Which Italian family farms will have a successor?

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Introduction

A characteristic of agriculture in western countries is that farms are mostly operated as a family business[1]. This implies that business continuity is normally ensured by an intergenerational transmission within the household. If there is no person within the household willing to take over the farm, this might entail effects to be evaluated from a general welfare point of view. The land of farms without successors being used for enlarging neighbouring farms has generally positive effects, since it might generate economies of scale and hence a greater efficiency. The farm being abandoned, on the other side, might entail environmental problems and land degradation, specially in marginal areas. But also the transfer to a new operator might have negative effects, if farm operation implies the accumulation of specific knowledge, that is lost if it is not transmitted to a child who worked with the parents. Finally, when farms have no successor, operators usually go on working on the farm even when old, and they are generally less open to innovations and to technical progress, so that there is a lower efficiency than it would be possible with a faster generational turnover.

The problem of farm succession is serious when considering the ageing of agricultural working population. In the Italian Region we consider, Piedmont, the average age of farm operators is 58 years, 35 percent of them are older than 65 years, and only 14 percent are 40 years or younger. In a short period of time, many operators will be too old to operate a farm, and the destiny of their farms is at stake, if no successor will take on their farms. This is therefore an obvious issue of policy concern.

The literature of the family as an insurance against risk and more generally about intergenerational transmission (Kotlikoff and Spivak, 1981; Laferrère, 1999) is the appropriate

[1] High supervision costs of hired labour, due to the technical features of agricultural production, have been pointed at to explain this situation: by contrast, family labour does not need supervision, since family members are involved in the income it provides (Pollack, 1985).

reference about the transfer of the farm assets. But it does not account for the specificity of farm transfers within families, i.e., why the farm operation, and not only the value of farm assets, is transmitted within families. Rosenzweig and Wolpin (1985) show that the accumulation of farm-specific, experience-based knowledge can explain why transfer within the family is dominant. Their argument is that the accumulation of farm-specific knowledge raises labour productivity, so that for an offspring who worked on the farm and gained specific knowledge the farm is more profitable and the land is worth more than for anybody else. Therefore, the children have an incentive to work on the farm when young at a lower wage than external labourers and to purchase the farm from their parents. Rosenzweig and Wolpin's paper focused on developing countries; as they note, the effects of technological innovations, that reduce the value of accumulated knowledge, should be studied. It is therefore of interest to verify if their argument is still valid in a developed country environment. At first sight, it would be tempting to answer in the negative. Technology is rapidly changing, and farm operation is largely and increasingly based on scientific knowledge rather than on experience. Nevertheless, farming skills are still very location and crop-specific, due to the heterogeneity of soils and weather conditions, that require that scientific knowledge be adapted to those specific conditions. Second, the degree of standardization of techniques varies according to the type of production and to the specialization of farms, and certain types of farming require higher technical skills than others. Third, market trends in the last decades push towards an increasing quality diversification of food. Diversification of agricultural products requires location-specific technical skills, to exploit diversified local conditions, and location-specific marketing skills to implement actions for the valorisation of the *terroir*. In summary, how much specific knowledge is a determinant of farm succession is a question to be addressed empirically.

Apart from some work of social scientists (Khera, 1973; Errington 1993; Blanc and Perrier Cornet, 1993), only few economic papers deal with this problem and the related problem of exits from farming for developed countries (Pesquin et al., 1999; Weiss, 1999; Stiglbauer and Weiss, 2000; Kimhi and Nachlieli, 2001; Glauben et al., 2002 and 2004; Hennessy, 2002). The definition of successor is different in these papers, and the determinants generally include operator's and household characteristics, and indicators farm profitability and of labour intensity. In the above literature the specific experience is not specifically taken into consideration.

The goal of this paper is therefore to further explore the determinants of intra-family succession in Italian farms with particular emphasis on the effect of specific knowledge and on the effects of part- or full-time status of the operator.

