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## EFFECT OF NON-FARM INCOME ON INCOME INEQUALITY IN PAKISTAN

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### ABSTRACT

The portion of farm households' income outside the farm, such as non-farm salaries and wages, pensions, and interest income, is referred to as non-farm income. In Pakistan, non-farm profit is an essential source of income. "income inequality" describes the inequitable income distribution between people or families in a community or economy. Income inequality is a significant issue worldwide, including in Pakistan. This research estimated the effect of non-farm income on rural and urban areas and analyzed the relationship between non-farm income and income inequality within households. Secondary data from the Pakistan Social and Living Standard Measurement Survey Household data (2019-20) was used. Multinomial Logistic Regression was applied to the data, and income inequality was calculated using the Gini coefficient. The population was divided into quartiles to measure income distribution. The research found that non-farm income raises income inequality, while farm income is an income equalizer among the population. The reason behind this is that a major portion of income or wealth is accessed by the upper society, with only a minor portion reaching the lower levels of the population. Specifically, the Gini coefficient for non-farm income was 0.65, indicating higher inequality, compared to 0.45 for farm income. In urban areas, non-farm income provides large opportunities, while rural areas predominantly depend on the farm sector. There is a need to raise awareness about the non-farm sector in rural sector. The study's policy implications include the following: In order to improve agricultural households' income and low-income disparity, non-farm income activities have to be promoted. The study also suggests that Inequalities within rural communities should be addressed as part of an equal development strategy, in addition to the rural-urban gap.

*Keywords: Effects; Non-farm income; Income inequality; Pakistan.*

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### INTRODUCTION

Income refers to money earned regularly through work or investments. The unequal distribution of income within a population is known as income disparity. Increased income disparity might impede economic growth and poverty alleviation initiatives since it indicates a less equitable distribution of resources. The unequal distribution of income within a population is known as income disparity. Increased income disparity might impede economic growth and poverty alleviation initiatives since it indicates a less equitable distribution of resources (Piketty, 2014; Stiglitz, 2012).

Additionally, income disparity can lead to social and economic instability, affecting social cohesion and overall well-being (Wilkinson & Pickett, 2010). Income inequality refers to the uneven income distribution within a population, highlighting the disparities in earnings among individuals or groups within an economy. Huang et al. (2020) note that significant income inequality can hinder economic development and efforts to reduce poverty. Income disparity is a significant concern on the global development agenda, particularly in developing nations, where it poses substantial challenges to poverty alleviation and

sustainable economic growth. Understanding the root causes and socio-economic implications of income inequality in Pakistan is essential (Ahmed, 2022).

Furthermore, disparities in income can cause social unrest and economic instability, harming general well-being and social cohesiveness (Wilkinson & Pickett, 2010). The term "income inequality" highlights the differences in wages between people or groups within an economy by referring to the unequal income distribution within a population. According to Huang et al. (2020), substantial income inequality can impede attempts to combat poverty and promote economic growth. The global development agenda is greatly concerned about income inequality, especially in emerging countries, which present enormous obstacles to reducing poverty and promoting sustainable economic growth. It is crucial to comprehend the underlying factors and social ramifications of wealth disparity in Pakistan (Ahmed, 2022). Furthermore, disparities in income can cause social unrest and economic instability, harming general well-being and social cohesiveness (Wilkinson & Pickett, 2010).

Revenue from agriculture, off-farm sources, and non-farm sources make up the three main revenue streams. While off-farm money is earned by laboring on other people's farms, farm income is generated via agricultural operations. In developing nations like Pakistan, non-farm income—which includes interest, pensions, and salaries—is frequently neglected while significantly impacting many economies. Non-farm income can lessen income inequality, albeit its effects can vary (Hassan et al., 2021). This study examines how increasing non-farm income prospects can help close the income gap at the household level in Pakistan's rural and urban areas, highlighting how important this is.

