FACTORS DETERMINING RURAL LABOUR SUPPLY: A MICRO ANALYSIS

MUHAMMAD ZAHIR FARIDI and A. B. BASIT*

Abstract. Rural development is the heart of the country's economic development. Rural development is attained by providing employment opportunities to rural labour force. The aim of the present study is to explore the factors which decide about rural labour market participation. Primary source of data is used for analysis which is gathered by the authors. Binomial Logit regression method is employed to estimate the determinants of rural labour supply model. Findings indicate that Education, Economic Capital Index, and Social Capital Index have discernible impact on rural labour supply. In addition, it is observed that number of livestock and size of land holdings have negative and significant impact on rural labour force participation. The study has suggested that rural infrastructure should be developed and educational facilities should be improved.

I. INTRODUCTION

Pakistan is basically an agricultural country and agriculture is the biggest sector of the Pakistan's economy. Almost 66 percent of the Pakistan's population is residing in rural areas of Pakistan. Agriculture is the main source of their livelihood. One fourth of Pakistan GDP is being contributed by agriculture sector. Labour force participation rate is vital indicator of supply of labour. Labour market behavior is assessed by labour force participation rate. Out of total labour force, 43.61 percent work force is employed by agricultural sector.[1] In addition, this sector regularly supplies workers to the manufacturing sector. Rural development is the heart of country's economic development. It is not only sufficient to raise the

---

*The authors are, respectively, Lecturer at Department of Economics, Bahauddin Zakariya University, Multan (Pakistan), and Associate Professor of Economics at the Islamia University, Bahawalpur (Pakistan).

[1]See *Pakistan Economic Survey* (2008-09).

agriculture productivity but it is necessary to provide employment opportunities to rising rural population by enhancing their incomes. Further rural development takes place by providing with necessary facilities like better houses, paved streets, health and education services, improved socio economic infrastructure. In nutshell, the socio economic condition of rural people may be uplifted by attaining the goals of increased productivity, employment opportunities and income redistribution.

Despite the above discussed importance of rural and agriculture sector, there is still a large portion of rural labour force which remains unemployed and under employed in rural areas. The main purpose of the present study is to explore the factors which directly or indirectly influence the rural labour force participation.

The rest of the analysis is planned as follows: The section II reviews the important studies on labour force participation both at national and international levels. Theoretical framework regarding labour market participation is provided in the section III. In the section IV, we have developed labour supply model and estimation method. Sources of data and interpretation of variables are described in the section V. The section VI discusses the results of study. The last section offers concluding remarks of the study in section VII.

II. STUDIES REVIEWED ON LABOUR MARKET PARTICIPATION

There is an immense of studies granting to debate on labour market conditions in rural or agriculture areas available both in the developed and developing economies. Some of the important studies are reviewed at the national and international level. There are some studies which illustrate the emergence of rural labour markets functioning and collapse of institutional impediments while other empirical findings support the hypothesis that there still exist imperfections in the labour markets.

Benjamin and Brandt (1997) and Liu *et al.* (1998) identified that there is negative relationship between the size of farm and labour force participation, showing labour market barriers.

Meng (2000) and Yang and Zhoou (1998) explored that off farm labour force participation was discouraged by institutional obstacles or barriers like land tenure systems and perceptive quota system.

Naud and Serumage-Zake (2001) provided the estimates of the labour market participation and unemployment in South Africa's North West

province. The determinants were estimated using probit model. They used data collected from three sources like the 1993 Caldru Survey, the 1995 CSS Survey and survey conducted by the authors in 1997. The analysis found that education, location, sex and family structure were significant factors of unemployment. The study concluded that the unemployment was a severe challenge in rural areas of South Africa.

Renkow (2003) estimated labour market model at the county level for North Carolina. He used the county level data considering the years 1980 and 1990. Three stage least square (3SLS) method employed for empirical analysis. The findings showed that changes in real wages and housing prices seemed to be more vital factors of adjustment in labour market in metro counties than in rural counties. In addition, labour force growth was significantly influenced by the changes in employment in nearly counties.

