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Off- and On-Farm Labour Participation in Italian Farm Households^{*}

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ABSTRACT

Most farms are family business, both in developed and developing countries. Labour allocation choices of farm household members are therefore relevant both for production choices in the farm and for rural labour markets. In particular, off-farm work and combination of on- and off-farm work (pluriactivity) are viewed as an efficient allocation of household labour resources. Moreover, labour choice of the children of the farm household are relevant for farm succession. In this paper we extend previous literature by estimating in an unified framework labour participation choices both for on- and off-farm work for operators, spouses, and their eldest children in working age, using a five-equation multivariate probit.

Keywords: off-farm labour participation, on-farm labour participation, farm household, multivariate probit

JEL: J22, J43, Q12

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1. INTRODUCTION

The labour behaviour of farm household members has long been examined in the agricultural economics literature, due to its importance for agricultural and rural development policies. Off-farm work is an important supplement to farm income, a relevant issue both for designing farm policies and rural development policies.

Combining on- and off-farm work, at the individual and/or at the household level (pluriactivity) is indeed an efficient use of households' labour resources. By taking into account income opportunities stemming from the farm and from alternative employments, it allows income levels compatible with farm survival. Pluriactivity is increasing in developed countries, and off-farm incomes are an increasing part in farm household income (Ocse, 2001; Eurostat, 2002). Hence the interest in analysing the determinants of off-farm work choices, that dominated the literature. Recently, though, since the analysis extended from operators to other household members, on-farm work choices too had to be taken into consideration along with off-farm work choices, since other household members do not necessarily work on-farm like operators.

The approach to modelling labour choices in farm households at the beginning only considered off-farm labour participation of farm operators (e.g. Sumner). Later, the analysis has been extended to jointly determining off-farm labour participation of husbands and wives (e.g. Huffman and Lange, Tokle and Huffman, Lass and Gampesaw), also including the use of waged labour (Benjamin, Corsi and Guyomard). On- and off-farm labour participation of operators and spouses has been examined by Kimhi (1994). Recently, Kimhi (2004) has argued that, since families do not always consist of husbands and wives only, modelling jointly the labour behaviour of parents with adult children is important too, and has estimated a model considering off-farm labour participation of husbands, wives, and adult children. A similar model was estimated for Italian farms by Salvioni, Sciulli and Parodi (2005). Consideration of children's work

choices is also particularly important in view of intra-family succession of family farms, which is a crucial variable for the future of farm structures (Corsi, 2004 and 2005). Working on the farm is the usual way children acquire specific skills and start training in farm operation. An insight in children's on- and off-farm labour participation mechanisms, and in their interrelationship with their parents' might help designing specific policies favouring farm continuity.

We extend the above stream of literature by considering both on- and off-farm labour participation of the farm couple and their eldest child in working age. We use data on 528 farm couples with at least one child in working age drawn from a random survey on socio-economic characteristics of Italian agriculture to estimate jointly participation equations concerning off-farm labour of operators, and on- and off-farm labour of spouses and the eldest child.

In the following paragraph the theoretical background and the econometric approach will be presented; the results concerning the correlations among labour choices, and concerning participation determinants will follow. Some considerations will conclude.

2. THEORETICAL BACKGROUND AND ECONOMETRIC APPROACH

The theoretical model underlying our analysis is the standard farm household model (Singh et al.; Huffman, 2001). The farm household is assumed to maximise utility over household consumption and leisure of family members, under income and time constraint. The income constraint comprise both farm income and off-farm wages. Non-negativity constraints are added to allow for non-participation in on- and off-farm work. The model is as follows:

$$\text{Max } U = U(C, L^g; H^g, Z_H) \quad g = o, s, c$$

S.t.:

$$T^g = F^g + M^g + L^g,$$

$$L^g > 0,$$

$$F^g, M^g \geq 0,$$

$$Q = f(F^g, X; H^g, Z_F)$$

$$PQ + \sum W^g M^g + V = C + RX$$

$$W^g = W^g(H^g, Z_M)$$

where:

