The Generational Turnover in Agriculture: Theoretical Problems and Empirical Evidences

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The purpose of this study is to understand the causes determining the exit from the sector of young adults. Drawing from migration and succession theories, a number of factors, hypothesised to influence the decision, are tested using a Probit model.
The findings lend support for the selectivity hypothesis: low incomes are negatively related with the propensity to stay in the sector. The exit of young could be related to the low earnings and to the preferences of individuals. The intergenerational transfer seems to be the result of an involvement in the farm activity.
Keywords: Generational-turnover, migration, transfer farms.

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1 INTRODUCTION

Nowadays there is a lot of interest in understanding the generational turnover in agriculture, sector that in many countries is suffering from a fragmented and old structure and consequently cannot be competitive in the European Single Market. In the past years, the agricultural sector was considered mainly under the production aspects because it was considered important to guarantee enough food to feed the population. Nowadays, the economic scenario is changed and the sector is increasingly oriented towards the quality of productions, the food security, the protection of the environment and in maintaining the local cultural traditions of the rural areas. These are the topic of main interest of the policy makers who are paying a lot of attention to promote a multifunctional agriculture, considered the key element of the rural development. To promote a multifunctional agriculture the starting point is to create the condition for a generational turnover. In fact, the abandon of the farms determines negative externalities on the environment: the first result is a concentration of the production and the degradation of the landscapes. In addition, the concentration of the production in the areas with intensive agriculture determines negative effects on the environment related to the use of chemical inputs and the reduction of biodiversity in the abandoned area.

A successful policy encouraging the generational turnover would favour the entrance of young in the sector in substitution of the old and reduce the increasing phenomenon of the reductions of the number of farms due to the abandon and to the migration of young adults from the sector. The existence of a generational turnover is relevant in the agriculture of Italy that is one of the countries in Europe with the lowest level of young adult farmers. Looking at the statistics on the age of farmer in Europe, Portugal and Italy are the countries with the lowest level of young adults' farmers. In particular, in Italy the 40% of the farms is conducted by farmers older than 65 and the 50% of the farmers are over 60. The results of the latest statistics from the Agricultural Census, conducted by Istat in 2000, confirmed this phenomenon. In fact, the 60.9% of the young farmers' familiars with age between 35-39 years are working in the farms belonging to a farmer over 65 and the 47.9% of the young familiars in the range of age between 20-24 years old is working in farms conducted by a farmer over 55. Only 31.2% of the young familiars with age between 25 and 29 years are working in the farm with farmers between 60-65 years old.

The Italian agricultural sector is notably changed in the latest decades and its contribution to GDP and to the employment is going to reduce progressively. The phenomenon of migration is confirmed by the statistics conducted on the employment rates by sector. Over the last ten years, the percentage of the population employed in the service industry has increased from 25,4% in 1992 to 27,3% in 2002, while it has fallen in industry (from 12,4 to 11,9) and has become even more marginal in agriculture, dropping from 3,4% to 2,2%. In fact, the ratio of the agricultural workforce to the population has changed rapidly: in 1992 there was approximately one work unit engaged in agricultural activities for every 29,5 inhabitants whereas in 2002 there was one in 43.8 (Inea 2003).

Policies try to promote the entrance of young farmers in the agricultural sector in order to reach the objectives of a sustainable agriculture and to keep the occupation in the agricultural sector. The latest normative on the sector is based on rules to keep young farmers in the sector in the following way: try to encourage the young to take over the farm from an old farmer or to start a new one. This support has be given only to the young between the ones from 18 and 39 years old that are interested in taking over a farm from a farmer older than 55 years. In this way, the program of Structural Funds for the years 2000-2006 tried to overcome

the difficulties in the application of the old legislation defining a unique programme for all the measures of structural helps in favour of agriculture (Reg.(CE)1257/99; Reg.(CE) 817/2004), including also actions to sustain the young farmers in agriculture. It established the measures to facilitate the substitution of old farmers with young farmers.

1.1 Purpose, Method, Scope and Limitations, Reliability and Validity

The purpose of this research is to understand the causes that determine the exit of young farmers from the sector. The relevance of understanding the causes could be important to give scientific support to the policy makers, through an understanding of the causes determining the migration of young adults from agriculture. The theory of migration of young adults from rural area and succession theory are applied. The necessary data for the thesis have been collected by a questionnaire prepared considering the economic literature on the models described above. The study is based on primary data collected on 100 farmers in three Italian provinces: Frosinone, Latina, Napoli. The sampling technique utilised is two-stage cluster sampling. The econometric model utilised wants to identify the social, economics and structural factors determining the generational turnover. The employed econometric model was a Probit model.

