Factors Affecting Employment Choices in Rural Northwest Pakistan

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Abstract

Using the multinomial logit model, this study explores the factors affecting occupational choices in rural northwest Pakistan. The study uses census data of 2825 households in six villages of Peshawar district Pakistan collected by an interdisciplinary research team of Göttingen University, Germany. The results comparing six distinct occupations versus non-farm informal activities suggest that asset endowment of households has a significant effect on households' head choice of employment. Livestock holding increases the odds of practicing farm related occupations relative to informal wage activities. Wealth, defined here as household per capita income, matter a lot in the likelihood of pursuing occupations other than informal activities in northwest Pakistan. Similarly, the likelihood increases for household with fairly younger and illiterate heads to engage in non-farm informal sector. Household size is positively and significantly related to all the occupational groups while an additional working member reduces the odds to work as farmer. Credit and farm land constraint also drive households into informal jobs. Finally, comparing the six villages in term of labour market, we find that business activities are significant in villages with better infrastructure. Due to lack of natural, financial and human capital more and more people in the study area have to find their livelihood in the informal casual sector. However, majority of these non-farm activities are survival oriented and have little to do with wealth accumulation. The implication of the study is that rural non-farm sector needs its due share in development policies as it has the potential to uplift the rural areas.

Keywords: Informal employment, multinomial logit, Northwest Pakistan, occupational choices

1. Study Background

Livelihoods in the rural Pakistan are becoming increasingly divorced from farming and, at the same time there is an ever-rising growth and expansion of non-farm opportunities (MANIG, 1991; RIEKEN, 1994; KUROSAKI & KHAN, 2006). For instance, the share of agriculture in Pakistan GDP reduced to almost 23 percent compared to 29 percent in 1982. Keeping the same trend, in the last few decades, the rural labor market also steadily changed. As now almost 44 percent of the labor force is engaged in the agriculture sector (GOV. OF PAKISTAN, 2005). However, only 16 percent of total 45 million workforce in Pakistan have jobs in the formal private sector (WORLD BANK, 2007). Thus, what is striking about rural Pakistan is the proliferation of informal sector mostly self-created low-skill wage employment or petty trade. Little is known about the factors behind these diverse occupations in rural Pakistan as most of the past studies in the area (MOHNHAUPT, 1971; ALBRECHT, 1976; KUHNEN, 1985; MANIG, 1991; RIEKEN, 1994) failed to consider quantitatively the livelihood strategies and behaviour of rural households. The current study, therefore, attempted to fill this gap by examining these determinants under the context of rural northwest Pakistan. To be specific, the paper aims at answering the question: what determines the head of the household decision to engage in a particular employment?

2. Literature Review

Most of the Pakistani population lives in the rural areas and the common view of rural economy among the policymakers is that it is confined only to agriculture. The dwellers of rural Pakistan, to achieve their desirable livelihood outcomes are not only facing the institutional constraints but also lack the required assets to overcome them (ALBRECHT, 1976; MANIG, 1991; RIEKEN, 1994). Rural households' decision to engage in various occupations according to DAMITE & NEGATU, 2004; KUROSAKI & KHAN, 2006 and LANJOUW et al., 2001 takes place under the influence of several individual, household and community level factors (household size, education, age, location etc.). It is the population pressure, resulting into rather higher dependency, which is forcing increasing number of Pakistanis to engage in diverse economic activities. So, the trends in population growth and urbanization in Pakistan need increasing labor absorption not only in agriculture but also in the non-farm sector (HUSSAIN, 2004).

The rural households are rational (BECKER, 1976) as they strive to build an increasingly diverse portfolio of activities and assets to survive and improve their living standards (ELLIS, 2000). However, the dilemma in front of poor households is that while they would most need income diversification, they are less able to become engaged in better paid jobs because of entry and investments barriers (FAFCHAMPS & QUISUMBING, 1999) resulting in their concentration in low paid refuge jobs (BARRETT et al., 2001; RUBEN & PENDER, 2004; BARRETT et al., 2005; BUCHENRIEDER, 2005; KIM, 2005). So, some households are pushed to diversify their activities

because of external shocks (lack of cash, credit or location) while some are pulled into more paid jobs (SCOONES, 1998; ELLIS & FREEMEN, 2004).

