Discrepancies between the Intentions and Behaviour of Farm Operators in the Contexts of Farm Growth, Decline, Continuation and Exit – Evidence from Estonia

Unterschiede zwischen den Absichten und dem tatsächlichen Verhalten der Betreiber von landwirtschaftlichen Betrieben im Falle von Wachstum oder Rückgang der Größe des Betriebes oder von einem Ausstieg aus der landwirtschaftlichen Produktion – der Fall Estland

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Abstract

A considerable body of research on farmers' behaviour is based on the surveys regarding their behavioural intentions. The theory of planned behaviour states that while the formation of intentions normally precedes behaviour, several factors affect the realisation of the intended behaviour. Therefore, the usefulness of ex-ante surveys for predicting farmers' behaviour requires more attention to reduce the potential biases in such analyses. The paper investigates how well the farmers' intentions correspond with the behaviour in cases of farm exits, continuation of farming and farm size changes in Estonia. Based on the farm survey in 2007, the follow-up survey in 2011, and paying agency's registry data, the ex-ante data on the intentions is combined with ex-post data on actual behaviour. A recursive bivariate probit regression is used to study the effects of selected socioeconomic characteristics on the probabilities of intended and realised behaviour, and the effects of stated intentions on actual behaviour. The results indicate that the usefulness of intentions in predicting actual behaviour differs, depending on the nature of the question in the farm life cycle context. Intentions are found to be a better predictor of actual behaviour when the considered event is regarded as positive (continuation of farming and farm growth) rather than negative (farm exit or farm shrinkage).

Key Words

intention-behaviour discrepancy; farm exits; farm growth; theory of planned behaviour; structural changes; Estonian agriculture

Zusammenfassung

Die Studie hat den Unterschied zwischen der Verhaltensabsicht und dem tatsächlichen Verhalten der Betreiber untersucht. Viele Studien über Betreiber der landwirtschaftlichen Betriebe basieren auf der Forschung des geplanten Verhaltens der Betreiber. Die Theorie des geplanten Verhaltens sagt, dass, obwohl die Absicht das Verhalten vorhersagt, gibt es mehrere Faktoren, die die Absichten und das tatsächliche Verhalten beeinflussen. Das Ziel des Artikels ist die Erforschung des Unterschieds zwischen den Absichten und dem tatsächlichen Verhalten der Betreiber im Falle eines Ausstiegs aus der landwirtschaftlichen Produktion und einer Änderung der Größe des landwirtschaftlichen Betriebes. Die Forschung basiert auf Studien über landwirtschaftliche Betriebe aus dem Jahr 2007 und 2011 und auf den Zahlen aus dem Register der Zahlungsstelle. Die Angaben über Absichten sind kombiniert mit den Daten zum tatsächlichen Verhalten der Betreiber. Das rekursive bivariate Probit-Modell wurde verwendet, um den Einfluss von ausgewählten sozioökonomischen Faktoren und Absichten auf das Verhalten zu erforschen. Die Ergebnisse zeigen, dass die Zweckmäßigkeit der Absichten bei der Prognose über dem tatsächlichen Verhalten differiert, abhängig von der Absicht, die erforscht wird. Die Absichten, aus der landwirtschaftlichen Produktion auszusteigen, waren nicht statistisch signifikant verbunden mit dem tatsächlichen Verhalten bei dem Ausstieg aus der landwirtschaftlichen Produktion. Die Absichten, die Größe des Betriebes zu verkleinern, waren nicht so nützlich im Vergleich, die Absichten die Produktion fortzusetzen und den Betrieb zu vergrößern bei der Erklärung des realen Verhaltens.

Schlüsselwörter

Unterschied zwischen der Verhaltensabsicht und dem tatsächlichen Verhalten; Theorie des geplanten Verhaltens; Ausstieg der landwirtschaftlichen Betriebe; Wachstum der Betriebe; estnische Landwirtschaft; strukturelle Änderungen

1 Introduction

The long-term trend of decreasing farm numbers and increasing average farm size has been well-observed in Western countries (GALE, 2003; CALUS et al., 2008; GEBREMEDHIN and CHRISTY, 1996; BREUSTEDT and GLAUBEN, 2007; LOBLEY and POTTER, 2004). This on-going change, characterised by a decline in farm transfers to successors and a decrease in the number of new farm entrants, implies significant changes for rural societies; therefore, it draws significant attention from both researchers and policy-makers.

In farm management literature, farm exits and growth are often associated with the concept of the farm life cycle, according to which a farm typically passes through entry, growth, maturity, and exit stages (BOEHLJE, 1973; POTTER and LOBLEY, 1992; AHITUV and KIMHI, 2002). Between the entry and exit stages farmers have to choose among the strategies of farm growth, status quo or gradual decline. For growth, farmers need to invest both financial and human capital, while success is determined by the availability of both. In the exit stage, the farm is either transferred to a successor or liquidated; farm operators who exit from agriculture either retire or seek off-farm employment.

The EU's Common Agricultural Policy (CAP) has a diverse set of measures to address the structural problems of the farming sector, e.g., an early retirement scheme promotes earlier exits with the aim of increasing the average size of the remaining farms. Payments for farms situated in less favoured areas (LFA) and semi-subsistence farms aim to increase livelihoods and thereby slow down exits from farms in disadvantaged areas or very small farms. Measures for young farmers and investment subsidies aim to accelerate farm growth.

After Estonia regained its independence in 1991, ownership, land and agricultural reforms were initiated in order to transform the socialist planned economy to a market-based system. The land reforms in post-communist Central and Eastern European Countries (CEEC) had two, sometimes conflicting, aims: 1) to establish historical justice via restitution of (or compensation for) land to pre-collectivisation landowners or their heirs; 2) to provide some level of social equity by allowing rural inhabitants to privatise land in the vicinity of their homes (SWINNEN, 1999). In addition to restitution and compensation, Estonian agricultural reform aimed to privatise the assets of collective farms (EMA, 2002). This lead to the development of a dualistic farm structure characterised by large agricultural enterprises (mainly those previous collective farms that remained relatively intact during the reforms), and an increasing number of small private farms in the 1990s.

From 1991-2001, the number of agricultural holdings increased markedly from 2,679 to 55,748 (SOE, 1995; SOE, 2013). There were several factors that encouraged the establishment of private farms: in 1989-1992, the government and collective farms subsidised inputs and services for new farms (ALANEN, 2004; OECD, 1996); the wish to return to a traditional (family farm) lifestyle, and an opportunity to work according to one's desire (KELAM, 1993). Therefore, new farmers had somewhat naïve expectations about the viability of small farms in the market economy (TAMM, 2001). From 2001-2010, the number of agricultural holdings decreased from 55,748 to 19,613 (SOE, 2013). Therefore, more than 50% of the Estonian farms established in the 1990s turned out unviable in the first decade of the 2000s.

In 2010, 43.8% of smallest Estonian agricultural holdings (standard output (SO) <2,000 Euros) accounted for 0.8% of the total SO, and managed 8.0% of agricultural land, while 1.1% of the largest agricultural holdings (SO ≥500,000 Euros) accounted for 51.6% of total SO, and used 27.5% of agricultural land (SOE, 2013). Therefore, a considerable decline in farm numbers and the dualistic farm structure makes the survival of small family farms and the growth of larger agricultural enterprises an acute and controversial topic in Estonian agricultural policy discussions.