1.2 Overview of the Economic Literature on Succession and Migration of Young Adults from Agriculture

Different studies have been conducted to forecast the dynamic of the sector based on the past migration (Carbone 1996; Barbero and Mantino, 1988) and the results supported the thesis of a future disequilibrium in the sector. The return of young people into agriculture could be important for the sector because young people are more dynamic and innovative. It has been demonstrated the thesis that the age of farmers has a direct influence on the farm strategies, and that younger farmers look more professional and gain higher revenue (Russo, Sabbatini 2001; Simeone, Spigola 2004). Detecting the causes of growth and survival of farms, the age of farmer proved to be one of the factors- together with education level, size and off–farm employment- that affects the farm's growth (Weiss, 1999; Simeone and Spigola, 2004). Moreover, according to the literature, an important factor that encourages farmer's sons to stay in the sector is the size of the farm, as well as the fact that a farm is part time or professional (Barberis and Siesto, 1993). Results from different studies showed that in agriculture, more than in any other sector, the pattern of succession that is more likely to take place is from father to son (Labvand and Lentz, 1983). The crisis in farming led to a change in the typical succession structure of farms that represents a source of benefits. Economic literature showed that the standard of living of the succeeding family farm is more than 20% higher than that of a farm taken by new buyers. The reason for this is related to the fact that a son who grew up on a farm understands its functioning better than a buyer from outside. (Pesquin et al., 1999). Studies conducted on the type of exit in agriculture indicated that time and types of farmer exit decision

depend on the economic environment and on the particular characteristics of farms and farmers. In their work, Pietola and Vare (2003) analysed the type and the timing of exit decisions among farmers who have the option to exit from farming or to continue farming and exit later. The result that came up was that timing and type of exit decision responded elastically to some characteristics related to the farmer's age, farmland area, prices and retirement benefits. In particular, the probability of exit through an early retirement programme decreases with farmer age, it is not influenced by the output prices, and it is affected positively by the level of pensions, especially for low-income farmers with higher marginal utility of money. Farmers' behaviour changes with age, but it is also determined by the existence of sons working in the farms. Different studies (Keating and Munro, 1989) demonstrated that reduction in work is the first stage of the exit from the farm business. The decision to work part-time could mean tiredness arrived at a given age but also could be a way to exit from a sector to avoid shocks to the successor. On the other hand, in the agriculture sector, part-time work is quite common in comparison with other sectors, and other studies have demonstrated that pattern of part-time work in agriculture could be the result of a stable situation (Kimhi, 2000). Evidence from the analysis conducted in Germany by Pfeffer (1988) suggested that part-time farmer is less likely to continue to farm than the full-time farmer is. The part-time farmers showed lower expectations of continuing to farm in the short as well as in the long run. Moreover, according to the author, the possibility of intergenerational transfer is the most important factor in determining whether the farmer expects to continue to farm. In fact, reason affecting farmer behaviour could be related to the presence of children: transferring the farm to a child decreases the incentive to delay the transfer. At the same time, the status of a farmer is considered determinant to predict the retirement: if a farmer has a spouse, he is predicted to retire earlier than a farmer living alone who has a low probability to have a successor. In other studies, the main result was that it is likely that age of retirement of farmer is connected to the income and to the heir's educational level. The more educated the parents are, the later they will transfer the farm to an heir, and a more educated heir will get the farm earlier. Because farm's income seems to rise when the farmer is young and to fall when he becomes older, the exit of farmer and the transfer to the child is naturally determined by family's interested to optimise the utility (Kimhi, 1994). Different hypotheses have been developed in the economic literature to explain the main causes that determine the migrant's behaviour. The first models of Lewis, Fei and Ranis considered the migration from rural areas to urban areas determined by the high demand of work in the manufacturing sector characterised by higher salaries for workers and highest profits for the entrepreneurs. This model was not able to explain the situations where although the unemployment rate in some urban area was high the migration flow from non-metropolitan area did not stop (Inea, 2002). The migration process was explained as an irrational behaviour driven by non-economic motivations, but simply by the "bright lights of the city" that attract people who will raise their utility from moving to the urban area.

A different approach was presented in the Harris-Todaro (Harris and Todaro, 1970) migration model assumptions that considered migration as a rational phenomenon based on expected earnings rather than actual earnings. According to them, the migration rate is not determined by the labour supply curve in the urban area but just from the difference in the expected earnings between rural and urban areas. The expected earnings are given by the marginal salary in the industrial sector weighted with the probability of being employment for a person in the metropolitan area. This probability is given by the ratio of urban employed to urban labour force on the assumption that labour turnover is random (Anam, 1988). This model explains why even if there is a high unemployment rate in the urban area there are migration flows in the urban area. In fact, the movement towards the urban area is connected with their own personal probability to find a job. The probability to find a job, that changes from person to person is higher for high educational level of the migrant, higher the money he has to survive in the city when is looking for a job. Moreover, this probability depends also on the information that could be connected with the fact that migrants know persons that live in the city. These persons have the role to inform people living in the rural area about the job

