Should One Trust a Farmer's Succession Plan?

Empirical Evidence on the Intention-Behaviour Discrepancy from Finland

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SHOULD ONE TRUST A FARMER'S SUCCESSION PLAN? EMPIRICAL EVIDENCE ON THE INTENTION-BEHAVIOUR DISCREPANCY FROM FINLAND

Abstract

This study examines and compares farmers' succession plans and actual succession behaviour and finds that the farm operator's age and regional variables influence both. We also find a discrepancy between intention and actual behaviour which is significantly related to the farm operator's age. Whereas the likelihood of planned succession is overestimated significantly for younger farm operators, the opposite is observed once the farm operator's age exceeds 65 years. Therefore, stated plans have only a negligible value in predicting the observed behaviour and farm operator's statements on the timing of succession may not provide enough information on the grounds of designing structural policies in agriculture.

1. Introduction

The circumstances of succession are of great importance not only for the family members directly involved but also for the survival and success of family farms in the long run, the appearance of rural areas, and the structure of the farm sector (Gale, 1993). Given the importance of (family) succession for family firm survival (*e.g.* Kimhi, 1997), surprisingly little theoretical and empirical work has been devoted to this issue in agricultural economics. The existing literature is dominated by social scientists and anthropologists (Khera, 1973; Errington, 1993; Blanc and Perrier-Cornet, 1993). Only during the last decade, agricultural economists have started to investigate family succession more intensively (Kimhi, 1994).

Two different empirical approaches can be distinguished in this literature. The first group of studies analyses (actual) succession *ex-post* by investigating panel data on farm households. Information on the farm operator's age in different time periods is used to identify farm successions. If the age of the farm operator between period t and $t + x$ increases by less than x years (or more than x years), one concludes that the person operating the farm has changed. This approach has been used successfully in Kimhi (1994) and Stiglbauer and Weiss (2000).[1] The second and more common approach is to investigate future succession plans of farm operators *ex-ante* on the basis of a farm survey. The respondents are asked about the probability and timing of family succession and whether a farm successor is already determined. Examples of studies following this approach include Kimhi and Lopez (1999), Kimhi and Nachlieli (2001), Glauben et al. (2004) and Mishra *et al.* (2004). Sharma et al., (2003) investigate succession in family firms empirically by collecting data on both, firms that had undergone succession from one family member to another in the five years prior to the survey as well as those, that anticipate such an event in the ensuing five years.

Clearly, each of the two approaches has its specific advantages and disadvantages. Farm surveys typically provide more detailed information on the motives of specific behaviour as the design of the survey and the questions to be asked can be particularly focused on the issue to be analysed. Similarly, surveys typically allow choosing the group of individuals to be surveyed directly and to control

the impact of exogenous factors. On the other hand, authors from different fields of economics (and, in particular, from economic psychology and marketing) have challenged the usefulness of intention measures (such as succession plans) as a predictor for actual behaviour.[2] Foxall (1983), for example, argues that a high intention-behaviour correspondence should be expected only under strictly limited (and unrealistic) conditions.[3]

A discrepancy between intention and actual behaviour might exist for a number of reasons. First, individual preferences might change over time because both the economic environment and the family situation have changed (Ajzen, 1985). New information becomes available, the financial situation of the farm changes, the potential successor receives an attractive job offer in the non-farm business, and so forth.

Secondly, the survey design, as well as the quality of the responses, is often inappropriate. In some of the surveys used, information on succession plans is only a by-product of questionnaires focusing on different issues. Furthermore, individuals certainly spend a lot of time and effort in making the right succession decisions but may only devote little time responding to a survey. This point is emphasised in the revealed preference literature: people display their true preferences in what they do, not what they say. Individuals might also feel obliged to answer the question about intentions even though they have not yet made specific plans (Bagozzi and Yi, 1989). Ill-formed intentions are held with low confidence, will change quickly over time and will only have a weak impact on behaviour.