Bowlus and Sicular (2003) and Wang *et al.* (2007) showed that there existed non-divisibility between labour demand and supply decisions of farm workers and thus imperfections in the labour markets.

Maurer-Fazio (1999) and Li *et al.* (2005) reported that the off farm labour markets would be functioning well because the returns of off farm labour were almost equal over many alternative employment opportunities and off farm incomes were significantly determined by education.

Kimhi (2004) discussed the role and importance of agriculture sector in the development of rural areas. The study used data on rural semi-cooperative villages. The data collected from four sources. Census of Population in Israel was the main source of data for the study. OLS technique was used for estimation analysis. The study concluded that the impact of importance of agriculture or rural development was mixed.

Mduma and Wobest (2005) analyzed the factors that affect the rural labour force participation. The study used the data from Household Budget Survey (HBS) in Tanzania in the year 2000-01. Truncated regression and negative binomial regression techniques were employed for estimation. The findings of the study indicated that level of education, land availability, access to economic centers and credit turned out to be the most crucial factors in determining the rural labour force participation and the share of the labour income in total cash income.

Glauben *et al.* (2008) contributed to the continued discussion over Chinese labour force participation in rural labour market during the last twenty years. They used the household data from the Zhejiang province during the period 1986-2002. Multinomial Logit technique was used to

analyze empirically household, farm and regional characteristics influencing the probability of the farmers' participation in any one labour market regimes. The results of the study indicated that rural employment was significantly affected. The findings showed that the education turned out to be the crucial factor for labour market participation.

There is a rich body of empirical studies scrutinizing the determinants influencing the labour force participation decisions both rural and urban in Pakistan. For example, Afzal and Nasir (1987), Ali (1990), Ghayur (1993), Jamil (2001), Hafeez and Ahmed (2002), Naqvi and Shahnaz (2002), Faridi *et al.* (2009, 2010), Azid *et al.* (2001) analyzed the determinants of labour force participation considering the some socio-economic and demographic factors. But only few studies concentrate on rural labour market participation. The present study is focused especially on the factors effecting rural labour supply.

III. THEORETICAL FRAMEWORK

The economic theory underlying labour supply is reviewed briefly. We start by examining the individual's participation. The present study employs a standard participation model based on traditional theoretical household models of time allocation (Mincer, 1962; Becker, 1965; Gronau, 1977; Blundell and McCurdy, 1999; Hafeez and Ahmed, 2002). In the literature of labour supply, different dimensions of the life cycle models have been prepared and examined[2]. The present study uses the standard static, within period labour supply model which is based on the basic theory of consumer behavior. The individual is assumed to allocate time to market work and non-marketable activities (leisure). Utility is maximized by choosing combinations of goods and leisure hours subject to time, price and income constraints. Formally, the model may be presented as follows:

$$U = F(G, L, Z) \qquad\qquad (1)$$

Where U shows the utility, G = consumption of goods and L stands for leisure hours. Similarly Z indicates individuals and household characteristics such as age, education, marital status, number of dependents, family setup, spouse participation in economic activities etc. For examining the rural labour characteristics, the number of livestock, size of land holding,

---

[2]*See* Rozenz Weig (1976); Ben-Porath (1973); Willis (1973); for example, the use of one period static life cycle models and Rozens Weig and Wolpin (1980); Sprague (1988); Troske and Voicu (2009); for formulation and application of rural multi-period life cycles models.

economic and social over head capital are incorporated in the vector of individual and household attributes *Z*. So it is assumed that utility is maximized subject to the income and time constraint.

$$P_gG + WL \ = \ V + WT \tag{2}$$

Where *W* is the constant wage rate, P_g = Unit price of goods, *V* = Non-labour income and *T* is the total time available. The individual maximizes a utility function subject to the limitation of fixed time "*T*". Further, the individual decides how to allocate his or her time to inside home activities, outside home or market activities and leisure. Thus, the optimal time allocation to market activities would be determined by the individual and household characteristics. The costs of a job search and remunerations of the market work are determined by the labour market conditions.