In response to the structural changes and structural policies, there is a considerable body of research addressing the issues related to farm growth, exit and succession. The empirical data used in the analysis is one of the distinguishing features of these studies. The ex-ante approach is usually based on surveys in which farmers are asked about their subjective evaluations and opinions on the likelihood of future events (e.g. GLAUBEN et al., 2004; HENNESSY, 2002; KERBLER, 2012; VIIRA et al., 2009). In the ex-post approach, research is based on the data from agricultural censuses,

farm registers, etc., which document actual events and decisions taken by farmers (e.g. KIMHI, 1994; KIMHI, 2000; KIMHI and BOLLMAN, 1999; BREUSTEDT and GLAUBEN, 2007; FOLTZ, 2004; WEISS, 1999; STIGLBAUER and WEISS, 2000; CALUS et al., 2008; PIETOLA et al., 2003). The advantage of ex-ante farm surveys is that detailed and direct information can be obtained about the respondents' subjective evaluation of the situation, and motives for planned behaviour. However, several studies have questioned the usefulness of ex-ante surveys in the prediction of the future behaviour of farmers due to discrepancies between the stated intentions and actual behaviour (THOMSON and TANSEY, 1982; GLAUBEN et al., 2002; VÄRE et al., 2010; VÄRE, 2007; LEFEBVRE et al., 2013). VÄRE et al. (2010) studied the planned and actual succession in Finnish farms and found that in 63% of cases farm operators acted according to the stated intentions. THOMSON and TANSEY (1982) studied the intentions of dairy farmers regarding herd size and found that in 33-50% of cases farmers acted according to their stated intentions. LEFEBVRE et al. (2013) investigated farm investments in land and found that 74% of the farms behaved consistently with their intentions. This implies that the information from intention can be of dubious quality. VÄRE et al. (2010) argue that if the survey results cannot be consistently linked to the observed behaviour, then the surveys cannot be justified as an expensive means that attempt to provide information for predicting behaviour. Therefore, the integration of farm surveys that study intentions and the investigation of actual behaviour is important in improving our understanding about structural changes in agriculture, and to assess the usefulness of intentions stated in farm surveys for predicting actual behaviour (GLAUBEN et al., 2002).

We use data from two farm surveys and the registries of Estonian paying agency (ARIB) in order to investigate the correspondence between intended and actual behaviour. In 2007, a survey was conducted that investigated the perspectives and intentions of Estonian farmers for the coming three years (2008-2010), and their views on the potential policy changes discussed within the context of the CAP's "Health Check". Amid other questions, respondents were asked whether they would continue with or quit farming, and whether the agricultural area of their farm would increase, remain stable, or decrease. In 2011, the survey was repeated in order to collect data about the actual behaviour of farm operators regarding farm exit and farm size changes.

Based on this data, this paper investigates the correspondence between intended and actual behaviour in cases of farm exits, continuation of farming, farm growth and decline, and studies the factors that affect the intended and actual behaviour of farm operators in the aforementioned cases, therefore covering different stages of farm life cycle.

2 Factors Affecting Intention Behaviour Discrepancy

In this paper, the intention behaviour discrepancy is analysed in the framework of the theory of planned behaviour (TPB). According to the TPB, the probability that behaviour will occur depends on the intention of an individual to engage in that behaviour; and intentions are a function of three determinants: attitude towards the behaviour, subjective norm, and perceived behavioural control (AJZEN and FISHBEIN, 1980; AJZEN, 1987; AJZEN, 1991).

The attitude towards the behaviour refers to the degree to which a person has a favourable or unfavourable appraisal of the behaviour in question (FISHBEIN and AJZEN, 1975). It is influenced by behavioural beliefs about the consequences of the behaviour and the evaluation of those consequences. Personal feelings of moral obligation or responsibility to perform or refuse to perform a certain behaviour affect attitudes (AJZEN, 1991). As farmsteads are often the homes in which the family has lived for generations, family members, in most of the cases, have a considerable emotional connection to the farmstead and to the family traditions. In CEECs, the historical context should be taken into account – the sense of duty and wish to return to traditional family farms were important drivers in the restoration of private farms in the 1990s. The wish to keep the family home and traditions alive and to transfer the farm to the next generation can be associated with moral obligation, even though it may not be economically rational or feasible. People favour behaviours they believe have largely desirable results, and they form unfavourable attitudes towards behaviour they associate with mostly undesirable consequences (AJZEN, 1991). Farm operators may perceive the shrinkage of farm size and farm exit as unfavourable events (e.g. failure to maintain the family's traditions, loss of income), and, inversely, farm growth or transfer as positive events. This can influence the development of negative attitudes towards exit and decline, and positive attitudes towards

farm growth and succession. At the same time, other actors may perceive farm exit as a favourable event (e.g. economically rational).

Subjective norm refers to the perceived social pressure to perform or not to perform the behaviour, and it is based on the normative beliefs about what certain people will think of the person performing that behaviour, as well as the motivation of the person to comply with or defy the social pressure (FISHBEIN and AJZEN, 1975). Considering the strong emotional links that families have with farms, one can expect that the farm operator is faced with pressure from family to ensure the viability of the farm, and the potential successor is faced with pressure to take over the farm. However, at the same time, the general economic development and agricultural policy may influence the development of attitudes and social pressures that favour farm exit instead of transfer, and therefore, can be in conflict with attitudes and pressures that emphasise the importance of family traditions. For example, a farm operator may concurrently feel pressure from the older generation to maintain the family farm and prepare for farm transfer, while pressure from spouse and children (incl. potential successors) to prepare for exit, e.g. when they see farming as too hard a profession to provide a sufficient livelihood for the next generation.

The perceived behavioural control is based on the control beliefs, i.e. beliefs on how much control one has over the outcome as opposed to how much the outcome is controlled by external factors like other people, economic developments, etc. The perception of control is assumed to be a reasonably accurate reflection of the actual control (AJZEN, 1991). The more favourable the attitude and the subjective norm towards the behaviour, and the greater the perceived behavioural control, the stronger an individual's intention should be to perform the behaviour under consideration (AJZEN, 1991; AJZEN, 2005). As a general rule, it is found that when behaviour poses no serious problems of control, they can be predicted from intentions with considerable accuracy (AJZEN, 1991). However, the realisation of most intentions depends to some degree on such non-motivational factors as the availability of the necessary opportunities and resources (e.g. time, money, skills, and cooperation with others) (SUTTON, 1998). Also, intentions are likely to predict a single action more correctly than the behaviour that consists of a sequence of actions. Collectively, these factors represent the level of control the person has over the behaviour and the higher the level of control the stronger the intention-behaviour relations (SHEERAN, 2002).

In the research of inconsistencies between intentions and behaviour, it is vital that the degree to which an intention is measured is at the same level of specificity as the behaviour. The more similar the time, target, action, and context of one indicator is to those of the other, the stronger the relation between intention and behaviour (AJZEN, 2005). The discrepancies between planned and actual behaviour may be induced by poor survey design and data quality (COURNEYA, 1994; VÄRE et al., 2005). Another limitation is that the surveys are typically addressed to one respondent (e.g. farm operator), while the actual decisions involve the actions of different actors like family members (VÄRE et al., 2010), whose actions, while being outside the farm operator's control, have a considerable influence on the behaviour of the operator. The time interval is another consideration. As people constantly review new information and intervening events occur, it is likely that their intentions will change over time. Therefore, the longer the time interval between intentions and behaviour, the more likely is the occurrence of inconsistency between the original intention and actual behaviour (AJZEN, 2005; FISHBEIN and AJZEN, 1975). For example, GLAUBEN et al. (2002) demonstrate the time-inconsistency of farm operators' retirement plans – as time passes from the stated plans, the farm operator will revise his/her plans repeatedly and will postpone retirement, therefore causing a bias in the intended succession time.