Thirdly, actual succession decisions in family firms involve actions of different family members (Kimhi, 1997), whereas surveys typically are addressed to one individual only. Surveys often consider the farm operator's point of view without paying enough attention to the children's opinion. The farm operator's plans, however, do not always materialise as the designated successor may decide to develop a career in the non-farm business, for example.

A final reason for an intention – behaviour discrepancy is intertemporal inconsistency in individuals' preferences and behaviour. According to Horowitz (1992), 'intertemporal consistency' means that the activity an individual now plans to carry out in the future are the activities that the individual actually carries out when the future arrives' (p. 171). The phenomenon of intertemporal consistency (or inconsistency) was introduced as a characteristic of the utility function by Strotz (1956) and, since then, repeatedly arises in models of marketing and consumption behaviour and of monetary or fiscal policy. Empirical evidence from experimental studies suggests that individuals do not act in a consistent way.

Such discrepancies between intention and actual behaviour are of concern to economists for two reasons. First, if these differences appear in a non-systematic (random) fashion, the predictive validity (reliability) of intention measures is reduced due to a random measurement error. Secondly, and maybe more importantly, if the probability of the farm operator's succession plans to come true are related to farm and family characteristics (such as farm size, the farm operator's age, etc.), the results of econometric studies based on farm surveys would be biased. As the farm operator's age increases, new information about his health status emerges which could motivate him to revise his original plans. Similar, the potential farm successor might be less interested in taking over smaller and less profitable farms, which would suggest a systematic relationship between farm size and the intention–behaviour discrepancy. Furthermore, economic psychologists frequently hypothesise that an individual's discount rate is not constant over time but varies inversely with the length of the time to be waited. The relative marginal price of waiting for rewards appears to decline as the time necessary to wait increases. This would suggest farm operators' succession plans to be systematically biased.[4] It is further suggested, that the rate of discount might vary inversely with the size of the reward for which the individual must wait (people getting the big decisions right). Again, this would imply that the actions of individuals are not consistent over time and succession plans and actual behaviour are at variance.

The goal of this study is to investigate succession considerations empirically by focusing on both actual succession behaviour and subjective succession plans. We also compare intentions and behaviour, and investigate whether the difference between them is systematically related to farm and family characteristics.[5] If this discrepancy is large and non-random, then the value of farm succession

surveys for agricultural policy-making is diminished. Section 2 briefly describes the data and the estimation method. Section 3 reports the estimation results and section 4 concludes.

2. Data and Estimation Method

The farm data are taken from the Finnish Farm Accountancy Data Network (FADN). This network collects annually information on financial characteristics on roughly 900 farms. Accountancy data are supplemented by annual surveys on farm operator's (*ex-ante*) succession plans, which are carried out on the FADN farms since 1996. Among other things, the questionnaire includes information on farmers' plans for the following five years. The question posed here is: 'If you are not going to continue farming on the farm by yourself, what is going to happen?' One of the nine response options is: 'the farm will be handed down within the farm family'. We define a dummy variable for planned succession (*PS*), which is set equal to 1 if this option is chosen by the respondent, and is zero otherwise.

We also confront the attitudes and intentions of individuals with the record of their subsequent behaviour. Information on actual succession (*AS*) is obtained *ex-post* by applying an approach similar to Kimhi (1994) and Stiglbauer and Weiss (2000). If the age of the farm operator in two succeeding years increases by less (or more) than one year, we conclude that the person operating the farm has changed. In this case, we set the dummy variable *AS* equal to 1.

A balanced panel of 348 farms is available for the period of 1996-2001.[6] The farm data include detailed information on the farm characteristics and the financial situation of the farm. Since the primary objective of the supplementing survey was not to study succession, little information on variables that are considered important for investigating this issue econometrically is available. In particular, no information on children and other family members living on the farm is to hand. Furthermore, information on the specific motivation of farm operators with respect to succession is not accessible. The planned and actual succession behaviour of the 348 farms is reported in Table 1.