Opportunity disparity can impede economic growth by preventing low-income people from investing in human capital, such as education. New developments in the measurement of opportunity equality, such as intergenerational mobility indices, have shed light on this problem. Pakistan and other developing countries are looking for ways to boost economic growth and close the gaps in income and poverty. Trade liberalization has a complex and regionally variable effect on income inequality, notwithstanding its ability to spur development. For example, income inequality has improved in some parts of Latin America and the Caribbean since 1990 but has worsened in many wealthy and middle-income nations (Delaporte et al., 2021; Acheampong et al., 2022).

Most of the world's impoverished live in rural parts of emerging nations and depend on agriculture as their primary source of income. Despite its significance, the agricultural industry has many difficulties, including insufficient credit and investment. Income diversification, mainly through off-farm activities, is essential for socio-economic development in these locations (Anang & Yeboah, 2019). Income inequality and economic stability are impacted by political and social stability. Countries with more equitable resource distributions typically see faster rates of economic growth. Significant differences between major Asian countries can be seen by the Gini coefficient, which measures income inequality. With 33.5%, Pakistan's inequality is higher than South Korea's and Japan's, but lower than Malaysia's and the Philippines'.

Income inequality, which arises from the uneven distribution of income earned through employment or investments, is a significant issue in many countries. The Gini coefficient, a standard measure of inequality, highlights disparities in wealth distribution that can hinder efforts to alleviate poverty and stimulate economic growth. Higher levels of income inequality suggest a less equitable distribution of wealth (Huang et al., 2020). Globally, income disparity is a pressing concern, particularly in developing nations, where it obstructs poverty reduction and sustainable economic progress (Ahmed, 2022). In 2021, vital Asian countries exhibited varying degrees of wealth inequality: Malaysia (41.0%), the Philippines (42.1%), Thailand (36.0%), Vietnam (35.3%), China (38%), India (35%), Indonesia (38.2%), Japan (32.9%), and South Korea (31.6%). Pakistan's Gini coefficient of 33.5% places it below Malaysia and the Philippines but above South Korea and Japan.

Various activities, including farming and off-farm ventures, can yield income. While off-farm money is earned by laboring on other people's farms, farm income is generated via agricultural operations. When properly managed, non-farm income—including interest, pensions, and wages—is critical in lowering income inequality (Hassan et al., 2021). By generating alternate revenue streams and decreasing reliance on agriculture, diversifying sources of income, primarily through non-farm activities, aids rural communities' economic stability (Martey et al., 2022). Since more educated rural residents have more professional options outside of farming, education is essential to lowering economic disparity (Anang & Yeboah, 2019). Furthermore, non-farm employment is favorably correlated with decreased income inequality and frequently requires access to infrastructure and higher education (Zulfiqar, 2022).

Policies that increase economic growth and decrease income disparity are essential for developing nations. These goals can be significantly aided by trade liberalization and the encouragement of non-farm employment (Do et al., 2019). While some income disparity might encourage investment and creativity, too much inequality can impede economic growth and cause social unrest (Vo et al., 2019). Moving from rural to urban locations is a popular tactic to boost earnings and lower economic instability. Yet, depending on regional dynamics, its effects on agricultural productivity and rural development differ (Nguyen et al., 2019).

Pakistan's labor force comprises 30.9% farmers, and the sector generates 18.5% of the nation's GDP. The Gini coefficient fluctuated between 1987 and 2018, with the most current estimations showing 29.6 index points (Ali et al., 2023). Through non-farm income streams, there is significant potential to lower income inequality and raise living standards in rural areas. For example, non-farm income in the US makes up a sizable portion of farm households' overall income (Whitt et al., 2021). It is imperative to tackle the issue of non-farm income to promote economic expansion, improve employment opportunities in rural areas, and mitigate poverty (Danso-Abbeam et al., 2020). It is crucial to implement efficient policies that balance income distribution while giving non-farm income opportunities, infrastructure development, and other top priorities to encourage equitable growth and eliminate poverty.