More formally, the individual solves his or her maximization problem by optimizing $U = F(G, L, Z)$ subject to budget constraint $P_gG = W(T - L) + V$. The first order conditions are the solution of this optimization problem.

$$F_G(G, L, Z) \ = \lambda \qquad F_L(G, L, Z) \ \geq \ \lambda W \tag{3}$$

Where λ shows the marginal utility of income. On the one hand, the equation (3) indicates the demand function of the commodities which produce utility and on the other hand it involves the optimal allocation of time among leisure hours and market work. If there is the existence of strict inequality in the equation (3), then the individual is not participating in labour market. It means that leisure hours are equal to total time, *i.e. L = T*. The concept of reservation wage ($\dot{W}$) underlies the labour force participation decision. The wage rate $\dot{W}$, such that $F_L(G, L, Z) = \lambda\dot{W}$, is the reservation wage below which the individual would not be willing to work. So, the individual would participate in the labour market if and only if the expected market wage is more than the reservation wage, *i.e. We > \dot{W}*.

IV. LABOUR SUPPLY MODEL AND ESTIMATION METHOD

We have considered those rural workers in the labour force who are participating in market work as paid, unpaid or self employed worker. For estimating our rural labour supply model, we would perform a multivariate regression analysis. The general function for rural labour supply model is given as follows;

$$Y_i \ = \ f(X_1, X_2, \ldots\ldots, X_n) \tag{4}$$

Where Y_i shows rural labour market participation, $Y = 1$, if a rural work force involves in business and economic activities and $Y = 0$, if rural work force does not work. $X_1, X_2, \ldots\ldots, X_n$ show various socio-economics factors. The dependent variable in our model is binary or qualitative in nature. So linear probability model (LPM) is not sufficient for estimating rural labour supply model. In the present analysis, the non linear probability model (Logit) is the most appealing which generally involves non linear maximum likelihood estimation. The Logit model assumes the following cumulative probability density function:

$$P = \frac{1}{1 + e^{-(\alpha_0 + \alpha_i X_i)}} \tag{5}$$

Where 'P' is the probability that an individual worker supplies its services to the rural labour market, 'e' is the exponential value. α_i is the row vector of the parameters and Xi is the column vector of the variables.

Since 'P' is the probability of rural labour force participation in the economic and business activities which is not directly observable, a latent (0, 1) variable is formulated who decides to participate in the labour market and zero otherwise. The following regression equation is derived directly from the logistic probability equation (5).

$$\ln\left[\frac{P}{1-P}\right] = \alpha_0 + \alpha_i X_i + \varepsilon_i \tag{6}$$

This equation indicates the Logit model. The parameters of our model are not conveniently/ easily explained because they provide only information on the effects of independent variables (Xi) on the odd ratio. We calculate the partial derivatives to interpret the effect of independent variables on the probability of rural labour force participation. The probability derivatives are calculated as (Greene, 2004):

$$\frac{\partial P}{\partial X_i} = \hat{P}_i(1 - \hat{P}_i)\alpha_i \tag{7}$$

After a comprehensive discussion of theoretical framework and estimation technique, the theory permits to develop a standard but very simple rural labour supply model which formulates the rural worker's decision to join labour market as a function of its educational attainment, rural related factors (*i.e.* Number of livestock, size of land holdings), role of rural infrastructure.

$$RLS = \alpha_0 + \sum_j \gamma_j EDC_{ji} + \sum_k \alpha_k RRF_{ki} + \sum_t \eta_t RI_{ti} + Z_i \lambda + \varepsilon_i$$

Where *RLS* indicates rural labour supply which is equal to "1" for *i* the worker is in the rural labour force and zero otherwise. On the right hand side of the equation, the basic variables of interest are educational attainment (EDC_{ji}), rural related factors (RRF). Similarly rural infrastructure (RI) is considered very important factor in determining rural labour force participation. The vector Z_i consists on extra information probably effecting labour force participation just like age and number of dependents, family set up and marital status, sex and spouse's participation etc.