C: family consumption

L: leisure

g = o, s, g, i.e. refers to operator, spouse and child

H: vector of personal variables, e.g. age and education

Z_H: vector of characteristics of the household, e.g. number of children

T: total available time

F, M time spent working on the farm and off the farm, respectively

Q: quantity of the good produced by the farm

X: vector of hired inputs

Z_F: vector of farm characteristics

P: price of the good produced by the farm

W: off-farm market wage

V: value of capital income

R: vector of prices of purchased inputs

Z_M: vector of characteristics of the off-farm market

The Kuhn-Tucker maximisation conditions yield the following on-farm and off-farm participation conditions:

$$\delta PQ / \delta F^g \leq \mu / \lambda$$

$$W^g \leq \mu / \lambda$$

where μ and λ are the marginal utilities of leisure and income, respectively. The first condition states that participation in farm work (an internal solution) occurs if the marginal value product of farm work is equal to the leisure-income marginal rate of substitution. The second states that participation in off-farm work occurs if the wage is equal to the leisure-income MRS.

Reduced-form participation equations are obtained by comparing the reservation wage (the MRS evaluated at zero hours) with the market wage and the marginal value product of farm labour with the market wage. If the difference is negative, the relevant participation occurs. The reservation wage can be expressed as a function of variables that may affect the marginal utility of leisure and income (personal and household characteristics). The marginal value product of farm labour can be assumed to be a function of farm characteristics. Market wages can in principle be observed only for those participating in off-farm work, and are assumed to be function of personal characteristics and of labour market situations. Reservation wages and marginal value product of farm labour are not observable, but participation in off- and on-farm labour is. Therefore, the participation equations are estimated by including random terms in the difference equations and assuming their distribution. An assumption of normal distribution yields probit models. Participation equations of each family member include among the explanatory variables farm characteristics, household characteristics, and the characteristics of all family members. I.e., they include all variables that may affect the marginal utility of leisure and income, or the potential wage, or the farm labour productivity.

In principle, it would be desirable to include participation equations of all household members in working age. Nevertheless, this is practically unfeasible, also due to the different household composition. Therefore, we confined ourselves to analysing the joint participation behaviour of operators, spouses, and their eldest child in working age.

Given that unobserved variables may be common to the equations of the different household members, a general correlation structure among the equations can be assumed. Joint estimation of the equations through a multivariate probit exploits all available information and provides efficient estimators.

Up to recently, estimation of multivariate probit models including more than two equations was practically unfeasible, because it requires calculation of multivariate normal probability functions. Recent literature is based on calculating multivariate normal pdfs using simulation-based methods. In particular, Cappellari and Jenkins (2003) elaborated a Stata module allowing estimation of multivariate probits using the Geweke-Hajivassiliou-Keane simulator (see Cappellari and Jenkins for more details). Though the method is numerically intensive, specially when the number of draws is large enough to reach a sufficient accuracy, runtime remains within acceptable limits.

3. DATA

The data used for this study are drawn from a survey on socio-economic characteristics of Italian agriculture conducted in 1996 by the Italian Institute for the Studies of Agricultural Markets (Ismea, 2005) in Italy.

The Ismea survey is a random sample of 1881 farms, 1777 of which are household farms (i.e., not companies, co-operatives, etc.). The sampling is based on the Agricultural Census conducted in 1991 by the Italian National Statistical Institute, and excluded farms with an economic dimension lower than 4 Esu¹. This criterion was adopted to exclude those farms where agricultural activity is either marginal or dismissed. The

¹ The European Size Unit (Esu) is the indicator used by the Farm Accounting Data Network (FADN) of the European Commission to measure the economic size of farms. It is based on the standard gross margins (SGM) attributed to the farm, that is on the potential gross margins producible in a farm with given structural characteristics in every particular area. In 1995: 1ESU = 1200 ecu = 920.95 euro.

sample was statistically representative at macro-regional level (North, Centre and South). The survey data were merged with official statistics at the provincial level of the unemployment rate used as an (admittedly poor) proxy for local labour market conditions.

In the following analysis we use a sub-sample of 528 households including both couple members and the eldest child in working age. In the sample, the average participation in the off-farm labour market is 6 percent for the operator and 7 percent for the spouse and 12.9 percent for the child².