Pakistan has turned its attention from increasing income distribution to lowering poverty rates throughout the last 20 years. Although income disparities frequently rise during the early stages of economic expansion, this is not a universal trend observed in all nations. According to Kochar et al. (2019), governments must take proactive measures to stop or lessen the widening wealth disparities. Income disparities have traditionally been assessed using data from the Household Income and Expenditure Survey (HIES) and the Pakistan Integrated Household Survey (PIHS), which cover both the agricultural and non-farm sectors. Nonetheless, it is imperative to carefully investigate inequality within this sector given its explosive expansion and substantial GDP contribution to Pakistan (Khan et al., 2019). An analysis of the dynamics of wealth distribution, which are influenced by inheritance, savings, investment returns, and asset value variations, requires an understanding of household non-farm income inequality. Pakistan's land allocation has been noticeably unequal (Zulfiqar, 2022).

This study attempts to fill the research gap by concentrating on the non-farm economy and thoroughly examining income inequality in Pakistan at the household level. It looks at how non-farm income affects income inequality and suggests ways to improve income distribution. The study emphasizes the value of social safety nets, essential for protecting disadvantaged groups from unforeseen financial difficulties. These safety nets shield people from unanticipated financial difficulties by assisting in risk management, preventing forced asset sales, and granting access to income insurance programs.

## **METHODOLOGY**

The primary objective of this study is to examine household income data from Pakistan that spans a range of income brackets. The data obtained from secondary sources are empirically estimated by the study using

a strong economic analytical framework. The Pakistan Bureau of Statistics' 2019–2020 Pakistan Social and Living Standards Measurement (PSLM) Survey is the source of the primary dataset.

The PSLM survey, which draws from a sample of about 6,500 blocks, covers about 195,000 homes. It pays special attention to variables connected to disability. Out of the original 633,770 households for which income data was available, a final sample of 12,020 households remains after the dataset is adjusted to remove those with zero income. This ensures accurate estimations. The study's goals are to be achieved with the help of this updated dataset.

### **Economic Analysis**

To have a more profound understanding of economic performance, data analysis and pattern recognition are crucial elements of financial analysis. This procedure entails gathering, assessing, and interpreting data to identify patterns and correlations between various factors. Economic analysis and research are essential for deciding on financial plans, investments, and policies.

The literature has explored various methods for measuring inequality (Dubey & Mitra, 2014; Chancel et al., 2022; Dubey & Laguzzi, 2021; Charalampidis, 2022). A robust inequality index should exhibit the following characteristics:

**Pigou-Dalton Transfer Sensitivity:** If income is moved from a poorer to a wealthy person, inequality in income rises.

**Symmetry:** If two people only move up or down in the distribution, then there is still the same amount of income disparity.

**Independence:** Income disparity wouldn't alter if everyone's income increased by the same percentage.

**Population Homogeneity:** Income disparities would not alter if the overall population of each income category increased or decreased by the same amount.

**Income Percentiles:** The income of the population is divided into 100 equal segments using income percentiles. In this study, income across various percentiles is analyzed to investigate wealth distribution and inequality.

**Population and Cumulative Income:** The cumulative income percentage, which is computed by adding the income of each percentile to the total income, shows the total income accrued over a given time period. The percentage of the population that makes less than a given income level is shown by the cumulative population percentage.

**Quartiles:** Quartiles are a useful tool for assessing income distribution and spotting inequality since they split the population into four income-based categories.

The Lorenz curve plots cumulative population percentages against cumulative income or wealth to visually depict the distribution of income within a community. It is frequently used in conjunction with the Gini coefficient.

$$L - X = 1 - L X (1 - F) \quad (1)$$

**Gini Coefficient:** The income inequality within a population is measured by the Gini coefficient, which goes from 0 (perfect equality) to 1 (perfect inequality). This is how the coefficient is computed:

$$G \text{ is equal to } (A / (A + B)) \quad (2)$$

In this case, area B denotes the region below the Lorenz curve, and area A denotes the distance between the Lorenz curve and the perfect equality line.

Multinomial Logit Regression Model: The link between a binary dependent variable and several independent factors is examined by this model. It calculates the likelihood that a person will select a particular option from a range of options.

$$\ln(p/1-p) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_mX_m \tag{3}$$

In this equation,  $\ln(p/1-p)$  represents the log odds of the dependent variable.

The intercept is denoted by  $\beta_0$ .