V. DATA SOURCES AND DESCRIPTIONS OF THE VARIABLES

This section provides the sources and description of data and also interprets the major characteristics of the variables that are related to the econometric analysis.

SOURCES OF DATA

In order to analyze the factors which influence the rural labour force participation in economic activities, we have selected district Bahawalpur, which is the least developed district of the southern Punjab. The main source of the data for the present study is Primary data, collected through field survey, using simple random sampling technique. Almost three hundred and twenty six rural workers (both male and female) in the age cohort 15-64 are interviewed for the present study.

STATEMENT OF HYPOTHESIS

The unit of analysis is rural worker. After reviewing the important studies, we have hypothesized that educational attainment is positively related to the rural labour supply. As far concerned the rural related factors (*i.e.* number of livestock and size of land holdings) it is hypothesized that these factors reduce the off farm labour force participation. In addition, to observe the effect of social and economic capital over head on rural labour supply, we have developed Social Capital Index (SCI) and Economic Capital Index (ECI). It is expected that there is positive relationship between SCI and ECI and rural labour force participation. Further, study incorporates some additional variables like age, number of dependents, spouse's participation, family set up and marital states to influence the rural labour supply.

The detailed list of these variables is given in Table 1.

TABLE 1

List of Some Selected Variables

Variables	Description of the variables	
Variables	Description of the variables	
Dependent variable		
RLS	Rural labour supply	= 1 if rural worker participates in the labour market = 0 Otherwise
Explanatory variables		
AGE	Age of the worker	Completed years of age are taken
ECY	Education level of worker	Completed years of education are considered
PEC	Primary level of education	= 1 if worker education is up to primary = 0 Otherwise
SEC	Secondary level of education	= 1 if worker education level is secondary = 0 Otherwise
HEC	Higher level of education	= 1 if worker education level is graduation and post graduation. = 0 Otherwise
MAR	Marital Status	= 1 if the worker is married = 0 Otherwise
NLS	Number of livestock	Total number of livestock is considered because it is difficult to give economic value of the livestock due to instable livestock market.
SLH	Size of land holdings	Total size of land holdings in acres
NDT	Number of dependents	Total number of dependents below 15 years and above 64 years
ECI	Economic Capital Index[3]	Economic capital index indicates the presence of one or more of the followings such as: (*i*) Market centre or utility stores (*ii*) Village Bank (*iii*) Animal health centre or Veterinary clinic (*iv*) Agriculture counseling center, *i.e.* $(0 \leq ECI \leq 1)$

[3]We owe these indices to Datt and Jolliffe (1999).

SCI	Social capital index[4]	Social capital index shows the presence of one or more of the following public service such as
		(*i*) Police station
		(*ii*) Education facilities up to secondary level
		(*iii*) Public hospital or health facilities
		(*iv*) Post Office, *i.e.* ($0 \leq SCI \leq 1$)
FSP	Family setup	= 1 if the worker belongs to joint family
		= 0 Otherwise
SEX	Gender	= 1 if the worker is male
		= 0 Otherwise
SPT	Spouse participation in Economic activities	= 1 if the spouse is working
		= 0 Otherwise

VI. RESULTS AND DISCUSSION

PRELIMINARY ANALYSIS

Preliminary analysis of the data is made through explaining the descriptive statistics of the some selected variables and by providing the pair-wise correlation matrix among relevant explanatory variables.

Descriptive Statistics

Table 2 interprets the means and standard deviations of some selected variables for the chosen sample of rural labour supply. The mean age of the rural worker is 39.81 year with standard deviation 13.76. The average education of the rural labour force is 10.31 years with 3.98 dispersion. The proportion of rural workers with primary education is 32 percent while the proportion of the secondary level educated worker is 39 percent. Overall 74 percent workers are married. On the average, rural workers hold 9.18 numbers of livestock. The mean size of land holdings is 11.67 acres with variation 12.16. In order to examine the shape of distribution, the values of coefficient of Skewness and Kurtosis of each variable are also given in Table 2.