Table 1. Actual and planned succession behaviour between 1996 and 2001.

		Actual Succession (*AS*)		
		0	1	Total
Planned	0	279	11	290
Succession (*PS*)	1	40	18	58
	Total	319	29	348

Remarks: An χ^2-test rejects the assumption of independence of the two variables at the 99% level. Planned succession refers to the plans reported in 1996 for the period 1996 to 2001.

From the 348 farm households interviewed in 1996, the majority (290 or 83%) did not plan to transfer the farm within the following five years. Fifty-eight respondents (17%) indicated the intention to hand over the farm to a successor. As Table 1 suggests, not all of these succession plans did actually materialise. Looking at actual farm succession, we find that only a third of those farms that planned succession did hand over the farm to a successor within the following five years (18 out of 58 farms). In the majority of cases (40 farms) the planned succession did not take place. We call this a 'type two-error' of succession planning. On the other hand, from those 290 farms planning not to hand over the farm in the following five years, the majority (279 farms or 96%) actually comply with this plan. Unplanned succession took place in 11 farms. These 11 cases are considered 'type one errors' of succession planning.

The econometric analysis of succession plans and actual succession behaviour will be carried out in two steps. First, we estimate probit models on the binary variables *AS* and *PS* and compare results. Secondly, we define a new variable measuring the intention–behaviour discrepancy (*DS*) and test, whether the likelihood of a discrepancy to occur is related to specific characteristics of the farm and the farm household.

$$DS_i = \begin{cases} 0 & if \ PS_i - AS_i = 0 \\ 1 & if \ PS_i - AS_i = -1 \quad ('type-one\ error') \\ 2 & if \ PS_i - AS_i = 1 \quad \ \ \ ('type-two\ error') \end{cases}$$

The choice of exogenous variables is determined by earlier literature and data availability.

3. Results

First, single equation probit models were estimated separately for planned and actual succession. Parameter estimates are shown in Table 2. The estimated models are statistically significant at the 1% level or better, as measured by the likelihood ratio test.

Table 2. Parameter estimates of the single equation probit models (t-values in parentheses).

Explanatory variable	Planned Succession PS		Actual Succession AS	
	Coefficient	t-value	Coefficient	t-value
Constant	-5.624	(-7.66)	3.418	(1.16)
Farmer's age (*AGEF*)	0.998	(6.99)	-0.399	(-2.94)
Farmer's age squared (*AGEF*^{2})			0.005	(3.75)
Spouse's age (*AGES*)	0.001	(0.04)	0.009	(0.88)
Arable land area (*LAND*)	-0.002	(-0.57)	0.007	(1.16)
Farm Income (*INC*)	0.057	(0.86)	0.029	(0.32)
Livestock and dairy farm (*LDF*)	0.254	(0.91)	0.869	(1.83)
North (*NORTH*)	-0.147	(-0.70)	0.695	(2.16)
Debt to Asset Ratio (*DAR*)	0.257	(0.85)	-0.180	(-0.33)
Farm family's 'working hours (*HOURS*)	-0.067	(-0.91)	-0.012	(-1.07)
Log-likelihood	-114.245		-51.611	
Restricted log-likelihood	-156.780		-99.818	
Likelihood ratio test (DF)	85.099 (8)		96.416 (9)	
% Correct predictions	84.19		95.11	
% Correct predictions 1 (0)	24.14 (96.20)		51.72 (99.05)	

Remarks: DF refers to the degrees of freedom.

The estimated probit model on succession plans correctly classifies 84.2% of the cases. Whereas 96.2% of farms which do not plan succession ($PS = 0$) are correctly predicted, the percentage of correctly classified observations where the farm operator plans to hand over the farm ($PS = 1$) is substantially lower with 24.1%. The predictive power of the probit model on actual successions is somewhat higher. The empirical model correctly classifies 95.1% of all observation, 99.1% of farms with no succession ($AS = 0$) and 51.7% of farms with succession ($AS = 1$) are correctly classified.

