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Determinants of Income Diversification among Rural Households of Pakistan

Saba Javed[1], Abdul Majeed Nadeem[2,3]*, Muhammad Zahid Rafique[3], Muhammad Asif Kamran[4]
1. Institute of Agri. And Resource Economics, University of Agriculture Faisalabad, Pakistan
2. Department of Economics, Govt College University Faisalabad, Pakistan
3. Centre for Economic Research , Shandong University China
4. Nuclear Institute for Agriculture and Biology (NIAB) Jhang Road Faisalabad, Pakistan

Abstract
This study is designed to determine the poverty status and determinants of income diversification in rural areas of Pakistan using cross sectional data of Pakistan Social and Living Standards Measurement (PSLM) for 2010-2011. The variables used for measuring income diversification are demographic indicators, poverty status, and income of households. Foster-Greer-Thorbecke (FGT) poverty measures show that 43.1% poor and 56.9% non-poor resided in rural areas of Pakistan. A Tobit model was employed to examine the determinants of livelihood diversification among households. The results show that non-poor and female headed household with higher family size diversify more as compared to poor, male headed household with small size of family members. The place of residence (province used as proxy) also plays important role for income diversification. It is recommended to improve the ways of income diversification among rural household to reduce poverty.
Keywords: Poverty, Income diversification, Rural Pakistan, Tobit Regression Model, FGT Poverty index

1. Introduction

Poverty defined as a distinct lack of welfare due to lack of income or consumption, exposure to risk, low levels of education and health, no opportunity and powerlessness (World Bank, 2001). Therefore Minot *et al*., (2006) defined poverty as a lessening of the deprivation of well-being. Poverty involves in constraints enforced by a lack of income. More than 70 percent of world population is poor (World Bank, 2007) and most of the poor population live in rural areas. In the world, 1.2 billion people are poor and living in rural areas (IFAD, 2001) and 75% of the population in developing world is living in rural areas (Ravallion *et al*., 2007). About 21 percent of Pakistan population is living below poverty line (World Bank, 2008). Socio-economic and political instability, climate change and less capital accumulation in developing countries have resulted in agriculture as less productive to fulfill basic needs in rural communities leading to diversification (Oluwatayo, 2009). Climate change led drought has emerged as source of household level vulnerability in agriculture sector due to which farmers are facing problems in growing of crops. Limited and week adaptive capacity as well as limited resources for support of farmers and lack of targeted support are major causes of poverty (Ghimire *et al*, 2010). This results in rural household's income diversification to improve their income by joining multiple jobs to enhance their consumption.

The diversity of rural livelihoods is receiving increased attention in discussions in low income developing countries for rural poverty reduction. By studying the distinction between diversification of necessity and that of by choice, the following determinants namely seasonality, risk, labour markets, credit markets, asset and coping strategies of diversification are found to have positive attributes for livelihood security that outweigh negative connotations. He recommended that diverse rural livelihoods are less vulnerable than undiversified ones and policies should focus on its development (Ellis, 2000).

Over the past decade, in rural areas of developing countries, there had been an outstanding tendency of diversification. The rural households regulate activities to find new opportunities and to cope with risks. According to Joshi *et al,* (2003), Income diversification is the balance among the different sources or an increase in different income sources. A household would be more diversified with two sources of income than a household with one source. In some studies, diversification is measured from different types of income sources. Some studies showed income diversification as the amount of income which is derived from off -farm sources (Davis et al. 2010). It had explored that Income diversification is strategy to earn income by primary activities from multiple sources (Joshi et al. 2003; Ersado, 2003; Dercon and Krishnan, 1996). These analyses focus on different sources of income of poor households. Reardon (1997) and Escobol (2001) describe income diversification as an increase in the significance of off-farm income. Off-farm wage labor and self-employment include in off-farm income. When income sources increases households diversify into non-farm activities. The exiting literature on determinants of income diversification has found age, gender, marital status, household size, education, poverty status and geographical location as major factors (Dercon and Krishnan, 1996; Ersado, 2003; Oluwatayo 2009). Taise et al.,(2012) analyzed the determinants of off-farm income diversification in Rivers State, Nigeria and found that small farm holdings, low farm income and poor living conditions has become a push on rural households to fairly diversify their income sources to alleviate the prevalent poverty among

themselves. The education, farm size, household size, farm investment and value of farm output are significant determinants of off-farm income. The results also indicate that the more formal educational attainment of households, the more reluctant they shall be to work in the farm because of better opportunities outside the farm. The previous estimates have been primarily diagnosing livelihood and poverty issues with respect to Rural-Urban or cross gender analysis (Joshi et al. 2003; Oluwatayo 2009). The analysis did not address rurality and gender in combination with socioeconomic and locational dimensions. Therefore, the study is designed with major objectives to determine how various socioeconomic factors affect income diversification, poverty measurement and to suggest some policy measures for rural poverty reduction via improving income diversification.