---

[4]See Assaad *et al.* (2000).

TABLE 2

Descriptive Statistics of Some Selected Variables

Variables	Mean	Standard Deviation	Skewness	Kurtosis
RLS	0.69	0.46	−0.84	1.70
AGE	39.81	13.76	0.02	2.00
ECY	10.31	3.98	−0.53	2.91
PEC	0.32	0.45	0.97	1.94
SEC	0.39	0.49	0.47	1.22
HEC	0.29	0.46	0.90	1.81
MAR	0.74	0.44	−1.11	2.23
NLS	9.18	9.05	1.36	6.38
SLH	11.67	12.16	1.08	3.36
NDT	4.83	1.92	0.11	2.19
ECI	0.65	0.26	−0.42	2.51
SCI	0.67	0.27	−0.57	2.64
FSP	0.57	0.50	−0.29	1.08
SEX	0.67	0.47	−0.75	1.56
SPT	0.41	0.49	0.36	1.13

Source: Calculated by the authors using E-Views 5 Statistical Software.

Correlation Analysis

The pair wise correlation among different explanatory variables is reported in Table 3. To examine the existence of multicollinearity among the independent variables, we get aid from this correlation matrix. The explanatory variables, whose pair wise correlation is greater or equal to 0.83, indicate the existence of high multicollinearity (Gujarati, 1995). Then the multicollinear variables are dropped in the econometric analysis. From Table 3, it is clear that there is no existence of multicollinearity among the repressor variables; albeit, there is some degree of relationship between the variables.

TABLE 3

Correlations Among Explanatory Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	AGE	1.00													
2	ECY	0.07	1.00												
3	PEC	-0.03	-0.51	1.00											
4	SEC	-0.09	0.04	-0.50	1.00										
5	HEC	0.12	0.65	-0.41	-0.50	1.00									
6	MAR	0.60	0.20	-0.13	-0.11	0.23	1.00								
7	NLS	-0.04	-0.20	0.14	0.11	-0.31	-0.10	1.00							
8	SLH	-0.04	-0.14	0.14	0.05	-0.21	-0.11	0.55	1.00						
9	NDT	0.26	0.12	-0.07	0.02	0.07	0.23	-0.11	-0.35	1.00					
10	ECI	-0.03	0.11	-0.09	-0.01	0.11	0.04	-0.14	-0.18	0.08	1.00				
11	SCI	-0.01	0.28	-0.18	-0.02	0.27	0.03	-0.29	-0.30	0.02	0.23	1.00			
12	FSP	-0.32	-0.05	0.08	0.00	-0.05	-0.44	0.02	-0.08	0.31	0.01	0.10	1.00		
13	SEX	0.03	0.00	0.00	0.00	0.02	-0.06	-0.01	0.15	0.05	-0.07	-0.05	-0.07	1.00	
14	SPT	0.19	0.00	0.02	0.03	-0.06	0.44	0.10	0.18	-0.18	-0.02	-0.14	-0.33	-0.14	1.00

Source: Calculated by the authors from the survey data.

ECONOMETRIC ANALYSIS

The results of the Logistic estimates of the determinants of rural labour supply model are reported in Tables 4 and 5. The major difference between these two equations is that the equation (4) uses completed year of education as an explanatory variable and the equation (5) provides the results of the various educational levels. Two-tailed test of significance is used in the present study to examine the reliability of the point estimates. For this purpose, one percent, five percent, or ten percent levels of significance are used. The intercept terms in both equations of rural labour supply model are negative and insignificant. The quality of our estimates may be examined by the moderate value of McFadden R^2 (0.53). In addition, overall performance of rural labour supply model is gauged by LR-Statistic which is highly significant.