Following previous research, we use four categories of explanatory variables to specify the model for on- and off-farm participation decision: individual, household, farm and local market characteristics. The empirical definitions of the variables and the descriptive statistics and the expected estimated signs are reported in table 1.

Individual attributes include age, age squared, years of education and gender (in the case of the descendent only). To avoid collinearity, age and education variables concerning other members were not included in individual participation equations. Off-farm participation, according to the previous literature, is likely to follow a curvilinear life-cycle pattern, with a positive age effect and a negative age-squared coefficient. Modelling on-farm work participation of spouses and children is quite new, and there is no established prediction concerning their age patterns. More human capital (as measured by higher educational levels) in general results in a wider range of job opportunities and in a larger potential wage, which would lead to higher off-farm participation rates. On the other side, higher educational levels may also rise the productivity of farm work, thus discouraging off-farm participation, due to the time constraint. For operators, in general the first effect has been found to prevail (Huffman,

² According to the Farm Structure Survey by Eurostat in the same year the percentage of holders with another main activity was 23.5 percent. The large difference with our data is probably mostly due to the fact that our sample does not include farms with less than 4 ESU.

2001). These results have nevertheless been obtained by only modelling operators' off-farm participation. Modelling both on- and off-farm labour participation of all family members may help clarifying this point.

Household characteristics include the number of pre-school children (Nchild05), the number of children in school age (Nchild614), the number of children – sons and daughters - in working age (Nchild15). When young children are present in the household more time for child care is likely needed from the farm spouse and possibly from the farm operator, which tightens their time constraint. This generally does not apply to the eldest children, therefore these variables were excluded from their participation equation. Housework and child care are traditionally imposed on wives, so an help in this field relaxes their time constraint. This is represented by the dummy variable (Substit) indicating whether in the household there is another member (generally a grand-parent) who is taking care of the children. This variable was only included in the spouses' equations, since 98 percent of them are females. The presence of children in working age (Nchild15) is expected to affect operators' and spouses' allocation of time to farming, as the work of other family members (spouses and descendants) may be a substitute or a complement to the operator's own farm work. The expected sign is therefore ambiguous. If they work, they also potentially increase family income, hence decreasing the need of off – farm employment. But if they do not work, they increase income needs. Therefore, the expected sign is again ambiguous. The household non labour income (Nla_income) and the value of owned land (Land) are used to explore the existence of a wealth effect. Larger values are expected to have a negative effect on off-farm participation. The value of owned land is to a certain extent also a variable concerning farm labour productivity, since the rent for owned land is included in farm income.

Farm characteristics include variables indicating the farm specialisation³ in labour intensive types of farming, namely dairy, beef, grapes, and vegetables, fruits, and flowers (Vegfruit); farm economic size, as expressed in Esu; farm location (Mountain, Hills). Esu is divided into three classes, namely under 8 Esu (Esu1 variable, the reference), 8-16 Esu (Esu2), and over 16 (Esu3). Farm sales variables were excluded from the participation equations due to potential simultaneity with work decisions⁴. Farm specialisation in the listed types of farming is anticipated to reduce the likelihood of off-farm work, given the higher labour requirements of these productions, and to increase on-farm participation.

Mountain and hill farms are typically characterized by low returns. Accordingly, the variables Mountain and Hills should be expected to positively affect off-farm participation for operators, spouses and children in working age, trying to increase household income with off-farm work. Nevertheless, these areas typically also provide less job opportunities, which would have the opposite effect. Finally, the sign of the provincial unemployment rate (Urate), i.e. the variable capturing the characteristics of local labour markets should be negative for off-farm participation and a priori ambiguous as to on-farm participation. The location of the family in Northern regions is likely to positively affect off-farm participation, given the better employment situation in these areas. Conversely, the location in the South is expected to negatively influence off-farm participation given the slack demand for labour.

Table 1 presents means and standard deviations of all the personal, household and farm attributes. The mean age of operators and spouses in the sample is rather high (50.6 and 47.3, respectively), partly due to the

³ The classification we used is similar to the Type of Farming used by FADN; it is based on the prevalence (over 55 percent) of a crop or animal production value on total gross production value.

