Kehinde: Nigerian Journal of Agricultural Economics (NJAE) Volume 2(1), 2011. Pages 17- 27

FACTORS DETERMINING TRACTOR USE AMONG ARABLE CROP FARMERS OF THE OSUN STATE GOVERNMENT TRACTOR HIRING SCHEME, NIGERIA

Kehinde, A. L.

Department of Agricultural Economics and Extension,
College of Agriculture, P.M.B 4014, Ejigbo
Osun State University, Osun State.
Email: tjgreenk@yahoo.com, kehindeal@uniosun.edu.ng

Abstract

The inability of Osun state government to sustain the various past mechanisation programmes and birth of a new tractor hire scheme alludes to poor policy implementation. This study examines the present tractor hire policy in the state. A multi-stage random sampling was used to select 266 arable crop farmers in the study area, while questionnaire and personal interviews were used to obtain information from them as well as from other stakeholders. Result from the logit regression reveals that farmers' household size ($P < 0.05$), membership of ruling party ($P < 0.10$), land area cultivated ($P < 0.01$), crop output ($P < 0.05$) and extension contact ($P < 0.05$) were important determinants of tractor use and they increase the probability of tractor use by arable crop farmers in the state. Conversely, years of formal education ($P < 0.05$) and farm equipment ($P < 0.05$) were also important determinants of tractor use , but reduced the probability of tractor use . The study recommends that, tractor hire operators should de-emphasize political consideration as condition for access to tractor use while farmers need to increase their present farm sizes to justify tractor use.

Keywords: Factors, Tractor use, Arable crop farmers, Osun State

Introduction

In Nigeria, the need for a coherent agricultural mechanization policy became very pressing in the early 1970s due to an increasing shortage of agricultural labour that necessitated the substitution of some appropriate forms of mechanical power for human labour. In an attempt to achieve the objectives of agricultural mechanization, the following policy instruments were adopted: (i) The operation of Tractor Hire Units (THUs) by states, (ii) Liberalized import policy in respect of tractors and agricultural equipment, (iii) Massive assistance program to farmers on land clearing through cost subsidies and (iv) The launching of a machinery ownership scheme in 1980 under which the federal government provided half of the purchase cost of farm machinery to be owned and used by farming cooperatives or group farms.

During the 1980s and 2000 the subsidies on tractor hire services that were mostly operated at the state level ranged from about 25 per cent to about 50 percent of the actual cost of tractor services (Manyong *et al.*. 2003). Also, a national network of agro-service centres to facilitate the distribution of modern inputs, including the provision of tractor and farm machinery services to farmers was created through government's input supply and distribution.

It costs a fortune to acquire tractors for use by peasant farmers for their farm operations. Ellis and Wainwright (1994), put the cost of machinery used in developing countries including

Nigeria, at about 30% of the total investment in agriculture. As a result, tractors and implements and equipment ownership was mainly organized by government through the ministries of agriculture and lately by local government areas, government departments and parastatals whose mandate involved substantial land clearing and development. These institutions have provided tractor hire units in order to make services available to the farmers who are not economically strong to acquire the equipment. All the 36 states in Nigeria and some Local Government Areas (LGAs) operate tractor-hiring units while few individuals; cooperatives and parastatals whose mandate include land clearing also maintain a good fleet of tractors and implements that are accessible to farmers at varied charges (Mijinyawa and Kisaiku, 2006). Of special note is the case of Osun state government that purchased 336 units of tractors in 2004 for distribution to its parastatal in charge of agricultural mechanization (Osun State Agricultural Development Corporation), farm settlements and LGAs tractor hiring units for use by farmers. It should be noted that the present tractor hiring scheme is introduced by a democratic government and with the rudimentary stage there are chances that political inclination of farmers may significantly influence their use of tractor. It is also likely that intended beneficiaries may be sidelined and as such, jeopardize the objective of the programme. This may likely impact negatively on efficiency of allocation of tractor hours to farmers on their farms. This study thus intends to investigate the determinants of and net returns of tractors use by arable crop farmers in Osun state under a democratic government.