opportunities. This information affects the decision of people that live in the rural area, generally risk adverse, to migrate (Mills and Hazarika, 2001; Rhoades and Renkow, 1998). In order to understand the migration, it is important to consider not only the economics aspects, but also the change in preferences of individuals that in the last decades changed very fast. In fact, the changes in the life style are considered as one of the likely causes determining the abandon of rural area. Other studies, attempting to understand causes determining migration, try to explain it looking at a simple correlation between migration flows and several economics indicator variables. Renkow and Hoover (2000) in their analysis, conducted to understand trends in rural-urban population dynamics, found that the dominant force underlying the trends in rural-urban population dynamics has been ex-urbanization related to changes in residential preferences. The preferences changed and net migration can be determined by the need to access some services that are difficult to find in some rural area. This reason could affect the choice of individuals leaving in the more remote rural hinterland than the ones living in the nearby rural area.

2 DATA COLLECTION, VARIABLES SPECIFICATION AND EMPIRICAL MODEL TO DETERMINE THE FACTORS AFFECTING THE GENERATIONAL TURNOVER

2.1 Data collection

In our study have been analysed primary data collected by using a questionnaire. The choice to do a questionnaire came from the consideration that the studies of succession are mainly based on the farm operator's opinion on children plans (Stiglbauer and Weiss, 2000). Our study will not suffer of this limitation, because we have investigated the actual decisions of the farmer's child. A farm survey provides more detailed information on the motives of a specific behaviour. Before starting the interviews, in order to have a full understanding of the causes determining migration, we have run also a focus group to gathering new ideas and insights about the causes determining the abandon of the agriculture sector from the youngest. It was organised in a way to have in the group farmers with children who have remained in the sector and farmers with children who have left the sector, to get a wide spectrum of insights. (Churchill, Iacobucci, 2002). Information requirement on the topic was derived from the economic literature on migration from rural area and the literature on the generational turnover. Several questions were answered for each information requirement. For each information that it was necessary to address in this study there was a specific question to address: Perception of their *work in agriculture*; Importance of the *attach to the local rural community* and to their origin; Importance of the *life in the metropolitan areas* for them and for the new generations; Causes determining *the migration of young adult* from rural area, *Services and entertainment available* in their area; Determination of *the value in their work*; *Income and working conditions*. In spite of the diversity in the group, the final point of views that arose at the end of the discussion has converged at the same conclusions. The utility of the focus group was to help to specify some of the questions in a more specific way and to include other questions relative to the structure of the farm that resulted to be determinant to a child for deciding where is better to work. It helped to a better understanding of the likely psycho-demographic profiles of the children leaving the sector. In particular, focus groups helped to generate several hypotheses willing to be tested quantitatively.

The following steps compose the sampling design process: definition of the target population, sampling frame, sampling technique and sample size. The *target population,* is important to decide who should be included in the sample. The *elements* of the target population are the respondents and the *sampling unit* is the farmers in the selected provinces. Farmers between 50 and 70 years old of both sexes compose the target population of this research. The range was decided because at this age it makes sense to speak about successor and generational turnover. The *sampling frame* is important to represent the elements of the target population. The chosen sampling frame consisted of a map of the selected municipal districts used for identifying the target population. The *sampling technique* chosen is the Probability Sampling and in particular it was used the cluster technique. In the cluster technique, the sample unit is a cluster population. We selected a casual sample and all the units belonging to it are considered. In this sample, we considered a sample of administrative districts because not all the population in the district has been interviewed. This technique is appropriate for natural cluster of the population related to the spatial and administrative characteristics. Contrary to the simple random and stratified sampling in which the subjects are selected from the population, in cluster sampling the subjects are selected in groups called cluster. The use of this technique allowed reducing the costs of the survey. In our survey each provinces was divided in municipal district (the smaller administrative unit in Italy) representing our cluster in which each cluster had to be a small version of the total population (area sampling or geographical cluster sampling)[ii]. The way to select these districts was not random, but came from several considerations: It was prepared a table, in which was considered the Superficies utilised for agriculture in each municipal district and the number of farms. From this rate, we have the average dimension of the farms in each cluster. Moreover, the districts have been selected taking into consideration the importance of the agricultural sector. In *single-stage cluster sampling* all the elements from each of the selected clusters are used. In our research, we used *two-stage cluster sampling*, not all the units of the selected clusters were interviewed but only farmers selected randomly within the selected clusters. The main objective of the *cluster sampling* is given by the reduction of the costs by increasing the sampling efficiency[iii]. Finally, the sample size has been defined in 100 farm households, the minimum required considering the quantitative nature of the research, the number of variables used and the sample sizes used in similar studies (Malhotra N. K, 1999).