SHEERAN (2002) suggests that the properties of intentions such as certainty and accessibility of intentions, as well as the degree of formation of the intentions that indicates how well persons have thought through the consequences of their decision to perform a particular behaviour, should also be taken into account in studying how well intentions predict behaviour. One limitation is that the intentions stated in the surveys may be provisional (SUTTON, 1998). While some respondents may have already formed intentions, it is likely that for others the intentions are merely hypothetical. Persons who have well-formed intentions, as they have thoroughly considered the outcomes of their decisions, should be more likely to anticipate problems and try to enact the intentions. The persons who have not thoroughly considered their plans should more likely encounter unforeseen obstacles in realising the intended behaviour, and should therefore change their intention more likely (SHEERAN, 2002).

In the different life cycle stages, the priorities and challenges of farms differ. As farm exit or continuation and growth or decline are dependent on different set of actors and actions, the discrepancies between intentions and behaviour should differ in the aforementioned cases. As discussed above, the intentions are affected by attitudes, subjective norm and perceived behavioural control (FISHBEIN and AJZEN, 1975; AJZEN, 1991). Therefore, it is reasonable to assume that, in general, the farm operators have positive attitudes towards the continuation of farming and farm growth, and negative attitudes towards exiting from farming and the shrinkage of farm size. Also, it is likely that farm liquidation and/or reduction of the size of the farming operation requires the farmer to take a sequence of single and possibly unprecedented actions, and to consider more thoroughly the intentions of other family members, in comparison with the continuation of farming as before. In this situation, it is more likely that the farm operator's subjective norm is in conflict with the opinions of his/her family members. Decision to reduce the farm size or end the farming operation is closely linked to the intentions of the family members of the farm operator, implying that the farm operator does not have full control over these decisions. Therefore, considering these arguments, our hypothesis is that the farm operators' intentions regarding exiting from farming and shrinkage of farm size are less useful in predicting actual exits and contraction compared to the intentions regarding continuation of farming and farm growth in predicting actual continuation and farm growth.

3 Method and Data

According to the TPB, the intention formation and behaviour could be regarded as a sequence of actions with a causal relationship between intention and behaviour. Therefore, it is reasonable to assume that both intentions and behaviour may be influenced by similar farm- and farmer-specific factors accounted for in the model, as well as similar unobserved factors. This implies that the error terms of models describing intentions and behaviour may be correlated. Therefore, a recursive bivariate probit model, as suggested in MADDALA (1983), was considered appropriate for the present analysis, as it facilitates simultaneously controlling for unobserved heterogeneity, and considers the structural features of the problem by using the predicted values of intentions as regressors in the equations that describe the actual behaviour. Previously, the recursive bivariate probit model has been used in e.g. explaining the irrelevance of stated plans in predicting farm successions (VÄRE et al., 2010); studying the relevance of production contracts with regard to exit decisions in pig production (DONG et al., 2010).

In general form, the recursive bivariate probit model employed in this study has the following recursive structure:

$$y_1^* = \beta_1' X_1 + \varepsilon_1 \qquad (1)$$

$$y_2^* = \gamma y_1 + \beta_2' X_2 + \varepsilon_2 . \qquad (2)$$

Unobservable variables y_1^* and y_2^* in equations (1) and (2) are related to binary observable variables as follows: y_1=1 if y_1^*>0, and 0 otherwise; y_2=1 if y_2^*>0, and 0 otherwise. X_1 and X_2 indicate sets of explanatory variables, β_1 and β_2 are respective parameters to be estimated, γ is a parameter that indicates the effects of stated intentions on realised behaviour, and ε_1 and ε_2 denote errors that may or may not be correlated. The error ε=(ε_1,ε_2) is assumed to be normally distributed with mean zero. The correlation between errors ε_1 and ε_2 is given by ρ. If ρ is significantly different from zero, the errors of the two models are significantly correlated, implying dependency between intentions and the actual behaviour through the unobservable variables.

As considered in Section 2, the probability that behaviour will occur depends on the person's intention to engage in that behaviour; and intentions are a function of three determinants: attitude towards the behaviour, subjective norm, and perceived behavioural control. However, the data available for the present research set constraints on the direct application of the theory, as it lacks direct measures of attitudinal, normative and control elements. Therefore, in the empirical part, the effects of various socioeconomic variables on the probabilities of intention and actual behaviour are studied. The socioeconomic characteristics of farms and farm operators are considered as proxies for variables that describe attitude towards the behaviour, subjective norm and perceived behavioural control.

The model structure described by equations (1) and (2) is employed in four empirical models that study: a) intended and actual exits; b) intended and actual continuation of farming; c) intended and actual decline of farm's agricultural area; d) intended and actual agricultural area growth. In addition, the following explanatory variables are used in the models:

age of the farm operator, farm's agricultural area, share of rented land in farm's agricultural area; binary variables concerning off-farm job of the farm operator, farm's participation in semi-subsistence and LFA payment schemes, farm specialisation on arable crops, farm operator's affiliation to farming associations; farm operator's evaluation about his/her knowledge and experience, availability of successors, and condition of health.

Since the farm's agricultural area and the share of rented land in the farm's agricultural area are positively correlated, these variables are not used simultaneously in the empirical models. In the models of farm size decline (c) and farm growth (d), share of rented land in farm's agricultural area is used instead of farm's agricultural area. It is assumed that the decisions regarding farm exit and continuation of farming are more affected by the farm size as this represents the income earning potential of the farm; and farm decline and growth are more affected by the share of rented land. The expiry of rental agreements or opportunities to conclude new rental agreements could affect the intended and realised farm decline and growth.

The data for this study were obtained from two farm surveys conducted in December 2007 and March 2011. The 2007 survey investigated the perspectives and intentions of Estonian agricultural producers in the coming three years (2008-2010) and the farmers' opinions about the possible developments of the CAP discussed within the "Health Check" context. The questionnaire was posted to a random sample of 1,000 farmers from the population of 6,724 farms, the economic size of which exceeded 2 ESU in 2005[1]. In total, 29.0% of the questionnaires were returned. Amid other questions, farm operators were asked whether they would continue with or quit farming, and whether the agricultural area of their farm would increase, remain stable, or decrease in upcoming three years. In March 2011, the survey was repeated among the respondents of the previous survey. Of the 290 posted questionnaires, 78.6% were returned. In addition to collecting data similar to the previous study, the farmers were asked if they had quit agricultural production in 2008-2010. The data from two surveys was complemented with data from the registries of the paying agency (ARIB) regarding land use, crops, agricultural animals, and farm payments. Based on the registry data of 2006 and 2010, SO, as defined in the COMMISSION REGULATIONS (EC) NO 1242/2008, were calculated for each farm, based on Estonian SO coefficients used in 2011 (RURAL ECONOMY RESEARCH CENTRE, 2012). For those farms for which operators did not respond to the 2011 survey, it was assumed that if the farm had positive SO in 2010, it was operating and had not exited.

