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Article

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DEVELOPMENT ECONOMICS | RESEARCH ARTICLE

Rural Poverty profile in Pakistan: Incidence, Severity, and Correlates through Consumption Based Approach

Muhammad Mehboob Alam¹, Sayed Irshad Hussain², Akhtar Hussain³ and Izhar Ul Hassan^{4*}

Abstract: This study is an attempt to estimate the incidence, severity, depth, and determinants of poverty in Jhang district, Punjab, Pakistan. For this purpose, the data were collected from 1,000 households through a specifically designed questionnaire using multistages sampling technique in all four subdistricts of Jhang district. The study used both income-regression model and logistic regression to assess the impact of demographic and socioeconomic factors on poverty incidence. The results show that 54.3% of households are below the poverty line, including 16% extremely poor. Poverty measures including headcount index, severity, and depth of poverty are worse among the households headed by farmers, daily-wagers, and illiterates. Moreover, the results confirm that the household's livestock population, landholding, ownership of agricultural land, total assets, and earners per household considerably reduced the poverty incidence in Jhang district. While household size, age of household head, economic dependency ratio, and total



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PUBLIC INTEREST STATEMENT

The objectives of the study are to find the determinants of poverty, its incidence, severity, and depth in Jhang district, Punjab, a rural area of Pakistan. The study collected data from 1,000 respondents with the assumption of representing the whole population of Jhang district. The findings show that landholding, agricultural land, ownership of livestock, size of the family, number of earners, dependency ratio, female-male ratio, number of adults, the total value of household assets, and age, gender and level of education of household head are significantly differentiated between the poor and non-poor in Jhang district, Punjab, Pakistan. The study suggests that governments should increase public spending on socioeconomic programs with a particular focus on family planning, employment opportunities, education, and land distribution in order to reduce rural poverty in Pakistan.

dependency ratio significantly increased the level of poverty. The study concludes that demographic and socioeconomic characteristics of the households are of greater importance in alleviating poverty generally in Pakistan but particularly in rural areas. Hence, it is suggested that governments should increase public spending on socioeconomic programs and services with a particular focus on education, women's empowerment, family planning, employment opportunity, pro-agriculture policies, and equitable distribution of land and wealth to alleviate poverty in rural areas of Pakistan. Further research can be conducted by selecting large sample size and analyzing the household characteristics at the disaggregated level incorporating time variations to develop a more impactful policy framework.

Subjects: Population & Development; Sustainable Development; Sociology & Social Policy

Keywords: rural poverty; correlates; incidence; severity; depth; absolute poverty

1. Introduction

The situation of poverty generally in the whole world, particularly in Pakistan, has been precarious since its inception. According to the UNDP (2016), 38% of the population in Pakistan lives below the poverty line, which is approximately 74 million people. The pace of economic growth in Pakistan has been slower compared to poverty reduction and human development. Despite impressive economic growth, around one-fourth of the population lives below the poverty line. There are two contributing factors, impeding the poor to benefit from rising economic growth. First, lack of human capital in terms of education, training, and health. Second, the high-income earning jobs are constrained for poor dragging them further toward abject poverty. The government has adopted a welfare-centric approach rather than empowering the poor. The reduction in poverty over the long term is subject to accelerated human development along with adequate employment opportunities. Realizing the significance of poverty alleviation as not an end in itself but also as a critical factor for sustaining future economic growth, the government of Pakistan has shown enhanced commitment to reduce poverty. There are many factors and forces responsible for this social evil, which may include weaker human resources, outdated infrastructure, limited opportunities, and the unavailability of basic services.

The reduction of poverty is at the top of the global agenda as clearly indicated in the UN Sustainable Development Goals. The evidence-based information and research are critical on a regular basis in order to address issues of poverty and inequalities. Poverty alleviation has been the hallmark of policy formulation in many developing and developed countries for the last few decades. Eradication of poverty prominently features in the UN Sustainable Development Goals (SDGs) targeted for 2030. Pakistan has also taken the poverty alleviation as its top priority and has introduced various initiatives to overcome the menace of poverty.

Poverty reduction is one of the fundamental challenges faced by Pakistan. There are many factors and forces that have been worsening the poverty scenario in the country (Haq & Zia, 2013). The government of Pakistan has introduced many poverty alleviation programs to reduce poverty. However, despite various initiatives comprising of poverty alleviation, employment generation, and income distribution in Pakistan, the level of poverty is still very high among rural households in Pakistan. Many theorists and economists believed that the success and failure of any poverty alleviation program depends on better understanding of policy-focused questions. For example, (i) what percentage of people are poor? (ii) How far are the poor from the poverty line? (iii) What is the gap between the average poor and the core poor and (iv) what are the main determinants of poverty in the given society? The answers to these questions can help policymakers in alleviating poverty among poor households. In addition, Luczak and Kalinowski (2021) argued that the quantitative measurement of poverty at the household level is crucial for the formulation of anti-

poverty policy. In this context, the present study aims to find the incidence, severity, depth, and correlates of poverty in rural areas of Pakistan. More specifically, this study estimates how various demographic and socioeconomic characteristics affect the level of poverty in district Jhang. A larger number of existing studies focus on poverty, although most of these studies have concentrated on determining the incidence and determinants of poverty at the national and provincial levels, whereas at district level, information on poverty is still rare and unexplored in the rural areas of Pakistan. The study is a guiding source for policymakers to eradicate poverty in rural areas of Pakistan. This study is construed to improve the design of poverty alleviation programs and how better resources can be distributed to yield better results. Similarly, this study can specifically help to identify and pinpoint the poorest of the poor within the communities for targeting programs.

