

DOES FARMER'S DIVERSIFICATION INTO NON-FARM EMPLOYMENT REDUCE THEIR LIKELIHOOD OF POVERTY? EVIDENCE IN MALAYSIA

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ABSTRACT

The objective of this paper is to examine factors affecting the likelihood of poverty among farmers. Particular interest is on the question of whether diversification of a farmer into non-farm employment reduces their probability of being poor. This question is of interest since it has been argued in the literature that there is prospect for non-farm sector for playing an important role in alleviating poverty. This entails investigation on the impact of non-farm employment on poverty. Here, we provide the empirical evidence on this question by estimating a logit model using primary data gathered among agricultural household in Kedah, Malaysia. Our results show that non-farm employment is an important predictor of poverty and hence, matters to poverty. Other factors that are significant are education, household size, the number of dependent, land size ownership, remittance as well as the local area economic characteristics. The findings of this study imply that promoting non-farm activities such as intensifying rural industrialisation in the rural-agricultural areas will have a positive impact on effort to reduce poverty.

Keywords: Non-farm employment; logit model; poverty; Malaysia

I. INTRODUCTION

Studies have shown that non-farm income increasingly plays an important role and exhibits an increasing share in agricultural household income (De Janvry et.al, 2005; FAO, 1988). Thus, the non-farm (or off-farm) employment has been generally recognised to have the potential in raising agricultural household income, and therefore reducing rural poverty (FAO, 1998; Arif, Nazli and Haq, 2000; Lanjouw and

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Murgai, 2008; Foster and Rosenzweig, 2004). In fact, Ranjan (2006) has pointed out several grounds on the desirability of developing the non-farm sector as a vehicle to reduce rural poverty. Among them are: (i) the growing rural communities cannot be sustained by the agricultural sector alone; (ii) rural economies are not purely agricultural and most of the rural communities derive their incomes from various sources rather than from agriculture per se; (iii) avoid rural-urban migration; (iv) reduce the rural-urban economic disparities; (v) reduce rural unemployment since rural industries are usually labour-intensive and hence, expected to absorb more labour; (vi) intensifies linkages between industry and agriculture, and thus support agricultural growth; (vii) reduce income inequality in the rural areas since the lower income group is expected to participate more intensely in non-farm activities; and (viii) encourage the participation of women in the non-farm sectors and hence empowering them.

While it seems that promoting the development of the non-farm sector and hence, encouraging farmers to diversify their income sources is desirable, its impact on poverty remains to be substantiated. In fact, there are reasons to believe that promoting the non-farm sector, and encouraging farmers to participate in non-farm employment, might not necessarily reduce poverty. This would be the case if those who secure the non-farm jobs are mostly the non-poor farmers. The accessibility of the poor farmers to non-farm employment might be limited, for instance, due to their lower level of education. Thus, the poverty impact of non-farm employment merits investigation. Here, we investigate factors affecting the likelihood of poverty among farmers. Particular interest is on the question of whether diversification of a farmer into non-farm activities reduces their probability of being poor. We provide the empirical evidence on this question by estimating a logit model using primary data gathered among agricultural household in Kedah, Malaysia.

This paper is organised as follows. Section I provides the introduction, and Section II discusses the sources of data, measures of poverty, and the model for estimation in the study. Section III discusses the results, while Section IV concludes.

II. DATA AND METHOD

The data and sampel

The data used in this study is primary data which is gathered through a survey carried out on 384 agricultural households in the state of Kedah, Malaysia. The survey is conducted between the month of April and December 2008. A face to face interview were carried out with the the respondents, where they were chosen through a stratified random sampling. Six of the eleven districts in Kedah were

chosen in this study. These are Kubang Pasu, Sik, Kota Star, Baling, Kulim dan Pulau Langkawi. Table 1 shows the number of respondents by district.

Table 1: Respondents by district

District	Estimated agricultural households	Number of respondents
Kubang pasu	8,736	71
Kota Star	16,541	135
Baling	5,913	48
Kulim	9,455	77
Pulau Langkawi	3,541	29
Sik	2880	23
Total	47,067	384

Source: Population and Family Development Board (2004)

For each district, the respondent is divided further according to the local economic characteristics (economic structure of the local economy), to investigate its effect on the probability of poverty. In this study, we divide the local economic characteristics into four, which is based on the intensity of agricultural and industrial activities in the area. These are as follows:

- (i) area which has significant agricultural and industrial activities.
- (ii) area which has significant agricultural activities but has no or minimal industrial activities.
- (iii) area which has minimal agricultural activities but also has no or minimal industrial activities.
- (iv) area which has minimal agricultural activities, but is a major industrial area.

With regards to the non-farm activity, in this paper we refer non-farm activity as the participation of a farmer (or agricultural household) in remunerative work away from their plot of agricultural land (FAO, 1988). The non-farm job undertaken by the farmer could be permanent or casual in nature, covering both the secondary and tertiary sector of employment (Salter, 1991). Besides, to disaggregate the poor from the non-poor, poverty line income is used. The official gross poverty line income for the state of Kedah in 2009 is RM700³. Thus, in this study, a farmer with a household income that is equal or more than RM700 is considered non-poor, while those with household income that is less than RM700 is categorised as poor.