2.2 Variables Specification

Inter-generational transfer and succession pattern has been the subject of many researches, even if the majority of them are qualitative and normative. However, some studies have examined succession taking a broad range of variables and testing their significance using probability models (Stiglbauer and Weiss, 2000; Vare, Pietola and Lansink, 2003; Kimhi and Nachlieli, 2001). A formal economic model of succession that could serve as an adequate basis for testable predictions is not available (Stiglbauer and Weiss, 2000). Because of the non-existence of such a model, we will examine intergenerational transfer in the context of migration between rural and urban areas and succession theories. Drawing from migration and succession theories, a number of factors that are hypothesised to influence the decision are used as explanatory variables in the Probit Model. Differently from the previous studies on the succession mainly based on the farm operator's opinion on children plans (Stiglbauer and Weiss, 2000) in our study, we investigated the actual decision of the child and analysed data obtained by the question: *"Which one of your children is working in the farm to continue the activity?"* The methodology applied will identify how the dependent variable "probability that a child continues the farm activity" is explained by the explanatory variables in the Probit Model. This analysis wants to provide an understanding of the causes determining the exit of young adults from the rural sector. In order to explore the economic factors explaining

migration from the rural sector the following variables are hypothesised to influence the decision. The econometric model utilised wants to identify the social, economics and structural factors determining the generational turnover. The methodology applied will identify how the dependent variable *"child continuing the farm activity"* is explained by the considered explanatory variables.

In the following part, there is an analysis of each factor considered in our model to determine the individual choice of exit from agriculture and their importance in our study have been motivated.

Gender: The reason that suggests to specify gender in the person of the farmer comes from the consideration that the farm structure is likely to be different in the case it is conducted by a man rather than a woman and as demonstrated by Stiglbauer and Weiss (2000), the probability of succession are different. Others are the reasons that suggested specifying the gender for the children. In fact, women can have problem of discrimination in the labour market in both, metropolitan and non-metropolitan labour markets and women have different work needs and expectation from men (Mills and Hazarika, 2001). Men are more likely than women to be involved in the farm work during their adolescence. It means that to make discrimination in the children gender is important in our model.

Education: It is an important factor for both: parents and children. For children, education attained may influence the costs of migration decisions through the cost of employment attainment upon migration and upon foregoing migration (Mills and Hazarika, 2001). Education has an impact on the skills of persons and on the willingness to find another job easier than an uneducated person does. As showed by the literature, it is likely that for farmers that are more educated the opportunity cost of leaving the farm is higher than for uneducated farmers. Because the elasticity of the education respect to the salary is much higher in the urban area than in the rural one, the education could increase the probability of migration (Inea, 2002). Years of schooling together with *grades attained* could represent a measure of skills and they are expected to affect the job alternatives of the children. Broomhall and Johnson, 1994, demonstrated in their study that students that are less willing to move from rural area would perform poorly in the school. The education of parents is an important variable as well. The economic literature shows that the typical migrant is a person well informed that knows more persons in the urban area. Parents, especially the more educated ones, could provide the information about the work opportunities outside agriculture. Thus, parents' education is expected to diminish the cost of migration to the urban labour market.

Mother and father origin: this variable indicates a local absence or presence of matrilinear and father linear extended family that could have an impact on the psychic cost of migration of the child (Mills and Hazarika 2001). In other words, it could determine the child's attachment to the local community.

Residence: Recent empirical works underlying the trend of a continuing de-linking of residential choice and employment choice decisions. A number of factors determine this phenomenon including the increasing importance of amenities in residential choice decisions, the continuing declines in the cost of transportation and the increasing mobility of workers (Renkow 2003). Workers are assumed to move between counties in response to changes in employment and residence opportunities within the multi-county area. Because of the reasons explained above a working persons can choose to live and work in the same county or she/he may live in one county to commute to another. The diminishing cost of distance and rising negative externalities in urban areas, determine the fact that household residential choice could not be determined by workplace choice. This consideration has to take into account the fact that the existence of commuting from rural area to urban area, due to the fact that people prefer to have the residence in a place less populated, less polluted, with more amenities, it is likely to exist in nearby rural area, but less likely in the more remote rural hinterland. In fact, the presence of good viability and good transport connections are essential for this de-

concentration dynamics caused by change in residential preferences (Renkow and Hoover, 2000). The inclusion of the variables *"residence of the farmer"* and *"children's house available"* in the farm could affect the children choice to change sector. This factor can affect the psychic cost of migration because of the difficulties to get use of living in the urban area (Dillman, 1979; Deaton, Morgan, Anschel 1982). Moreover, the residence location of the farmer could postpone his retirement and as shown by the literature (Stiglbauer and Weiss, 2000) the time of exit of the farm could affect the choice of children to succeed.