Description of the Operation of the State Tractor Hire Scheme:

The major stakeholders in tractor hire service in Osun state are Osun State Agricultural Development Corporation (OSADEC) a state government agency, the local government areas (LGAs), private tractor owners and farmers. Osun State Agricultural Development Corporation (OSADEC) was established in 2005 as a result of the merger of the defunct Osun State Agricultural Mechanisation Corporation and Osun State Agricultural Credit Corporation both established in 1991. OSADEC works with farmers through its 6 administrative zones namely; Osogbo, Ede, Iwo, Ikirun, Ife and Ijesha. Eight additional centre offices were further established to bring her services closer to famers throughout the state. These are; Oke Osun, Ifon farm settlement, Ejigbo farm settlement, Wasinmi, Ile ogbo, Esa odo, Ikirun, Oyan and Ila centre offices. These 14 centres along with the head office in Osogbo own a tractor each and operate tractor hiring service. The corporation is yet to accomplish her mandate of establishing a presence in the 30 local government areas of Osun state. The mechanization arm at the state capital in Osogbo is controlled by a head of department while a workshop manager that works together with him oversees tractor hiring, other mechanization related activities and revenue collection. The zonal offices are manned by the zonal manager and the zonal mechanization officer who oversees tractor hiring, other mechanization related activities and revenue collection. The centres are managed by the centre mechanization officer and perform similar role as their state and zonal counterparts. There is one tractor mechanic per zone and 6 at the head quarters who complement the efforts of those at the zone when such situations demand. They all undertake mechanical repairs and maintenance of all the tractors in their fleet. So far the entire 15 tractors in their fleet are in good working condition. The major operations by farmers are primary and secondary tillage. Primary tillage, that is ploughing, involves the first

and second ploughing but most farmer undertake only first ploughing in other to reduce farm cost. It is interesting to note that most lands in Osun state have been cleared and the areas of ploughable land are reducing by the day.

Therefore, the purchase of 336 tractor units by the state government in 2004 may constitute an oversupply of tractor service. Arising from this OSADEC has made a proposal to the state government to approve the purchase of more bulldozers so as to clear over 50hectares of tractorable land for farmers use. Presently all the 30 local government areas in Osun state are involved in the programme. They have between 6 and 7 tractors in their fleet and between 2 and 3 of these are in good working condition. Ninety percent of the tractors belong to the Mercy Ferguson brand while 10% are David Brown. The Mercy Ferguson brands were bought by the state government from deductions made from the local government's statutory allocation from the federation account. Twenty five percent of the tractors have spent about 15.6years while the remaining 75% are 5years old. Some common implement mounted with the tractors include plough, harrow, ridger slicer, carrier and trailer.

At the LGA level, the tractor hiring units are supervised by a tractor hiring officer who oversees the maintenance and revenue collection from tractor hire service. Maintenance and repairs are carried out from the revenue collected. Maintenance and repair is privately negotiated with OSADEC tractor mechanics, as well as other mechanics from Iwo, Osogbo and Ibadan. The fund generated is usually inadequate to make necessary repairs and this explains why over 50% of the tractors are broken down. This estimate is rather high when compared with the state tractor hire service where all the tractors are in good working condition and there are enough mechanics to carry out maintenance and repairs.

Theoretical framework:

Modelling farmers' decision to use tractor service:

This study takes after similar studies that have investigated technology adoption by farmers. Generally technology adoption has been said to be affected by factors such as; availability of credit, limited access to information, aversion to risk, inadequate incentives, farm tenure arrangements, insufficient investment in human capital, inadequate farm size, absence of equipment to relieve labour shortages, unreliable and insufficient complementary inputs and inappropriate transport infrastructure (Feder *et al.*, 1985). In this study just as in other adoption studies the decision of farmers to use tractor is represented as "1" while the decision not to use tractor is represented as "0" (Amemiya, 1981; Jamnick and Klindt, 1985). Further it is assumed that the farmer is an independent decision maker who makes rational choices and maximizes his utility (Amemiya, 1981; Rahm and Huffman, 1984). In developing the logit model following Sheikh *et al.* (2003), let us assume that the farmer's decision not to adopt and to use tractor equals 0 and 1 respectively. Also, that the utility of each technology depends on a vector S_i (farmers' socio-economic and socio-political characteristics) and a vector R_i (framers farm characteristics that is, production input and output variables related to tractor use). Further U_{i1} and U_{i2} are indirect utilities derived from not using and using tractor service respectively.