3. Study Area and Data

The six study villages in North-west Pakistan near Peshawar are the focus of research since 1967 (for research methodologies see ALBRECHT, 1976; KHAN, 2007; MANIG, 1991; RIEKEN, 1994). NWFP is the smallest of the four provinces of Pakistan and Peshawar is the provincial capital of North-West Frontier Province (NWFP) with a population of around two million. The questionnaire, which included both open and closed-ended questions, was administered to 2825 households in six villages of NWFP between March-September 2005. The author along with two other doctoral candidates from Goettingen University Germany and four locally-hired male interviewers conducted the interviews. The basic survey as quick-snap shot presented a comprehensive picture of the major socio-economic characteristics of the study area. The respondents (heads of the households) were interviewed in their local language (Pashto).

4. Methodology for Multinomial Logit Model

To identify the determinants behind rural household decision to engage in various occupations in north-west Pakistan we assume that in a given period rational[1] household head choose among the seven[2] mutually exclusive occupational alternatives that offers the maximum utility[3]. Following GREENE (2003) and KENNEDY (2003), suppose for the ith respondent faced with j choices, we assume the utility choice j as:

$$U_{ij} = Z_{ij} \, \beta + \varepsilon_{ij} \qquad (1)$$

If the respondent makes choice j in particular, then we assume that U_{ij} is the maximum among the j utilities. So the statistical model is derived by the probability that choice j is made, which is:

$$\text{Prob } (U_{ij} > U_{ik}) \text{ for all other } K \neq j \qquad (2)$$

We further assume the random utility error terms are distributed independently and identically as log weibull distributions. Further, we have information on several characteristics of the employment decision makers (household heads) therefore, we can make use of the multinomial logit model (LONG & FREESE, 2001; KENNEDY, 2003). We select this model not only because of the computational ease (MILLER & VOLKER, 1985) but also multinomial logit analysis exhibits a

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[1] The behavioural notion of the model may be invoked here by considering rural households in the research villages as rational decision makers.
[2] Implying the multinomial logit model will be inappropriate whenever two or more of the alternatives are close substitutes (KENNEDY, 2003) hence; we reduced the number of categories to seven to avoid this situation.
[3] Utility is maximised by expected earning gains from adopting an activity profile choice (BERHANU et al., 2007).

superior ability to predict occupational distribution[4] (KEANE, 1992). The multinomial logit model can allow us to estimate a set of coefficients β_j corresponding to each occupational category as follows:

$$\Pr(y = j \mid \chi) = \frac{e^{\beta_j X_i}}{\sum\limits_{j=1}^{j=7} e^{\beta_k X_i}} \quad , \quad j = 0, 1, 2,\ldots.7 \tag{3}$$

To identify the model, we impose the normalization by considering the parameter vector associated with informal non-farm employment as zero ($\beta_1 = 0$). So, the remaining coefficients β_j measures the change relative to the base group informal non-farm employment. The probabilities as, therefore,

$$\Pr(y = j \mid \chi) = \frac{e^{\beta_j X_i}}{1 + \sum\limits_{j=2}^{j=7} e^{\beta_k X_i}} \quad \text{and} \quad \Pr(y = 1) = \frac{1}{1 + \sum\limits_{j=2}^{j=7} e^{\beta_k X_i}} \tag{4}$$