The concept of poverty is not easy to address, but there are certain factors on which different theorists have defined poverty. Several scholars have defined poverty line on the basis of the World Bank standard poverty line, i.e. 1.25 dollar per day for 2005 and 1.90 dollar per day for 2011, called absolute poverty; some philosophers have defined it on the basis of calorie intake per day, called food poverty, and many others have defined the poverty line as having no freedom, no rights. Kalinowski (2020) has used all three poverty lines, including relative, objective, and subjective, to estimate rural poverty. Hagenaars and Van Praag (1985) argued that the poverty line, whether absolute or relative, depends on the median income of the country. However, almost all the scholars agreed to the statement that absolute poverty (consumption approach¹) is a more appropriate measure of poverty in the developing nations. Therefore, it is necessary to estimate and analyze the absolute poverty in developing nations where the majority of the population lives in rural areas and has limited access to resources. As Pakistan is a purely agricultural country, the majority of the population (60.78%) lives in the country's rural areas. Therefore, the present study used the absolute poverty (consumption approach) to estimate how various factors, including demographics and socioeconomic, affect the level of poverty in Jhang district, Punjab, Pakistan.

The remaining article is organized as a literature review in Section 2. Methodology and results are presented in Sections 2 and 3, respectively, and Section 5 concludes the whole study by suggesting important policy implications.

2. Literature review

The concept of poverty can be defined differently depending on the context. It can be defined as a state or condition in which people belonging to a community face difficulties meeting certain living standards. The United Nations defined poverty as an inability of having opportunities and choices and a human dignity violation, whereas the World Bank described poverty as the deprivation of the social well-being of individuals. The World Bank classifies earning less than US\$1.90 - per day as extreme poverty. The prevalence of poverty, particularly rural poverty in developing and developed countries, has been discussed in literature extensively. The study conducted by Thompson et al. (1983) reported that the demographic and socioeconomic characteristics of the household, including education, occupation, number of children, race, sex, and age, made a significant difference between the poor and the non-poor in the southeastern state of the USA. In addition, Susheela et al. (2000) reported that land holdings and joint families have significantly differentiated between poor and non-poor in India. The study of Mehta and Shah (2001) analyzed the chronic poverty in "dry land" areas and "forest-based" areas of India. They documented that chronic poverty is high among casual agriculture laborers, scheduled castes, and scheduled tribes. Likewise, Minasyan and Mkrtchyan (2005) argued that the agriculture sector production or income from agriculture has a considerable influence on the reduction of poverty in Armenia. Recently, Eyasu and Yildiz (2020) argued that the non-off-farm income has considerably reduced the poverty incidence in the North-Western Ethiopia. The results of all three studies signify that occupation has played a decisive role in the determination of poverty level.

Geda et al. (2001) reported that level of education, places of residence (urban and rural), and livestock population have a considerable influence on poverty in Kenya. In addition, Apata et al. (2010) also argued that the education level, livestock, and female head of the household have increased the likelihood of being poor in Nigeria. Similarly, Rahman (2013) confirmed that the poverty level is high among the households that are headed by female and are illiterate in Bangladesh. The results of all three studies suggest that education level, livestock, and female head are crucial determinants of poverty level. Recently, Luczak and Kalinowski (2020) argued that material deprivation is high in new member states as compared to old European Union countries. It signifies that the poverty level is significantly different across European countries. The empirical findings of all the mentioned studies showed that micro-determinants, including the demographic and socioeconomic characteristics of the households, have a considerable influence on poverty incidence across the globe.

With respect to the literature available for Pakistan, Shirazi (1995) argued that the number of earners and education level of household head have adverse effects on poverty level, while the size of the household has a positive effect on the incidence of poverty. In addition, he claimed that the poverty level is high in Punjab as compared to other provinces in Pakistan. The study by Arif et al. (2000) ascertained that the poverty level is high in rural areas as compared to urban areas in Pakistan. Haq and Arif (2004) examined the dynamics of poverty and concluded that incidence, severity, and depth of poverty have increased over time in Pakistan. Anwar et al. (2004) in their study reported that agricultural landholding is one of the most crucial contributors to rural poverty in Pakistan. The study of Jamal (2005) documented that the family size, livestock population, land holdings, poultry, and level of education dependency ratio are critical poverty predictors in Pakistan. Similarly, Sikander and Ahmed (2008) asserted that the age, gender, and education level of household head, large family size, and high dependency have a considerable influence on the probability of being poor in Punjab. Chaudhry et al. (2009) also argued that landholding, livestock population, high dependency ratio, and large family size have a considerable influence on poverty level in the village of Betti Nala in Tehsil Jatoli, district Muzaffargarh in southern Punjab. Anka (2009) ascertained that land ownership, number of earners, and household size have substantial effect on poverty incidence in districts Sanghar and Badin, Sindh. Alam and Hussain (2013) argued that family size, education, gender, and age of the household head matter in differentiating between poor and non-poor in district Khyber Agency, Khyber Pakhtunkhwa. Recently, Jain et al. (2018) also reported that large household size and number of the earners have a significant effect on poverty level in Punjab. Likewise, Shah et al. (2020) argued that the education and age of household head, number of earners, own house, and physical assets are significantly discriminated between poor and non-poor in southern Punjab. Ahmad and Faridi (2020) argued that the high dependency ratio and lower level of education have considerably increased the rural poverty in southern Punjab. Likewise, Hatim et al. (2022) ascertained that education level has a significant impact on rural poverty in Multan and Bahawalpur division, Punjab. Mumtaz et al. (2022) argued that agricultural landholding, livestock population, and small household size have significantly reduced the predictive probability of being poor in rural areas of Pakistan. From the above discussion, it can be deduced that socioeconomic and demographic characteristics of the household have a significant influence on the poverty level in rural areas of Pakistan.

Extensive numbers of empirical studies have estimated poverty incidence and correlates in rural areas of Pakistan; however, the majority of the studies have used provincial or national level data. Using the national or provincial data has constraints of knowledge and exploration that can be simulated through district level data. Few studies have analyzed the poverty dynamics in Pakistan at a district level; however, they have framed a small sample size or covering only a unit of village and sub-tehsil. For instance, Chaudhry et al. (2009) have analyzed the poverty dynamics by using data from only the village of Betti Nala in Tehsil Jatoli, district Muzaffargarh in southern Punjab. Second, Anka (2009) investigated the correlates and incidence of poverty in Badin and Sanghar

districts using an income regression model on a small sample size comprised of 320 households. However, the current study utilizes a large sample size of 1,000 households covering all four subdistricts of Jhang district, which is likely to represent a true picture of poverty in the country and especially in the province of Punjab because of its unique geographical and demographic characteristics.