⁴ Using Esu rather than total sales avoids the endogeneity problem because Esu is based on Standard Gross Margins (SGM). SGM only depends on the area covered by the different crops and on the number of animals. Given the rigidity of the land market in Italy, total area can be reasonably considered as exogenous, and the type of farming depends to a large extent on natural conditions. The grouping of Esu in three classes further decreases the risk of endogeneity.

fact that we only consider those couples who have a child in working age. The mean age of the child is 23.1. The two spouses have a similar average education level, while the child's average education level is higher.

4. RESULTS AND DISCUSSION

4.1. CORRELATIONS WITHIN PARTICIPATION CHOICES OF HOUSEHOLD MEMBERS

When estimating a multivariate model, an important issue is whether the equations are correlated among them. In our case, this means assessing the structure of relationships among family members. Significant correlations among participation equations of different family members are currently interpreted as evidence of joint participation decision-making. To be more precise, they indicate that unknown unobserved variables are common determinants of the relevant choices, since the theoretical model itself assumes that decisions are made jointly. We had two participation equations (on-farm and off-farm) for the spouse and the child, and only one (off-farm) for the operator who, by definition, works on-farm.

The overall model, including all the five above equations, was estimated (full model). A likelihood ratio test strongly rejected the hypothesis that all correlation coefficients were zero (the chi-squared value was 59.06, with 10 d.f.). Nevertheless, such a test is not sufficient to assess the relationships among family members. On- and off-farm labour participation decisions may be made jointly by an individual member; moreover, the decision-making might be joint among two members (say, husband and wife) and independent for the child. We therefore tested the joint decision-making with the following strategy. First, we estimated bivariate probit equations of on-farm and off-farm participation for spouses and children, each individually. The correlation coefficients were (quite obviously) significant and negative for both.

Second, we confronted the full model of five equations versus separate models for each family member (an univariate probit for operator's off-farm labour participation, bivariate probits for on-and off-farm labour participation of spouse and child). If the full model were not found superior, this would suggest that each family member makes his/her decisions independently from the other members. A likelihood ratio test strongly rejected the hypothesis of no correlation between each member's participation equations and other members' (the chi-squared value was 28.0, with 8 d.f.). This result therefore strongly rejects the hypothesis of individual independence.

There remained the possibility that, though the decision-making was not joint among all family members, it was joint among two of them. We therefore estimated different models representing joint decision-making of operator and spouse, operator and child, spouse and child (three-equation multivariate probits for the first two cases –operator's off-farm, spouse's on-and off-farm; operator's off-farm, child's on-and off-farm- and a four-equation multivariate probit for the last one). The joint decision-making of two members with the independent decision-making of the third one was confronted with the full model. Again, the relevant likelihood ratio tests strongly reject the independence of any individual member's participation decisions with respect to other members'. When confronting joint decision-making of operator and spouse and independent decision-making of the child with the full model the chi squared statistic was 22.9 (6 d.f.). The result for operator's and child's joint decision-making, with the spouses independent decision was 17.9 (6 d.f.). Finally, the hypothesis that spouse's and child's decision-making were joint, but operator's was independent was rejected with a chi squared value of 11.7 (4 d.f.).

These tests suggest that labour participation is a joint decision among all family members. This is an important result, since the literature up to now only considered joint decision-making among operator and spouse, and Kimhi's (2004) model did not consider on-farm participation

of the spouse and of the child. Considering all joint decision-makings allows more efficient estimates.

The preferred model is therefore the multivariate probit including five equations. Examination of the correlation coefficients among the participation equations (Table 2) allows some insights into the structure of household decision-making. Neither on- nor off-farm labour participation of the spouses are significantly correlated with operators' off-farm labour participation. By contrast, children's on-farm participation (but not off-farm) is significantly positively correlated with operators' off-farm participation, which suggests that operators and children are substitutes in farm work. By contrast, spouses' and children's work seems to be complements for farm work: on-farm labour participation equations are significantly positively correlated. Children's off-farm participation is significantly negatively correlated with spouses' on-farm participation. Though the model does not imply a causal relationship, this may be due to a less stringent income constraint when the mother works on the farm, allowing the child to continue studying; or, when the child works off the farm, the larger family income reduces the need for the mother to work on the farm.