After integration of the datasets and excluding the data given by the respondents who did not provide answers for all the relevant variables, data from 251 farms remained valid for the analysis of intended and actual exits and continuation of farming. Farm growth or decline can only be planned and measured if the continuation of farming is planned and realised. Therefore, for the analysis of intentions regarding farm size changes, farms that planned to exit from farming and farms that actually exited from farming were excluded from the sample, resulting in valid answers from 198 farm operators. The definitions and descriptive statistics of dependent and independent variables are given in Table 1.

There are four models for which the effects of stated intentions on actual behaviour are estimated:

a) *Farm exit.* In 2007, farmers were asked if they would exit from farming in 2008-2010. The respondents could answer – 'yes', 'do not know', and 'no'. The answer 'yes' is considered as an intention to exit farming (variable *Exit_int*). Information about the realised exit (*Exit_real*) was gathered in the survey of 2011 and from the registries of the paying agency[2].

[1] ESU stands for economic size units defined for the purpose of FADN. 1 ESU equalled standard gross margin of 1,200 Euros in 2007.

[2] The survey of 2007 asked farm operators about their intentions regarding exit and continuation of farming. As there were no questions about the succession plans, this dataset did not provide an opportunity to analyse the effects of intended succession on farm growth, or discrepancies arising from the mismatch of intended and realised succession. From the comparison with the paying agency's registry data it occurred that, in 2007-2011, 6 sample farms that continued production had been transferred to successors. In 2007, none of the operators of these farms indicated an intention to increase their agricultural area; 1 respondent declared an intention to decrease farm size. In 2007-2010 the agricultural area of 2 of these farms declined >15%. The change of agricultural area of other transferred farms remained within the boundaries of 85-115% of their agricultural area in 2007. The average age of operators of these farms was 69.3 years and average agricultural area of the farms 46.0 ha. Five of the 6 transferred farms were participating in the semi-subsistence farming scheme. This suggests that obligation of the semi-subsistence farming scheme to maintain agricultural production for 5 years, was one of the most important considerations behind these farm transfers.

b) *Continuation of farming*. The answer 'no' for the previously mentioned question was considered as an intention to continue farming (*Cont_int*). Information about the actual continuation of farming (*Cont_real*) was gathered in the survey of 2011 and from the registries of the paying agency.

c) *Farm shrinkage*. In 2007, respondents were asked whether they intend to increase or decrease the agricultural area of their farms in 2008-2010. The answer could be given in the scale of five: 1=decrease significantly, 2=decrease somewhat, 3=do not change, 4=increase somewhat, and 5=increase significantly. We consider the change in the farm's agricultural area as proxy of farm size change. The answers 1 and 2 were considered as an intention to reduce the farm's agricultural area. Based on these answers, a binary variable *Decl_int* was formed. Information about the actual changes in the farm's agricultural area was gathered by comparing the survey data of 2007 and 2010 and paying agency's data of 2007 and 2010. Farm size was considered decreased (*Decl_real*) if its agricultural area in 2010 was <85% of the 2007 figure[3].

d) *Farm growth*. The answers 4 and 5 were considered as an intention to expand the agricultural area. The binary variable *Grow_int* is based on these responses. The farm size was considered as increased (*Grow_real*) if its agricultural area in 2010 was ≥115% of the 2007 figure.

Table 1 provides definitions and descriptive statistics of the dependent and explanatory variables used in the empirical models. Stemming from the arguments of the family farm life cycle concept, the age of the farm operator is one of the main factors that determines whether the farm is about to grow, be stable, shrink or exit (BOEHLJE, 1973; WEISS, 1999; VÄRE, 2007; GLAUBEN et al., 2002; CALUS et al., 2008).[4] We assume that the age of the farm operator has an effect on attitudes, subjective norms and perceived behavioural control. We expect that younger farm operators have positive attitudes towards the continuation of farming and farm expansion, and that elderly farmers are faced with higher pressure from family members encouraging exiting or constricting farming. However, this does not necessarily imply that elderly farmers agree with the other family members. Therefore, the subjective norm of elderly farmers may be in conflict with the views of other family members. Also, we assume that the elderly farmers have a lower level of perceived behavioural control, since their decisions regarding farm exit or continuation, and farm shrinkage or growth are more dependent on potential successors and other family members.

According to Gibrat's Law, farm growth is independent of initial farm size. However, it has been shown that the relative growth is higher in smaller farms (WEISS, 1999), and that larger farms are less likely to exit because of lower credit constraints and the ability to provide higher incomes (BREUSTEDT and GLAUBEN, 2007). We expect that due to the higher income providing potential, operators of larger farms have more positive attitudes regarding continuation of farming. Also, we presume that in case of larger farms the attitudes of family members are more in line with the outlook of the farm operator and support continuation of farming. Therefore, we assume that larger farms are more likely to behave according to the stated intentions.

In 2007, 49.9% of the agricultural land was used on the grounds of rental agreements in Estonia (SOE, 2013). In our sample of farms that intended and actually continued farming, the average of shares of rented land was 29.6%. However, the weighted average share of rented land was 43.2%, implying a higher share of rented land in larger farms. According to the survey of 2007, the average duration of rental agreements was 5 years. It is assumed that the share of rented land may affect perceived behavioural control regarding farm growth and shrinkage. Farm operators who have a higher share of rented land may have a better perception of behavioural control regarding farm expansion, as they have previous experience with expansion

[3] Since the farm's agricultural area may change from year to year depending on buying or selling plots, and new rental agreements or the expiry of previous agreements, we consider the variation of agricultural area within a specific range as relative stability rather than growth or decline. Based on the percentiles of changes in agricultural area (Annex I) and previous work (VIIRA et al., 2013), a 15% growth and decline threshold was considered appropriate in this analysis. In the process of model selection, 10% growth and decline thresholds were also tested. The results did not vary significantly between 10% and 15% thresholds.

[4] In Annex II, the distribution of responded farm operators according to the age groups is compared with the data from the farm structure survey (FSS) of 2007. It appears that the share of middle-aged (45-54 years) farm operators among the respondents was 6.8% points higher, and the share of more senior farm operators (≥65 years) 6.0% points lower than the results of FSS. Given that the FSS results also represent agricultural households in which economic size was <2 ESU (and probably had a higher share of older farm operators), we consider the differences in age distributions as minor.

via renting land, and most likely they are better informed about the situation in the rental market of agricultural land. At the same time, farm operators with a higher share of rented land may have a better perception of behavioural control over farm shrinkage, as they are well aware of the expiry dates of their rental agreements and therefore they are able to consider the potential shrinkage of their agricultural land. However, the realisation of the intentions regarding expansion via renting additional agricultural land depends not only on the behaviour of the farm operator and landowners but also on the behaviour of other farmers in the area who are competing for the same land. The higher dependence on the other actors may reduce the perceived behavioural control and increase the likelihood of discrepancies between intentions and behaviour.

