meteorological like storms, floods, cyclones, extreme weather, and landslides. Variation in climate change increases the vulnerability of poor citizens in Pakistan to disasters (Ullah and Takaaki, 2016). In Pakistan, most natural disasters that occurred in the preceding years seem seasonal and their impact is also different in different regions of the country being their diverse topography and climate. Tsunamis and cyclones mainly affected coastal areas, Punjab by flooding and droughts, Balochistan by droughts, floods, and earthquakes, Sindh by flooding and droughts whereas Khyber Pakhtunkhwa is mainly affected by floods, landslides, and earthquakes (NDMA, 2020).

The role of government has also been important in eradicating poverty. These findings are in according to the theory as the government has a distributing role and eradicating the highs and lows by progressive taxation. However, the increase in government current expenditure has significant role in expanding the income generation capacity of society to ensure more income for citizens and overcome the poverty issue (Khan *et al.,* 2020). The government current expenditure reduce poverty due to its negative relationship with poverty head counts. The federal and provincial current expenditure reduce poverty in a multiplier effect however the government development expenditure reduce poverty in long term. The development expenditure mainly comprising on the allocation of expenditures involved in development projects like infrastructure development.

The multiplier effect of federal and current government current expenditure reduce the poverty in such a way that it mainly comprises on salaries and pension disbursement etc. However, if the government is committed to eradicating the inequality of wealth distribution. We can infer from the current findings that the least amount of government intervention can help in eradicating poverty in society. Poverty decreases as a result of increased governmental spending discretion. Long-term, government spending stimulates the economy through increasing aggregate demand. A negative relationship exist between federal and provincial government current and development expenditures and poverty rates (Taruno, 2019; Sasana & Kusuma, 2018). Government expenditures or spending, are considered as productive and efficient because it increase job opportunities, private investment, human capital, and reduce poverty through education and health expenditure (Jehan and Sajjad, 2020; Mehmood and Sadiq, 2010).

The developmental expenditure should enable households to earn jobs and livelihoods. These expenditures are meant to increase the capability of household members which in turn can be applied to income generation activities. However, the duplication of different poverty reduction programs and misappropriation of funds may not produce the desired effects on poverty reduction (Shirazi & Obaidullah, 2014). In the present economic and political situation, the exercise to decrease the fiscal deficit is a good step because it in turn increase the GDP growth rate (Sriyalatha, 2019; Aero & Ogundipe, 2018; Iqbal *et al.,* 2017; Nayab, 2015) which in turn increase employment opportunities in the country (Asghar *et al.,* 2012). Result of the present study indicate that negative and statistical significant relationship exist between poverty and federal development and current expenditure which expedite that one percent increase in

federal development expenditure and federal current expenditure reduce the poverty up to 23.45 percent, 25.23 percent, respectively.

The provincial current expenditure shows economical significant relationship but statistically insignificant with poverty head counts. Economic security is an important strategy to protect people from the poverty, to develop human capital and to promote economic growth (Dugarova, 2019). Unfortunately, result of the present study reveals positive relationship between GDP and poverty headcounts. The association between poverty and GDP is positive and clear such that income inequality rise poverty in developing countries (Sinnathurai, 2013). The fact that the distribution of income disappears in the first stage and is followed by an improvement in the next stage of economic growth is a phenomenon called the Kuznets curve (Omodero, 2019). This phenomenon is thought to be due to the movement of labour force from the rural agricultural sector to the industrial sector, where fewer people benefit from greater access (Kuznets, 1955). Another possible reason of such relationship between GDP and poverty head counts is that terrorism and natural disasters incidence mainly disrupt the economic activities (Saleem *et al.,* 2020) which also reduce the GDP growth rate and subsequently the poverty head counts increase (Ali, 2010; Ahmed *et al.,* 2018).