The results in Table 2 suggest that the farm operator's age ($AGEF$) is the most important explanatory variable in both models. The probability of planned and actual succession within the following five years is significantly influenced by the age of the farm operator. As the farm operator's age increases, the probability of actual successions increases exponentially. Whereas the probability of succession for a hypothetical farm operator[7] is small (below 0.1) at ages below 55, the probability is close to 1 once the farm operator's age exceeds 70. Between 55 and 70, the succession probability on average increases by 5.6 percentage points with every additional year. The probability of planned succession increases with age as children become older and more suitable for succession and parents become more prepared to make succession decisions. We did not find a negative age-succession relationship at higher ages as suggested by earlier studies on succession for different countries (*e.g.* Kimhi and Bollman, 1999; Stiglbauer and Weiss, 2000; Kimhi and Nachliaeli, 2001). The spouse's age ($AGES$) is not found to have a significant impact on succession considerations.

We also observe that farms located in the northern parts of Finland ($NORTH = 1$) report a significantly higher probability of handing over the farm, which corresponds to earlier findings of Pietola *et al.* (2003). However, when looking at planned farm transfers, no such difference between northern and southern regions is observed.

Farm characteristics are expected to influence both, succession plans and actual behaviour because they affect the value of the farm for the potential successor. Previous studies found succession to be more likely in larger farms (Gasson *et al.*, 1988; Stiglbauer and Weiss, 2000; Kimhi and Nachlieli, 2001; Glauben *et al.*, 2004; Hennessy, 2002). In contrast to our expectations, hardly any of the farm and financial characteristics were found to influence significantly actual or planned succession[8]. This is particularly surprising, since our data base has relatively detailed information on the financial situation of the farm. Farm income ($FINC$), debt and farm property[9], farm size (measured in hectares under cultivation ($FIELD$)) as well as various dummy variables characterising the production structure of farms were all found to have no significant explanatory power. The only exception being the positive impact of the dummy variable LDF for production line, which is significantly different from zero at the 10%-level in the probit model on actual succession. The probability of actual succession is higher in livestock and dairy farms ($LDF = 1$). This lack of explanatory power of financial variables might be related to their high variability over time. More appropriate measures of the financial performance of farms could be obtained by using an average of farm income, for example, over a five year period prior to the period of investigation (1991 to 1996). This data unfortunately is not available here.

Differences between planned and actual successions can be investigated in more detail by empirically analysing the variable DS. This allows us to see whether the likelihood of succession plans not to materialise is significantly related to specific characteristics of the farm and the farm family. Table 3 reports results from a multinomial logit model estimated on DS.

Table 3. Results from the multinomial-logit model on the intention–behaviour discrepancy.

Explanatory variable	'type-one error' DS = 1 (AS > PS)		'type-two error' DS = 2 (PS > AS)	
	Coefficient	t-value	Coefficient	t-value
Constant	2.993	(0.51)	-18.699	(-2.58)
Farmer's age (AGEF)	-0.473	(-1.86)	0.596	(2.03)
Farmer's age squared (AGEF^2)	0.007	(2.55)	-0.005	(-1.57)
Spouse's age (AGES)	-0.018	(-0.92)	-0.013	(-0.97)
Arable land area (LAND)	0.002	(0.21)	-0.009	(-1.16)
Farm Income (INC)	-0.005	(-0.02)	0.059	(0.44)
Livestock and dairy farm (LDF)	0.061	(0.54)	0.062	(0.12)
North (NORTH)	-0.226	(-0.27)	-0.848	(-2.02)
Debt to Asset Ratio (DAR)	-0.241	(-0.16)	0.589	(1.03)
Farm family's 'working hours (HOURS)	0.013	(0.50)	-0.001	(-0.03)
Log-likelihood	-132.378			
Restricted log-likelihood	-171.596			
Likelihood ratio test (DF)	78.436 (18)			
% Correct predictions	85.6			
% Correct predictions 0, (1), [2]	98.6, (36.4), [2.5]			

Remarks: DF refers to the degrees of freedom. Outcome DS = 0 is the comparison group.

