



## Determinants of Earnings of Rural Households of Multan District (Pakistan)

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### ABSTRACT

*This study focuses on exploring the factors affecting on urban Earnings of household of Multan district. Cross-sectional data was collected through questionnaire from household of District Multan's belonging to rural areas. About 300 respondents belonging to rural areas were randomly engaged for an interview in 2021. Mincerian earning function was used for analysis and its extension form was also analyzed. In this study it was found that Experience and Education positively impact on earning whereas experience square had a negative impact while evaluating Mincerian Earning function. In the Extended Mincerian Earning function, Education, experience, age, spouse involvement, marital status, and migration positively impact on earnings while age squared, experience squared, and employment have a negative impact on earnings of rural household of Multan district.*

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### 1. Introduction

Agriculture is an important sector in Pakistan because it accounts for a substantial amount of the country's economy and is the primary source of employment for rural residents. Improvement of rural development and the agricultural sector are top priorities of the governments for eradicating poverty. So, the agriculture sector contributes 19.2 percent to the GDP of Pakistan and it offers employment opportunities to almost 38.5 percent labor force. Furthermore, agriculture provides a living and meets the fundamental necessities of 60 to 70 percent of Pakistan's population. (PBS,2021).

In recent years, Climate change, water scarcity, and arable land reduction have slowed agricultural expansion and the majority of the population has shifted from a rural to an urban region which has a detrimental impact on the agriculture industry. There is a need for innovative technologies to boost agriculture's productivity because this industry contributes 19.2 percent of Pakistan's GDP and can be a major driver of economic growth (Gillani et al., 2013).

Multan is an agricultural city, and more than 80 percent of residents depend on the agricultural sector for their livelihood. Mangoes production is famous in the district and is also exported to other

countries. Cotton is another product of the district and the major source of foreign exchange earnings in Pakistan. New cotton varieties announced by the Agriculture Ext. wing among the rural population is being discovered with the help of the Central Cotton Research Institute and Cotton Research Station in Multan.

On the other hand, Mango Research Institute is actively involved in the development of new varieties of mangoes which is the primary source of livelihood for rural residents of the Multan area (Govt of Punjab, 2021).

Despite its economic importance, Multan has about 2.28 percent of the country's population, with rural areas having a proportion of 56.62 percent of the Multan total population. People in rural areas of district Multan face severe poverty issues due to a lack of educational and health infrastructure, a lack of employment opportunities, resource inequality, and poor access to natural resources. In addition, rural areas of Multan have received little attention from policymakers, which has a negative impact on the rural people.

Multan's rural inhabitants have very few employment facilities to make revenue for purchasing food and meet the need for the basic facility; as a result, they experience hunger problems during their unemployment period. Rural people rely heavily on agriculture for a living, thus they suffer from food insecurity and micronutrient deficiencies, which diminish productivity, work days lost, and different illnesses. So the primary goal of the research is to identify the elements that influence the Earnings of rural residents.

## **2. Literature Reviews**

Dayal Talukder (2014) used regression analysis to evaluate the income determinants of Bangladesh's rural inhabitants. The economic and non-economic factors were studied to determine their combined effect on family income. The findings of the linear regression demonstrated that family size was the only non-economic factor that was significant and positively affecting family income in both 1986 and 2005. In this period, the family size was the most important positive determinant of income, whereas the farmer was the most important negative determinant of income. The revenue share from the rice was a positive component but not significant in contrast to the current year endowment. The agriculture share was a positive factor of family income in both years, but it was insignificant in 2005.

Memon et al. (2020) explored the factors of earning diversification of flood-prone rural areas of Pakistan. The primary data was used which was collected from 350 households in rural areas randomly and the linear regression method was used for the estimation of the data. The regression results revealed that households with more earnings persons and ruled by educated male earners had a diversified earning portfolio. Moreover, the moderation analysis indicated that a family ruled by an educated male head was more diversified than an uneducated person.

Nzabakenga et al. (2013) showed the agrarian earning determinants of a small-holder farmer from the northern part of Burundi. To achieve the study objectives, primary data was obtained from 218 inhabitants, and the linear regression model was employed for analysis. The eight variables were selected for the analysis but just two of them have an effect i.e farm size and family size were the only significant variables among all variables.