In a statistical model, the coefficients for the independent variables are denoted as  $\beta_1, \beta_2, \dots, \beta_n$ . These coefficients are used in the multinomial logit (mlogit) model, which is used to examine and forecast the likelihood that a person would select a specific choice from a range of options. Regression analysis of this kind is frequently employed in disciplines like economics, marketing, and social sciences. Given a set of predictors  $x$ , the probability of choosing option  $i$  is represented as:

$$P(i|x) = e^{(\beta_i*x)} / \sum_j e^{(\beta_j*x)} \tag{4}$$

The coefficient for the  $i$ th choice is denoted by  $\beta_i$  in this case, and the total of the exponentiated coefficients for all options is represented by  $\sum_j e^{(\beta_j*x)}$ . Based on the predictor values, the model estimates the probability of selecting each option using these coefficients.

The maximum likelihood estimation approach is used by the Multinomial Logit Model to estimate the coefficients and establish their statistical significance. This method assesses each independent variable's contribution and aids in determining how well the model fits the data.

## RESULTS AND DISCUSSION

This study utilized household data from the Pakistan Social and Living Standards Measurement Survey (2019–20) to explore the impact of non-farm income on income disparities. A multinomial logistic regression model was applied to assess this impact, while the Gini coefficient was used to measure income inequality.

### Effect of Non-farm Income on Income Inequality

The analysis uses data from 11,994 instances to investigate how non-farm income affects income disparity. The findings demonstrate that non-farm income (LNFINC), with a coefficient of 114.145 and a z-value of 14.44 ( $p < 0.000$ ), significantly reduces income inequality. Additionally, land assets (LAAST) and education (EDU) have a favorable and considerable impact on income disparity. The LR  $\chi^2(21)$  of 31,881.63 ( $\text{Prob} > \chi^2 = 0.0000$ ), a high Pseudo  $R^2$  of 0.9589, and a log-likelihood of 683.73676 all show that the entire model is robust and has significant explanatory power in predicting income inequality.

.Table 1. Effect of non-farm income on income inequality (overall sample).

NFINC_INE	Coefficient	Standard Error	z	P> z	95% Conf.	Interval
LNFINC	114.145	7.904	14.44	0	129.634	98.657
HEA	0.584	0.508	1.15	0.251	1.581	0.413
EDU	0.073	0.029	2.45	0.014	0.014	0.131
ICTC	0.359	0.624	0.58	0.565	0.846	1.583
ICTI	0.262	0.285	0.92	0.359	0.297	0.921
ICTP	0.417	0.552	0.76	0.499	0.664	1.5
LAAST	0.563	0.216	2.61	0.009	0.14	0.987
Cons	561.259	38.942	14.41	0	484.934	637.586

Rural and Urban Non-farm income

The analysis of non-farm income's effect on income inequality in rural and urban areas, using 11,164 observations, shows significant results. The log-likelihood stabilizes at -14,511.92 after four iterations. A modest fit of the model is indicated by the LR  $\chi^2(21)$  value of 1,336.34 with a  $\text{Prob} > \chi^2$  of 0.0000 and

the Pseudo R2 of 0.0440. With a z-value of 8.98 ( $p < 0.000$ ), the coefficient for LNFINC is 0.635, indicating a significant positive effect on income inequality. Education (EDU), health (HEA), and various ICT-related variables (ICTC, ICTP) also exhibit significant positive effects on income inequality in these areas. Land assets (LAAST) have a particularly strong impact, with a coefficient of 1.153. The model provides insights into how non-farm income and other factors contribute to income inequality across rural and urban settings.

Table 2. Effect of non-farm income on income inequality in Rural and Urban areas.

NFINC_INE	Coefficient	Standard Error	z	P> z	95% Conf.	Interval
LNFINC	0.635	0.071	8.98	0.000	0.774	0.496
HEA	0.285	0.093	3.05	0.002	0.102	0.467
EDU	0.051	0.007	7.52	0.000	0.038	0.064
ICTC	0.317	0.168	2.78	0.005	0.012	0.645
ICTI	0.11	0.121	0.91	0.362	0.348	0.127
ICTP	0.183	0.066	2.78	0.005	0.054	0.312
LAAST	1.153	0.512	22.32	0.000	1.105	1.254
Cons	5.088	0.506	10.05	0.000	6.079	4.096