Off_farm indicates whether the farm operator had an off-farm job in 2007. The effect of off-farm employment on farm survival has been found to be twofold. If part of the available labour input of the farm operator is used off-farm, it may provide additional income that may help maintain the farm as well (BREUSTEDT and GLAUBEN, 2007). However, an off-farm job may also lead to farm exits, especially in younger age groups who may benefit more from

Table 1. Definition and descriptive statistics of variables used in the analysis

Variable	Definition	Scale/ measurement	Obs*	Mean	Std. dev.	Min	Max
Dependent variables							
Exit_int	Intention to exit from farming in 2008-2010 as stated in 2007	0=no, 1=yes	251	0.056	0.230	0	1
Exit_real	Realised exit from farming in 2008-2010		251	0.171	0.378	0	1
Cont_int	Intention to continue farming in 2008-2010 as stated in 2007		251	0.649	0.478	0	1
Cont_real	Farm is operating in 2011		251	0.829	0.378	0	1
Decl_int	Intention to reduce agricultural area in 2008-2010 as stated in 2007		198	0.167	0.374	0	1
Decl_real	Agricultural area in 2010 ≤85% of agricultural area in 2007		198	0.172	0.378	0	1
Grow_int	Intention to increase agricultural area in 2008-2010 as stated in 2007		198	0.247	0.433	0	1
Grow_real	Agricultural area in 2010 ≥115% of agricultural area in 2007		198	0.162	0.369	0	1
Explanatory variables							
Age	Age of the farm operator in 2007	Years	251 198	55.35 54.17	12.16 12.09	23 23	85 79
Area	Farm's agricultural area	Hectares	251 198	144.0 171.5	352.4 389.9	1.0 2.0	2605.2 2605.2
Rental	Share of rented land in farm's agricultural area	100%=1	251 198	0.269 0.296	0.304 0.303	0 0	1 1
Off_farm	The farm operation had an off-farm job in 2007	0=no, 1=yes	251 198	0.259 0.237	0.439 0.427	0 0	1 1
Semisubs	The farm was participating in semi-subsistence farming scheme in 2007		251 198	0.438 0.455	0.497 0.499	0 0	1 1
LFA	The farm was participating in LFA payment scheme in 2007		251 198	0.498 0.525	0.501 0.501	0 0	1 1
Arable	Farm was specialised in field crops in 2007		251 198	0.303 0.293	0.460 0.456	0 0	1 1
Associations	Farm operator was a member of farming associations in 2007		251 198	0.422 0.455	0.495 0.499	0 0	1 1
Know_exper	Average of farm operator's evaluation on his/her agricultural knowledge and experience	1=very poor, 2=poor, 3=adequate, 4=good, 5=very good	251 198	3.528 3.578	0.596 0.563	1.5 2	5 5
Successors	Farm operator's evaluation on the availability of successor		251 198	2.426 2.571	1.094 1.091	1 1	5 5
Poor_health	Farm operator's evaluation on his/her condition of health	1=very good, 2=good, 3=adequate, 4=poor, 5=very poor	251 198	3.068 3.020	0.790 0.760	1 1	5 5

* In the models a) and b) considering farm exits and continuation of farming, the data from 251 farms remained valid; in the models c) and d) that explain decline and growth of agricultural area, data from 198 respondents remained valid.
Source: own calculations

career changes (RIZOV and MATHIJS, 2003). In the Estonian context, it has been found that exit from farms is more likely where operators have an off-farm job (VIIRA et al., 2013). Therefore, we assume that farm operators who had an off-farm job have less positive attitudes towards the continuation of farming and farm growth. If the off-farm employment provides an adequate level of income, these farm operators may perceive social pressure to quit or constrict farming to reduce their physical workload. Therefore, having an off-farm job may increase the likelihood of discrepancies between intentions and realised behaviour.

Several farm payments are enforced on the basis of contracts between the farm and the paying agency. In Estonia, the contracts of LFA and semi-subsistence farming payments prescribed that the farm should continue agricultural production for a 5-year period. If the farm ceases agricultural production earlier, then the payments received should be reimbursed to the paying agency. The semi-subsistence farming scheme was a transitional measure for supporting semi-subsistence farms in the new EU member states that were undergoing restructuring (DAVIDOVA et al., 2009). Participation in the scheme provided farmers with an annual flat rate payment of 1,000 Euros for five years. The scheme aimed to maintain smaller agricultural holdings and enhance their survival. In order to be eligible for semi-subsistence farming payment, a farmer had to be registered as a sole principal, use at least 0.3 ha agricultural land for crop production, or keep at least one agricultural animal (EMA, 2005). The aim of the LFA payment scheme is to maintain the countryside in less favoured areas through the continual use of agricultural land. The LFA payment rate in Estonia has been 25 Euros/ha since 2004. (EMA, 2005). According to the registry data of Estonian paying agency (ARIB), 14.2% of the recipients of farm payments received semi-subsistence farming payment, and 47.7% of the recipients of farm payments received an LFA payment in 2007. While both the LFA and semi-subsistence farming payments provide farms with additional income, which could improve their livelihood, we expect that farm operators, before taking the obligation and signing the contracts, have thoroughly considered the prospects of the continuation of farming in the next five years. Even though they had fulfilled the requirement by 2011 and this obligation was no longer relevant, we suppose that operators of these farms have more positive attitudes towards the continuation of farming, and their realised behaviour is more in line with their revealed intentions.

The decisions regarding farm growth or exit may also be influenced by the farm type. BREUSTEDT and GLAUBEN (2007) found that in regions that are specialised in livestock production, the decline of farm numbers is smaller. The persistence of livestock farms may be influenced by higher sunk costs as the farm buildings and technology may have fewer alternative uses, and stronger emotional commitments of livestock farmers to their farms and herds. In the empirical analysis, a binary explanatory variable *Arable* is used. *Arable* indicates whether the farm was specialised in field crops in 2007. In this farm type, the SO of field crops constitutes more than 2/3 of farm SO (COMMISSION REGULATION (EC) NO 1242/2008). Considering the high prices of cereals and oilseeds at the end of 2007 when the first survey was conducted, we assume that arable farms had positive attitudes towards the continuation of farming and farm growth. We also consider that farm operators of arable farms are emotionally less associated with their productive assets compared to livestock or mixed farms. Therefore, we assume that the probability of discrepancies in the case of arable farms between intentions and realised behaviour is lower.

Higher levels of human and social capital can be associated with higher level of perceived behavioural control, more reasoned and better-informed intentions and decisions. As discussed in Section 2, the level of intention formation has a positive effect on realisation of the intention. Thus, we assume that the higher the level of human capital in the farm, the better the intentions about the farm exit, continuation, growth or decline should be formed, and the more likely it is that the farm operator acts in accordance with his/her intentions. As the members of farming associations (variable *Associations*) participate in larger farmers' networks, we expect them to be better informed about developments in markets, technologies, agricultural policy, etc. In the 2007 survey, farm operators had to evaluate both their agricultural knowledge and experience as agricultural producers. Both evaluations were given on a scale of five ranging from 1 (very poor) to 5 (very good). Variable *Know_exper* is an average of the evaluations given in these two categories – agricultural knowledge and experience – and it is considered to be a proxy of the level of human capital of farm operators.

The availability of suitable and willing successors is one of the key factors when it comes to developing the farm in the later stages of the farm life cycle (GLAUBEN et al., 2002; CALUS et al., 2008; VÄRE, 2007). In the survey of 2007, the respondents were

asked to evaluate the availability of successors on a scale of five. We assume that if the farm operator is not sure whether his/her successors are interested in taking over the farm in the future, or if there are no successors available, he or she has a lower level of perceived behavioural control over the continuation of farming and farm growth. Also, we assume that if the farm operator is more confident about handing the farm over to the successor in the future, he or she has a more positive attitude towards continuation of farming and farm growth. Therefore, we expect that the more positive the farm operator's evaluation on the availability of successors is, the lower the probability of discrepancy between intention and realised behaviour.