3. Methods

3.1. Explanation of the variables and model specification

The causative factors of poverty can be classified into macroeconomic or microeconomic variables. It has been observed that poverty depends on various aspects mostly related to the household level, and it is difficult to explain the poverty dynamics through macroeconomic variables. Therefore, the current study is focused on the microeconomic variables and characteristics of the household. The demographic and socio-economic characteristics of the households and sub-factors defined in the Millennium development goals, a household survey of Pakistan and also used in the extant literature have been taken as determinants of poverty in the specified model. A detailed description of each variable is summarized in Table 1.

3.2. Data source

The current study has used the primary data collected through a questionnaire. The information in the questionnaire includes household size, the income level of the household, expenditures of the household, and other social and demographic characteristics of the household. Every possible effort was made in order to confirm the reliability and accuracy of the information. The questionnaire was designed based on various questionnaires already used by the United National Development program (UNDP) to calculate the Multidimensional Poverty Index and Benazir Income Support Programme (BISP) for the collected poverty data in Pakistan. In addition, we conducted the pilot study to check the reliability of the questionnaire. The questionnaire was finalized after making some changes that were suggested by different researchers in relation to region/district and observed in the pilot study. Along with the primary data, secondary data were also used. The secondary data obtained from the Population Welfare Department, Federal Bureau of Statistics, and Revenue Office of Jhang district. Other relevant data related to poverty were derived from available literature.

3.2.1. Sample size

All the people and households of the whole Jhang district are considered as the population in the current study. The results would be more accurate if the entire population of Jhang district was interviewed. However, due to certain constraints, the data were collected only from 1,000 households in all four subdistricts of Jhang district assuming that it represents the entire population. We have selected a sample size of 1,000 households from all four subdistricts of Jhang District. The sample size was obtained using a confidence level of 95% and an error margin of 0.05. In each subdistrict, the sample size was calculated on the basis of the households in each subdistrict and the population. The sample size in Table 2 in each subdistrict is obtained using the following formula:

$$N_k = n N_k \div \sum n_k$$

where N_k is the proportion of the sample in the k^{th} subdistrict, n is the size of the sample, N_k is the population of the k^{th} subdistrict, and n_k is the total population in Jhang district.

3.2.2. Sampling procedure

The household was selected based on the multiple-stage sampling techniques (Cochran, 1977). In the first phase, the number of respondents/households have been selected in all four subdistricts of the Jhang on the basis of population in each subdistrict. In the second stage, union councils have been selected through probability sampling technique in each subdistrict. In the third stage,

we have selected the number of villages in each union council based on a random sampling technique. In the fourth phase, a nonprobability sampling technique was employed throughout the Jhang district and households from each village were selected based on convenience and willingness to answer our questions.

3.3. Statistical analysis

The level/magnitude of the poverty was determined by calculating head count index, poverty gap/depth, and severity of poverty.

3.3.1. Headcount Index

This study has used the headcount index to measure poverty and poor household share, which is one of the most common measures of poverty. The head-count index is calculated as follows:

$$Po = \frac{H}{N} \times 100$$

P_o measures the magnitude of poverty as the percentage of households that are under the specific poverty line. N is the total number of households and H is the number of households that are below the poverty line.

3.3.2. Poverty gap/depth

This is indicative of the aggregate poverty depth of the poor relative to the poverty line. It is a good indicator as it shows the distance the poor are away from the poverty line. In addition, poverty gap demonstrates the average consumption gap that exists between the actual expenditure incurred by the poor and the poverty line. The poverty gap also represents the amount of income required to ensure that everyone pulls out of the poverty line. Poverty gap is calculated by using the following procedure:

$$PGR = \frac{1}{n} \sum_{i=1}^n \left(\frac{Z - Y_i}{Z} \right)$$

where P is the poverty gap ratio (distance of the poor below the poverty line), Z is the poverty line, Y_i is the income of the i^{th} poor household, and n is the population of the poor.

3.3.3. Severity of poverty

The severity of poverty takes into account the distribution of income among the poor and is measured by the squared proportional of the poverty gap ratio as follows:

$$SP = 1/n \sum [(z - y_1/z)^2 + (z - y_2/z)^2 + (z - y_3/z)^2 + \dots + (z - y_q/z)^2]$$

where z is the poverty line income level, y_1 to y_q is the income level of the poor, and n is the population of the poor.

3.3.4. Econometric models

3.3.4.1. Income regression model. We used the income regression model to identify the determinants/correlates of poverty and per capita income. The income regression model have been widely used to determine poverty correlates of households by researchers (Ahmad & Faridi, 2020; Chaudhry et al., 2009). In the model, per capita income is used as the dependent variable, whereas socioeconomic and demographic characteristics of the household are used as explanatory variables. The following model has been developed for a better understanding of the relationship of per capita income with different determinants of poverty:

$$\begin{aligned} \text{LnPCI}_i = & \beta_0 + \beta_1 \text{LnHS}_i + \beta_2 \text{LnHHAGE}_i + \beta_3 \text{LnEDR}_i + \beta_4 \text{LnEANPH}_i + \beta_5 \text{LnTDR}_i \\ & + \beta_6 \text{LnCHILR}_i + \beta_7 \text{LnAGEDR}_i + \beta_8 \text{LnFMR}_i + \beta_9 \text{LnTAST}_i + \beta_{10} \text{LnLIVST}_i \\ & + \beta_{11} \text{LnLANDH}_i + \beta_{12} D_1 + \beta_{13} D_2 + \beta_{14} D_3 + \mu_i \end{aligned} \quad (1)$$

where

Ln PCI = per capita income

HS = household size

EDR = earner (Economic) dependency ratio

HHAGE = household head's age

EANPH = earner per household

TDR = total dependency ratio

CHILR = child dependency ratio

AGEDR = aged dependency ratio

FMR = female to male ratio

LNTAST = value of total assets.

LN LIVST = number of livestock.

LANDH = Landholding by the household

D1 = dummy variable (Agriculture Land): 1 if the house has no farming land. (0 otherwise)

D2 = dummy variable (Education Level): 1 in the case when head of household has a matric education or less than matric. (0 otherwise)

D3 = dummy variable (No Livestock): 1 in the case when household does not have livestock. (0 otherwise)

μ_i = error term. β_0 is a constant. β_1 to β_{14} are the coefficients/elasticities with respect to corresponding variables.