These utilities can be stated as

$$U_{i0} = d_i S_0 + g_i R_{i0} \text{ and } U_{i1} = d_i S_1 + g_i R_{i1} \ldots\ldots\ldots (1)$$

Where d_i and g_i are vectors of coefficients corresponding to the variables in the vector representing farmers' socio-economic and socio-political characteristics and a vector of framers' farm characteristics which are attribute of tractor use and e_0 and e_1 are additive error terms. A farmer therefore uses tractor if $U_{i1}>U_{i0}$ or does not if $U_{i1}<U_{i0}$. If we now redefine tractor use with a qualitative variable $y_i=1$ and otherwise $y_i=0$. Then the probability of tractor use can be written as;

$$Pi = P(yi = 1) = P(Ui_1 > Ui_0) = P(ei_0 - ei_1) < \left[(di_0 - di_1)Si + (gi_0 - gi_1)Ri\right] = P(ui) < (BiXi)$$
$$= F(BiXi).....(2)$$

Where X_i embodies both S_i and R_i as earlier stated and $ui = \left(ei_1 - ei_2\right)$ is a random distribution term; P(.) is a probability function; and F is a distribution function for u_i. Thus the probability of a farmer using tractor is the probability that the utility of not using tractor is less than the utility of using tractor or the cumulative distribution function evaluated as B_iX_i. The exact distribution of F depends on the distribution of the random term u_i. If it follows a logistic distribution then the F is a cumulative logistic function. If u_i is normal then F is a cumulative normal distribution function. Thus the distribution assumption for u_i determines the type of probability model that reflects the farmers' adoption behaviour. Based on the cumulative logistic probability function, the logit model was used for transforming the dependent variable to predict probabilities within the bound of 0 and 1. The dependent variable thus becomes the natural logarithm of the odds ***when*** a positive choice is made and the model is specified as

$$\ln\left[P_x/(1-P_x)\right] = \sum B_iX_i..... ....(3)$$

Where P_x = the probability that farmers use tractor for an observed set of variables X_i as earlier defined and B_i = the regression coefficient to be estimated.

Methodology

Study area:

The study area is Osun State, south-western Nigeria. The state was purposively chosen because of the state government's policy to improve mechanization through the purchase of 336 units of tractor for use in the state in 2004. Osun state has a total land area of 9,396km^2 and a population of approximately 3.4 million ((National Population Commission, 2006). Osun state was carved out from the old Oyo state in 1991. It is bounded by Oyo state in the west, Kwara in the north, Ekiti in the east, Ondo in the southeast and Ogun state. There are 30 LGAs in the state and the residents are mainly artisans, traders and farmers.

Sampling procedure:

A multi stage random sampling procedure was used to select six out of the 30 LGAs in Osun state. In the first stage of sampling the three senatorial zones; Ife-ijesha, Iwo and Osogbo were included as samples while LGAs were selected in the second stage. The number of LGAs selected was proportional to the population of LGAs in the Zones. Based on this, 2 LGAs were

selected each in Ife-Ijesha, Iwo Osogbo zones out of the 10 LGAs present in each of the zones using a sampling fraction of 0.2. The LGAs selected were Ife south, Obokun, Ede north, Ayedire, Ifedayo and Boripe, respectively. The last stage of sampling involved the selection of 45 farmers each in the six LGAs to give a total of 270 farmers in all. Information were obtained by means of interviews and the use of a well structured questionnaire. Information was collected on farmers' socioeconomic characteristics and production activities. In all only 266 questionnaires were properly answered and used for analysis. Information were also obtained from the tractor hiring units of the state government agency (OSADEC) and the six LGAs that were surveyed by means of interview and a well structured questionnaire.

Analytical tools:

Budgetary technique:

The budgetary technique was used to quantify the gains and losses recorded by farmers as a result of tractor use. Π is net return, TR is total farm revenue and this was estimated as income derived from the sale of the farm's crop output while TC is total farm cost and estimated as the addition of the variable and fixed cost of production. Thus, $\Pi = TR - TC$.

Sensitivity analysis was conducted on farmers' net return to determine its tolerance to the cost incurred by the use of tractor on their farms. The cost of tractor hire was increased and reduced by 5% and 10% respectively, to determine whether tractor use was profitable or not at these levels.