The similar argument also applies in terms of the condition of health, because it is another source of uncertainty in the intention-behaviour model as the person might not have much control over it, especially on the sudden appearance of serious health problems. Therefore, we assume that if the farmer's evaluation about his or her condition of health is poor (variable *Poor_health*), he or she has a lower level of perceived behavioural control over continuation of farming and farm growth. If the farm operator's condition of health remains strong enough to carry on with farming, he or she may still be running the farm three years later. Therefore, from the intention-behaviour compatibility point of view, poor health could be considered as a source of discrepancy.

4 Results and Discussion

Table 2 summarises the intentions about continuation or exiting from farming, as stated by farm operators, and it compares these with actual behaviour. In 2007, 14 farm operators (5.6% out of the 251 respondents in the analysis) reported the plan to exit from farming. Four of these farms exited and 10 continued farming. 74 farm operators (29.5%) were uncertain about exiting from farming. Of those farm operators, 19 (25.7%) exited and 55 (74.3%) continued. Of the 163 (64.9%) farm operators who did not plan to exit, 20 (12.3%) exited and 143 (87.7%) continued. From another perspective, of the 43 farms that quit in 2008-2010 just 9.3% reported that intention in 2007; 44.2% were uncertain about exiting, and 46.5% did not intend to exit farming. Of the 208 farms that stayed in business, 68.8% acted in accordance with their stated plans; 26.4% of them were uncertain about it and 7.0% were those who stated an intention to quit.

Table 2. Actual and planned behaviour regarding exiting from farming in 2008-2010

Intentions stated in 2007 regarding exiting from farming in 2008-2010	Actual behaviour in 2008-2010		Total
	Exit	Continue	
Exit from farming	4	10	14
Not certain	19	55	74
Will not exit	20	143	163
Total	43	208	251

Source: own calculations

The comparison of the intended and actual change of the agricultural area of 198 farms in the analysis (Table 3) shows that between 2007 and 2010 the agricultural area declined >15% in 34 farms (17.2%). In 132 farms (66.7%), the agricultural area in 2010 was 85-115% of the area in 2007. In 32 cases (16.2%), the agricultural area in 2010 was >15% higher than in 2007. In 33.3% of the 33 (16.7%) farms in which operators stated an intention to reduce farm size, agricultural area declined >15%, in 63.6% of farms it remained relatively stable, and in one farm the area increased >15%. Of the 116 (58.6%) farms in which operators stated that the agricultural area would not change, in 19 (16.4%) farms it declined, in 88 (75.9%) farms it remained stable, and in 9 (7.8%) farms it increased. In 2007, the intention to increase the farm's agricultural area was declared by 49 (24.7%) farm operators. In 4 (8.2%) of these farms, the agricultural area declined, in 23 (46.9%) it remained stable and in 22 (44.9%) it grew. From another perspective – of the 34 farms in which the agricultural area declined >15%, the intention to decrease agricultural area was reported in 11 cases (32.4%). The relative stability of farm size was intended and maintained in 88 farms (66.7%). Farm growth was intended and realised by 22 operators (68.8%).

From Tables 2 and 3, it is evident that the discrepancy between intentions and actual behaviour is more frequent in cases of exiting from farming and decline of farm size. Just 9.3% of actual exits and 32.4% of farm shrinkages in 2008-2010 coincided with the respective intentions revealed in 2007, compared to 68.8% intention-behaviour compatibility in cases of continuation of farming and farm growth. Aggregation of the previous results reveals that farm operators' behaviour was consistent with intentions in 58.6% of the cases when the question was about exiting from farming and in 61.1% of the cases when the question was about farm size changes. Therefore, the compatibility of farm operators' intentions and behaviour in this study is similar to the 63% reported by

Table 3. Actual and planned behaviour regarding farm size changes in 2008-2010 compared to 2007

Intentions stated in 2007 regarding change of agricultural area in 2008-2010	Actual change of agricultural area, 2010 compared to 2007			Total
	Decline (agricultural area <85% of 2007 level)	Stable (85-115% of agricultural area retained)	Growth (agricultural area >115% of 2007 level)	
Decline	11	21	1	33
Do not change	19	88	9	116
Grow	4	23	22	49
Total	34	132	32	198

Source: own calculations

VÄRE et al. (2010). However, as we hypothesised, the level of consistency between intention and behaviour varies according to the stages of farm life cycle under scrutiny.

The estimated coefficients and average marginal effects of the explanatory variables in the specified recursive bivariate probit models a) to d) are presented in Table 4. The parameter estimates of intended behaviour indicate that in cases of continuation of farming (model b) and farm growth (model d) intentions have positive and statistically significant effects on actual behaviour. Intention to continue with farming increased the probability of actual continuation by 33.4%, and intention to expand agricultural area increased the probability of agricultural area growth by 37.0%. The effect of intended exit (model a) on actual exit was positive but statistically insignificant. Therefore, according to the current results, in the case of farm exits, revealed intentions are not acceptable predictors of actual behaviour. However, the effect of intended farm shrinkage (model c) on actual farm size decline was positive and statistically significant ($p<0.1$). Intention to constrict agricultural area increased the probability of realised agricultural area decline by 28.1%. In the models of farm exits (a) and shrinkage (c), the correlation (ρ) between error terms of equations that explain intention and actual behaviour was statistically insignificant. This implies that after accounting for all the explanatory variables used in the models, there are no unobserved explanatory variables left that would explain both intended and actual behaviour in a statistically significantly way. In the models of continuation of farming (b) and farm growth (d), the ρ was statistically significant, indicating that the intentions and actual behaviour are significantly affected by similar unobserved explanatory variables. Therefore, the conclusions drawn from Tables 2 and 3, and the results from Table 4, confirm our hypothesis that intentions are better predictors of actual behaviour in cases of continuation of farming and farm growth, compared to farm exits and shrinkage. Next, it is considered how the socioeconomic variables affect the intention-behaviour discrepancies.

The age of the farm operator has been found to be a significant determinant of intention-behaviour discrepancies (VÄRE et al., 2010; GLAUBEN et al., 2002). The results in Table 4 indicate that in the cases of continuation of farming and farm growth, elderly farmers are more likely to deviate from their respective stated plans. In the cases of farm exits and shrinkage, *Age* did not have significant effect on intended behaviour and therefore we cannot conclude that in those cases the age of the farm operator is related to discrepancies between stated plans and actual behaviour. The results also indicate that the probabilities of intending continuation of farming (model b) and farm growth (model d) decrease significantly as the farmer gets older. If the farm operator's age increases by 1 year, the probability of intending continuation of farming decreases by 0.4% and the probability of intended farm growth decreases by 1.1%. While the *Age* did not significantly affect the actual continuation of farming and farm growth, it had a significant positive effect on the probabilities of realised farm exits and shrinkage. If *Age* increases by one year, the probability of farm exit increases by 0.4% and probability of farm shrinkage by 0.5%.

The farm's agricultural area had a significant positive effect on the intention of continuation of farming (model b). Every 10 ha of agricultural land increased the probability of intending continuation of farming by 0.3%. Considering the positive significant effect of intended continuation on realised continuation, this implies that smaller farms are more likely to have discrepancies between intentions regarding continuation of farming and actual continuation. The results also show that large farms are less likely to exit from farming and more likely to continue with farming. Every additional 10 ha of agricultural land decreased the exit probability by 0.8% and increased the probability of continuation by 0.8%.