The inequality index of Pakistan confirmed the increasing trend of inequality (UN, 2020) Governments need to adopt appropriate efforts to prevent or at least slow the rise of income inequality, for example, capital accumulation combined with efficient initiatives to boost small and medium enterprises can help to improve income distribution (Lin *et al.,* 2020; Lakuma *et al.,* 2019). Another reason of such relationship is subsidies that aren't well-targeted have the potential to restrict growth by diverting investment away from its most productive uses (Qureshi & Sadozai, 2016; Mawdsley, 2007). The social protection towards GDP encounter a negative relationship with poverty head counts. In Pakistan, the number of beneficiaries from such social spending cross almost 14.4 million in 2020-21 (GoP, 2021) which means that such program significantly contribute their parts in poverty reduction. Spending on account of social protection by the government reduce the poverty in the way like social insurance, assistance and relief (Wills *et al.,* 2020). Remittances considered another pillar of poverty alleviation as it decrease poverty directly and indirectly (Kumar, 2019). Workers remittances increase the per capita income which ultimately increase the standard of living (Imran *et al.,* 2018) whereas it also increase the human capital building i.e. increase the health and education facilities of the receivers. On the other hand flow of remittances significantly contribute to increase the economic growth by increase the foreign exchange reserve (Mustafa & Ali, 2018) and promote business environment which decrease the poverty headcounts significantly. The current study also reveals that a one percent change in remittances tend to decrease the poverty by 57 percent. To avoid the issue of perfect linear dependence in a regression analysis, Stata does not automatically produce a dummy variable for a base group so the province Balochistan was considered as base province. Keep other variables the same, on the average the provincial dummy variable shows that Khyber Pakhtunkhwa have 4.3 times more poverty than base group variable whereas Punjab province recorded 16.9 times less poverty followed by Sindh province i.e. 10.9 times.

Table No. 12 Random-effects regression

Poverty	Coef.	St.Err.	t-value	p-value	Sig
Terrorism Incidence	0.022	0.002	13.38	0.000	***
Natural Disasters Incidence	0.06	0.032	1.90	0.057	*
Federal Development Expenditure	-0.235	0.041	-5.73	0.000	***
Federal Current Expenditure	-0.252	0.062	-4.09	0.000	***
Provincial Current Expenditure	-0.069	0.07	-0.97	0.331	
Social Protection % of GDP	-2.773	0.214	-12.96	0.000	***
GDP	2.303	0.589	3.91	0.000	***
Remittances	-0.573	0.1	-5.74	0.000	***
2.Khyber Pakhtunkhwa	0.043	0.044	1.00	0.32	
3.Punjab	-1.694	0.483	-3.51	0.000	***
4.Sindh	-1.097	0.328	-3.34	0.001	***

Constant		-8.889	3.183	-2.79	0.005	***
Mean dependent Var	3.919		SD dependent Var		0.316	
Overall r-squared	0.876		Number of Obs		32.000	
Chi-square	13.78		Prob > chi2		0.008	
*** p<0.01, ** p<0.05, * p<0.1						

Source: *Authors Own Calculations*

V. Recommendations

Based on previous findings and discussion, some policy recommendations are given as under:-

- To address the issue of poverty we should take targeted action. We need to identify the poorest regions and then devise our strategies to bring the poor regions at par with the less poor regions.
- We should identify the vulnerability of different regions to terrorism and natural calamities like floods and drought and then devise strategies for avoiding or reducing their adverse effects.
- Industry can help not only providing jobs to the rising population but also more goods for a better life standard. Government should make functional the non-functional industrial units at Gaddon and Hattar industrial estates in the province. These can be made functional by providing tax holidays to the industrialist in these regions. Similarly, the Rashakai economic zone which is part of the China Pakistan Economic Corridor (CPEC) be developed on a priority basis. These economic zones be connected with the mainland transport services by a project similar to metro bus and Bus Rapid Transit (BRT) to increase and ease the mobility of people.
- The oil and gas royalties should be spent on poverty reduction activities specifically in the districts of their origins.
- The loopholes in safety net programs be overcome and duplication of the beneficiaries from different safety net strategies be avoided. These strategies should strictly target the extremely deserved population on a priority basis by ensuring proper monitoring and implementation.
- The natural shocks can be reduced by forestation and reducing deforestation. The climatic shocks can be reduced by proper monitoring of the forestation drives like billion tree tsunami and strict punishment for cutting forests.
- There is a rise in conflicts and disputes and most of the people or involved in the litigation not only divert their money but also disrupting the time. Money and time can be used on human development and improving the standard of life. Though there is a parallel system of *jirga* (local community comprising on elders for resolution of disputes) for dispensing justice and resolving the issues, however, speeding up the process of justice dispensation can overcome the worsening of disputes which sometimes go for generations. The Dispute Resolution Council (DRC) solved many long-term dispute cases in Khyber Pakhtunkhwa by settlement and mutual agreements between the parties. By introducing the DRC system in other provinces will help to resolve the long-term litigation cases and the litigated land can be used for agricultural productivity or other productive ventures.
- The coal-based electricity generation can help in alleviating the issue of poverty in Sindh by allocating the royalty to the poorest people. The electricity generated should be provided at concessional prices for the industry in rural Sindh. Also, people from rural Sindh be given priority of employment in that coal-based projects.
- Local governments should increase their budget allocations to the health and education sectors in order to reduce poverty more effectively.

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