3.3.4.2. Logistic model. We have constructed the logistic regression model by incorporating socio-economic and demographic factors affecting the level of poverty. The logistic regression model gives better results than simple or multiple linear regression models (Landwehr et al., 2005). In the logistic model, we have to use dummy variables. In the model, we have used poverty as dependent variable, and all other quantitative and qualitative variables such as household size, joint family system, house structure, dependency ratio, education level, the age of head of the household, and occupation of head of the household are used as independent variables. Mathematically, the model is expressed as follows:

$$\begin{aligned} \text{Pov}_i = & \beta_0 + \beta_1 \text{LnHS}_i + \beta_2 \text{LnHHAGE}_i + \beta_3 \text{LnEDR}_i + \beta_4 \text{LnEANPH}_i + \beta_5 \text{LnTDR}_i \\ & + \beta_6 \text{LnCHILR}_i + \beta_7 \text{LnAGEDR}_i + \beta_8 \text{LnFMR}_i + \beta_9 \text{LnTAST}_i + \beta_{10} \text{LnLIVST}_i \\ & + \beta_{11} \text{LnLANDH}_i + \beta_{12} \text{D1} + \beta_{13} \text{D2} + \beta_{14} \text{D3} + \mu_i \end{aligned} \quad (2)$$

where

Pov = poverty; 1 if the household is poor; 0 otherwise

HS = household size

EDR = earner (Economic) dependency ratio

HHAGE = household head's age

EANPH = earner per household

TDR = total dependency ratio

CHILR = child dependency ratio

AGEDR = aged dependency ratio

FMR = female–male ratio

LNTAST = value of total assets.

LNLIIVST = number of livestock.

LANDH = Landholding by the household

D1 = 1 If head of household is farmer (0 otherwise)

D2 = 1 If the household's head is agriculturalist (0 otherwise)

D3 = 1 If the head of the household is daily wager (0 otherwise)

D4 = 1 If the household does not have agricultural land (0 otherwise)

D5 = 1 If the structure of house is Kacha (mud) (0 otherwise)

D6 = 1 in the case of joint family system (0 otherwise)

D7 = 1 in the case when head of household has a matric education or less than matric.

(0 otherwise)

D8 = 1 in the case when household size is more than 08 (0 otherwise)

D9 = 1 in the case when household does not have livestock (0 otherwise)

μ_i = error term. β_0 is a constant. β_1 to β_{19} are the coefficients with respect to corresponding variables.

Table 1. Variable formation and description

	Variable Name	Variable Description	Data Type	Categorical Description
Demographics Factors	Size of Household	Number of family members living in a household	Continues	Number
	Age	Age of household head	Continues	Number
	Type of Occupation	Occupation of household head	Categorical	1 = Farmer, 0 = Otherwise 1= Daily Wager, 0 = Otherwise
	Education of Household Head	Level of education/Years of schooling	Categorical	1= Matric and Less than Matric, 0= Otherwise 1= illiterate 0= Otherwise
	Type of Family	Joint family/Nuclear family	Categorical	1= Joint Family, 0 = Nuclear Family
	Earner (Economic) Dependency Ratio	Household size/Total number of earners per household. Not working members of the household/ household working members	Continues	Number
	Total Dependency Ratio	Number of not working-age population/working-age population	Continues	Number
	Female–Male Ratio	Number of females to the number of males in a household	Continues	Number
	Child Dependency Ratio	Number of children (0–14 years) in household/adults (15–64 years)	Continues	Number
	Aged Dependency Ratio	Number of household members above 64 years/adults (15–64 years)	Continues	Number
Social Factors	Number of Room per household	Number of rooms in the house	Continues	Number
	Structure of Houses	-	Categorical	1= Pucca, 0 = Kacha
Economic Factors	Total Assets	Value of total assets possessed by household	Continues	Number
	Livestock population/ production	Number of livestock population/ possession of livestock populations	Continues/ Categorical	Number/1 = No, 0 = Yes
	Landholding	Total area of land owned by the household	Continues	Number
	Agricultural Land	Possession of farming land	Categorical	1= Yes, 0 = No
	Number of the Earners	Total number of earners per household (<i>Earners are those persons who provide the household with the material return, in cash or in kind</i>)	Continues	Number

Table 2. Sample Size in subdistrict

District Name	No. of Questionnaires
Jhang District	480
Atthara Hazari	160
ShorKot	150
Ahmedpur Sial	210
Total	1,000

Source: Government of Pakistan, Census 2017.

Table 3. Poverty estimates in Jhang district of rural areas of Pakistan

Poverty Measures	Poverty Estimates
Poverty Incidence	54.3%
Poverty Depth	0.36
Severity of Poverty	0.13

Source: Calculated from the survey data.

4. Result and discussion

4.1. Magnitude of poverty

We have employed three different measures, including poverty depth, headcount ratio, and severity, to calculate the extent of poverty. The estimated results in Table 3 confirmed that 54.3% of households are below the poverty line. This implies that the situation of poverty is very critical in Jhang district of Punjab, Pakistan. In addition, the results showed that the poverty depth and severity were 0.36 and 0.13, respectively. Poverty depth, i.e. 0.36, indicates that 36% more consumption is needed to reduce the absolute poverty in Jhang district.

We further classified households based on income level into six categories: extremely poor, ultra-poor, poor, vulnerable, Quasi Non-poor, and Non-poor. The results in Table 4 indicate that 54.3% of households are poor, with 16% of households being extremely poor, 20% being ultra-poor, and 18% being poor in Jhang district. In addition, the findings show that 45.7% households are non-poor, including 19% of vulnerable, 6.7% are quasi non-poor, and the remaining 20% are non-poor in Jhang district.

4.2. Correlates of poverty

4.2.1. Bivariate analysis

Bivariate analysis was conducted to better understand the impact of demographic and socio-economic characteristics on poverty incidence in Jhang district.