Logit regression analysis:

The logit model was used to identify factors that determine the use or non-use of tractor by farmers. The model postulates that the probability (P_i) that a farmer will use a tractor is a function of an index Z_i, which is also the inverse of the standard logistic cumulative function of P_i that is, $P_i (Y=1) = F^{-1}(P_i)$ …… (4)

Then, $Z_i = F^{-1}(P_i)$

This index summarizes a set of attributes (X_{is}, that is farmers' socioeconomic, political and farm variables, while b_{is} are regression coefficient which indicate the probability effect of farmers' attributes) and is a linear function of the attributes, that is, $Z = b_0 + b_1X_1+b_2x_2+,\ldots\ldots\ldots..+ b_nX_n$ …..……...(5)

The probability of using a tractor is given by

$$Pi(Y=1) = \frac{1}{1+e^{zi}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

While the probability of not using a tractor is given by

$$1 - Pi(Y = 1) = \frac{1}{1 + e^{zi}} \quad \text{..... (7)}$$

and $$e^{zi} = \frac{Pi(Y = 1)}{1 - P(Y = 1)} \quad \text{.....(8)}$$

The dependent variable, (Yi, that is farmer's decision to use tractor or not) takes the value 1 if the farmer uses a tractor and 0 if he does not. Since the dependent variable is binary, the ordinary least square (OLS) technique is inappropriate to estimate the model (Pindyck and Rubinfield, 1981, Scolt *et al.*, 1997). The maximum likelihood estimate MLE is used to model the regression. The probability of a farmer using a tractor, which was already stated in equation 3 can be estimated from the average value of Zi as:

$$z_i = \ln \frac{P_i}{1 - P_i} = b_0 + b_1 X_1 + b_2 X_2 + \text{.....} + b_n X_n \text{.....} \text{.....} \text{.....(9)}$$

Results and discussion:

Socio-economic characteristics of farmers:

The socio-economic characteristics of arable crop farmers in Osun state is presented in Table 2. The result shows that on average 39.1% of arable crop farmers fall within the age range of 40 to 49 years, 95.5% are male, 53% have household size of 1 to 5 persons, 47.7% have primary education, 21.8% have farming experience of between 7 to 12 years, 80.1% are member of a farmers' association, 57.1% are member of a political party and 53.4% are member of the ruling party. Furthermore farmers possess a variety of land tenure status. Majority (66.1%) secured their land through inheritance and 40.2% cultivated less than 2 hectares of farm land.

Budgetary analysis:

The result presented in Table 3 revealed that cost per hectare outlay for labour is lower for tractor users than non- tractor users. This is expected because non tractor users are expected to engage more hours of labour since all operations in their farms are handled manually. Also, non tractor users utilized more farm implements and therefore incurred higher depreciation cost on farm implements compared with tractor users. Tractor users incurred higher cost on cassava cuttings, and pesticide per hectare. This may be because mechanized farms have better plot layouts and farmers have the opportunity to maximally utilize their farm lands. Furthermore, total variable cost is higher in the case of non-tractor users which may be due to the higher cost incurred on labour that tractor users are able to avoid as a result of tractor use during land preparation.

In terms of net revenue realized, the tractor users earn almost twice as much as non tractor users. While they receive about ₦43, 050.78 non-tractor users realize about ₦23, 001.33 per hectare. This suggests that tractor use is profitable, very attractive and capable of improving the income of tractor users. The result also showed that if tractor hire cost is increased both by

5% and 10% tractor users would realize ₦42, 818.51, and ₦42, 586.24 per hectare respectively.

Tractor use by arable crop farmers in Osun state:

The logit regression result (Table 4), revealed that farmers' household size (FHHSIZE), membership of ruling party (MRPTY), farm land cultivated (LANDC), crop output (CROPOUT) and extension contact (EXTCON) were significant determinants of tractor use and increased the probability of tractor use by arable crop farmers in Osun state. Conversely, years of education (FEDUC), labour man days (LABOUR) and farm equipment (FEQUIP) were also significant, but reduced the probability of tractor use by farmers. The log likelihood statistics of -80.05 confirms the significance of the variables used in the model while a Chi square statistics of 47.03 which is significant at 1% indicates a good fit for the regression line.

Table 4 also showed the marginal effects of probabilities with respect to the variables of the logit regression. The coefficient of farmers household size (FHHSIZE) showed that for it is increased by a unit (100%), the probability of using tractor increased by 0.0002 (2%). This implied that with increasing household size farmers are likely to adopt tractor use. Likewise, if land area cultivated (LANDC) and extension contacts (EXTCON) are increased by 1 unit (100%) the probability of tractor use will increase by 0.1396 (13.96%) and 0.0722 (7.22%), respectively. This is intuitively appealing since it is expected that with expansion of land area cultivated more hour of tractor use would be required, also more extension visit would be useful to enable farmers access to increased technical assistance which would add value to their farm production.

Furthermore, a unit increase in farmers years of education and farm equipment will reduce the probability of tractor use by 0.0001 (0.01%) and 0.0947 (9.47%) respectively. This result indicated that land area cultivated has the greatest positive effect on tractor use followed by extension contact and household size. Also, years of formal education and farm implements had negative impacts on tractor use by farmers.