4.2. DETERMINANTS OF OFF-FARM LABOUR PARTICIPATION

As to the determinants of off-farm participation, they are to a large extent consistent with the previous literature. Education has a significant positive effect on operators' off-farm labour participation, implying that its positive effect on off-farm wage is stronger than its impact on farm productivity (Huffman, 2001). Operators' age has the usual curvilinear impact on the probability of working off the farm, with the peak at an age of 50.3. Farm characteristics that significantly affect negatively the probability of the operators working off the farm are farm economic size and the value of owned land. Operators of large farms providing

substantial income are less likely to work off the farm. No household characteristic is significant.

Spouses (98 percent are females) are in general less affected by farm characteristics in their decision to work off the farm, but rather by personal and household characteristics. Education has a significant and positive influence on off-farm labour participation. Age variables are not significant, but the maximum probability of off-farm work is reached at 40, an age lower than the one observed in the case of operators. Though the coefficient concerning the number of small children is not significant, the number of older children (aged 6-14 and 15 and more) significantly decreases the probability of off-farm work. While for the former it is probably the need for child care that reduces off-farm work, children aged 15 and more possibly start working, thus reducing income needs of the household and resulting in less off-farm work of the spouses. Non-labour household income also significantly decreases the likelihood of spouses' off-farm work, since it relaxes the income constraint. Most of the included types of farming variables are not significant. Nevertheless, contrary to expectations, a labour-intensive specialised type of farming like vegetables, fruits, and flowers seems to encourage off-farm labour participation.

For children, education has no significant impact on the probability to work off the farm, but the sign is positive. Age variables are significant, with the usual signs. Interestingly, the maximum probability of off-farm work is reached at 27.1. This suggests that children make their decision to work off the farm early in their life. The decrease in probability for higher ages is probably due to children leaving the farm when they are adults if they have an alternative job. Since those children not living with the farm household were not recorded, this results in lower probability of off-farm work for those continuing living on the farm. Economic farm size has a significant negative effect on off-farm work. This is similar to the effect

for operators, but it is weaker. Finally, non-labour household income seems to encourage children's off-farm work.

4.3. DETERMINANTS OF ON-FARM LABOUR PARTICIPATION

The choice of whether to work on-farm only concerns spouses and children, since all operators work on farm. Age is not a significant determinant of on-farm work for spouses. Education has a significant negative effect, symmetrically with its effect on off-farm labour participation. Children aged 6-14 significantly decrease the probability of on-farm work, in the same direction of off-farm work. The time constraint of child care seems to be the same for both types of work. By contrast, the effect of older children has the opposite sign. Children aged 15 and more significantly increase spouses' participation to on-farm work, suggesting that they are complements in farm activity. On-farm participation is lower in the areas of North and South, relative to the Centre. Also, spouses are significantly more likely to work on the farm in hilly and mountain areas, where less non-agricultural jobs are available and where the cultural heritage is more agricultural. Finally, spouses work more on the farm when the type of farming is vegetables, fruit, and flowers. This is consistent with the labour-intensive nature of these crops, but leaves the puzzle of why at the same time it encourages also off-farm work of spouses.

Also on-farm work of children is significantly increasing with age, with the peak at an age of 35.2. Higher levels of education significantly decrease the probability of on-farm work, which is also lower in the northern regions. A larger farm economic size on the contrary increases on-farm work. The unemployment rate seems to decrease the probability of on-farm work of children. We have no explanation for this counterintuitive result.

5. CONCLUSIONS

In this paper we estimated in an unified framework labour participation choices both for on- and off-farm work for operators, spouses, and their eldest children in working age.

Participation decisions result correlated, but in a sort of a circular way. Operator's choices are not correlated to spouse's, but they are to child's. Child's choices are correlated both with the operator's and with the spouse's. This is an interesting results, that deserves further investigation. A priori, one would rather predict operator's and spouse's choices being correlated, and child's ones being independent.