The predictive power of this model is low. Only one of those 40 farm households which planned succession but then did not hand over the farm was correctly classified by the model. From the 11 households, where succession took place although it was not planned, only four are correctly classified. This low predictive power most likely has to do with the fact that unplanned behaviour is often caused by unexpected and accidental events, which are unforeseen and neglected in the individual farmer's decision making and are even more difficult to take into account for an outside observer. In any case, the main interest of this analysis is not the predictive power of the empirical model. Rather, we are concerned with the existence of a significant relationship between the intention–behaviour discrepancy (DS) and farm and family characteristics.

Table 3 suggests that the intention-behaviour discrepancy is significantly related to the farm operator's age. On the basis of the parameter estimates reported, Figure 1 illustrates this relationship for a hypothetical farm operator.
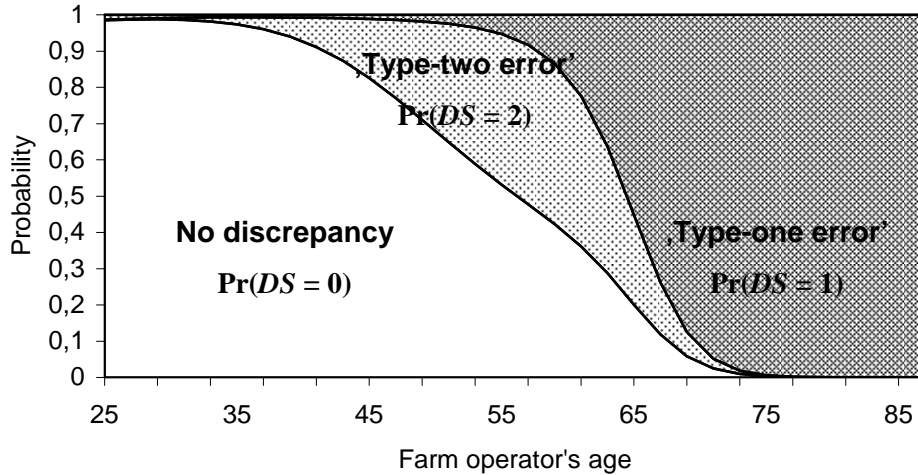
Figure 1. The intention-behaviour discrepancy over the farm operator's life cycle.

Remarks: The probability of a specific event j (with $j = 0, 1, 2$) is computed as

$$\Pr(DS = j) = P_j = e^{} \left/ (1 + \sum_{j=1}^{J} e^{}) \right.$$ with $Z_j = \hat{\beta}_j X$, where X is the matrix of explanatory variables and $\hat{\beta}_j$ is the vector of parameter estimates reported in Table 3.

The 'type-two error' first increases with the farm operator's age, reaches its maximum at age 59 and then decreases again. For a hypothetical farm operator aged 59, the calculated probability of planned succession is about 20 percentage points larger than the calculated probability of actual succession.[10] The extent of 'type-two errors' decreases and 'type-one errors' substantially gain importance as the farm operator's age further increases. The older the farm operator gets, the more likely an unplanned succession will take place and succession plans reported in farm surveys will significantly underestimate actual succession probabilities.