Parvin and Akteruzzaman (2012) studied the factors influencing the income of agricultural and

non-farm households in Bangladesh's Netrokona area. The descriptive analysis was performed to explain the socioeconomic features of the target sample and to determine the factors influencing the income of farm and non-farm inhabitants. According to the results of the estimated regression, family size, and farm size affect farm income positively, but non-farm income affects farm revenue negatively. Furthermore, the influence of family size on non-farm income was significant and positive, however, the effect of farm revenue on non-farm income is negative and significant.

Odozi and Adeyonu (2021) investigated the factors that influence employment and wages in rural Nigeria. The panel data was used in this study and the logit model was applied for the estimation of income and employment determinants. According to the study, agricultural self-employment was the most common cause of employment in rural Nigeria between 2010 and 2015. However, it was two times the non-farm employment and five times as much as the wage employment. In addition, the wage employment was diminishing during the study period.

### **3. Data Source and Methodology**

This study was carried out in the rural region of Multan, where agriculture is the main source of income for the local population. Approximately 70% of them work in agriculture. This study is based on primary data that was gathered through a survey in rural areas during the year 2022. A questionnaire was developed according to the study's objective. A random sample of 300 rural household was drawn from the district. To describe the socio-economic characteristics of the head household descriptive statistic was used including maximum, minimum, mean, and standard deviation. For finding the degree of association among the variables the coefficient correlation was used. The Mincerian earning function was used in both strict and extended forms to estimate the determinants of rural household income.

The econometrics form of the model is listed below:

Firstly, the Mincerian earning function was considered to find the impact of the variable on income which is given below:

Total income = f (Education, Experience, Square of Experience)

$$\text{ToT INC} = f (\text{EDU}, \text{EXP}, \text{EXPSQ})$$

The regression form of the model is as given below

$$\text{LnTOT}_{NC} = [\beta_0 + \beta_1\text{EDU} + \beta_2\text{EXP} + \beta_3\text{EXPSQ} + \mu_i]$$

A log-linear model was used in which total income was used as a regressand variable while the education, work experience, and experience square were used as independent variables.

Secondly, the extended form of the MEF (Mincerian Earning Function) was used by incorporating the other variables which affect income along with the variable included in the strict model.

Total income = f (Education, Experience, Age, Square of Age, Spouse Participation, Employment sector , Total acres of land )

Total income = f (Edu , Exp , Age, AGSQ , SP , EMP , LS )

The econometric form of the model is given as

$$\left[ \begin{aligned} LNTOT\_INC = \beta_0 + \beta_1 EDU + \beta_2 EXP + \beta_3 AGE + \beta_4 AGSQ + \beta_5 SP + \\ \beta_6 EMP + \beta_7 LS + \mu_i \end{aligned} \right]$$

A log-linear model was used in which total income was used as a dependent variable and education, work experience, experience square, age, age square, spouse participation, migration, employment, and land size are used as independent variables.

**Where**

<b>Variables</b>	<b>Description of variables</b>
Total_Inc	Total household income from all sources
EDU	completed years of education of the household head
EXP	Years of work experience
EXPSQ	Years of work experience (Square)
AGE	Age of the household head in years
AGESQ	Age of the household head in years (Square)
SP	Spouse Participation ( Dummy variable by Yes= 1, No= 0)
EMP	Employment sector ( Dummy variable by informal= 1, formal=0)
LS	Total acres of land

**4. Explanation of the Variables**

**4.1 Education**

Education is the most important human capital and investment in human capital in return increases the earnings of the family head. Educated persons are more productive, and skilled that's why the earnings opportunities are higher for them. So according to Schultz, we should use our resources on human capital which not only increases the earnings of the households but also make them able to take part in the economic growth of the country (Krasniki& Topxhiu, 2016). Education is expected to have a positive effect on the earnings of the family, the higher the education the higher will be the earnings. Household head education is measured in completed years of education.