***Structural factors*:** The definition of the farm in terms of working hours (part-time and full-time farm) could have different implications on the turnover. In fact, if the farm is *part-time*, it is likely that the child will not consider the farm as his future work able to provide an income. The off-farm activity of the farmer could be a signal of the need to work outside to guarantee a higher income to their family. Moreover, it could also happen that because the farm is part-time and there are other sources of income for the family, the child could find a challenge to find his main source of income in the farm and to transform it in a *full-time* farm.

Farmer's partner work: it could explain the professionalism of the work in the farm. Moreover, the presence of one of the parents working outside could affect the future working choice of the children. The economic literature showed that young people occupational choice depends on education and on their parents work (Becker and Tomes, 1979).

Among the structural characteristics of the farm, the *Total superficies* of the farm (Stiglbauer and Weiss, 2000) as well as the part of the land *rented* could affect the intergenerational transfer. Moreover, it was also considered if the main activity of the farm was breeding or cultivation. In fact, at each kind of activities will correspond different structural characteristics.

***Farm Income**:* the economic theory suggests that the young access to agriculture is determined by the income obtained by the farm. This variable was measured with different ranges of income. The farmers have declared their income considering the average of the last five years. Two more variables have been introduced to understand the *performance* and therefore the farm income. It was asked to the farmer how he considered the performance of the farm at the time when the child started to work in the farm and how the farmer considers the performance for the coming years. To the farmers with children working outside was asked if the earning they can get from working outside agriculture was higher, lower or the same compared with the earnings they would have got working in the family farm.

Child Information: The importance of this variable (more informed child consider several work alternatives), is controlled with the number of newspapers the child reads per week. A well-informed child behaves differently from the one that is not well informed. The probability to find a job that changes from person to person is higher for persons well informed about the job opportunities. The information affects the decision of people that live in the rural area, generally risk adverse, to migrate (Mills and Hazarika, 2001; Rhoades and Renkow, 1998).

***Child Cultural Interests**:* Trends in the spatial distribution of population and employment are mainly related to the following choices: *"where to live, whether or not work in the wage market and where to work"* (Renkow and Hoover, 2000). The migration from the agriculture could be explained by the preferences of individuals that could be connected with the interests in some activities and services that are less likely to be found in the rural areas. Metropolitan areas can attract youngest interested in a life style considered possible in the metropolitan area, defined by the literature as "the bright light of the city". This variable was measured with children's attitude to attend cinema and to travel in the metropolitan area for entertainment.

2.3 Empirical Specification

Economics study generally are related to the choice that individuals make and that depend on the attitudes, behaviour, characteristics, decisions and events that are analysed in discrete, nominal, ordinal or non continuous ways. For that reason, the model used to describe the choice behaviour represents an alternative to econometric models in which the dependent variable is continuous and fully observable. These models are useful to describe why choices are made and in which measure each factors enter in the decision process affecting the outcome. To represent the choices is used a binary variable, which takes two values: the value 1 if the outcome is chosen and takes the value 0 otherwise. This binary variable is the dependent variable rather than an independent variable. For these models, maximum likelihood estimation is the usual method chosen. The econometric packages have the maximum likelihood estimation procedure to estimate the parameter, but to be reliable large samples are required (Hill R.C., Griffiths W.E., Judge G.J., 2001) in order to determine the properties of the maximum likelihood rule that in large sample is normally distributed, consistent, and best in the sense that has the smallest variance (Hill R.C., Griffiths W.E., Judge G.J., 1993).

The use of the linear probability models generates two kinds of problems. The error term is heteroskedastic and the variance of the error term *e* varies from one observation to the others. The estimates obtained are inefficient and the result would generate non-sense predictions with probability estimates outside 0 and 1. Estimating the parameters by least squares, we will obtain the fitted model explaining the systematic portion of *y* that is *p* and we will obtain value of p lower than 0 and higher than 1 that will not make sense as probabilities. The problem lies because using the linear probability model is assumed that the exogenous variable b_k measure the effect on P(Y=1) of a unit change in x_k and this effect is the same for all values of x_k since the model is linear (Aldrich J.H. and Nelson F.D., 1984). Because $0 \leq p \leq 1$, a constant rate of increase is impossible. To overcome this problem can be used a non linear S-shaped relationship between x and p in which the probability curve rises rapidly at the first as x increases and then begins to increase at a decreasing rate. The slope of this curve, that is not constant as in the linear probability model, gives the change in probability given a unit change in *x* (Hill R.C., Griffiths W.E., Judge G.J., 2001). The Probit function is used as a functional relationship to represent this curve. The probit function is related to the standard normal probability distribution. If Z is a standard normal random variable then its probability density function is

(1) $$f(z) = \frac{1}{\sqrt{2\pi}} e^{-0.5z^2}$$

One specification of this function is the probit model that represents the choice probability P_i

(2) $$F(z) = P\left[Z \leq_i z\right] = \int_{-\infty}^{z} \frac{1}{\sqrt{2\pi}} e^{-0.5z^2} dz$$

The expression (2) is the probability that a standard normal random variable falls to the left point of *z*, the area under the standard normal density function to the left of *z*.