A more detailed evaluation of the reasons for this discrepancy is beyond the scope of this paper. Horowitz's definition of intertemporal consistency with respect to preferences (see section 1) requires that exogenous shocks (changes in the economic environment that could lead individuals to revise their plans between 'now' and 'in the future') do not occur or are adequately controlled. This certainly is a problem in the current setting. In particular, the farm survey does not provide detailed information on the health status of the farm operator nor the employment opportunities of the potential farm successor, etc. But even if this information were to have been collected in a survey, its reliability as a predictor for future behaviour could be called into question in the same way as the farm operator's succession plans. These variables might change between the time of the survey and the time of the planned succession. From the results reported, it seems plausible that unforeseen events, that are important for actual succession decisions (such as health problems of the farm operator, for example), occur more frequently as the farm operator's age increases.

Again, the regional dummy variable (NORTH) is significant in the second column. In the northern parts of Finland, a 'type-two error' is less likely. If there is a succession plan, it will be carried out. In the southern parts, the family members involved in succession seem to change their minds more often. Whether this effect is due to the stronger impact of non-farm factors, that might be more difficult to predict for a farmer, remains an open question though. Besides the higher opportunity cost of farming, uncertainty over agricultural income policy programs might be higher in the South than in the North (Niemi and Ahlstedt, 2004).

The parameter estimates of all other explanatory variables introduced (financial characteristics of farms) are not statistically significant.[11]

4. Conclusions

This study investigates and compares farmers' succession plans as well as their actual succession behaviour. The data set taken from the Finnish Farm Accountancy Data Network is supplemented with results from annual farm surveys for 348 farms. A first comparison of succession plans and actual behaviour indicates that farm operator's plans are realised in 85% of the cases. In 11% of the observations, planned successions did not take place whereas 3% of the farm households report unplanned successions. The econometric analysis indicates that both, planned and actual successions are significantly related to the farm operator's age and to regional variables. Further, we find that the intention-behaviour discrepancy is not purely accidental but is significantly related to the farm operator's age. Neither succession plans nor actual behaviour is significantly influenced by the financial situation of the farm.

For researchers aiming at empirically investigating planned succession behaviour, our results offer both, good news and bad news. The good news is that the above mentioned results do not suggest that the realisation of farm operator's succession plans is significantly biased by farm characteristics. In fact, the data set analysed here does not support any relationship between farm financial characteristics and succession behaviour, either planned or actual. The only variable being a good predictor of succession is the farm operator's age. And this is the bad news: for this variable, we find that results from farm surveys on planned succession behaviour seem to be unvaluable. Whereas the likelihood of planned succession is overestimated significantly at younger ages, the opposite is observed once the farm operator's age exceeds 65 years.

Unfortunately, the specific reason for this discrepancy (new information, time inconsistent preferences, …) cannot be identified on the basis of the available information and is open for further research. The present contribution suggests that the relationship between the farm operator's age and his succession plans estimated on the basis of farm surveys may be misleading. Therefore, stated plans have only a negligible value in predicting the observed behaviour. A farm operator's statements on the timing of succession may not provide enough information on the grounds of designing structural policies in agriculture.

Notes

1   Pietola, Väre and Oude Lansink (2003) follow a different empirical approach. Using data from the Farmers' Social Insurance Institution has allowed them to study actual succession on the basis of more reliable information.

2   Mueller (1957), Tobin (1959) and Theil and Kosobud (1968) are early examples of empirical studies on the relationship between plans and actual behaviour. In agricultural economics too, there is some empirical evidence that the difference between planned and realised investments can be large (Honkanen, 1983; Kuhmonen, 1995). Focusing on farm succession, Glauben *et al.* (2002) suggest an inconsistency in farm operator's succession plans over time. However, their results are based on cross-sectional data only and thus cannot account for actual behaviour.

3   The author notes that there must be no impediment to the voluntary performance of the action and that the individual's situation must remain stable from the time of the measurement throughout the performance of the behaviour. This *ceteris-paribus* condition will also be relevant in interpreting the results from our empirical analysis.

4   Thaler and Shefrin (1981) illustrate time inconsistency with a customer, who plans to go on diet on January 1, but when January 1 arrives, postpones the beginning of the diet. It is often suggested that the difference between today and tomorrow will seem greater than the difference between a year from now and a year plus one day.