**4.2 Experience**

The experience of the household head is taken in the years. When the experience of the person increases due to training in a particular job their earnings start to rise because the experience people have more opportunities than inexperienced people. So it is expected to have a positive effect of experience on the earnings of the household, which means that when people gain experience in a particular job it improves their productivity which in turn increases the income of the family head. To capture the effect of experience over a longer period experience squarely is used in this study. Experience square showed that it affects the earnings negatively because nobody can work in the same position for a long-term period they start to get tired and want to take rest from their job that's why their earnings start to decline.

**4.3 Spouse Participation**

Spouse participation explains the involvement of both partners in different types of fields to earn income. If the spouse is participating financially with the partner earnings of the household heads will increase. Education is the most important indicator of the spouse's participation because when the spouse is educated they can work in different fields which in turn increases their income (Pape &

Mistiaen, 2018). It is expected to have a positive effect of spouse participation on the earnings of the household head, so to capture the effect of spouse participation on earnings dummy variable is used.

#### **4.4 Age of the household head**

The age of the household head is used as an explanatory variable. Based on literature, it is observed that household head earnings are higher at the young stage because they are more active and productive in the initial stage period. To capture the effect of old age households age squarely is used in this model it indicates that earnings at the initial stage of age increase but start to decline when we move towards old age so age square has a negative effect on the earnings of the family. The age of the household head is taken in the year (Khan. Z,2021).

#### **4.5 Migration**

Migration is the movement of people from one region to the other region within the country, in looking for better employment opportunities and efficient allocation of resources. The statistics showed that migration to the urban area is much more in the last few decades, showing that the majority portion of the population has been facing problems in rural areas (Harris and Todaro, 1970). The expected income in urban areas is greater than in rural areas so it is expected to have a positive impact on migration on the earnings of the household. To find the effect of migration in our model a dummy variable is used.

#### **4.6 Employment Status**

Employment status explains the economically active person concerning his or her employment. The status of the job indicates whether the respondent has a job or not and if the respondent has an occupation then the question arises in which job sector they engaged. The categorical variable is used for this, if the respondent belongs to the formal sector it will be represented by 0 otherwise by 1. Because this status of employment determines the earnings of an individual and people engaged as common laborers and professional workers will in general receive more payment than the junior team of workers and clerical staff.

#### **4.7 Land Size**

Land size is an important indicator that affects the earnings of the household head. If the head of the household has the possession of one or more acres of land the income can be increased because the land can be utilized for different earning purposes. Higher will be the land size higher will be the earnings of the family which in turn decreases the earnings gap among the regions. So it is expected to have a positive effect on the land size on the earnings of the family.

### **5. Results and Discussion**

#### **5.1 Descriptive Statistics**

Descriptive analysis is the best method to analyze the data and to explain the minima, maxima, mean, and standard deviation. The results of the descriptive analysis of determinants of income are explained in the tables below.

Table 1, shows that the average age of the family head of the rural population of district Multan is 59.43 years. The mean of the education years of the family head belonging to district Multan is 17.29 years, suggesting that on average education of the family head in district Multan is 17.29. The mean value of work experience is 21.71, implying that the average work experience of a rural household is 21.71.

**Table: 1 Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Age	300	20	65	59.43	19.618
Education	300	1	18	17.29	2.701
Work Ex	300	3	36	21.71	9.252
Migration	300	0	1	.50	.519
SP	300	0	1	1.36	1.277
EMP_SEC	300	0	1	.79	.426
Land Size	300	1	3	1.50	.650
Total_INC	300	12000	110000	48571.43	29635.515

Source: Authors own calculation through SPSS

The mean value of migration is 0.50, revealing that on average 0.50 people migrated to district Multan urban areas for income-earning. The mean value of spouse participation is 1.36, denoting that on average spouse participation is 1.36 in rural areas. The mean value of the employment status is .79, showing that 0.79 percent of the rural household in the district Multan belongs to the informal sector while the remaining belong to the formal sector. The mean value of land size is 1.50, revealing that an average rural household in the Multan district possesses 1.50 acres of land. The mean value of rural household head monthly income in district Multan is 48571.43, pointing out that the average income of the household in district Multan is 48571.43. The minimum earnings of the rural respondents from district Multan is 12000 rupees while the maximum earnings of the rural respondents in district Multan is 110000 rupees. The maximum variation is shown by the education variable and the least variation is shown by the variable migration.