Urban Non-farm income

The analysis of the effect of non-farm income on income inequality in urban areas, using 1,126 observations, reveals specific patterns. The model's log likelihood stabilizes at -1,338.6715 after four iterations. The LR chi2(21) is 208.43 with a Prob > chi2 of 0.0000, and the Pseudo R2 is 0.0722, indicating a moderate fit of the model. The coefficient for LNFINC is 0.052, which is not statistically significant ( $z = 0.300$ ,  $p = 0.768$ ), suggesting a minimal impact of non-farm income on income inequality in urban areas. Health (HEA) and land assets (LAAST) show significant positive effects, with coefficients of 0.527 and 1.243, respectively. Other variables, such as education (EDU) and ICT-related indicators, do not show significant effects. This model highlights the limited role of non-farm income in affecting income inequality within urban settings, with health and land assets being more influential factors.

Table 3. Effect of non-farm income on income inequality in urban areas.

NFINC_INE	Coefficient	Standard Error	z	P> z	95% Conf.	Interval
LNFINC	0.052	0.178	0.300	0.768	0.402	0.297
HEA	0.527	0.261	2.02	0.043	1.038	0.017
EDU	0.013	0.016	0.8	0.426	0.019	0.044
ICTC	0.116	0.127	0.91	0.361	1.331	0.366
ICTP	0.253	0.194	1.3	0.192	0.634	0.127
ICTI	0.001	0.274	0.000	0.996	0.537	0.539
LAAST	1.243	0.134	9.29	0.000	0.981	1.505
Cons	7.736	1.196	6.47	0.000	10.081	5.392

The study found that non-farm income positively affects income inequality. Literature indicates a health facilities gap between lower income and higher income people, with high-income individuals enjoying better mental health, which influences their decision-making power compared to low-income individuals (Bu et al., 2023).

The current results suggested a pro-rich phenomenon in terms of personal health status, with higher average income significantly improving health. These results highlight the need for public health policy interventions, particularly in areas with low average income. In rural Pakistan, health facilities are inadequate, with 186 deaths per 100,000 live births and 32% maternal mortality in 2019. There is a pressing need for government policies or social welfare institutions to focus on improving health facilities in rural areas.

In urban areas, income inequality also plays a significant role but is less pronounced than in rural areas. Non-farm income predominantly exists in urban areas, contributing to a middle average income class.

Income inequality also affects education (Barr & Miller, 2020). Significant amounts of income disparity raise the value of higher education, which in turn drives up demand for improved educational options and intensifies competition, which in turn encourages parents to make larger educational investments (Chen et al., 2023). The study's results indicate a significant role of non-farm income in education, though it also perpetuates income inequality. Investment in education improves the standard of living for high average income individuals. However, in rural areas, education does not significantly affect the income disparity. Access to education opportunities can reduce inequality in rural areas. The relationship between education and inequality of income is similar in urban areas.

Information and communication technology (ICT) impacts income inequality differently. In Pakistan, limited internet access negatively impacts non-farm income inequality. In urban areas, where access to internet, computers, and smartphones is higher, ICT does not significantly affect income inequality. However, studies show that ICT can exacerbate income inequality (Odhiambo et al., 2022). In rural Pakistan, internet and computer access is negligible, with only limited phone access.

Finally, asset holdings play a role. In Pakistan, high average income individuals hold significant assets and possess decision-making power. In rural areas, asset holdings are limited to farming land used for earning. In urban areas, assets are primarily living houses. However, the upper class holds the major portion of assets, perpetuating income inequality due to corruption and legislative manipulation for personal gain.

## **CONCLUSIONS**

The study concludes that non-farm income significantly contributes to income inequality in Pakistan. While non-farm income provides large opportunities in urban areas, rural areas predominantly depend on the farm sector, leading to higher inequality. To address this issue, there is a need to promote non-farm income activities among agricultural households to raise their incomes and lower income disparity. Additionally, a balanced development approach should be adopted to address disparities within rural areas, not just between rural and urban areas. Improving access to health, education, and ICT resources in rural areas can help mitigate the impact of income disparity and promote a more equitable increase in the economy.

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