5   It is not the intention of this study to empirically test the different explanations for an intention–behaviour discrepancy (should one exist) based on family's commitment or desires like *e.g.* in Sharma *et al.,* (2003). This would go far beyond the scope of this paper and could not be done without additional experimental evidence.

6   The FADN data include 511 farms on which survey data on farm succession is available both in 1996 and in 1997. Of these farms, 366 continued farm profitability accountancy to the year 2001 whereas 145 disappeared from the data set between 1998 and 2001. Those 145 farms do not differ substantially from those remaining in the farm profitability accountancy over the whole study period 1996-2001 (see Appendix 1). Unfortunately, we do not have more specific information on the reasons for farms' exit from the FADN. We further eliminated 18 observations where the farm operator reports plans to sell or rent out the farm to a non-family member, reforest the fields or has some "other plans" for the following five years.

7   A hypothetical farm (operator) is characterised by taking mean and mode values for all explanatory variables.

8   The endogenous variables farm income *(INC)*, debt to asset ratio *(DAR)* and farm family's working hours *(HOURS)* were included in the analysis under the H_0 hypothesis but were not found to be statistically significant according to the t-test and do not thus cause any problem.

9   Table 2 reports results for the debt to equity ratio (*DAR*) but we also included variables separately.

10   This calculation is based upon the parameter estimates reported in Table 2.

11   Changes in farm characteristics between 1996 and 2001 also did not contribute significantly to the explanatory power of the model.

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Appendix 1.

Descriptive statistics of farms continuing farm accountancy system as well as exiting farms.

	Farms used for econometric analysis (number of farms is 348)			
	Mean	Std.Dev.	Min.	Max.
Farmer's age	43.4	9.21	19.0	68.0
Spouse's age	36.3	16.1	-	69.0
Arable land, ha	41.6	26.2	7.54	191.5
Forest, ha	79.4	74.5	0	656.0
Share of livestock and dairy farms (%)	70.9	-	0	1.00
Share of farms located in the North (%)	49.7	-	0	1.00
Total assets, €10,000	18.1	11.3	2.45	79.1
Farm depts., €10,000	6.16	6.63	0	35.8
Farm family's working hours, 100 h	36.7	17.12	2.62	81.4
Farm Income, €10,000	2.19	1.37	-3.09	10.1

	Continued in the FADN (number of farms is 366)			
	Mean	Std.Dev.	Min.	Max.
Farmer's age	43.8	9.48	19.0	84.0
Spouse's age	36.3	16.5	-	69.0
Arable land, ha	39.8	25.1	6.30	187.0
Forest, ha	78.7	73.5	0	656.0
Share of livestock and dairy farms (%)	71.0	-	0	1.00
Share of farms located in the North (%)	50.5	-	0	1.00
Total assets, €10,000	17.8	11.2	2.40	79.1
Farm depts., €10,000	5.90	6.60	0	35.8
Farm family's working hours, 100 h	36.3	17.0	2.62	81.4
Farm Income, €10,000	2.09	1.38	-3.09	10.9

	Exited from the FADN (number of farms is 145)			
	Mean	Std.Dev.	Min.	Max.
Farmer's age	43.5	10.5	25.0	68.0
Spouse's age	36.5	16.6	-	71.0
Arable land, ha	33.8	17.4	6.40	130.9
Forest, ha	81.7	102.5	1.42	1079.2
Share of livestock and dairy farms (%)	82.1	-	0	1.00
Share of farms located in the North (%)	64.1	-	0	1.00
Total assets, €10,000	16.3	8.60	2.93	51.6
Farm depts, €10,000	6.19	6.20	0	28.4
Farm family's working hours, 100 h	37.4	16.1	3.60	84.5
Farm Income, €10,000	2.10	2.25	-1.71	