### 5.2 Correlation Matrix

The problem of multicollinearity is investigated by coefficient correlation, it explains the degree of association among the variables presented in the data. This table indicates the correlation between the different factors, however, the diagonal of the table shows the correlation of the factors with itself which always be 1. All variables are positively related to income except employment which is negatively associated with income. As can be seen from the table the value of correlation among all the variables is less than 0.70 so according to the rule of thumb, it can be concluded that there is not a high problem of multicollinearity in this study.

**Table. 2 Correlations District Multan**

	S-PART	AGE	EDU	MIG	WORK	EMP	LAND	TOT-INC
S-PART	1							
AGE	.092	1						
EDU	.290	.227	1					
MIG	.124	.099	.274	1				
WORK	.004	.301	.160	.249	1			
EMP	-.140	-.034	-.174	-.258	-.251	1		
LAND	.024	.000	.114	.000	.268	.139	1	
TOT-INC	-.055	.239	.340	.253	.157	.069	.283	1

Source: Authors own calculation through SPSS

**5.3 Econometrics Analysis**

**5.3.1 Strict Mincerian Earnings Function**

The outcomes are explained by the restricted Mincerian earnings function. Further the results of the R-Square value, explain that the model's explanatory variables were responsible for 59.1 percent of the variation in household income. Indicating a good fit model with an F-Value of (24.45), which was significant at a 1 percent level. The education variable is statistically significant at a 1% level of significance and it shows a direct association between earning and education in a rural area of district Multan. If education increases by a year it will increase the income of the household head by 0.023 percent. The result is consistent with the study of Khan, Z. (2021); Shabbir (1994); Teng et al. (2007); Su B & Heshmati A (2013); Rashid and Faridi (2014); Mincer (1974) and Chaudhry et al.(2011). The work experience is statistically significant at a 5% level of significance and explains a direct relationship between work experience and the income of the family head. If the experience of the family head increases by one year it will raise income by 0.0260 percent. This result of experience is also in line with the study of Khan, Z. (2021); Shabbir (1994); Lima et al.(2020); and Nasir (2000).

**5.3.2 Extended Mincerian Earning Function**

In this, the results of the 'extended' MEF were showed which was obtained by extending the 'traditional' MEF by incorporating variables, age, age square, spouse participation, migration, employment status, and the size of landholding. The relationship between household education and the natural log of income is positive and significant at a 1% level of significance. The household head education variable indicated that if the education years of the household head increase by 1 year, it leads to a rise in the household income by 0.0202%. The result is consistent with the study of Khan, Z. (2021); Shabbir (1994); Teng et al. (2007); Su B & Heshmati A (2013); Rashid and Faridi (2014); Mincer (1974) and Chaudhry et al.(2011).

**Table: 3 Strict MEF: Rural District Multan**

<b>Dependent Variable: Lnincome of the household</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	9.938897	0.101664	97.76178	0.0000
EDUCATION	0.023663	0.007123	9.321902	0.0015
WORK_EX	0.026056	0.011182	2.330173	0.0231
EXP2	-3.78E-05	0.000324	-0.116621	0.9075
<b>R-squared</b>	<b>0.591576</b>		<b>Adjusted R-squared 0.571490</b>	
<b>F-statistic</b>	<b>24.45152</b>		<b>Prob(F-statistic) 0.000000</b>	
<b>Sample size (N) 300</b>				

**Source: Authors Own calculation through E-Views**

The years of experience of the household head are positively related to income and are statistically significant at a 5% level of significance. It explains that the income of a household head increases by 0.0134 % if there is a rise in the experience of the family head by 1 year. This result of experience is also in line with the study of Khan, Z. (2021); Shabbir (1994); Lima et al.(2020), and Nasir (2000).

The age of the household head is directly related to the monthly earnings of the family member and is significant at the one percent level of significance. Family monthly income rise by 0.0173 % as the family member’s age rises by 1 year. The reason is that as the family

member moved toward older age they become more hard workers, efficient, specialized, and responsible in their work so their earnings also rise as the age of individuals increases. The same result was in the study by Khan, Z. (2021). Chaudhry et al.(2011) Sun et al.(2011) and Lima et al.(2020).