Theoretical background and empirical approach

From a theoretical point of view, farm succession is a complex issue, since it involves decision-making both by the parents and by the children. Moreover, a decision about succession often not only involves choices concerning work, but also residence. Planning a succession also implies investments in human capital by parents and children (Kimhi, 1995) and the choice of the appropriate timing (Pesquin et al., 1999; Kimhi, 1994 and 1997). Finally, parents' and children's work choices are probably interrelated in a complex way, and some papers explicitly modelled these interrelationships as a Nash game (Pesquin et al., 1999). From an empirical point of view, it would be desirable to observe actual successions. But since they happen at a generation time distance, data concerning actual successions along time are seldom available (one exception is in Stiglbauer and Weiss, 2000). Hence, some papers are based on operators' statements of having a successor in the household (Kimhi and Lopez, 1999; Glauben et al., 2002 and 2004; Hennessy, 2002) or on legal decisions connected with the succession (Kimhi and Nachlieli, 2001). We use a different approach, and we consider that there is a likely successor in the farm household if a household member of the new generation is involved in the farm operation, which is shown by his/her choice to work on the farm.

We assume that a decision is made by the potential successor among different work alternatives, so to maximise his/her expected utility. Though the choice of a family member to work on the farm will not necessarily result in the farm handed over to him/her, it undoubtedly raises this possibility, due to accumulation of idiosyncratic human capital, which renders less likely for a young member to give up farm operation in the future. Working on the farm also creates trust and collaboration between the present operators and the prospective successor, possibly reinforced by income pooling, and renders more likely an implicit contract among them by which the farm succession obtained by the child is traded off with the commitment to support the parents in old age. It also copes with moral hazard and adverse selection problems in evaluating the farm worth, and reduces transaction costs in farm transmission (Bjuggren and Sund, 2002). The preference for working on the farm and in prospect for succeeding to the parent is based on the comparison between the expected utility from working on the family farm and taking it over with the expected utility from working off the farm. The comparison concerns expected income from both alternatives, considerations about risk attached to each alternatives, and idiosyncratic preferences (cultural heritage, preference towards outdoor work and towards independent work, parent-child relationship, etc.).

Of course, for the young household member to take on the family farm, also the operator's agreement is required. In the parent's perspective, the choice is based on the comparison between the expected utility from keeping the child working on the farm or not, which depends on insurance considerations, on preferences about the continuity of a farm tradition, on altruism towards the child.

Having a young member working on the farm is therefore the result of both operator's and child's choices. In our data we do not observe actual successions, but we consider that if a younger household member works on the farm, and the actual succession can therefore take place in the future, the operator agreed that he/she did so. The situation is therefore the final result of a choice involving both parent and child. We do not explicitly address the way in which the interactions between parent and child led to the decision-making process, and we simply assume that a collective choice has been made. An overall utility is attached to having a successor or not, and the alternative yielding the greater utility has been chosen. Call V_{ij} the indirect utility that household i attains when choosing alternative j (working on the farm). The alternative is not working on the farm, which yields utility V_{ik}.

The utilities V_{ij} and V_{ik} that the household obtains from each alternative concerning the succession are assumed to have a deterministic component in a set of explanatory variables $\mathbf{X}_i$ and $\mathbf{Z}_i$, possibly with common terms, and of random terms ε_{ij} and ε_{ik}, respectively. The indirect utility stemming from the individual's choice is not observable, but the choice is. Then, alternative j is chosen if:

$$V_{ij} > V_{ik} \quad (1)$$

$$\boldsymbol{b}'_j \boldsymbol{X}_i + \varepsilon_{ij} > \boldsymbol{b}'_k \boldsymbol{Z}_i + \varepsilon_{ik} \quad (2)$$

$$\boldsymbol{b}'_j \boldsymbol{X}_i - \boldsymbol{b}'_k \boldsymbol{Z}_i > \varepsilon_{ik} - \varepsilon_{ij} \quad (3)$$

or:

$$\boldsymbol{c}'\boldsymbol{M}_i > \mu_i \quad (4)$$

Assuming the error $\mu = \varepsilon_{ik} - \varepsilon_{ij}$ is normally distributed results in a probit model (Maddala 1983; Greene, 1993).

Data

The basic farm household data are drawn from individual farm records of Piedmont Region (Italy) of the Agricultural Census held in 2000. A random sample of 10,000 farms (8.2 percent of the total) was drawn from the farm records. Since the interest was in family farms, those farms that were not individual farms or "società semplice" were excluded, as well as farms reporting sales for less than 4 million Lire (€ 2066), to avoid considering hobby or very marginal farms.