The determinants of off-farm labour participation are well studied, and our results are to a large extent consistent with the previous literature, which suggests that the received results are robust to inclusion of on-farm labour participation and of children's labour decisions in the estimation framework. Operator's off-farm labour participation is mainly influenced by personal and farm characteristics, but not by household characteristics. Spouse's off-farm participation, by contrast, are influenced by personal and household characteristics, but not (or weakly) by farm characteristics. Child's off-farm work choices are more similar to operator's than to spouse's.

On-farm labour participation of spouses (mostly women) is a rather new issue. It turns out to be influenced by personal and household characteristics. While schooling seems to have unambiguously opposite effects for on- and off-farm labour participation, the presence of young children equally discourages both. By contrast, children in working age seem to increase on-farm and to decrease off-farm labour participation of spouses. The effect of farm characteristics on spouses' decision to work on the farm seems to be weak, like for off-farm work. The external environment, both the type of area and the region, seems to have greater

importance. Both cultural heritage and the conditions of the local labour market might explain this result.

Children's on-farm labour participation as well is affected by personal variables; nevertheless, the effect of schooling, while clearly negative for agricultural work, is positive but not significant for off-farm work. Age positively affects both participation choices, which is most likely due to inclusion of the period of life in which labour choices are made. Not surprisingly, farm characteristics favouring children's on-farm work are the same that negatively affect the probability of operators' off-farm work, in short farm economic size. The fact that children's on-farm labour participation is positively correlated to operators' off-farm work suggests that they are substitute. How this affects succession in farm households remains nevertheless unclear. It might indicate that, e.g., operators approaching retirement look for another job to leave the farm operation to their children; or, that when children decide to work off the farm, part-time operators are forced to come back and work full-time on the farm. Our model does not allow for a causal interpretation of the correlation, and this issue is left to further research.

Another research direction is assessing whether the presence of children in working age affects labour behaviour of parents. In other words, one might check if there is a significant difference in labour participation behaviour between couples with and without children. This is important since our findings only concern those farms where there exist a couple with a child in working age, and are not necessarily valid for the other farms.

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Table 1. Descriptive statistics

Variable	Description	Mea n	Std. Dev.	Min	Max
<i>Personal</i>					
wof_op	Off farm participation of the operator	0.061	0.239	0	1
wof_sp	Off farm participation of the spouse	0.070	0.256	0	1
onf_sp	On farm participation of the child	0.754	0.431	0	1
wof_ch	Off farm participation of the child	0.129	0.335	0	1
onf_ch	On farm participation of the child	0.598	0.491	0	1
Age_op	Age of the operator	50.57			
		0	6.225	22	60
Age_sp	Age of the spouse	47.26			
		7	6.116	27	60
Age_ch	Age of the child	23.14			
		8	5.263	15	47
Schooling_op	Education of the operator	6.784	3.628	0	18
Schooling_sp	Education of the spouse	6.860	3.424	0	18
Schooling_ch	Education of the child	11.13			
		8	3.174	5	18
<i>Farm/household</i>					
Nchild05	Number of children 0-5 years of age in the household	0.034	0.211	0	2
Nchild614	Number of children 6-14 years of age in the household	0.235	0.517	0	3
Nchild15	Number of children 15 years of age and over in the household	1.913	0.938	1	7
North	Dummy for location in the North (base Centre)	0.350	0.478	0	1
South	Dummy for location in the South (base Centre)	0.419	0.494	0	1
Mountain	Dummy for location in the mountains (base plains)	0.070	0.256	0	1
Hills	Dummy for location in the hills (base plains)	0.150	0.357	0	1
Vegfruiflower	Dummy specialization in fruits, vegetables and flowers	0.131	0.337	0	1
Dairy	Dummy for specialisation in raising dairy cattle	0.119	0.324	0	1
Beef	Dummy for specialisation in raising beef cattle	0.027	0.161	0	1
Wine	Dummy for specialisation in wine production	0.087	0.282	0	1
Esu2	European Size Unit 8-16 (base 4-8)	0.277	0.448	0	1
Esu3	European Size Unit over 16 (base 4-8)	0.494	0.500	0	1
Land	Value of owned land	380.6	689.5	0	9000
Nla_hh	Non labour income (000 ITL)	2515.3	5534.9	0	39600
Urate	Provincial unemployment rate	0.131	0.073	0.02	0.33