The hypothesized equation is:

(3) P(Yi) = *f*(Gender, Education, Mother and father's origin, Residence, Farm structural factors, Farm income, Child Information, Child Cultural Interests).

2.3.1 Results: 100 farm families have been interviewed and in each, one the description of factors has been reported. It generates a total of 225 numbers of observations. All the

variables have been considered together and the probit model was run[1]. Table 1 shows the variables specification, how the variables employed in the econometric analysis were coded. The results from the estimate of a binary Probit model are reported in the Table 2. A likelihood test of the hypothesis that all the coefficients are 0 was done on a chi-square value of 269,561 and the hypothesis that all coefficients being 0 may be rejected.

TABLE 1:Definition and Coding of the Variables

Variable	**Definition and coding[1]**
Csex	1 if female; 0 otherwise
Cprimarynone	1 if child has a primary school, 0 otherwise
Fundergraduate	1 if farmer has an undergraduate degree; 0 otherwise
Psecondary	1 if farmer's partner has a secondary school; 0 otherwise
Pfulltime	1 if farmer's partner works full-time in the farm; 0 otherwise
Kindwork	1 if the farm is considered full-time; 0 otherwise
Ahouse	1 if there is an house available for the child; 0 otherwise
Mainactivity	1 if the main activity is cultivation; 0 otherwise
Rent	if part of the hectares utilised are rent
Income1-2	1 if the farmer declares this level of income; 0 otherwise
Cnewspaper	number of newspapers child reads per week
Cinema	number of times the child attends theatre per month

The variable Gender is significant and has a negative sign. Being woman is negatively associated with the propensity to continue the family farm, and it is significant at a confidence level of 99%.

Individual schooling level shows statistical significant influence on the decision of leaving the sector. The variable “Cprimary-none” is significant and as expected on the basis of other studies has a positive sign. This result means that at this level of schooling (primary) it is likely that the child will not leave the sector. At this level of education the cost of migration from the agriculture is high because it is low the opportunity to find another occupation. The reservation salary is lower than the one for well-educated children.

As discussed, parent’s education is likely to decrease the cost of employment attainment in destination labour markets by providing the young adult with better information (Mills and Hazarika (2000). It is also true that a farm conducted by well-educated parents is likely to be more efficient and then it is likely that a child could remain, in fact the sign of both these estimated parameters (F.undergraduate and P.Secondary) is positively associated with the propensity to continue the farm. From the variables considered associated to the farm’s work structure, it can be seen that the variable farmer’s partner working full-time in the farm is negatively associated with the propensity of child to remain in the family’s farm. The fact that the farmer’s partner is working full- time in the farm could mean that the farm is the only source of income for the family and it could not be enough to guarantee an income also to the child. Additionally, the result obtained by the estimated coefficient “kind of work” that indicates if a farm is *full-time or part-time* showed that the full-time farms are more likely to be continued by the child. If a farm is structured as part-time, the child does not consider the farm as an activity able to guarantee an income for his family.

The *“availability of the house”*, significant at a confidence level of 99%, is positively associated with the probability for the generational turnover. Even if the viability improved a

lot, this result suggests that this variable affects the choice of the child to work in the same place of residence. It can be interpreted mainly in two ways: Firstly, it may be related to the fact that leaving the farm job could determine the necessity to move to the urban area because of the distance and the low quality of the connections. In the urban area, the cost of the houses is likely to be higher and even if the earning is higher than the earning in agriculture, the cost of living is much higher as well (Gisser and Davila, 1998).

Secondly, the residence location could determine the child choice also in another way: the presence of his residence in the farm could make the child feeling in charge of the farm and naturally involved in its activity.

TABLE 2:Binary Probit Model Results

Variable	Coefficient	Standard Error	t-statistic
Constant	1,47122	1,04244	1,41132
Csex	-1,19874***	0,32154	-3,72813
Primarynone	0,64082**	0,32608	1,96521
Fundergraduate	2,71404**	1,25427	2,16383
Psecondary	0,79976*	0,47416	1,68668
Pfulltime	-0,65616*	0,3658	-1,79377
Kindwork	0,8046*	0,44589	1,80449
Ahouse	1,48309***	0,34233	4,33236
Mainactivity	1,01186*	0,5935	1,70491
Rent	0,1716*	0,09935	1,72733
Income1-2	-0,76171*	0,45437	-1,6764
Cnewspaper	-0,39323***	0,14331	-2,74396
Cinema	-0,13079***	0,03884	-3,36739
Summary Statistics			
Sample Size	225		
Chi square	269,561		
Degree of freedom	212		

***Statistically significant at the 1-percent level

**Statistically significant at the 5-percent level

*Statistically significant at the 10-percent level

The variable *"Main activity"* suggests that in the farm where the earnings come from cultivation are more likely to have generational turnover. This result was expected because of the marginality of the importance of the breeding in the area where the study was conducted.