We consider as prospective successors the children working on the farm[2]. Nevertheless, they may work on the farm as their exclusive, predominant or secondary activity. We decided to test two specifications. The first one assumes the presence of a potential successor (represented by the dummy variable Succ1) only when at least one child is working exclusively or predominantly on the farm. The second model assumes that a potential successor is any child working on the farm, regardless of the quantity of labour contributed (dummy variable Succ2). In a way, the former variable might represent the possibility of an intergenerational transfer of more professional farms, while the latter includes also marginal or small, part-time farms. Family farms in the former situation are 9.3 percent and in the latter are 16.7 percent, which can give an idea of the relevance of the problem of family succession.

A first group of explanatory variables refers to farm characteristics that may favour the accumulation of specific experience. Dummy variables for specialised types of farming, based on the FADN classification of farms[3], were included for dairy, cattle raising and fattening, fruits, quality viticulture. Other dummy variables concern organic production, and the farm having agro-tourism activities, other activities (recreational activities, handicrafts, etc.), or making wine on the farm. All these variables are predicted to increase the value of specific knowledge and, hence, the probability of an intra-family succession. To control for the differences among farms when keeping types of farming equal, we used Standard Gross Margins as calculated for FADN[4]. A second group of variables refers to the operator's characteristics: operator's gender, operator's age and age squared, education levels, represented by dummy variables (the reference group is those operators

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[2] Unfortunately, the data do not indicate the kinship of individuals with the operator but for the spouse. Therefore, to identify the children, we had to assume that they are those relatives at least 18 years younger than the operator.

[3] The Farm Accounting Data Network of the European Union defines a farm as specialised in a Type of Farming (TF) if the Standard Gross Margin (SGM) for the particular production covers more than 2/3 of total SGM. Standard Gross Margins are calculated as the balance between a standard value of production and a standard value of certain specific costs, determined for the various crop and livestock characteristics within each region.

[4] Using SGM rather than total sales may also avoid an endogeneity problem, that might raise if succession prospects influence operator's labour effort and, by this way, production and sales. SGM only depends on the area covered by the different crops and on the number of animals. The type of farming is less likely influenced by succession prospects, since it depends to a large extent on natural conditions. Farm physical size might in principle more easily be influenced by succession prospects, which would make SGM endogenous; this problem cannot be addressed with our data but, given the rigidity of the land market in Italy, it should not be too serious.

with compulsory level or less), and a dummy variable indicating whether he/she followed professional training. A third group comprises variables that represent both farm characteristics and human capital of the operator: a dummy variable indicating whether farm accounts are kept, another indicating whether computer and Internet are used, and a third indicating whether the farm belongs to some economic association. Finally, some variables represent characteristics of the area (dummies for mountain and hill areas) and local labour market conditions. The latter, given the long-term nature of succession decision, are drawn from the 1991 Population Census and refer to Sistemi Locali del Lavoro (SSL). SSLs are aggregations of municipalities (Comuni) established by ISTAT (the National Statistics Bureau) based on commuting patterns to work. Variables were attributed to each observation according to the SSL in which the farm was located. They comprise the employment rate, intended to represent the overall job availability, the share of unskilled jobs (proxied by industry, buildings, commerce), the share of agricultural to total employment. The 1991-2001 variations in these variables were also introduced.

Since there is no possibility of observing a child working on the farm if he/she is too young to work, the sample should comprise only those households in which having a child in working age is a real possibility. Inspection of the data showed that the minimum age at which some household is in this situation is when the operator is 34 years old. Farm households with younger operators were therefore excluded from the sample, and the final sample size was 8134 (6.7 percent of total farms).

Table 1 presents the definition and the descriptive statistics of the variables.