4.2.1.1. Demographic factors. Various measures of poverty, including headcount index, depth, and severity, have been properly analyzed among poor households to identify the factors influencing the incidence of poverty in Jhang district. The analysis for educational attainment shows that as the head of household's level of education increases, the incidence, depth, and severity of poverty decrease. It implies that education level has considerably reduced the poverty level in Jhang district. Furthermore, the analysis of job structure shows that more than 50% of poor households are headed by farmers. All three measures—headcount ratio, depth, and severity—are low in households headed by the government and private employees. Overall, more than 35% of poor people are living in households that are headed by farmers. These results signify that the job structure has a significant influence on the level

Table 4. Magnitude of poverty in Jhang district with respect to income level

Income Level	Poverty Bands	Frequency	%	Income Level	Poverty Bands	Frequency	%
Less than 3,030	Poor	543	54.3%	1,515	Extremely Poor	163	16%
				2,273	Ultra poor	196	20%
				3,030	Poor	184	18%
More than 3,030	Non-Poor	457	45.7%	3788	Vulnerable	189	19%
				4,545	Quasi Non-Poor	71	6.7%
				6,060	Non-poor	197	20%

Source: Calculated from the survey data.

Table 5. Decomposition of poverty

Poverty Correlates (Demographics)	As percentage of Poor Households	Percentage of total Household	Headcount index	Poverty Depth	Severity of Poverty
Measures of Poverty by educational attainment					
Post Graduate	0%	1%	0%	-	-
Graduate/Equivalent	13%	21%	7%	0.33	0.11
Intermediate/College	9%	7%	5%	0.32	0.10
Matric (SSC)	36%	41%	17%	0.25	0.06
Illiterate	48%	31%	26%	0.45	0.20
Measures of Poverty by job structure					
Private Job	38%	42%	21%	0.29	0.08
Government employee	9%	15%	5%	0.14	0.02
Farmer	51%	35%	28%	0.46	0.21
Own Business	1%	8%	1%	0.08	0.01
Measures of Poverty by family type					
Nuclear family	15%	19%	8%	0.33	0.11
Joint family	85%	81%	46%	0.37	0.13
Measures of Poverty by household size					
1-4	4%	6%	2%	0.28	0.08
5-6	7%	19%	4%	0.30	0.09
7-10	65%	57%	36%	0.38	0.14
10 & above	24%	19%	13%	0.34	0.12
Measures of Poverty by dependency ratio					
0.1-2	6%	16%	3%	0.26	0.07
2.1-4	48%	43%	26%	0.26	0.07
4.1-6	12%	12%	7%	0.41	0.17
Above 6	34%	29%	18%	0.50	0.25

Source: Calculated from the survey data.

Table 6. Decomposition of poverty

Poverty Correlates (Social)	As percentage of Poor Households	Percentage of total Household	Headcount index	Poverty Depth	Severity of Poverty
Measures of Poverty by house structure					
Pucca(Concrete)	48%	67%	23%	0.31	0.10
Kacha(made of mud)	49%	25%	30%	0.38	0.14
Mix(Pucca & Kacha)	3%	8%	2%	0.21	0.04
Measures of Poverty house roof type)					
Concrete	19%	12%	10%	0.43	0.18
Mud/Kacha	45%	31%	24%	0.48	0.24
Wood/Bamboo	17%	35%	10%	0.47	0.22
Iron Sheet	19%	23%	10%	0.37	0.13
Measures of Poverty by number of rooms in house					
1 Room	13%	7%	12%	0.48	0.23
2 Rooms	39%	29%	21%	0.42	0.18
3 Rooms	20%	47%	17%	0.27	0.08
4 & more than 4 Rooms	8%	16%	4%	0.15	0.02

Source: Calculated from the survey data.

of poverty in Jhang district. In addition, the analysis of family type shows that the family structure has a significant influence on poverty incidence, and most of the poor are living in the joint family system in Jhang district. Moreover, large family size has also increased the incidence of poverty as all three measures, including headcount ratio, depth, and severity of poverty, are high in poor households having 7–10 family members in the household. The results of the dependency ratio in Table 5 ascertained that an increase in the dependency ratio significantly raises the level of poverty in Jhang district as incidence, depth, and severity of poverty are high in poor households that have a dependency ratio ≥ 2 . It can be concluded that demographic characteristics are of great importance in alleviating poverty in rural areas of Pakistan.

4.2.1.2. Social factors. The results in Table 6 show that 49% poor families live in Kacha houses, while 48% of poor families live in Pacca houses. However, the depth and severity of poverty are worse among people living in Kacha houses (mud houses). In addition, the findings also suggest that poverty is worse in houses where the roof is made of mud, wood/bamboo, or iron sheet. This implies that the house structure is considerably correlated with the level of poverty in Jhang district. Another social factor that increases the incidence of poverty is the number of rooms in the house. The results in Table 6 indicate that households are highly overcrowded, and the incidence, depth and severity of poverty are high in poor households having 1–2 rooms at house in Jhang district. Overall, it can be inferred that social factors are crucial in determining the level of poverty in rural areas of Pakistan.

4.2.1.3. Economic factors. The income-generating activities or consumption patterns of households are mainly dependent on various economic variables. As a result, these economic factors determine the living standard and poverty status of the households. The results in Table 7 explicate that the majority of the poor households, comprising 64%, have possession of less than five acres land. The poverty incidence is high in landless households. Furthermore, the findings demonstrate that incidence, depth, and severity of poverty are high among poor households having less than 5 million in total assets. In addition, the possession of the livestock population also has considerable influence on poverty level in

Table 7. Decomposition of poverty					
Poverty Correlates (Socioeconomic)	As Percentage of Poor Households	Percentage of total Household	Headcount index	Poverty Depth	Severity of Poverty
Measures of Poverty by landholding					
No land	39%	36%	18%	0.24	0.06
Up to 05 acres	25%	28%	12%	0.31	0.10
05 acres –40 acres	35%	33%	24%	0.41	0.16
40 + acres	1%	3%	0%	0.46	0.21
Measures of Poverty by total amount of assets					
Less than 1 Million	29%	16%	16%	0.34	0.11
1 Million to 5 Millions	68%	76%	37%	0.24	0.06
5 Million to 10 Millions	2%	6%	1%	0.17	0.03
10 Millions & above.	1%	3%	0%	0.03	0.00
Measures of Poverty by Livestock population					
No Livestock	19%	12%	10%	0.43	0.18
1–2	45%	31%	24%	0.48	0.24
3–6	17%	35%	10%	0.47	0.22
Above 6	19%	23%	10%	0.37	0.13

Source: Calculated from the survey data.