Where Pr is the probability of an economic activity; i indexes the individuals; j represents the six nominal unordered occupational categories; e is the natural log; and x_i vector of exogenous variables affecting employment decision of household head (see Table 1). The model is estimated by maximum likelihood, where these probabilities enter the likelihood function. For further details see LONG & FREESE (2001); GREENE (2003); and KENNEDY (2003). A simplification of the overall Multinomial Logit Model is as follows:

$$\text{Multinomial Logit Analysis} \left\{ \begin{array}{l} \text{Formal} = 1 \text{ if HH in private or government regulated sector} \\ \text{Businessmen} = 2 \text{ if HH in self employed in business and trade} \\ \text{Pure farmer} = 3 \text{ if HH runs only own land} \\ \text{Mixed farmer} = 4 \text{ if HH works own land with non-farm job} \\ \text{Pure tenant} = 5 \text{ if HH is engaged in land tenancy} \\ \text{Mixed tenant} = 6 \text{ if HH engaged in land tenancy with non-farm job} \\ \text{Informal wage} = 7 \text{ if HH rely on informal wage activities} \end{array} \right\} = f(X_i)$$

5. Descriptive Analysis

Survey respondents reflect a wide range of personal and household characteristics (Table 1). In particular, we can see at the top of the table that although the household heads are young on average (44 years) nevertheless, there is wide spread variation in the age of the household heads. The total population of these villages is nearly 23 thousands distributed into 2825 households

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[4] The study of occupational choice, by SCHMIDT & STRAUSS (1975) provides a well known application of Multinomial Logit Model.

with an average member of eight people. The surveyed villages also have a particular miserable record when it comes to educational attainment. For instance, the average educational attainment of household head in the surveyed villages was four years of schooling, with only four percent of the respondents being university graduate. There is little farm activity in these villages, but what little there is, is vital to the livelihoods of the households involved in it. Farming is almost entirely subsistence as it is a survival strategy, and is not business-oriented.

Table 1. Summary Statistics of Variables Used in Multinomial Logit Model

Variable	Mean	Std. Dev.	Min	Max
Age (years)	44.29	12.24	15	88
Education (years)	3.55	4.82	0	16
Household size (no.)	7.99	3.99	1	34
Workers (no.)	1.91	1.23	0	8
Land (log acres)	0.09	0.62	-3.47	5.08
Livestock (log no.)	0.08	0.67	-2.29	4.61
Dalazak[1] (dummy)	0.13	0.34	0	1
Gulbela (dummy)	0.15	0.36	0	1
Kochian (dummy)	0.16	0.37	0	1
Kukar (dummy)	0.26	0.44	0	1
Mushtarzai (dummy)	0.19	0.39	0	1

Note: 1) Village Yousafkhel served as reference village.
Source: Basic survey of six villages in North-west Pakistan, 2004-05

Considering the seven dependent variables, slightly over 32% of the total 2825 households were engaged in wage employment that was exclusively informal (unregistered) in nature. Similarly, around 17 percent of the household find their livelihood in non-farm formal sector (organized government and private sector) offering not only higher pays but more prestige and social status, as well. The combined share of the only farmer and tenant households in the employment pie was as little as six percent. Besides these around 20 percent of the rural households have combined agriculture with non-agricultural activities to spread risk and utilize available resources (both human and material) as much as possible. The share of those engaged in petty trade and self employment was around 18 percent.

6.   Multinomial Logit Results and Discussion

As the multinomial logit model has the strong assumption of independence of irrelevant alternatives[5] (IIA), therefore we carried out the Hausman and McFadden test, which revealed the

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[5] In multinomial logit model, the (log-) odds of one level of response versus another do not depend on any of the other levels; that is, other possible outcomes are not relevant. This is known as the independence of irrelevant alternative property. Hence multinomial logit should only be used in situations where IIA is reasonable, such as when the different response categories are distinct and dissimilar (SIMONOFF, 2003).

assumption of IIA has not being violated. To examine the outcomes are distinguishable, we carried out Wald & LR test which suggested that we cannot combine any occupational category. Table 2 shows the results for multinomial logit model however, it make more sense to report the results in odd ratios (Table 3). Households belonging to non-farm informal wage sector serve as the comparison group, which happens to be the dominant (32%) employment strategy in the study area.