Results

Table 2 presents the results of the probit models. The table also includes the marginal effects, that indicate the change in the probability of the dependent variable due to a marginal change in the explanatory variables[5]. A likelihood ratio test rejects the hypothesis of no effect of the explanatory

[5] Marginal effects depend on the value of the explanatory variables at which they are calculated. Since many explanatory variables are dummies, marginal effects were calculated at the mean values of the continuous variables and at zero values of the dummy variables. While the interpretation of the marginal effects of the continuous variables is as

variables at any conventional significance level for both models. Also, the models overall correctly predict 91 and 95 percent of the actual outcomes for model 1 and 2, respectively, though they do a very good job in predicting the alternative of no successor (99.7 and 99.1 percent of correct predictions, respectively), but are rather deceiving for the other alternatives (5 and 7 percent), probably due to the very unbalanced proportions of the alternatives in the sample (Greene 1993, p. 652). This is also common in other studies on this issue (e.g., Stiglbauer and Weiss, 2000).

An obvious determinant of succession is farm economic size: the SGM variable is significant for both models. Also Stiglbauer and Weiss (2000) find a positive effect of farm size on succession, unlike Kimhi and Nachlieli (2001), who explain their results by previous investment behaviour in the particular Israeli situation. In general, a larger farm income makes working on the farm more attractive for children relative to off-farm work. Nevertheless, the marginal effect of SGM on the probabilities of the different outcomes is not very strong: a 1000 Euro increase in SGM raises the probability of Succ1 and Succ2 by 0.1 and 0.2 percent at the mean values.

Among operator's characteristics, gender is significant, and a female operator increases the likelihood of a succession by 3 percent in the case of the first model. The effect is stronger in the second model (9 percent). This result is consistent with Stiglbauer and Weiss' (2000) finding that a female operator raises the likelihood of family succession.

Operator's age significantly affects the probability of having a successor. Its effects is curvilinear, since the parameters of age squared are significant. Though, the ages of maximum probability of succession are well beyond retirement age, which means that for all practical purpose the probability is strictly increasing with operator's age. These results are consistent with Kimhi and Nachlieli's (2001), that also find a positive effect of operator's age on designing a successor, with a maximum from 67 to 82 years, depending on the models, and with Stiglbauer and Weiss' (2000).

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usual, the interpretation of the marginal effects of the dummy variables is the change in probability due to a shift from not being to being in the status indicated by the dummy variable (which in general is also the median value, except for gender, accounts and hill variables).

The effects of operator's education are negative, though not significant for some school degrees. Surprisingly, they are also negative for the agricultural high school. In general, higher levels of education of the operator entail a greater farm profitability, that renders farming more attractive for prospective successors. On the other side, a greater education may also raise the potential off-farm wage. Since usually children of highly educated operators are highly educated too, this may raise their off-farm wage and render them less eager to take on the farm. This double effect of education has already been noted with reference to off-farm employment of farmers, and the second has generally been found to prevail (Huffman, 2001). The predominance of the off-farm wage effect of education seems to apply to succession in Piedmont, contrary to what was found for Upper Austria (Stiglbauer and Weiss, 2000) and in Israel (Kimhi and Nachlieli, 2001). We also find that formal education in agriculture is no different from the corresponding general education. By contrast, having followed agricultural training significantly increases the likelihood of succession. Also another variable connected with the accumulation of human capital by the operator, i.e., keeping farm accounts, has a significant positive impact. By contrast, though their signs are positive, neither the computer and Internet variable nor the association variables are significant for the first model, but the latter is for the second one. Probably belonging to an association helps in working on the farm even on a part-time basis.

The parameters of the dummy variables for mountain and hill areas are positive and significant (except for hills in the first model). This may either be the effect of traditions and of farming cultural heritage, or of stricter land market conditions that renders it more difficult for parents to sell the land. Also particular conditions not captured by the relevant labour market variables that make it difficult to find alternative jobs for the successors may be a reason for these results.

An important group of explanatory variables are those representing the accumulation of specific knowledge, as measured by farm specialisation in types of farming requiring high skills.

The parameters of farm specialisation in fruits, quality vineyards, dairy and cattle raising and fattening are all positive and significant for the second model; the results, though still positive, are more mixed in the first one. The largest increase in probability of succession is when the farm is specialised in cattle, but also dairy, fruits and quality vineyards have sizeable effects.