Substit	N. household members more than 60 years old contributing to domestic activities	0.076	0.292	9 0	3 3
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Table 2. Multivariate probit : correlation coefficients among equations

	Off-farm operator	Off-farm spouse	On-farm spouse	Off-farm child
Off-farm spouse	0,194			
On-farm spouse	0,162	-0,419***		
Off-farm child	-0,102	0,211	-0,277***	
On-farm child	0,340***	0,089	0,268***	-0,418***

LR test of $\rho_{ij} = 0, i \neq j$:

chi²(10) 52,491

Prob > chi² 0,000

Note: ***, **, * indicate significant parameters at 0.01, 0.05, and 0.1 levels, respectively

Table 2. Multivariate probit estimates

	Operator			Spouse			Child		
	Coeff		Std. Err.	Coeff		Std. Err.	Coeff		Std. Err.
<i>Off-farm labour participation</i>									
Constant	-40.667	***	12.199	-5.705		5.246	-7.027	***	1.736
Age	1.580	***	0.491	0.162		0.230	0.455	***	0.144
Age squared	-0.016	***	0.005	-0.002		0.002	-0.008	***	0.003
Schooling	0.145	***	0.036	0.121	***	0.026	0.009		0.025
Sex_child							-0.162		0.157
Nchild05	-0.038		0.680	0.389		0.334			
Nchild614	0.274		0.205	-0.387	*	0.218			
Nchild15	-0.106		0.174	-0.277	*	0.148			
Substit				0.928	**	0.390			
North	-0.370		0.330	0.295		0.308	0.280		0.208
South	-0.571		0.423	0.135		0.369	-0.178		0.318
Mountain	0.074		0.594	0.048		0.476	0.314		0.273
Hills	0.395		0.276	0.165		0.281	0.206		0.201
Vegfruiflower	-0.028		0.331	0.504	*	0.262	0.317		0.232
Dairy	-0.509		0.537	0.230		0.338	0.071		0.229
Beef	0.753		0.525	0.295		0.585	0.215		0.388
Wine	-0.047		0.412	0.447		0.326	0.027		0.290
Esu 2	-1.017	***	0.296	0.123		0.257	-0.039		0.198
Esu 3	-0.949	***	0.293	-0.279		0.252	-0.449	**	0.203
Land	-0.003	**	0.001	0.000		0.000	0.000		0.000
Nla_income	0.000		0.000	0.000		0.000	0.001	*	0.000
Urate	1.274		2.772	2.458		2.440	0.830		1.961
<i>On-farm labour participation</i>									
Constant				5.044		3.452	-3.450	***	0.969
Age				-0.117		0.146	0.300	***	0.083
Age squared				0.001		0.002	-0.004	**	0.002
Schooling				-0.043	**	0.019	-0.073	***	0.022
Sex_child							0.860	***	0.127
Nchild05				-0.487		0.302			
Nchild614				-0.250	*	0.132			
Nchild15				0.202	**	0.089			
Substit				0.130		0.268			
North				-0.869	***	0.216	-0.338	**	0.174
South				-1.236	***	0.286	0.090		0.235
Mountain				0.672	**	0.307	-0.054		0.252
Hills				0.679	***	0.212	-0.382	**	0.172
Vegfruiflower				0.371	*	0.218	0.237		0.193
Dairy				0.182		0.217	-0.136		0.197
Beef				0.139		0.432	0.052		0.394
Wine				-0.295		0.220	-0.023		0.219
Esu 2				-0.031		0.178	-0.027		0.170
Esu 3				0.187		0.168	0.321	**	0.161
Land				0.000		0.000	0.000		0.000
Nla_income				0.000		0.000	0.000		0.000
Urate				-0.212		1.671	-3.909	**	1.548

N. observations: 528

LL: -875.54933

Wald chi²(93): 310.31Prob > chi²: 0.000