From the variable *"Rent"*, it can be seen that as the superficies of the lands rented increase the probability of turnover increases as well. This result could be related to the fact that the farms that can afford to pay a rent are more remunerative and professional, it utilises more than the superficies owned.

The importance of the economic aspects in the intergenerational transfer is confirmed: the result of the variable Income for the first two levels is significant and negative; it means that at the lowest level of income the child are likely to leave the sector.

The variable *"Child Newspaper"*, significant at the 99% confidence level is negatively related to the propensity to stay in the sector. This result could be supported by the fact that a well-informed person (child) considers more job alternatives and is more likely to find another job.

Finally, another finding interesting to consider is the interest of children for the cinema, significant at 99% confidence level. The negative sign suggested that a child interested in this kind of entertainment is more likely to migrate to urban area where there are services that are less likely to be found in the rural areas. It could be related to a different life style that it is easy to conduct in the urban area.

Looking at the Matrices of parameter estimates (Appendix A), we can gain some more insight. The child with primary school are positively correlated with the number of newspaper read and negatively correlated with the female. It could explain the situation in which the children with low level of schooling are likely to be well informed in a way to increase the probability to find a job outside even with low education. The negative correlation between primary education and female could mean that females are likely to study more than males, in order to find other occupation outside. This confirms also the result that female children are more likely to leave the sector. The full-time work is negatively correlated with the presence of child female: it could be because of the low expectation of succession in the farm, the part-time is a way out of agriculture. The availability of the house is correlated with the full-time work and the farmer is aware that to maintain the child in the farm has to provide an accommodation there. Partner full-time is correlated with the presence of female children and negatively correlated with cultivation and with the availability of the house for the children. It could support the thesis that the presence of the partner working full-time is related with the low probability that the child will continue. The fact that the presence of rent means that the farm activity is remunerative could be seen by this result: it is likely to diminish in the case there are female children and in the part-time farms and it is positively correlated with the farmer well educated.

3 DISCUSSION AND POLICY IMPLICATIONS

In the last years, there have been technological progress that leads to a rise in the marginal physical product of farm labour and the mismatch between supply and demand caused food prices to fall, lowering the value of the marginal product of farm labour. Technical efficiency and productivity growth, coupled to an inelastic demand that increases very slowly over time and to the open trade with more competitive countries with lower labour costs, are contributing to decreasing the prices of the agricultural products and then the farm income. In this scenario, the agricultural sector has always more a marginal role and one of the consequences seems to be the difficulty to recover the process of turnover in agriculture that in the past was naturally from father to son. The findings of our study lend strong support for the selectivity hypothesis. The generational turnover seems related to the capacity of the farm to remain in the market. Our study showed that the low income is negatively associated with the propensity of the child to stay in the family farm. It means that only the more competitive farms are likely to have a generational turnover. This could be also confirmed by other findings: it is more likely to see a turnover when well-educated parents conduct the farm; the increase in superficies of lands rented is positively associated with the propensity to stay in the sector. Both factors play in favour of a professional farm: Well-educated parents are working in the farm because they can get higher earning than outside; the presence of rented lands confirmed the productivity of the activities: the result of a study

conducted by Cnel (2004) in Italy was that land rented is conducted in a way to be more productive.

Another finding is about the Part-time work that seems to be a “way out of agriculture”. This is in line with the results from the study of Stigbauer and Weiss (2000) that have demonstrated that if the married couple works part-time in the farm the probability of family succession decreases. A result that came up from our research was that when the farmer’s partner works full-time the probability of transfer to the child decreases. This finding could be explained by the fact that when the farmer's partner works full-time it is because the farmer cannot afford to pay other employers.

The migration from the sector of young can be related to economical factors or also to the preferences of young. Our study demonstrates that the child likely to leave the sector is a person well educated, well informed, with cultural interests. Both the high level of education and the information (measured in newspaper read) can facilitate them to find a job. It is true that the well-educated young are likely to go away, but the decision to study could be also related to a choice made because of the low revenue of the farm, they did not consider it as their future work.

The choice of staying in agriculture is made since the young have to decide what to do of his future. It is a result of an involvement in the farm activity. The availability of the house could be part of this process. The availability of a residence was incorporated into the model of migration to accept the appeal of Dillman (1979) and it has been demonstrated that it has an influence in the migration decisions. The policy existing to encourage the intergenerational succession arrives in the moment of the transfer, when the career of the child is already decided, without considering that the transfer process is a gradual process. The policy to be effective could act in a way that a child can consider it when he starts planning is future. Therefore, it seems associated with the need to improve the competitiveness of the farms.