Operator's off-farm work status has interesting effects. The likelihood of a succession is lower when the operator works off the farm but keeps farming as his/her main occupation, relative to being a full-time farmer, though this result is only weakly significant. When the operator has an off-farm job as his/her main activity, the probability of succession is significantly higher than when he/she is full-time. There is therefore no consistent pattern relating the operator's degree of part-time farming and the probability of succession. Stiglbauer and Weiss (2000) found that if the operator was not a full time farmer the likelihood of a family succession was significantly lower. By contrast, a result similar to ours, though not statistically significant, was found by Kimhi and Nachlieli (2001). Our results differentiating operator's off-farm work status between main and secondary occupation suggest that the interrelationships between off-farm work choices of the operator and the potential succession are complicated. A parent with a successor might mainly work off the farm exactly because he has someone substituting for him on the farm and wants to leave him more responsibility in running the farm; while an operator with no successor might work mainly off the farm as a prelude to exiting from farming. In the same way, the finding that secondary off-farm work is inversely related to succession probabilities might hide different phenomena. This problem cannot be addressed with our data, and more research is needed on this issue.

Explanatory variables concerning local labour market conditions have the predicted signs and are significant. An high employment rate, indicating many job opportunities for farm children, significantly decreases the likelihood of succession.. By contrast, the share of agricultural employment significantly increases these probabilities (by 4.3 and 3.9 percent for a 10 percent increase in the share. The 1991-2001 changes in the labour market variables were never significant.

Conclusions

In this paper probit models of the determinants of intra-family succession for a sample of Piedmont farms were estimated. In addition to other determinants already considered in previous studies, we were interested in testing in a technologically advanced country the hypothesis, put forward by Rosenzweig and Wolpin (1985) for LDCs, that the accumulation of specific knowledge creates an incentive for intra-family succession.

In our model, the variables representing specific knowledge do significantly affect the probability of a succession. Therefore the results suggest that also in developed economies the accumulation of specific knowledge plays a role in creating incentives to intra-family transmission of farm operation. Nevertheless, their impact, as well as the impact of other explanatory variables, is not very strong. This suggests that the influence of specific knowledge in determining farm succession in developed countries is less marked than in developing countries, due to technological progress and to standardized and formal knowledge, and that other variables, not considered in the studies up to now, might affect the succession in family farms. One obvious determinant might be children's individual tastes for farming, which might induce them to accept taking over the farm even when it provides a lower income than alternative jobs (Fall and Magnac, 2004). Identifying this determinant is obviously impossible with a cross-section sample, but it might be difficult even with panel data, given the long-term nature of the succession process.

Another direction of further research is the relationship between parents' off-farm work choices and succession. In the previous literature the results in this respect are mixed, and our results suggest that complex relationships are involved between the operator's off-farm work choice and succession. There seems to be no monotonic pattern between the degree of part-time farming and the probability of succession. This suggests that choices of off-farm work might be made differently according to the prospects of farm succession the specific operator is facing. If this is the case, then off-farm work choices and succession are a joint decision, to be modelled accordingly; this issue deserves further research.

Finally, as a general picture, it is comforting that a core of strong, specialised farms has good perspectives of going on with the new generation. On the other hand, for the large majority of farms there are gloomy continuity prospects. It is easily predictable that in a short term agriculture will undergo deep changes in property structures and in farm operations. This change should be governed, on one side to facilitate the consolidation and enlargement of remaining farms, and on the other side to avoid the territory degradation induced by a too rapid depopulation.

References

Blanc M., Perrier Cornet Ph. (1993) Farm transfer and family entry in the European Community, *Sociologia Ruralis*, 33: 319-335

Bjuggren P.O., Sund L.G. (2002) A Transaction Cost Rationale for Transition of the Firm within the Family, *Small Business Economics*, 19: 123-133

Errington A. (1993) Managing succession in the farm family business, *Farm management*, 8: 349-359

Fall M., Magnac T. (2004) How valuable is on-farm work to farmers?, *American Journal of Agricultural Economics*, 86 (1): 267-281

Glauben T., Tietije H., Weiss C. (2004) *Succession in agriculture: a probit and a competing risk analysis*, Selected paper for the annual meeting of the American Agricultural Economists Association, Denver, 2004