Jhang district as 64% of poor households have ≤ 2 units of livestock population. The incidence and depth of poverty are also high among the poor households with no livestock at all. It can be deduced that an equitable distribution of land and assets must be ensured to lessen the incidence of poverty in rural areas of Pakistan.

4.2.2. Multivariate analysis

4.2.2.1. Results of income regression models. The estimated results in Table 8 show that the coefficient value of household size is negative and significant in all three models. It implies that household size is a major determinant of the per capita income of household and has contributed considerably to the level of poverty incidence in Jhang district, Punjab. This result is in agreement with previous literature; for instance, the Pakistan Integrated Household Survey (various annual reports) reported that the poorest segment of the country is mostly lived in larger households, with an average family size of 8.4 persons in the poorest quintile compared to 6.2 in the non-poor quintile. Chaudhry et al. (2009) for village Betti Nala in Tehsil Jatoli, district Muzaffar Garh in southern Punjab, Pakistan, also documented a similar result. Moreover, the negative and significant coefficient of age of the household head in Table 8 signifies that the age of the household head has an adverse effect on the per capita income of the household and has contributed positively to the incidence of poverty in the Jhang district. These results are generally consistent with the findings of previous empirical studies; for example, Alam and Hussain (2013) for the District Khyber agency, KPK and Mumtaz et al. (2022) for Pakistan documented that the age of the head of the household has a significant effect on the poverty level.

Furthermore, statistical estimates show that the level of education is also significantly related to the per capita income of the household. D2 is the dummy variable in the income regression model that shows the impact of education level on per capita income of the household. The values of the dummy variable D2 are 1 in the case when the head of the household has matric education and less than matric, 0 otherwise. However, the coefficient value of D2 is negative in all three models and highly significant. Although, the findings show that matric and less than matric education of the household head considerably reduces the per capita income of the household and increases the incidence of poverty in Jhang district. This implies that the household with highly educated heads has a greater potential to utilize resources and technology and avoid poverty in Jhang district of Punjab, Pakistan.

The number of workers/earners per household is the main component of household income generation. The positive and significant coefficient of earners per household in Table 8 indicates that the number of potential earners per household has substantially enhanced household income and reduced the level of poverty incidence in Jhang district. In addition, the economic dependency ratio (not-working family members/working family members) has a negative coefficient and is highly significant in models 3 and 4. However, it has a positive coefficient in models 1 and 2, but is statistically insignificant in both models. These results imply that the economic dependency ratio significantly reduces the per capita income of the household and increases the incidence of poverty in Jhang district. Likewise, the coefficient values of the total dependency ratio (not-working age population/working age population) are negative in all four models and significant. The estimated coefficient of the total dependency ratio is greater than unity in all four models, implying that household income is highly responsive to changes in the total dependency ratio. An increase in the total dependency ratio has considerably reduced the per capita income of the household and increased the incidence of poverty in Jhang district. Moreover, the results of the income regression model suggest that female-male ratio (number of females in the household/number of males in the household) has a negative influence on per capita income of household in Jhang district. These results are generally consistent with the common view that the poverty level is higher in households in rural areas that have a high female-male ratio. This is mainly because female members of households in rural areas do not participate in income-generating activities.

Furthermore, the results show that the child dependency ratio [number of children (0–14 years old in the household/Adults (15–64 years old)] and the aged dependency ratio [number of household members over 64 years/Adults (15–64 years old)] have positive coefficients and are statistically significant in all four models. These results suggest that the child dependency ratio and the aged dependency ratio

Table 8. Regression analysis (four models)

Variable	Model 1			Model 2			Model 3			Model 4		
	Coeff	t-Stat		Coeff	t-Stat		Coeff	t-Stat		Coeff	t-Stat	
C	9.57	9.75		11.43	12.37		7.92	8.57		8.17	9.29	
Log(Household Size)	-1.00	-4.76		-0.98	-5.06		-1.04	-2.31		-	-	
Log(Age of Household Head)	-	-		-0.02	-1.27		-0.04	-1.55		-0.304	-4.78	
D2 (Education Level)	-	-		-0.52	-10.94		-0.34	-7.00		-0.32	-6.66	
Log(Earner per Household)	0.86	5.01		0.96	6.05		-0.90	-1.52		0.156	1.82	
Log(Earner/Economic Dependency Ratio)	0.06	1.20		0.09	1.37		-1.14	-3.40		-0.95	-2.87	
Log(Total Dependency Ratio)	-2.51	-3.35		-2.81	-4.05		-4.06	-5.97		-4.14	-6.07	
Log(Child Dependency Ratio)	1.37	2.86		1.52	3.41		2.42	5.52		2.46	5.62	
Log(Aged Dependency Ratio)	1.37	4.92		1.38	5.32		1.79	7.07		-	-	
Log (Female-Male Ratio)	-0.18	-4.64		-0.05	-1.36		0.07	1.72		-0.02	-0.78	
Number of Livestock Population	0.14	1.86		0.13	1.69		-0.06	-0.72		0.08	0.67	
Landholding	0.48	1.05		1.18	2.80		0.55	1.21		1.26	2.79	
Log(Total Assets)	0.04	0.75		-0.01	-0.29		0.15	3.20		0.13	2.77	
D1 (Agricultural Land)	-	-		-	-		0.58	8.04		0.53	7.35	
D3 (Possession of Livestock)	-	-		-	-		-0.21	-3.87		-0.19	-3.56	
R-squared	0.29			0.39			0.457			0.445		
Adjusted R-squared	0.28			0.38			0.447			0.435		
S.E. of regression	0.54			0.50			0.470			0.471		
Akaike info criterion	1.61			1.46			1.350			1.351		
F-statistic	26.21			38.03			42.465			45.418		
Prob (F-statistic)	0.00			0.00			0.000			0.000		
Durbin-Watson stat	1.62			1.86								

Dependent Variable: Log (Per Capita Income).
Source: Calculated from the survey data.

have a significant impact on the per capita income of households as well as on reducing the incidence of poverty in Jhang district. The positive effect of child dependency ratio on income is not surprising because children in rural areas of Pakistan have frequently contributed to income-generating activities, therefore, the positive relationship between household income and child dependency ratio is possible.