Table 4. The results of the recursive bivariate probit estimates

	Model							
	a) Farm exit		b) Continuation of farming		c) Farm shrinkage		d) Farm growth	
Dependent variable	*Exit_int*		*Cont_int*		*Decl_int*		*Grow_int*	
	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
Intercept	0.1823 (1.8069)		0.6205 (0.9527)		-1.0314 (1.4101)		2.1433 (1.1654)*	
Age	0.0149 (0.0143)	0.0013	-0.0142 (0.0079)*	-0.0045	0.0121 (0.0113)	0.0023	-0.0467 (0.0103)***	-0.0109
Area	-0.0013 (0.0015)	-0.0001	0.0008 (0.0004)**	0.0003				
Rental					2.0529 (0.5086)***	0.3966	0.7863 (0.3883)**	0.1841
Off_farm	0.3844 (0.4592)	0.0334	-0.4908 (0.2085)**	-0.1552	-0.2523 (0.3336)	-0.0487	-0.6224 (0.2929)**	-0.1457
Semisubs	-0.1081 (0.3640)	-0.0094	0.2601 (0.1797)	0.0822	-0.0790 (0.2506)	-0.0153	-0.1226 (0.2296)	-0.0287
LFA	-1.0338 (0.3954)***	-0.0897	0.1540 (0.1779)	0.0487	0.1742 (0.2505)	0.0337	0.0243 (0.2331)	0.0057
Arable	-0.3596 (0.3558)	-0.0312	0.2289 (0.1927)	0.0724	-0.3746 (0.2897)	-0.0724	0.2505 (0.2393)	0.0586
Associations	1.0387 (0.3917)***	0.0901	-0.1386 (0.1915)	-0.0438	-0.4512 (0.2901)	-0.0872	0.0139 (0.2544)	0.0032
Know_exper	-0.8225 (0.3448)**	-0.0714	0.2513 (0.1592)	0.0795	-0.1299 (0.2444)	-0.0251	-0.2474 (0.2187)	-0.0579
Successors	-0.2030 (0.1842)	-0.0176	0.2193 (0.0906)**	0.0693	-0.4584 (0.1440)***	-0.0886	0.2965 (0.1113)***	0.0694
Poor_Health	0.1906 (0.2476)	0.0165	-0.3204 (0.1319)**	-0.1013	0.1587 (0.1801)	0.0307	-0.1696 (0.1591)	-0.0397
Dependent variable	*Exit_real*		*Cont_real*		*Decl_real*		*Grow_real*	
Intercept	-0.1956 (1.2045)		-0.9005 (1.0240)		-0.3178 (1.2662)		-0.4490 (1.3588)	
Exit_int	0.9632 (1.6040)	0.1950						
Cont_int			1.5968 (0.2773)***	0.3346				
Decl_int					1.3214 (0.7824)*	0.2809		
Grow_int							2.4174 (0.3620)***	0.3700
Age	0.0196 (0.0108)*	0.0040	-0.0079 (0.0091)	-0.0016	0.0231 (0.0102)**	0.0049	-0.0131 (0.0129)	-0.0020
Area	-0.0039 (0.0018)**	-0.0008	0.0037 (0.0016)**	0.0008				
Rental					-0.5810 (0.5020)	-0.1235	-0.1915 (0.4366)	-0.0293
Off_farm	0.6630 (0.2622)**	0.1342	-0.3091 (0.2356)	-0.0648	0.2967 (0.2875)	0.0631	0.1556 (0.3026)	0.0238
Semisubs	-0.5234 (0.2360)**	-0.1060	0.2933 (0.2006)	0.0615	0.1291 (0.2346)	0.0274	0.1165 (0.2420)	0.0178
LFA	-0.5174 (0.2911)*	-0.1047	0.3726 (0.2026)*	0.0781	-0.0942 (0.2383)	-0.0201	0.1765 (0.2468)	0.0270
Arable	0.2132 (0.2254)	0.0432	-0.2939 (0.1958)	-0.0616	-0.3492 (0.2903)	-0.0742	-0.0316 (0.2596)	-0.0048
Associations	-0.0812 (0.2606)	-0.0164	0.0581 (0.2114)	0.0122	0.2986 (0.2546)	0.0635	-0.4388 (0.2919)	-0.0672
Know_exper	-0.3072 (0.2041)	-0.0622	0.0917 (0.1769)	0.0192	-0.0416 (0.2183)	-0.0088	-0.0512 (0.2283)	-0.0078
Successors	-0.2169 (0.1229)*	-0.0439	0.0448 (0.1141)	0.0094	-0.1018 (0.1383)	-0.0216	-0.0189 (0.1157)	-0.0029
Poor_Health	-0.0277 (0.1682)	-0.0056	0.1131 (0.1378)	0.0237	-0.5882 (0.1907)***	-0.1250	-0.0789 (0.1766)	-0.0121
Disturbance correlation ρ	-0.5199 (0.7862)		-0.9174 (0.1230)***		-0.2683 (0.4364)		-0.8635 (0.1999)***	
Log likelihood	-131.75		-227.17		-147.38		-145.43	
N	251		251		198		198	

Figures in parentheses are standard errors; *Significant at 0.1 level; **Significant at 0.05 level; ***Significant at 0.01 level.
Source: own calculations

The share of rented land of the farm's agricultural area had a significant positive effect on both the intention to decrease farm size (model c) and the intention to increase farm size (model d). This suggests that farms with a higher proportion of rented land in their total agricultural area were less likely to deviate from their intentions regarding farm shrinkage and farm growth. This could be explained by the good awareness about the expiry dates of existing rental agreements (decline in farm's agricultural area) and better information about opportunities to conclude new rental agreements (farm expansion). As discussed in Section 3, these factors may contribute to the farm operators' higher level of perceived behavioural control over the short-term (3 years) changes in the agricultural area. However, the effect of *Rental* on the probabilities of realised farm shrinkage and growth were statistically insignificant.

The farm operators with an off-farm job had a significantly lower probability to declare an intention to continue farming (model b) and intention to extend the farm's agricultural area (model d). On average, the farm operators who had an off-farm job had a 15.5% lower probability to state an intention to continue farming, and a 14.6% lower probability to state an intention to expand the farm's agricultural area. If the positive significant effects of the intended behaviour on the realised behaviour in models b and d are considered, this implies that farm operators who have an off-farm job are more likely to deviate from their plans regarding continuation of farming and farm growth. This could be related to the income level provided by the off-farm job compared to the income earning potential of the farm. If the income earning potential of the farm is lower than the income provided by the paid job, then the farmer might have a less positive attitude about the continuation of farming or farm growth. In addition, in such a case he or she may feel pressure from family members to reduce his or her own farm workload. While the positive effect of having an off-farm job on the probability of intended exit was statistically insignificant, its positive effect on the probability of realised farm exits was significant. An off-farm job increased the probability of farm exit by 13.4%.

Our assumption was that farm operators, who had taken a 5-year obligation to continue farming within the semi-subsistence farming or LFA payment schemes, had more positive attitudes and better-formed intentions regarding the continuation of farming. The results indicate that participation in the semi-subsistence farming scheme had a positive effect on the intended continuation of farming; however, the estimated coefficient is only significant at the 15% level. Participation in the LFA payment scheme had a significant negative effect on the probability of intended exit; however, the intended exit did not have a significant effect on actual exits. Considering the significant negative effects of participating in LFA or semi-subsistence farming scheme on the probability of realised farm exits, and positive effects (though estimated coefficient of *Semisubs* is significant at 15% level) on the probability of continuation of farming, there is positive but statistically weak evidence that farmers who have taken the 5-year obligation to continue farming are less likely to depart from their intended behaviour regarding farm exit and continuation of farming. The weak statistical significance of the estimates may be related to the fact that those who did participate in the scheme had to maintain agricultural production for five years, but by 2011 they had fulfilled the requirement and this obligation was no longer relevant. In the farm decline and growth models, the effects of variables *Semisubs* and *LFA* were statistically insignificant.