Glauben T., Tietje H. and Weiss C.R. (2002) *Intergenerational Succession on Family Farms: Evidence from Survey Data*, Contributed paper presented at the Xth EAAE Congress, Zaragoza, Spain, 28-31 August, 2002

Greene W.H. (1993) *Econometric Analysis*, MacMillan, New York

Hennessy T. (2002), *Modelling succession in Irish dairy farms*, Paper presented at the Xth EAAE Congress, Zaragoza, 28-31 August 2002 (CD-rom)

Huffman W.E. (2001) Human capital: education and agriculture, in B. Gardner e G. Rausser (eds.), *Handbook of agricultural economics*, Elsevier, Amsterdam

Khera S. (1973). Social stratification and land inheritance among Austrian peasants, *American Anthropologist*, 75: 814-823

Kimhi A., Lopez R. (1999) A Note on Farmers' Retirement and Succession Considerations: Evidence from a Household Survey, *Journal of Agricultural Economics*, 50 (1):154-162

Kimhi, A., Nachlieli N. (2001) Intergenerational succession in Israeli family farms, *Journal of Agricultural Economics*, 52 (2):42-58

Kimhi, A. (2000) Is part-time farming really a step in the way out of agriculture?, *American Journal of Agricultural Economics*, 82: 38-48

Kimhi, A. (1997) Intergenerational Succession in Small Family Business: Borrowing Constraints and Optimal Timing of Succession, *Small Business Economics*, 9: 309-318

Kimhi A. (1995) Differential Human Capital Investments and the Choice of Successor in Family Farms, *American Journal of Agricultural Economics*, 77: 719-724
Kimhi, A. (1994) Optimal timing of farm transferral from parent to child, *American Journal of Agricultural Economics*, 76: 228-36
Kotlikoff, L.J. and Spivak.A. (1981) The family as an incomplete annuities market. *Journal of Political Economy,* 89: 372-91
Laferrère, A. (1999) Intergenerational transmission Models; A Survey, *The Geneva Papers on Risk and Insurance*, 24: 2-26
Maddala, G. S. (1983) *Limited Dependent and Qualitative Variables in Econometrics*, Cambridge University Press, Cambridge.
Pesquin C., Kimhi A., Kislev Y. (1999) Old-age security and inter-generational transfer of family farms, *European Review of Agricultural Economics*, 26 (1): 19-37
Rosenzweig M.R., Wolpin K.I. (1985) Specific experience, household structure, and intergenerational transfers: farm family land and labour arrangements in developing countries, *The Quarterly Journal of Economics*, 100 (supplement): 961-987
Stiglbauer A.M., Weiss C. (2000) Family and non-family succession in the Upper-Austrian farm sector, *Cahiers d'économie et de sociologie rurales*, n° 54, 5-26
Weiss, C. (1999) Farm growth and survival: econometric evidence for individual farms in Upper Austria, *American Journal of Agricultural Economics*, 81: 103-116

Table 1- Definition and descriptive statistics of the variables (N = 8134)

Symbol	Definition	Mean	Std.Dev.
Explanatory variables			
GSM	Gross Standard Margin (thousand €)	13.358	26.373
Fruits	=1 if specialised in Fruits	0.099	0.299
Quality viticulture	=1 if specialised in Quality viticulture	0.111	0.314
Cattle	=1 if specialised in Cattle raising and fattening	0.027	0.162
Dairy	=1 if specialised in Dairy	0.038	0.191
Agro-tourism	=1 if with an agro-tourism activity	0.006	0.075
Wine-making	=1 if making wine	0.085	0.279
Organic	=1 if organic farming	0.020	0.141
Other activities	=1 if other activities (recreational, handicrafts, etc.)	0.181	0.385
Accounts	=1 if farm accounts are kept	0.516	0.500
Computer	=1 if computer or Internet is used	0.014	0.118
Association	=1 if the farm belongs to economic associations (co-operatives, consortia, etc.)	0.246	0.431
Mountain	=1 if in mountain area	0.149	0.356
Hill	=1 if in hilly area	0.562	0.496
Gender	=1 the operator is male	0.711	0.453
Age	Operator's age	59.505	12.961
Graduate agriculture	=1 if the operator graduated in agriculture	0.003	0.059
Graduate other	=1 if the operator graduated in other fields	0.014	0.119
High school agriculture	=1 if the operator has an high school diploma in agriculture	0.020	0.140
High school other	=1 if the operator has an high school diploma in other fields	0.118	0.323
Professional training	=1 if the operator followed professional training courses	0.077	0.266
Minor PT	= 1 if the operator works off the farm as the minor occupation	0.016	0.125
Main PT	= 1 if the operator works off the farm as the main occupation	0.136	0.343
Employment rate	Employment rate 1991	0.588	0.025
Change employment	1991/2001 change in employment rate	1.067	0.016
Share Agriculture	Share of agricultural to total employment	0.114	0.051
Change agricultural	1991/2001 change in agricultural share	0.706	0.154
Share unskilled	Share of unskilled (industry, buildings, commerce) to total employment	0.677	0.053
Change unskilled	1991/2001 change in share of unskilled	0.909	0.030
Dependent variables:			
Succ1	Child working full-time or mainly on the farm	0.093	0.290
Succ2	Child working on the farm (in any proportion)	0.167	0.373