Conclusion and Recommendations

Tractor use is popular and embraced by about 87% of the arable crop farmers. However, more needs to be done to create tractor access to farmers who may be interested in tractor use but do not presently benefit from the scheme. The study recommends the need for the LGAs tractor hire units to de-emphasis political party affiliation as major consideration for access to tractor hire if the scheme must be sustained and the need for a better land acquisition arrangement that would provide farmers with access to large and economically feasible plots of farm land. Secondly, more arable land should be opened up for arable crop production to increase farmers' scale of operation and thus improve farmers output since tractor use is presently profitable. Finally, extension agents should sustain their technical assistance to farmers and encourage them to embrace the use of tractors beyond primary tillage operations.

References

Amemiya, T. (1981). Qualitative response models: a survey. *Journal of Economic Literature* 19, 1483–1536.

Awotide, D. O., Kehinde, A. L. and Adejobi, A. O. (2004). Determinants of Fertilizer Usage by Upland Rice Farmers in Ogun State of Nigeria, *Bowen Journal of Agriculture*, Vol 1, No 2, 108 – 116.

Ellis, J. J. and Wainwright, K. P. (1994). Criteria Affecting Agricultural Machinery Rehabilitation Schemes. Silsoe Research Institute, Bedford.

Feder, G., Just, R. E., Zilberman, D. (1985). Adoption of Agricultural Innovations In Developing Countries: A Survey. *Economic Development and Cultural Change* 33, 255–298.

Jamnick, S. F., Klindt, T.H. (1985). An Analysis of 'no-tillage' Practice Decisions. Department of Agricultural Economics and Rural Sociology, University of Tennessee, USA.

Rahm, M.R., Hufman, W.E. (1984). The adoption of reduced tillage: the role of human capital and other variables. *American Journal of Agricultural Economics* 66, 405–413.

Manyong, V. M., Ikpi, A., Olayemi, J. K., Yusuf, S. A., Omonona, B., and F. S, Idachaba (2003). Agriculture in Nigeria: Identifying Opportunities for Increased Commercialization and Investment. Main Report, pp 145.

Mijinyawa, and Kisaiku, O. (2006). "Assessment of the Edo state of Nigeria Tractor Hiring Services''. *Agricultural Engineering International*: the CIGR Ejournal. Invited Overview paper No. 10. Vol. VIII.

Olayemi, J. K., (1998). *Elements of Applied Econometrics*. ElShaddai Global Ventures Ltd, Nigeria, pp 250.

Olayemi, J.K., Titilola, S.O. and Igben, M. S. (1986). Nigerian Food Balance Sheet 1985-1995. Final Report Submitted to Agricultural Division, Federal Ministry of National Planning Ikoyi, Lagos.

Pindyck, R.S. and Rubinfed, D. L. (1981). *Econometric Models and Economic Forecast*. 2nd Edition, London, McGraw-Hill.

National Population Commisssion (2006). Provisional National Population Census Figure.

Scolt, L.C., Smith, L. and Rungeelling, B. (1997). Labour Force Participation in Southern Labour Markets. *American Journal of Agricultural Economics*, Vol 59, No 2: 266 – 274.

Sheikh, A. D., Rehman, T, and Yates, C. M. (2003). Logit models for identifying the factors that influence the uptake of new 'no-tillage' technologies by farmers in the rice–wheat and the cotton–wheat farming systems of Pakistan Punjab. *Agricultural Systems* 75: 79–95.

Table 1: Description of variables used in the logit models

Variable	Type	Description
FAGE (X_1)	Continuous	Farmers age in years
FHHSIZE (X_2)	Discrete	Number of persons in farmer's household
FEDUC (X_3)	Discrete	Years of formal education. Six years for primary, 12 years for secondary and 15years for tertiary education.
FAREXP (X_4)	Continuous	Number of years in farming
MFASOC (X_5)	Binary	Membership of farmers' association. Members are represented by "1", while non members "0".
MRPTY (X_6)	Binary	Membership of the ruling political party. Members are represented by "1", while non members "0".
LANDC (X_7)	Continuous	Land area cultivated
LABOUR (X_8)	Continuous	Labour hours expended on the farm in mandays
FEQUIP (X_9)	Continuous	Depreciation value of farm implements using straight line depreciation method in Naira
CROPOUT (X_{10})	Continuous	Grain equivalent of crop output (Grain equivalent estimate is relevant when dealing with multi-output crop farms, Olayemi *et al.*., 1986)
NETREV (X_{11})	Continuous	Net farm revenue
SLOPE (X_{12})	Discreet	Topography of farmland using a scale of 5 to 1 representing the most steep to the least steep
EXTCON (X_{13})	Binary	Farmers that benefited from extension contact is represented as "1" while those that do not benefit are represente as "0".