Table 2. Multinomial Logit Regression for Occupational Categories

Explanatory variables	Formal (1)	Businessmen (2)	Purefarmer (3)	Mixedfarmer (4)	Puretenant (5)	Mixedtenant (6)
Age (years)	0.145***	0.040	0.102	0.245***	0.143*	0.106**
	(0.033)	(0.029)	(0.071)	(0.037)	(0.078)	(0.048)
AgeSq (years)	-0.001***	-0.000	-0.001	-0.002***	-0.001	-0.001*
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Education (years)	0.278***	0.117***	0.152***	0.292***	-0.006	0.097***
	(0.015)	(0.015)	(0.033)	(0.017)	(0.041)	(0.024)
Household size (no.)	0.044*	0.099***	0.077	0.051**	0.083*	0.101***
	(0.023)	(0.021)	(0.049)	(0.023)	(0.044)	(0.027)
Workers (no.)	0.087	-0.102	-1.075***	0.342***	-0.849***	0.402***
	(0.073)	(0.067)	(0.245)	(0.074)	(0.195)	(0.087)
Land (log acres)	-0.014	0.020	1.527***	0.538***	-0.074	-0.279
	(0.147)	(0.160)	(0.186)	(0.132)	(0.365)	(0.212)
Livestock (log no.)	0.107	0.101	1.579***	0.773***	2.094***	1.276***
	(0.109)	(0.099)	(0.202)	(0.114)	(0.184)	(0.146)
Dalazak[1] (1,0)	-0.117	1.925***	0.432	-1.276***	1.202	-0.004
	(0.295)	(0.375)	(0.553)	(0.254)	(1.128)	(0.428)
Gulbela (1,0)	-0.947***	0.461	-2.089***	-4.100***	1.488	-0.313
	(0.286)	(0.377)	(0.735)	(0.342)	(1.058)	(0.383)
Kochian (1,0)	-0.393	1.371***	-1.283*	-4.052***	2.708***	0.988***
	(0.283)	(0.368)	(0.694)	(0.404)	(1.044)	(0.367)
Kukar (1,0)	-0.387	1.673***	-0.145	-2.677***	0.857	-1.603***
	(0.265)	(0.356)	(0.545)	(0.245)	(1.077)	(0.432)
Mushtarzai (1,0)	0.618**	1.276***	1.955***	0.415*	1.645	-0.138
	(0.284)	(0.390)	(0.512)	(0.226)	(1.097)	(0.441)

Observations = 2825　　　Log-likelihood = -3599　　LR chi2(72) = 2323　　　　Prob > chi2 = 0.000
McFadden's R^2 = 0.24　　McFadden's Adj R^2 = 0.23　　Model predicted correctly = 51%

Note: Those engaged in informal wage activities serve as base group.
1) Village Yousafkhel served as reference village.　　Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1　　　　　　Source: Basic survey of six villages in North-west Pakistan, 2004-05
Constant, standard errors and z-statistics are not reported here because of space constraints.

Our results support the human capital hypothesis. The year of education variable is significant and positive in almost all comparisons. Additional years of education prompt the respondents into occupations other than non-farm informal sector, ceteris paribus. Nevertheless, the size of education coefficient is highest (odd ratio in range of 32-34%) for mixed income earners and formal sector. Results are in congruence with earlier findings (SCHMIDT & STRAUSS, 1975; AMELIE & ZIMMERMANN, 2004).

Age of the household head as proxy for experience, turn out to positive for all categories but it is not significant for pure farmer and businessmen. Older household heads are expected to be involved in occupations other than informal wage-earning since they have higher accumulated experience. The negative sign of age square variable point to the nonlinearity in age. It was observed in the study area that majority of those employed in the formal sector were in lower cadre jobs, increasing the likelihood for their early retirement. Similar results were reported by ARIF et al., 2000 in their study in Pakistan.