Among the explanatory variables in the income regression models, livestock of the household is positively associated with per capita household income, and livestock has a negative impact on rural poverty. Statistical findings indicate that the coefficient values of the livestock variable are correctly signed in all equations except model 3, but statistically significant in model 1 and 2 only. In conclusion, the estimated results suggest that livestock has a significant influence on household income as well as reducing the incidence of poverty in Jhang District, Punjab. In addition, the dummy variable D3 also captured the effect of livestock possession on household income. The value of the dummy variable D3 is 1 in such cases when households do not have livestock, 0 otherwise. The results in Table 8 show that the coefficient values of D3 are negative and statistically significant in both model 3 and model 4. This means that per capita income is lower in those households that do not have livestock. These results imply that the contribution of the livestock sector toward household income and rural poverty reduction is quite significant in Pakistan in general and Jhang district, Punjab, in particular.

In rural areas, ownership of agricultural land is considered the prime factor that plays a critical role in reducing poverty. Statistical evidence shows that the coefficient values of landholding in models 2 and 4 are positive and highly significant. However, the magnitude of the coefficients of landholding in both models is greater than unity, implying that household income is highly responsive to changes in land ownership per household. In addition, the dummy variable D1 also captured the influence of ownership of the agricultural land on household income and poverty. The values of the dummy variable D1 are 1 if the households have agricultural land, 0 otherwise. Statistical estimates confirm that the coefficient values of D1 are positive and highly significant in both models 3 and 4. This signifies that per capita income is higher in those households that have agricultural land. Overall, the results suggest that farmland ownership and land holdings contributed significantly to rural household income as well as poverty reduction in Pakistan.

The assets of households are also an important factor in determining the level of poverty incidence. The assets of households include their tangible goods (land, livestock, house, television, car, agricultural equipment and machinery etc.) and their financial assets (cash, saving etc.). The statistical results, based on income regression models, show that the coefficient values of total assets are positive and statistically significant. These results imply that total assets have a significant effect on household income as well as reducing poverty incidence in Jhang district, Punjab.

4.2.2.2. Logistic regression results and discussion. Logistic regression analysis is commonly undertaken to explore the influence of various household-level characteristics on the probability of being poor. The logistics regression model gives better results than the linear income-regression model (Mumtaz et al., 2022; Rahman, 2013). In logistic regression, only the assumption of multicollinearity creates a serious problem in the model and other assumptions are not required. For this purpose, we have estimated the four different equations by dropping some variables in each equation to avoid the problem of multicollinearity.

The results reported in Table 9 show that the coefficients of earner per household are negative in all three models as expected, but statistically significant in models 2 and 3. These results indicate that an increase in earner per household significantly reduces the probability of being poor in Jhang district. Moreover, the positive and significant coefficients of household size in all four equations in Table 9 imply that, with an increase in family size, the likelihood of being poor rises in Jhang district, Punjab. Furthermore, the coefficient values of a dummy variable (D8; capturing the effect of larger household size) are positive in all equations but statistically significant in model 4. This indicates that households with more than eight family members are more likely to be poor. In addition, the dummy variable D6 (1 if nuclear family system, 0 otherwise) captured the effect of type of family on the probability of being

Table 9. Results of the logistic regression (four models)

Variable	Model 1		Model 2		Model 3		Model 4	
	Coeff	z-Stat	Coeff	z-Stat	Coeff	z-Stat	Coeff.	z-Stat
C	21.33	4.93	20.25	4.75	-4.92	-4.10	14.86	4.37
Household Size	0.41	4.25	0.59	7.23	0.58	7.01	0.58	7.42
Age of Household Head	0.01	0.20	0.00	0.55	0.01	0.66	0.01	1.44
Earners per Household	-0.01	-0.17	-0.76	-6.54	-0.72	-6.50	-	-
Earner/Economic Dependency Ratio	0.31	3.06	-	-	-	-	-	-
Total Dependency Ratio	0.02	2.75	0.03	3.91	0.01	1.97	-	-
Child Dependency Ratio	-0.01	-2.00	-0.02	-3.29	-	-	-	-
Aged Dependency Ratio	-	-	-	-	-0.01	-1.91	-0.01	-2.03
Female-Male ratio	0.20	1.79	0.19	1.69	0.26	2.28	0.06	0.56
Total Assets	-1.83	-6.14	-1.66	-5.77	-	-	-1.48	-6.31
Number of Livestock Population	-0.05	-0.72	-0.14	-1.10	-0.36	-2.93	-0.25	-2.11
Landholding	-0.15	6.53	-0.17	-7.21	-0.10	-4.88	-0.14	6.65
D1 (Education Level; class -0)	0.65	1.84	0.79	2.29	-	-	-	-
D2(Occupation: Farmer)	2.12	7.33	2.17	7.41	2.43	10.44	2.18	10.07
D3 (Occupation: Daily-Wager)	0.97	2.19	0.97	2.24	0.99	2.36	1.20	2.93
D4 (Agricultural Land)	-0.36	-1.06	-0.14	-1.47	-0.32	-2.92	-	-
D5 (Structure of Houses)	-1.64	-4.23	-1.75	-4.41	-1.35	-3.60	-1.40	-3.99
D6 (Type of Family)	-1.73	-5.98	-1.72	-5.98	-1.19	-4.30	-1.29	-4.85
D7 (Education Level; class -10)	0.11	0.42	0.12	0.45	0.88	3.93	0.64	3.03
D8(Larger household size)	0.41	1.09	0.24	0.66	0.38	1.05	0.67	1.95
D9 (Possession of Livestock)	1.35	3.56	1.26	3.43	1.27	3.58	1.52	4.35

(Continued)

Table 9. (Continued)								
Variable	Model 1		Model 2		Model 3		Model 4	
	Coeff	z-Stat	Coeff	z-Stat	Coeff	z-Stat	Coeff.	z-Stat
Total observations		964		964		964		964
Log Likelihood		-395.45		-400.18		-423.707		-431.26
LR statistic		495.75		486.29		439.25		424.14
Prob(LR statistic)		0.00		0.00		0.00		0.00
McFadden R-squared		0.39		0.38		0.36		0.33
Note: Dependent variable: Poverty: 1 if the household is poor; 0 otherwise. Calculated from the survey data.								

poor. The negative and significant coefficients of D6 in all four equations indicate that the nuclear family system is negatively related to the probability of being poor. Overall, these results suggest that an increase in household size and larger family size have significantly increased the probability of being poor in Jhang, Punjab.