Source: Field survey 2007

Table 2: Distribution of farmers by socio-economic characteristics

Variable	Frequency	Percentage (%)
Age (years)		
20 – 29	4	1.5
30 – 39	56	21.1
40 – 49	104	39.1
50 – 59	85	31.9
60 – 69	17	6.4
Total	**266**	**100**
Sex		
Male	254	95.5
Female	12	4.5
Total	266	100
Household size (Persons)		
1 – 5	141	53
6 – 10	120	45.1
11 – 15	3	1.1
16 – 20	2	0.8
Total	**266**	**100**
Formal education (years)		
No formal education	50	18.8
Primary education	126	47.4
Secondary education	71	26.7
Tertiary education	19	7.1
Total	**266**	**100**
Farming experience (years)		
1 – 6	12	4.5
7 – 12	82	30.8
13 – 18	58	21.8
19 – 24	45	17
25 – 30	52	19.5
> 30	17	6.4
Total	**266**	**100**
Membership of political party		
Member	152	57.1
Non- member	114	42.9
Total	**266**	**100**
Membership of ruling political party		
Member	142	53.4
Non- member	124	46.6
Total	**266**	**100**
Tractor Use		
Users	231	86.8
Non users	35	13.2
Total	**266**	**100**

Source: Field survey 2007.

Table 3: Costs and revenue per hectare of tractor and non tractor users in Osun state

Cost and revenue per hectare (₦)*	Tractor users (₦)	Non tractor users (₦)
Rental cost of Land	347.50	346.62
Labour	57,984.71	76,524.92
Tractor hire	4645.42	0.00
Depreciation of farm implements	799.07	1088.37
Seeds	1175.76	1588.03
Cassava cuttings	7172.97	6799.55
Fertilizer	7956.07	15176.08
Pesticide	114.22	42.08
Total variable cost	74,403.74	100130.70
Total fixed cost	5792.00	1435.00
Total cost	80195.73	129168.60
Total revenue	123246.50	124567.00
Net revenue	43050.78	23,001.33
Effect of 5% increase in tractor cost on net revenue	42818.51	--
Effect of 10% increase in tractor cost on net revenue	42586.24	--

Computed from field survey data. *1US$= ₦128 (Central Bank of Nigeria official exchange rate, 2007)

Table 4: Result of the logit model showing probabilities and the marginal effects of probabilities with respect to the influence of causal factors on tractor use by arable crop farmers in Osun state

Variable	Probabilities			Marginal Effects		
	Coefficient	Standard error	Z value	Coefficient	Standard error	Z value
Constant	5.8459	8.0032	0.730	0.3866	0.5452	0.709
FAGE	0.2004	0.6747	0.297	0.0287	0.0805	0.356
FHHSIZE	0.0023**	0.0011	2.045	0.0002*	0.0001	1.727
FEDUC	-0.0023**	0.0011	-2.082	-0.0001**	0.0001	-2.030
FAREXP	-0.0081	0.0443	-0.182	0.0106	0.035	0.300
MFASOC	0.1602	0.5263	0.304	0.0518	0.0339	1.528
MRPTY	0.7834*	0.4629	1.693	0.0005	0.0028	-0.192
LANDC	2.1103***	0.7072	2.984	0.1396**	0.0631	2.212
LABOUR	-1.4322	0.8795	-1.629	-0.0947	0.0636	-1.489
FEQUIP	-1.5047**	0.6941	-2.168	-0.0995*	0.0557	-1.713
CROPOUT	1.2729**	0.6422	1.982	0.0841*	0.0492	1.713
NETREV	-0.0008	0.0006	-1.360	0.0001	0.00004	1.268
SLOPE	0.2547	0.2854	0.892	0.0168	0.0194	0.868
EXTCON	1.0913**	0.5439	2.007	0.0722*	0.043	1.669
Log likelihood	-80.0575					
Restricted log likelihood	-103.5743					
Chi square	47.03					
Significance	0.00001					

Source: Computed from field data collected.

*Significant at 10%, **Significant at 5% and ***Significant at 1%