On the other hands, our results showed also the existence of a positively selective process of migration to the urban sector, defined the “brain drain” on the farm labour force (Davila and Gisser (1998)). The study of Broomhall and Johnson (1994) demonstrated that students who are less willing to move from rural area will have less positive attitude toward education and will perform more poorly in the school. This is confirmed by our study but only in part. In fact, it is demonstrated that children with low education are likely to remain in agriculture but from the analysis of the variable *“mark attained in the school”* the result was that children with high mark are willing to stay[iv]. The performance in the school does not seem to be associated with the level of school attained. This result could suggest that the child stop his education because of his plan to work in agriculture and not because of his skills. The school, considered the most important characteristic of human capital, seems not to be considered important by the people working in agriculture. The return of schooling are higher for non agricultural sector (Orazem and Mattila,1991), but result from a previous study has showed that young people in agriculture have a higher degree of professionalism especially in the case where there are high level of schooling (Simeone and Spigola 2004).

As far, our results would support the hypothesis that a direct economic incentive, measure adopted in the recent normative, will not affect the generational turnover that is a result of a process that starts long time before the moment of taking over the farm from the father. It seems to be a result of many factors, also linked to the general condition characterising the rural areas and to the structural condition of the farm to inherit. The children who have attended a high level of education will look for alternative job outside the farm. Stiglbauer and Weiss that in their study have shown the negative relation between the farmer operator’s age and the probability of family succession confirm this also: the result demonstrated that it is difficult to find a successor when the children already started looking for alternative employment in the non-farm economy.

From the findings of this research, a policy to support the sector has to be integrated. To encourage people to stay in agriculture it is important to improve the competitiveness of the sector also improving the general condition of the rural area. The policy for the generational turnover is an economic support, but it arrives only in the moment of the transfer, when the child's decision is already taken.

Appendix A: Matrices of Parameter Estimates

	Ccinema	Cnewspap	Csex	Primaryn	Kindwork	Ahouse
Ccinema	,00151	-,00860	,09178	-,02418	-,06338	-,03745
Cnewspap	-,00005	,02054	,03657	,26463	,06507	-,07533
Csex	,00115	,00169	,10339	-,31233	-,10850	-,01931
Primaryn	-,00031	,01237	-,03275	,10633	,04473	,12627
Kindwork	-,00110	,00416	-,01556	,00650	,19882	,20487
Ahouse	-,00050	-,00370	-,00213	,01410	,03127	,11719
Mainacti	,00015	,00130	-,00583	,02146	,03275	,07639
Pfulltim	,00207	-,00215	,02198	-,00946	-,02053	-,02525
Fundergr	-,01026	-,07162	-,03660	,03107	-,02402	,06059
Rent	-,00038	-,00283	-,00453	,00221	-,00696	-,00124
Income12	,00643	,01070	,03422	-,00738	,00046	,04991
Pseconda	-,00507	-,03156	-,01471	-,01288	-,00972	-,00512

	Mainacti	Pfulltim	Fundergr	Rent	Income12	Pseconda
Ccinema	,00638	,14565	-,21070	-,09719	,36462	-,27550
Cnewspap	,01524	-,04099	-,39842	-,19912	,16432	-,46446
Csex	-,03053	,18683	-,09075	-,14166	,23424	-,09645
Primaryn	,11091	-,07931	,07595	,06830	-,04981	-,08327
Kindwork	,12376	-,12588	-,04294	-,15714	,00226	-,04597
Ahouse	,37599	-,20164	,14112	-,03646	,32086	-,03154
Mainacti	,35224	-,05256	,01879	,27584	,26508	-,07880
Pfulltim	-,01141	,13381	,01049	,14885	,19715	,15470
Fundergr	,01399	,00481	1,57320	,17270	-,15962	,21731
Rent	,01626	,00541	,02152	,00987	,02075	,07877
Income12	,07148	,03277	-,09097	,00094	,20646	-,22237

NOTES

[ii] In particular, the three provinces of Latina, Frosinone and Naples have been considered and within each one, two of the municipal districts have been selected: for Latina has been chosen Formia and Fondi, for Frosinone the two districts of Cassino and Pignataro, and finally for Naples have been chosen Afragola and Cardito.

[iii] The opportunity of combining cluster sampling with stratified sampling was not possible because of the difficulty to have a list of farmers including the characteristic relevant to the study.

[iv] Considering the performance in the school, 77,2% of the children with an high mark are continuing the farm *(*Chi-square test, *p value 0,00<0,01);* only the 17,5% of the children with medium mark is represented by the children who are continuing the farm *(*Chi-square test, *p value 0,00<0,01)* and among the children with low mark only the 5,3% are continuing the farm.

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