Table 2 - Results of the probit models

	Succ1			Succ2		
	Coeff.	t-ratio	Marg. Eff.	Coeff.	t-ratio	Marg. Eff.
Constant	-1.258	-0.507	-	-0.191	-0.09	-
GSM	0.009***	12.584	0.001	0.009***	11.869	0.002
Fruits	0.122	1.597	0.011	0.167***	2.632	0.030
Quality viticulture	0.129*	1.877	0.012	0.174***	2.929	0.031
Cattle	0.435***	3.946	0.039	0.382***	3.675	0.069
Dairy	0.227**	2.278	0.020	0.332***	3.68	0.060
Agro-tourism	0.389	1.614	0.035	0.242	1.042	0.044
Wine-making	-0.196**	-2.03	-0.018	-0.069	-0.811	-0.012
Organic	-0.227	-1.417	-0.020	-0.134	-1.007	-0.024
Other activities	0.284***	4.047	0.025	0.208***	3.239	0.038
Accounts	0.533***	9.989	0.048	0.430***	9.811	0.038
Computer	0.114	0.72	0.010	0.157	1.056	0.028
Association	0.081	1.628	0.007	0.107**	2.455	0.019
Mountain	0.267***	3.539	0.024	0.359***	5.669	0.065
Hill	0.070	1.269	0.006	0.203***	4.24	0.037
Gender	-0.317***	-6.611	-0.028	-0.507***	-12.707	-0.091
Age	0.058***	4.117	0.005	0.069***	5.547	0.012
Age squared	-0.000**	-2.402	-0.000	-0.000***	-2.795	-0.000
Graduate agriculture	-0.459	-1.096	-0.041	-0.045	-0.146	-0.008
Graduate other	-0.152	-0.731	-0.014	-0.466**	-2.397	-0.084
High school agriculture	-0.299*	-1.689	-0.027	-0.352**	-2.148	-0.064
High school other	-0.082	-1.112	-0.007	-0.129**	-2.063	-0.023
Professional training	0.142*	1.898	0.013	0.112	1.633	0.020
Minor PT	-0.391*	-1.699	-0.035	-0.188	-1.042	-0.034
Main PT	0.236***	2.921	0.021	0.298***	4.433	0.054
Employment rate	-3.921***	-3.123	-0.351	-2.278**	-2.147	-0.411
Employment change	-2.223	-1.082	-0.199	-2.321	-1.342	-0.419
Agricultural share	4.751***	4.193	0.425	2.144**	2.194	0.387
Agricultural change	0.035	0.182	0.003	-0.121	-0.664	-0.022
Unskilled share	2.566***	3.052	0.230	1.125	1.592	0.203
Unskilled change	-0.725	-0.558	-0.065	-1.48	-1.402	-0.267
N. Obs	8134			8134		
Log Likelihood	-2182.2			-3225.36		
Likelihood Ratio test of no effect of the variables: χ^2 (d.f.)	658.01 (30)			892.95 (30)		
Likelihood Ratio Index	0.131			0.1216		
Correct predictions (%)	90.89			0.954		

***, **, *: significant at 1, 5, 10 percent, respectively