2. Methodology

Household Integrated Economic Survey (HIES) and Pakistan Integrated Household Survey (PIHS) has been conducted in Pakistan which was named as Pakistan Social and living Standards Measurement Survey (PSLM) in 2004. The Pakistan Social and Living Standards Measurement Survey (PSLM) 2010-11 is the sixth round of a series of survey planned to be conducted up-to 2015. The survey was conducted during July, 2010 to June, 2011covering 76546 Households to get data on socio-economic indicators at district level with urban/rural breakdown. Data about rural households taken from Pakistan Social and Living Standards Measurement Survey (PSLM) 2010-11 is used for this study. Three analytical techniques are used for data analysis and results description. Means and percentages (Descriptive statistics) are used to describe the socioeconomic characteristics. Freer, Greer and Thorbecke (FGT) poverty index is used to measure poverty status. FGT (1984) derived mathematical formulation of poverty as

$$FGT_{\alpha} = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z - y_i}{z}\right)^{\alpha}$$

FGTα = the weighted poverty index
α is FGT index. It ranges from 0 to 2 and 0 for incidence, 1 for depth and 2 for severity of poverty.
Whereas z is the poverty line, H is the number of households below the poverty line, N is the total number of households in the survey, Yi is the per capita income of household, Z- Yi is poverty gap, Z-Yi/Z is poverty gap ratio and H/n is the proportion of the population that falls below the poverty line.
Tobit model is used to study the determinants of income diversification among rural households. The Tobit model (Greene 2003) is written as;

$$Y^{*}t = Xt\beta + \varepsilon t$$

Where ε_i is normally distributed with constant variance and zero mean.
Y*ι is the income diversification index which is number of income sources employed divided by all the income sources available in the study area. Then take square and subtracted by 1. The Simpson diversity index is used to measure the income diversification index. It ranges between zero to one. Zero means no diversification. The value closer to one shows high diversification.
The explanatory variables are
X1 = Age (in years), X2 = Gender (Female = 1, Male = 0)
X3 = Marital status (Married = 1, Single, Divorced or Widowed, = 0)
X4 = Household size, X5 = Years of formal education
X6 = Poverty status (Poor = 1, Non-poor = 0)
X7 = Province (Punjab, Sindh, Khyber Pakhtunkhwa (Kpk), Baluchistan)
β = Regression parameters or coefficient, ε_i= Error term

3. Results and Discussion

Descriptive studies are used to present socio-economics characteristics of Households of the study area.

Table 1: Socioeconomic Characteristics of Households

Socioeconomic characteristics	Percentage	Socioeconomic characteristics	Percentage
Age (Years)		**Educational level**	
<30	71.00		12.20
31-40	10.60	Primary	17.40
41-50	7.90	Middle	7.60
51-60	5.70	Intermediate	1.00
61-70	3.20	Graduation	1.00
71 and above	1.60	Higher Education	60.90
		Illiterate/below educational age /no formal education	
Gender		**Poverty status**	
Male	50.90	Poor	43.1
Female	49.10	Non poor	56.9
Marital status		**Household size(No's)**	
Unmarried	60.4	1-3	12.1
Married	36.1	4-6	38.6
Widow	3.3	7-9	33.8
Divorced	0.2	10-12	11.2
Nikkah*	0.1	13-17	3.4
		>18	0.75

Poverty status by gender	Male	Female	**Poverty status By Province**	Poor	Non poor
			Punjab		
Poor			Sindh	42.2	57.8
Non Poor	22.8	66.2	Kpk	42.2	57.8
	77.2	33.8	Balochistan	44.8	55.2
				41.4	58.6

Source: Authors' calculations

(* Legal formalities for marriage fulfilled but functions of marriage rituals remaining)