Age of the rural worker turns out to be positive and statistically insignificant factor in both equations. Rural labour force is more likely to participate in economic activities due to an increase of one year in worker's age. Education is another factor which has a significant effect on rural labour force participation. We have used completed years of education as an explanatory variable in our first Logit equation of rural labour supply model. The coefficient of education (ECY) is positive and highly significant. An additional year of education raises rural labour supply by 3.15 percentage points. In equation (2) of rural labour supply model, we have introduced three dummies representing various educational levels. Non-formal education is considered as base category. All the coefficients of educational levels are positive and have significant impact on labour supply except primary level of education. Higher educated rural workers are 48.6 percentage points more likely to participate in off farm labour market. Our results are consistent with Glauben *et al.* (2008), Kimhi (1994), Zhang *et al.* (2003)'s findings.

The study has pointed out that marital status of the worker performs an integral role in determining the rural labour supply. The coefficients of marital status (MAR) in both equations are positive and statistically significant. The rural workers are more likely to participate in labour market by 28 percentage points due to one unit increase in MAR. In order to trace out the influence of agricultural assets on rural labour market participation, the study incorporates number of livestock and size of land holdings as an explanatory variable. The coefficients of number of livestock and size of land holdings are negative and statistically significant at one percent level of significance. The probability of rural workers' participation falls by 1.66 in off farm activities and 2.51 percentage points due to an addition of one unit

in livestock (NLS) and size of land holdings (SLH) respectively. The reason may be that the livestock and land holdings are the major source of rural income and have a depressing impact on off farm employment. The estimation results stay in line with Glauben *et al.* (2008)'s findings which emphasize on the importance of rural assets.

TABLE 4

Binomial Logit Estimates of Rural Labour Supply Model
(with Completed Years of Education)

Variables	Coefficients	Z-Statistic	Prob. Derivatives
Constant	−1.028	−0.93	–
AGE	0.013	0.71	0.0028
ECY	0.148*	2.64	0.0315
MAR	1.321***	1.69	0.2809
NLS	−0.078*	−2.96	−0.0166
SLH	−0.118*	−5.32	−0.0251
NDT	0.322*	2.53	0.0685
ECI	0.216***	1.78	0.0459
SCI	0.528**	2.13	0.1123
FSP	0.181	1.08	0.0385
SEX	0.505	1.22	0.1074
SPT	−1.355*	−2.36	−0.2882
Log Likelihood	−94.57801	McFadden R^2	0.53
LR Statistic (11 df)	212.7852	Size of Sample	326
Probability (LR Stat)	0.0000		

Source: Estimated by authors using E-Views 5.0 Statistical Software.

* Significant at 1 percent level
** Significant at 5 percent level
*** Significant at 10 percent level

Note: Illiterate is taken as base outcome.

TABLE 5

Binomial Logit Estimates of Rural Labour Supply Model
(with Various Levels of Education)

Variables	Coefficients	Z-Statistic	Prob. Derivatives
Constant	−1.124	−0.83	−
AGE	0.011	0.94	0.0023
PEC	0.946	1.06	0.2012
SEC	1.234**	1.98	0.2625
HEC	2.285*	2.46	0.4860
MAR	1.309***	1.66	0.2784
NLS	−0.071*	−2.73	−0.0151
SLH	−0.114*	−5.15	−0.0243
NDT	0.373*	2.94	0.0793
ECI	0.225***	1.65	0.0479
SCI	0.672**	1.98	0.1429
FSP	0.053	1.19	0.0113
SEX	0.431	1.06	0.092
SPT	−1.335*	−2.28	−0.284

Log Likelihood	−94.62296	McFadden R^2	0.52
LR Statistic (11 df)	212.6953	Size of Sample	326
Probability (LR Stat)	0.0000		

Source: Estimated by authors using E-Views 5.0 Statistical Software.