³ e-SINAR.Kedah.gov.my

The logit model

In estimating the effects of various factors on the probability of a farmer being poor, we employ a binary choice model based on maximum likelihood method. Dummy dependence variable of 0 and 1 is used. The value of 1 is assigned to a poor farmer, i.e. if the household income of the farmer is less than the specified poverty line income. On the other hand, the value of 0 is assigned to a non-poor farmer, i.e. if the household income of the farmer is equal to or more than the specified poverty line income.

The logit model used in this study is specified as follows:

Latent variable specification:

$$Y_i^* = \beta X_i + u_i \quad (1)$$

where:

$Y_i = 1$ (poor) if $Y_i^* > 0$

$Y_i = 0$ (non-poor) if $Y_i^* < 0$

u_i = error term

β = estimated parameter.

X_i = vector of independent variables

The error term, u_i , is assumed to be logistically distributed. The probability of individual i being poor or otherwise, is postulated to depend on the vector of individual (INDC), household (HHC), and local area (LAC) characteristics. The individual characteristics are characteristics of the farmer (head of household), i.e. age, gender and the level of education. As our interest in this paper is to investigate the impact of non-farm employment on poverty, the variable non-farm employment is also included under the individual characteristics. This is to examine whether the participation of the farmer in non-farm employment will reduce their probability of being poor. Here, dummy variable is used for the non-farm employment. We assign the value of 1 if the farmer participates in non-farm employment and the value of 0 if otherwise.

Household characteristics are the characteristics of the household with regards to their household size, number of dependent, total amount of remittance received, and the size of land owned by the family.

Beside the individual and household characteristics, here we also interested to investigate the effect of the local economic characteristics (i.e. the structure of the local economy) on the probability of the farmer being poor. Do the economic characteristics where the farmer resides make a difference in terms of their probability of being poor? As already being mentioned earlier, we categorised local economic characteristics into four as follows: (i) LC_1 = area which has significant agricultural and industrial activities; (ii) LC_2 = area which has significant agricultural activities but has no or minimal industrial activities; (iii) LC_3 = area which has minimal

agricultural activities but also has no or minimal industrial activities; and (iv) LC₄ = area which has minimal agricultural activities, but is a major industrial area. Dummy variable is also used to for the local economic characteristics. We assign the value of 1 to the area where the farmer resides, and 0 to other areas. The area that is neither agriculture nor industrial area is made as a reference.

Thus, the probability of household *i* being poor could be written as follows:

$$\Pr(Y_i = 1 | \mathbf{x}_i) = F(\mathbf{x}_i' \boldsymbol{\beta}) = \frac{\exp(\mathbf{x}_i' \boldsymbol{\beta})}{1 + \exp(\mathbf{x}_i' \boldsymbol{\beta})}, \quad (2)$$

where

$$\mathbf{x}_i' = [AGE_i, GEN_i, EDUC_i, NFE_i, HHSIZE_i, DEPEND_i, REMITT_i, LANDSZ_i, LC_i]$$

Equation (2) is estimated to examine the probability of the farmer being poor. The variables used in the estimation are explained and summarised in Table 1. It is worth to note that the sign of the estimated parameter is already sufficient to conclude whether the independent variable has a positive or negative impact on the dependent variable (Wooldridge, 2002). In addition, the impact of the independent variables on the dependent variable could be examined by looking at the odds ratio. In addition, given the value of the independent variables, the estimated value for the dependence variable could be interpreted as the probability of the farmer being poor (Greene 2000; Long dan Freese 2006; Maddala 1983).

Table 1: Description of variables and expected sign

Variables	Definition	Expected Sign
DEPENDENT VARIABLE		
POOR	(Binary) Yes = 1, No = 0	
INDEPENDENT VARIABLE		
Individual Characteristics (INDC)		
AGE (Age)	(Continuous) Age of the head of	+

	household	
GEN (Gender)	(Dummy) Male = 1, Female = 0	-
EDUC (Education)	(Continuous) Years of education of the head of household	-
NFE (Non-farm employment)	(Dummy) Yes = 1, No = 0	-
Household characteristics (HHC)		
HHSIZE (Household size)	(Continuous) Household size	-
DEPEND (Dependent)	(Continuous) Number of dependents	+
REMITT (Remittance)	(Continuous) Total income received from remittance (RM)	-
LANDSZ (Land size)	(Continuous) The size of land cultivated ("Relung")	-
Local economic characteristics (LC)		
LC1	(Dummy) agriculture and industrial area	-
LC2	(Dummy) agricultural area, no industrial activity	-
LC3	(Dummy) neither agriculture nor industrial area	+
LC4	(Dummy) industrial area, with some agriculture activities	-

III. THE FINDINGS

Due to incomplete information, only 346 out of 384 respondents (questionnaires) are used and analysed. Table 2 reports the results of the estimated logit model. The estimated parameter and the odds percentage change are reported together with the log likelihood value, Wald Chi-Square, Mc Fadden's R-squared, as well as the percent correctly predicted. The estimated logit model show that the value of McFadden's R-squared is 0.403. The percent correctly predicted is 87.86%, which indicates that the estimated logit model is generally good.