The study revealed that the average age of the respondents is 23 years and 71 percent of the respondents are in their working age. There are more male (50.9 %) in rural Pakistan than female (49.1 %). There are 36.1 % married, 60.4 % single with 3.3 & 0.2 % as divorced and widowed respectively. It is observed from the data that most of the respondents are single rather than either married, divorced or widow. About 60.9 % of the respondents are either illiterate, without formal education or lies below the educational age, whereas only 2% have higher education. The very low level of education may attribute to poverty in the area. It is observed that 38.6 % of the population have a family size of 4-6 members and those with a family size of 7-9 members constitute 33.8 % showing an average family size of 8-members. The large household sizes also cause poverty and low income among Households. The poverty status of respondents is measured FGT poverty index showing 43.1 % as poor and 56.9 % non-poor. This 43.1 percent are relying on less than 1.25 US dollars a day or approximately 125 Pak Rs. The minimum monthly income is Rs.2810 for poverty line in Pakistan. Gender wise measurement of poverty shows that there are more female-headed households living below the poverty line than their male-headed counterpart. Thus female-headed households in rural Pakistan are poorer than male-headed households. This is due to lack of access and control over productive resources. . In province wise description it is shown that Punjab constitutes about 37.9 percent of respondents. Sindh, KPK and Baluchistan constitute about 24%, 21.4% and 16.7 % respectively. In KPK 44.8% respondents are poor so they have more tendencies to diversify. The analysis shows that Punjab is less diversified as compared to KPK and KPK is less diversified as compared to Sindh. The data shows that higher proportion of households in Sindh has multiple jobs as compared to other provinces. The proximate reason for this can be diversified ecology with Pakistan's biggest seaport, farming systems, herding, desert environments etc.

A Tobit model is used to examine the determinants of income diversification among rural households. The results show that the coefficients of age, household size, education are positively affecting the income diversification. The co-efficient of age is significant showing that increase with age brings an increase in income diversification. Families with higher household size are more diversified because of higher number of earners. In the analysis higher education is a bench mark category. The respondents with formal education particularly those educated up to Middle or intermediate level are engaged in multiple jobs in rural areas of Pakistan than those with less education or highly educated. Hence, uneducated respondents have a lower possibility to have more than one job. Education improves the potential of respondents and provides opportunities. Though, the coefficients of gender, marital status and poverty of respondents are negative. The coefficient of gender shows

that male headed households are less diversified than female headed households. The coefficient of marital status shows that unmarried household heads are less diversified as compared to married household heads. The coefficient of poverty shows that households who are living below poverty line are less diversified.

Table 2: Tobit Regression Results of the Determinants of Diversification

Tobit regression: Number of observations = 8070
LR chi2(12) = 674.38 Prob > chi2 = 0.0000
Log likelihood = -2580.8 Pseudo R2 = 0.1156

Index		Co efficient	Std. Err.	T-Value	P value
Constant		0 .771	0.257	29.99	0.000
Age		0.002	0.0003	6.42	0.000
Gender		- 0.103	0.008	-12.39	0.000
Marital status		-0.161	0.009	-17.70	0.000
Poverty status		-0.141	0.009	-16.29	0.000
Household size		0.009	0.0009	9.49	0.000
Education Level					
	Primary	0.012	0.0217	0.56	0.575
	Middle	0.038	0.0202	1.86	0.063
	Intermediate	0.044	0.0205	2.14	0.033
	Graduation	0.030	0.025	1.21	0.226
Province	Punjab	-0.0004	0.009	-0.04	0.968
	Sindh	0.048	0.009	4.88	0.000
	KPK	0.000			

The results show that female headed, married and non-poor families are more diversified than male headed households. The province wise coefficient of income diversification shows that Punjab is less diversified as compared to KPK whereas Sindh is more diversified than KPK.

4. Conclusions

The study investigated poverty and determinants of income diversification among households in rural Pakistan. According to FGT poverty index 43.1 % poor relying on less than 1.25 dollars a day while 56.9 % non-poor. Gender wise measurement of poverty shows that there are more female-headed households living below the poverty line than their male-headed counterpart. Thus female-headed households in rural Pakistan are poorer than male-headed household. Most of the respondents are single rather than either married, divorced or widow. Families with higher household size are more diversified because they have a large number of earners. A large number of respondents had no education. About 17.9 % respondents are educated up to Middle level. The result of the Tobit regression model in determining the determinants of income diversification showed that the coefficients of age, household size and education are positive. Any increase in the value of the coefficients of these variables has a higher possibility of influencing the estimated diversification index positively. The coefficients of gender, income and marital status are negative. Thus, increases in the value of the coefficients of variables influence the estimated diversification index negatively. The coefficient of gender shows that female headed households are more diversified than male headed households. Married household's heads are more diversified as compared to unmarried household heads. The coefficient of the province shows that Punjab is less diversified as compared to KPK but Sindh is more diversified as compared to KPK. In general, households with formal education have the income and accesses to facility are engaged in diversified income generation activities.

The study has important policy implications for more investment in education with universal access for poor and remote localities households. The findings of the study can be helpful for development planning as it provides entry points to address poverty issues across different categories of rural and urban households. Future studies can be designed to narrow down level of analysis and look at regional and district level data to identify poverty and income diversification factors so that district level state departments and NGOs can include such information in their development planning.

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