         * Significant at 1 percent level
         ** Significant at 5 percent level
         *** Significant at 10 percent level

We have observed that the number of dependents has positive and significant impact on rural labour force participation. The rural workers are more likely to join the labour market by about 7 percentage and 8 percentage points in both equations of rural labour supply model as a result of an increase of one dependent in the family. The present study indicates that social overhead capital plays a pivotal role in raising rural employment. The coefficients of ECI and SCI are positive and statistically significant. The rural labour supply increases by about 4.6 and 4.8 percentage points in both Logistic equations respectively as a result of an improvement in ECI. The significant result indicates that the presence of market center, village bank, animal health centre and agricultural counseling centre raise more

employment opportunities in rural areas. Supporting to the previous result, the SCI also influences positively the rural labour force participation. The SCI raises probability of rural labour force participation by about 11.2 percent and 14.3 percent in both equations of the rural labour supply model respectively. Labour force participation is highly influenced by family set up. The study shows that rural workers are more likely to participate in the labour market belonging to joint family system but have insignificant impact on rural market participation. Similarly, the probability of rural male worker increases by 10.74 percentage points due to one unit increase in male labour force. Spouse participation in economic activities (SPT) reduces the probability of rural labour market participation by about 28 percentages. The coefficient of SPT is not only negative but highly significant at one percent level of significance.

VI. CONCLUSIONS

The rural labour force participation both on farm and off farm activities is regarded very important for rural development. The present research has explored various human and non-human factors for determining the rural labour supply. We have observed from the present analysis that Education turns out to be very significant factor in determining rural labour supply. The completed years of education and various educational levels have positive and significant impact on rural supply of labour. The study concludes that marital status; number of dependents and social overhead capital positively affect the supply of labour in rural areas. Further, we have found that number of livestock, size of land holdings and spouse's participation in economic activities significantly reduce the off farm labour force participation.

Based on the study's findings, the following suggestions are recommended.

1. Basic and higher education institutions should be established in rural areas especially agricultural education.

2. Government should improve the rural infrastructure by providing electricity, health facilities and also road infrastructure.

3. Security facilities should be provided through establishing police stations in rural areas.

4. To expand the rural business activities, markets and business centers might be developed in rural areas.

REFERENCES

Afzal, M. and Z. M. Nasir (1987), Is female labour force participation really low and declining in Pakistan? A look at alternative data set. *The Pakistan Development Review*, Volume 26(4), pp. 699-707.

Ali, K. (1990), Problem of working women in the rural informal sector of Multan district. *Pakistan Economic and Social Review*, Volume 33(2), pp. 89-104.

Assaad, R., F. El-Hamidi and A. U. Ahmed (2000), The determinants of employment status in Egypt. *FCND Discussion Paper* No. 88.

Azid, T., M. Aslam and M. O. Chaudary (2001), Poverty, female labour force participation and cottage industry: A case study of cloth embroidery in Rural Multan. *The Pakistan Development Review*, Volume 40(4), pp 1105-1118.

Becker, G. S. (1965), A theory of the allocation of time. *The Economic Journal*, Volume 75(299), pp 493-517.

Benjamin, D. and L. Brandt (1997), Land, factor markets, and inequality in rural China: Historical evidence. *Explorations in Economic History*, Volume 34(4), pp. 460-494.

Blundell, R. and T. McCurdy (1999), Labour supply a review of alternative approaches. The Institute for Fiscal Studies, *Working Paper Series* No. W 98/18.

Bowlus, A. J. and T. Sicular (2003), Moving toward markets? Labour allocation in rural China. *Journal of Development Economics*, Volume 71(2), pp. 561-584.

Datt, G. and D. Jolliffe (1999), *Determinants of Poverty in Egypt*: 1997. International Food Policy Research Institute, Washington, D. C.

Faridi, M. Z., I. S. Chaudhry and A. B. Basit (2009), An analysis of the determinants of male labour force participation and employment status in Pakistan: The case of Bahawalpur district. *Pakistan Journal of Social Sciences*, Volume 29(2), pp. 189-208.