Table 3. Odd Ratios for Multinomial Logit Regression for Household Occupations

Explanatory variables	Formal (1)	Businessmen (2)	Purefarmer (3)	Mixedfarmer (4)	Puretenant (5)	Mixedtenant (6)
Age (years)	1.16***	1.04	1.11	1.28***	1.15*	1.11**
AgeSq (years)	1.00***	1.00	1.00	1.00***	1.00	1.00*
Education (years)	1.32***	1.12***	1.16***	1.34***	0.99	1.10***
Household size (no.)	1.04*	1.10***	1.08	1.05**	1.09*	1.11***
Workers (no.)	1.09	0.90	0.34***	1.41***	0.43***	1.50***
Land (log acres)	0.99	1.02	4.61***	1.71***	0.93	0.76
Livestock (log no.)	1.11	1.11	4.85***	2.17***	8.12***	3.58***
Dalazak[2] (1,0)	0.89	6.86***	1.54	0.28***	3.33	1.00
Gulbela (1,0)	0.39***	1.59	0.12***	0.02***	4.43	0.73
Kochian (1,0)	0.68	3.94***	0.28*	0.02***	15.00***	2.68***
Kukar (1,0)	0.68	5.33***	0.87	0.07***	2.36	0.20***
Mushtarzai (1,0)	1.85**	3.58***	7.06***	1.51*	5.18	0.87

Observations = 2825	LR chi2(72) = 2323	Prob > chi2 = 0.000 Log-likelihood = -3599	
McFadden's R^2 = 0.24	McFadden's Adj R^2 = 0.23	Model predicted correctly = 51%	

Note: The coefficients for each occupations measure the odd ratio relative to informal wage activities.
Standard errors in parentheses.   1) Village Yousafkhel served as reference village.
*** p<0.01, ** p<0.05, * p<0.1   Source: Basic survey of six villages in North-west Pakistan, 2004-05
Constant, standard errors and z-statistics are not reported here because of space constraints.

A large household because of dependency problems, make it necessary on part of the household to diversify their income sources and strive for occupations that are more productive. In addition, in a Pashtun society, household composition also affects the types of employment its members enter, as well as how or by whom decisions are taken. Similarly, in informal wage-earning household majority of its members have to work as a strategy of survival. As expected ownership of land and livestock, stimulate households to farming. Although wealth, defined here as household per capita income, matter a lot in the likelihood of pursuing occupations other than informal work. However, because of possible endogeneity problems, the variables on income and credit were dropped from model.

Finally comparing the six villages in term of labor market, we find that relative to Yousafkhel, the likelihood increases for the rest of villages, that households follow businesses or work as tenants than informal wageworker. However, for the rest of occupation categories, majority of the results are negative and significant. Tenancy is strong in Kochian, where the landlord rent-out

their land in small parcels on sharecropping (50-50 share in produce). Being a resident of Dalazak, Gulbela, Kochian, and Kukar decreases the likelihood of involvement in formal regulated jobs in government and private sectors as opposed to the base category. It shows an emerging positive tendency on part of the dwellers in Yousafkhel with its rainfed nature to find their livelihood in more secure and high return occupations.

7. Conclusions and Recommendations

Based on the present study we conclude that informal sectors like casual daily wage earners, self-employed and petty trades dominate the job market in the area. Majority of these non-farm activities are survival oriented and have little to do with wealth accumulation. Similarly, the multinomial logit model reveals the importance of individual, household and community related variables like education, age, income, household size, working members and location in household employment decisions. The implication of the study is that rural non-farm sector needs it due share in development policies as it has the potential to uplift the rural areas. Several studies on promoting non-farm employment in developing countries reached the same conclusion (CHAPLIN et al., 2004). There are many challenges like education, infrastructure, and services for livelihoods in north-west Pakistan that need to be addressed at the policy levels.

Acknowledgment

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