The other demographic factor that increases the likelihood of being poor is the dependency ratio. The evidence in Table 9 clarifies that the coefficients of the economic dependency ratio and the total dependency ratio are positive and highly significant in all cases. This implies that a higher dependency ratio has resulted in an increase in the probability of being poor. Furthermore, the results in Table 9 explicate that the coefficients of the female–male ratio are positive and statistically significant in all four equations except model 4. It implies that the female–male ratio has a positive and significant effect on the probability of being poor in Jhang district. More interestingly, the coefficients of the child dependency ratio are negative in both estimated equations and highly significant. Likewise, the coefficients of the aged dependency ratio are negative and statistically significant in both models. These results signify that an increase in the child dependency ratio and the aged dependency ratio decreases the probability of being poor in Jhang district.

In addition, D2 and D3 have captured the effect of household heads' occupation. The dummy variable D2 takes the value 1 if the head of the household is a farmer and 0 otherwise. Likewise, the dummy variable D3 takes the value 1 if the head of the household head is a daily wager and 0 otherwise. Statistical findings, based on logistic regression, show that both D2 and D3 have positive coefficients and are highly significant in all cases. It implies that households headed by the farmer and daily-wager are more likely to be poor.

Education plays an important role in reducing poverty and improving the socioeconomic status of households. The estimated results in Table 9 clarify that the coefficient values of D1 (1 if the head of household is illiterate, 0 otherwise) are positive and statistically significant in both models. This implies that the probability of being poor is higher for those households that are headed by illiterate. Moreover, the coefficients of the dummy variable D7 (1 if the household head has a matric education or less than matric, 0 otherwise) are positive in all four equations but statistically significant in models 3 and 4. This means that the households headed by member who have a matric or less than matric education are more likely to be poor in Jhang district. The results signify that educational attainment is significantly related to the likelihood of being poor in Jhang district, Punjab.

Ownership of agricultural land and livestock is considered a potential factor for reducing rural poverty in Pakistan. The estimated results in Table 9 reveal that the coefficients of landholding and livestock are negative and statistically significant in all four models. This implies that an increase in household landholding and livestock decreases the probability of being poor in Jhang district. Moreover, the evidence shows that the dummy variable D4 (1 if the household has a farming land; 0 otherwise) has negative signs in all three equations but is statistically significant in model 3 only. On the other hand, the dummy variable D9 (1 if the household does not have livestock; 0 otherwise) has a positive coefficient and is statistically significant in all four equations. This implies that ownership of agricultural land and livestock has a significant impact on reducing the probability of being poor. Similarly, total household assets also have a negative and significant effect on the probability of being poor as the estimated coefficients of total assets in all three models are negative and highly significant. In conclusion, the results suggest that an increase in landholding, livestock, and total household assets have considerably decreased the probability of being poor in the Jhang district.

5. Conclusions and policy implications

Pakistan has experienced volatile economic growth over the past 20 years. Despite decent growth rates, poverty incidence remains a severe problem in rural Pakistan. Exploring the determinants of poverty can help the policymakers in designing policies to alleviate poverty. The current study quantitatively estimates the determinants of poverty, its incidence, severity, and depth in rural areas of Pakistan. The study collected primary data in Jhang district from 1,000 households through a specifically designed

questionnaire. The respondents were selected based on multi-stage sampling techniques. We employed descriptive and inferential statistics (income regression and logistic regression) to evaluate the effect of demographic and socioeconomic factors on the poverty level. The results indicate that 54.3% of households are below the poverty line, including 16% extremely poor, while severity and depth of poverty are 36% and 13%, respectively. Furthermore, the results based on the income regression model show that the household size, age of the household head, economic dependency ratio, total dependency ratio, and female-male ratio significantly reduced the per capita income of the households and increased the incidence and severity of poverty in Jhang district, Punjab, Pakistan. On the other hand, earners per household, education level of household head, ownership of agriculture land and livestock, landholding, and total assets considerably increased the per capita income of household and reduced the poverty level in Jhang district. In addition, the findings suggest that education is the single topmost factor in distinguishing between rich and poor in rural areas of Pakistan.

The logistic regression findings demonstrate that the likelihood of being poor is high among households headed by farmers, daily wagers, and illiterates. Moreover, results show that the age of the household head, household size, economic dependency ratio, and total dependency ratio were positively and significantly related to the probability of being poor. In contrast, an increase in the landholding, ownership of agricultural land, possession of livestock, earners per household, and total assets of the household have considerably reduced the probability of being poor in the rural area of Pakistan. Finally, the study concluded that the demographic and socioeconomic characteristics of the households are of greater importance in alleviating poverty generally in Pakistan, but particularly in rural areas.

The results postulate that enhanced public spending on socioeconomic services is required in order to alleviate poverty among rural households. Moreover, a dialogue should be initiated, and a participatory approach should be adopted by including local entrepreneurs and the business community for the creation of employment opportunities in the rural areas. In addition, the advocacy plan should be introduced to control the growth of population in rural areas as it stresses the current resources available for households. Finally, the results are consistent with the fact that an egalitarian approach must be adopted by competent authorities to redistribute the large tracts of agricultural lands among the rural population.

Due to financial and other constraints, the study is based on a small sample size and limited to Jhang District. Further research can be conducted by selecting large sample size and analyzing the household characteristics at the disaggregated level, incorporating time variations to develop a more impactful policy framework.

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Note

1. Consumption poverty is the degree to which the consumptions of a family or household fall below the poverty line.

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