Faridi, M. Z., S. Malik and R. I. Ahmad (2010), Impact of education and health on employment in Pakistan: A case study. *European Journal of Economics, Finance and Administrative Sciences*, Volume 18, pp. 58-68.

Ghayur, Sabur (1993), Employment pattern and extent of under utilization of manpower in Rural Barani Areas of Pakistan. *The Pakistan Development Review*, Volume 30(4), pp. 1225-1233.

Glauben, T., T. Herzfeld and X. Wang (2008), Labour market participation of Chinese agricultural household: Empirical evidence from Zhejiang province. *Food Policy, Science Direct*, Volume 33, pp. 329-340.

Greene, W. H. (1992), *Econometric Analysis*. New York: MacMillan Publishing Company.

Gronau, R. (1977), Leisure, home production and work: The theory of the allocation of time revisited. *The Journal of Political Economy*, Volume 85(6), pp. 1099-1124.

Gujarati, D. N. (1995), *Basic Econometrics*, Third edition. New York: McGraw Hill, Inc.

Hafeez, A. and E. Ahmed (2002), Factors determining the labour force Participation decision of Education married women in Pakistan. Sustainable Development Policy Institute, *Working Paper Series* No. 174.

Jamil, Khalida (2001), The Determinants of Female Labour force Participation in Pakistan. M. Phil. thesis, Department of Economics, Quaid-e-Azam University, Islamabad.

Kimhi, A. (1994), Quasi maximum likelihood estimation of multivariate Probit models: Farm couple's labour participation. *American Journal of Agricultural Economics*, Volume 76(4), pp. 828-836.

Kimhi, A. (2004), The role of agriculture in rural well-being in Israel. The Center for Agricultural Economic Research, *Discussion Paper* No. 3.04.

Li, Q., A. de Brauw, S. Rozelle and L. Zhang (2005), Labour market emergence and returns to education in rural china. *Review of Agricultural Economics*, Volume 27(3), pp. 418-424.

Liu, S., M. Carter and Y. Yao (1998), Dimension and diversity of property rights in rural china: dilemmas on the road to further reform. *World Development*, Volume 26, pp. 1789-1806.

Maurer-Fazio, M. (1999), Earnings and education in China's transition to a market economy: Survey evidence from 1989 to 1992. *China Economic Review*, Volume 10(1), pp. 17-40.

Mduma, J. K. and P. Wobest (2005), Determinants of rural labour market participation in Tanzania. *African Studies Quarterly*, Volume 8(2), pp. 32-47.

Meng, X. (2000), *Labour Market Reform in China*. Cambridge University Press, Cambridge.

Mincer, J. (1962), Labour force participation of married women: A study of labour supply. In H. G. Lowis (ed.), *Aspects of Labour Economics*. Princeton, N. J.: Princeton University Press, pp. 63-97.

Naqvi, Zareen F. and Lubna Shahnaz (2002), How do women decide to work in Pakistan? *The Pakistan Development Review*, Volume 41(4), Part II, pp. 495-513.

Naud, W. and Serumage-Zake (2001), An analysis of the determinants of labour force participation and unemployment in South Africa's North west province. *Development Southern Africa*, Volume 18(3).

Renkow, M. (2003), Employment, growth, worker mobility and rural economic development. *American Journal of Agricultural Economics*, Volume 85(2), pp. 503-513.

Wang, X., T. Herzfeld and T. Glauben (2007), Labour allocation in transition: Evidence from Chinese rural households. *China Economic Review*, Volume 18, pp. 287-308.

Yang, D. T. and H. Zhou (1998), Rural-urban disparity and sectoral labour allocation in China. *Journal of Development Studies*, Volume 35(3), pp. 105-133.

Zhang, L., A. de Brauw and S. Rozelle (2003), Labour market liberalization, employment and gender in rural China. In proceedings of the 25th International Conference of Agricultural Economists (IAAE), Durban, pp. 918-930.