The results indicated an indirect relationship between income and age square variables and are significant at a 5 % level. The negative sign of the age square shows the nonlinearity of the age square, which indicates when the age of the household head reaches a certain level it will raise income by -0.00016 but this increase of income will be at a decreasing rate. This result of age square is also consistent with the study of Khan, Z. (2021) and Su, B., & Heshmati, A. (2013). Migration is directly related to the income of the household and is significant at a five percent level of significance. The monthly household income upsurged by 0.1740 % as family members migrated from rural to urban areas. This finding supports the study of Huhua Cao (2010) and Lima et al. (2020).

The size of the landholding is included in the model and is statistically significant at a 1% level of significance. Further, the result proposes that if the head of the household has the possession of one or more acres of land the income can be increased because the land can be utilized for different earning purposes. So, The coefficient of landholding size is positively related to the monthly income of the household head, it shows that as household heads possess more land their income increase by 0.04 percent. This result is also in line with the study of Chaudhry et al. (2011).

The results of the strict Mincerian function indicate that education and work experience has a positive effect on the earnings of the rural households in district Multan while experience square has a negative effect on the earnings due to the nonlinearity of the variable. The variables for the extended Mincerian function were Education work, experience,  $Exp^2$ , Age,  $Age^2$ , Spouse Participation, Migration, Employment status, and land size. Moreover, in the extended Mincerian function

**Table 4 Extended MEF: Rural District Multan**

<b>Dependent Variable: Lnincome of the household</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
<b>C</b>	9.755284	0.251827	38.73799	0.0000
<b>EDUCATION</b>	0.020163	0.006903	2.920924	0.0051
<b>WORK_EX</b>	0.013467	0.005940	2.267108	0.0270
<b>EXP2</b>	0.000147	0.000432	0.339615	0.7354
<b>AGE</b>	0.017336	0.004406	3.934715	0.0002
<b>AGE2</b>	0.000162	6.77E-05	2.396513	0.0197
<b>SPOUSE_PART</b>	-0.007350	0.068075	-0.107971	0.9144
<b>MIGRATION</b>	0.174054	0.084596	2.057480	0.0444
<b>EMP_STAT</b>	-4.26E-05	0.000557	-0.076515	0.9393
<b>LAND_SIZE</b>	0.045667	0.013599	3.358029	0.0013
<b>R-squared</b>	<b>0.434427</b>		<b>Adjusted R-squared 0.341879</b>	
<b>F-statistic</b>	<b>4.694065</b>		<b>Prob(F-statistic) 0.000123</b>	
<b>Sample size (N) 300</b>				

Source: Authors Own calculation through E-Views



## **6. Conclusion and Policy Recommendation**

This paper examined the determinants of income among rural households of district Multan. This study was based on primary data which was collected through a structured questionnaire during the period 2022. A sample of 300 households from rural areas was drawn randomly. To describe the socio-economic characteristics of the household head descriptive static was used. The coefficient correlation was used to find the degree of association among the variables. In estimating the determinants of rural household income Mincerian earning function was used both in strict and extended form. variables like education, work experience, age, spouse participation, migration, and land size has a positive effect on the earnings while work experience square, age square, and employment sector have a negative effect on income in district Multan. Furthermore, the value of the coefficient correlation was less than 0.30, revealing that there is no problem with multicollinearity in our model.

## **7. Recommendation**

- Withholding taxes should be withdrawn by the Government from rural areas and must be exchanged with less taxation so that the indirect taxes on the less well-off is removed and decrease the income gap between rural and urban area.
- Policy formulation on investment in human capital is needed and its effective implementation is necessary for the well-being of society.
- The job formation for skillful labor in rural areas would be instrumental in tumbling the wage gaps and in the growth of rural workers.
- Programs should be introduced that benefit the rural areas and assist in enhancing the productivity of rural areas to stop the migration towards the urban areas.
- Women's employment has dramatic effects on income. Fewer women involve in Working in rural areas as compared to urban. Women should be counseled in rural areas through awareness.

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