Table 2: Estimated Logit Model

DEPENDENT VARIABLE	
POOR	(Binary) (Poverty Line Income=RM700) Yes = 1, No = 0
INDEPENDENT VARIABLE	ESTIMATED COEFFICIENT

	Parameter	Standard Error	Odds Ratio
CONSTANT	3.2214*	1.9065	
Individual Characteristics (INDC)			
AGE (Age)	0.0148	0.0200	1.0149
GEN (Gender)	0.2581	0.7538	1.2944
EDUC (Education)	-0.1432*	0.0715	0.8665
NFE (Non-farm employment)	-3.2398***	0.83111	0.0392
Household characteristics (HHC)			
HHSIZE (Household size)	-0.7925***	0.2191	0.4526
DEPEND (Dependent)	0.6183**	0.2133	1.8557
REMITT (Remittance)	-0.0078***	0.0021	0.9922
LANDSZ (Land size)	-0.4113***	0.1027	0.6628
Local area (economic) characteristics (LAC)			
LC1(agriculture and industrial area)	-1.3157*	0.5927	0.2683
LC2 (agricultural area, no industrial activity)	-1.3646**	0.5136	0.2682
LC3 (neither agriculture nor industrial area)	Reference	-	-
LC4 (industrial area, with some agriculture activities)	-2.4207**	0.7327	0.0889
	0.0386*	0.0214	1.0394
Log likelihood = -92.3764 Number of obs = 346 LR chi2(12) = 124.88 Prob > chi2 = 0.0000 Pseudo R2 = 0.4033 Percent correctly predicted = 87.86% McFadden's R2 = 0.403 Significance level: ***p<0.01; **p<0.05; *p<0.1			

The results show that age and gender are not statistically significant to explain the probability of a farmer being poor. However, as expected, the level of education is significant, and has a negative relationship with the probability of being poor. This implies as the level of education of the farmer increases, the probability of the farmer being poor decreases. In fact, the odds ratio of education implies that if education of the farmer increases by one year, the likelihood of the farmer being poor decreases by a factor of 0.87, *ceteris paribus*. The explanation for this result is quite obvious. Education increases human capital and hence, increases the chances of the farmer to secure non-farm jobs (Dercon and Krishan, 1996; Abdulai and Crole Rees, 2001). Other studies that found similar results as this study are studies by Bogale A., and K. Hagedorn (2003) and Chaudhry (2009).

It is also interesting to find that the variable of interest in this study, i.e. non-farm employment, is found significant and has a negative relationship with the probability of the farmer being poor. This result implies that if farmers are to diversify their income sources by participating in non-farm activities, their probability of being poor will decrease. This finding appears to confirm the findings in other studies such as by Canagarajah, Newman and Bhattamishra (2001), de Janvry and Sadoulet (2001), and Ferreira and Lanjouw (2001).

This study also discovers that all variables of the household characteristics – household size, number of dependent, remittance and cultivated land size – are significant and have the expected signs. Our results also show that remittance, as expected, tends to reduce the probability of the farmer being poor. Besides, the results also show that the size of land cultivated by the farmer is important to explain their likelihood of being poor. The larger the size of land cultivated by the farmer, the lower their probability of being poor.

Another interesting finding of this study is that the local economic characteristics, i.e. the structure of the local economy, where the farmer lives are found as important determinants of poverty. Indeed, all of the variables are found to have a negative signs. Since the area that is characterised by neither agriculture nor industrial area (LC3) is made as the reference point, we make the following interpretations: if a farmer that lives in an area that is neither agriculture nor industrial area (LC3) is relocated to another area, their likelihood to be poor will decline. For instance, the results of this study reveals that if a farmer that lives in an area that is neither agriculture nor industrial area (LC3) is relocated to an area characterised by agriculture and industrial area(LC1), their likelihood of being poor will decline by a factor of 0.2683.

IV. CONCLUSION

Poverty alleviation has been one of the main agenda of development in most developing countries. The observed increase in the share of non-farm income in total agricultural household income as found in most studies has led to the argument that the non-farm sector could play an important role in alleviating poverty. This argument calls for examination on determinants of poverty, particularly the poverty impact of the non-farm activities. Here, we provide the evidence from a case study among agricultural households in Kedah, Malaysia.

Our results show that non-farm employment, level of education, number of dependent, size of land cultivated, remittance, as well as local economic

characteristics are significant to explain the likelihood of a farmer being poor. Hence, our findings suggest that participation of the farmer in the non-farm employment does reduce their likelihood of being poor. The findings of our study therefore lend support to the view that the non-farm sector could be a viable option to reduce poverty among the rural-agricultural households. Besides, our results also suggest that the economic structure of the local area where the farmer lives is also matters to poverty. Areas that have relatively higher industrial activities tend to reduce the likelihood of being poor. Thus, opening up opportunities for farmers to participate in non-farm employment, through development of rural industrialisation for instance, will have a positive impact on poverty reduction effort among the agricultural households.

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