It was assumed that arable farms are less likely to have discrepancies between intentions and realised behaviour, as the operators of arable farms might have had a more positive attitude towards continuing and expanding production due to high cereal prices at the end of 2007 when the first survey was conducted. From Table 4, it stems that while the signs of the estimated regression coefficients of *Arable* are in line with our assumption, the estimates are statistically insignificant.

A higher level of social and human capital should positively affect the perceived behavioural control and improve the formation of intentions. Our results reveal that members of farming associations had a significantly higher probability to report an intention to exit farming, while the association membership did not have statistically significant effect on realised exits. The parameter of *Know_exper* indicates that farmers with a higher level of knowledge and experience are less likely to intend to exit and also less likely to actually exit from farming. The level of knowledge and experience has a positive (significant at 12% level) effect on the probability of intended continuation of farming. Taking into account the statistically significant positive effect of intended continuation of farming on realised behaviour, this implies that in this model a lower level of knowledge and experience increases the likelihood of discrepancy between intention and behaviour.

The availability of successors is one of the key determinants of farm viability in the exit phase of a farm's life cycle. It is argued that the succession effect has an influence on farm growth from the age of 45 of the farm operator, and the early designation of the successor motivates the farmer to invest and improve the management of the farm (GLAUBEN, et al., 2002; CALUS et al., 2008). Results from Table 4 confirm that the availability of successors has significant negative effect on the probability of intended farm shrinkage, and positive effects on the probabilities of intended continuation of farming and farm growth. This implies that in cases of farm growth and continuation of farming the good availability of successors increases the likelihood of intention-behaviour compatibility. However, in the case of farm shrinkage, the good availability of successors increases the likelihood of intention-behaviour discrepancy. This inconsistency may be related to the fact that while the decision making often involves other family members in family farms, the intentions of farm operators were studied in the survey of 2007 and not the intentions of other family members. When it comes to actual behaviour, the effects of *Successors* are negative (significant at 0.1 level) with respect to the probability of actual exits. The effects of this variable on the actual continuation of farming, farm shrinkage and growth are statistically insignificant.

The poor condition of health had a significant negative effect on intended continuation of farming. While the other estimates of this parameter were statistically insignificant, the estimates of model c (farm shrinkage) indicate that farm operators who evaluate their condition of health as poor are less likely to actually decrease the farm size. This implies that a poor condition of health may decrease the farm operators' perceived behavioural control over the continuation of farming and therefore increases the probability of respective discrepancy. However, if the condition of health permits and farmers who evaluated their health as poor keep on farming, they are not likely to reduce the agricultural area of their farms.

5 Conclusions

The theory of planned behaviour states that intentions should predict behaviour. It also emphasises that the formation of intention depends on attitudes, perceptions of control and subjective norms, and there are a number of external and internal factors that affect the likelihood of actually carrying out the formed intentions (AJZEN, 2005; SUTTON, 1998; SHEERAN 2002).

This research aimed to study the effects of the stated intentions and selected socioeconomic characteristics on the farmers' behaviour in cases of farm size changes and farm exit, using recursive bivariate probit regression. To this end, data from the Estonian farmers' survey in 2007 on the farmers' intentions on exit and farm size changes for the period of 2008-2010 was complemented with data from the follow-up survey of those farmers in 2011, and paying agency's registry data.

The results of the present study are in line with the conclusions of VÄRE et al. (2010), THOMSON and TANSEY (1982), GLAUBEN et al. (2002), and LEFEBVRE et al. (2013) in that the value of the stated plans of the farmers for predicting actual behaviour is limited as considerable discrepancies exist. The study confirmed our assumption that the discrepancy between farmers' future intentions and actual behaviour depends on the nature of the behaviour under scrutiny, and intentions are better predictors of actual behaviour when the considered event (continuation of farming and farm growth) could be regarded as positive rather than negative (exit from farming, farm shrinkage).

As noted in several studies (VÄRE et al., 2010; GLAUBEN et al., 2002), the farmers' age is a significant determinant of decisions taken in different phases of the farm life cycle. VÄRE et al. (2010) found that elderly farmers are more likely to diverge from their intentions regarding farm succession. In the present study, the realised behaviour of older farmers was more likely to diverge from intentions in the contexts of continuation of farming and farm growth. The relevance of farm size in farm survival has been noted by e.g. RIZOV and MATHIJS (2003), and GLAUBEN et al. (2002). Our results indicated that farm size had a positive effect on the probability of intended continuation of farming, and the probability of mismatch between intended and actual continuation of farming was larger in smaller farms. These results are somewhat in contrast with the findings of LEFEBVRE et al. (2013) in that smaller farms are less likely to modify their intentions (in the context of land investments). The share of rented land of the farm's agricultural area had a significant positive effect on both the probabilities of intended farm growth and intended farm shrinkage, implying the lower probability of intention-behaviour discrepancy. This result may be related to better perceived behavioural control of farm operators who rent a significant part of their agricultural land over their short-term land use changes.

The positive relationship between farm operator's off-farm job and farm exits has previously been found by e.g. RIZOV and MATHIJS (2003), and STIGLBAUER and WEISS (2000). WEISS (1999) found that farm operator's off-farm increases the likelihood of reduction of farm size. According to our results having an off-farm job increased the likelihood of intention-behaviour discrepancy in cases of continuation of farming and farm growth; and increased significantly the probability of realized farm exits. A higher level of social and human capital should result in more clearly formed intentions. In the present analysis, the farmers with a higher level of knowledge and experience were more likely to realise their intentions regarding the continuation of farming.

Successors are one of these important other actors who considerably affect the planning of the future of the farm. However, as the plans of the potential successors are not necessarily in line with the intentions of the acting farm operators, the plans of the successors may be a source of discrepancy if the farm operator is unaware of these plans (VÄRE et al., 2010; GLAUBEN et al., 2004). This was demonstrated in the present analysis by the fact that while the good availability of successors reduced the likelihood of intention-behaviour discrepancy in the cases of continuation of farming and farm growth, it increased the probability of intention-behaviour mismatch in case of farm shrinkage. Therefore, for predicting actual behaviour on the basis of ex-ante research, the collection of the background information on the successors and their plans could explain the sources of discrepancies and the impact of the outside actors on both formation of the intentions and realisation of them in the behaviour.

The farmer's health condition plays a central role in decisions on exit or growth (GALE, 2003). However, the connection with behaviour was not so straightforward in this study. Farmers who evaluated their condition of health as good in 2007 were more likely to intend to continue farming. A poor condition of health increased the likelihood of discrepancy between intended and actual continuation of farming. At the same time, farmers with poor health, if they continued farming, maintained the size of their agricultural area. This implies that the fact that there is a high level of unpredictability in using health condition for predicting behaviour should be taken into account.

The theory of planned behaviour was used in this research as a general frame, but the limitations of the available data did not allow for studying directly the elements influencing the formation of intentions. The incorporation of questions about the attitudes, perceptions of control and subjective norms, as well as questioning the main external actors in future farmers' surveys, and the investigation of the actual behaviour of the farm operators, could immensely contribute to understanding the development of intentions and possible sources of discrepancies between intentions and behaviour.

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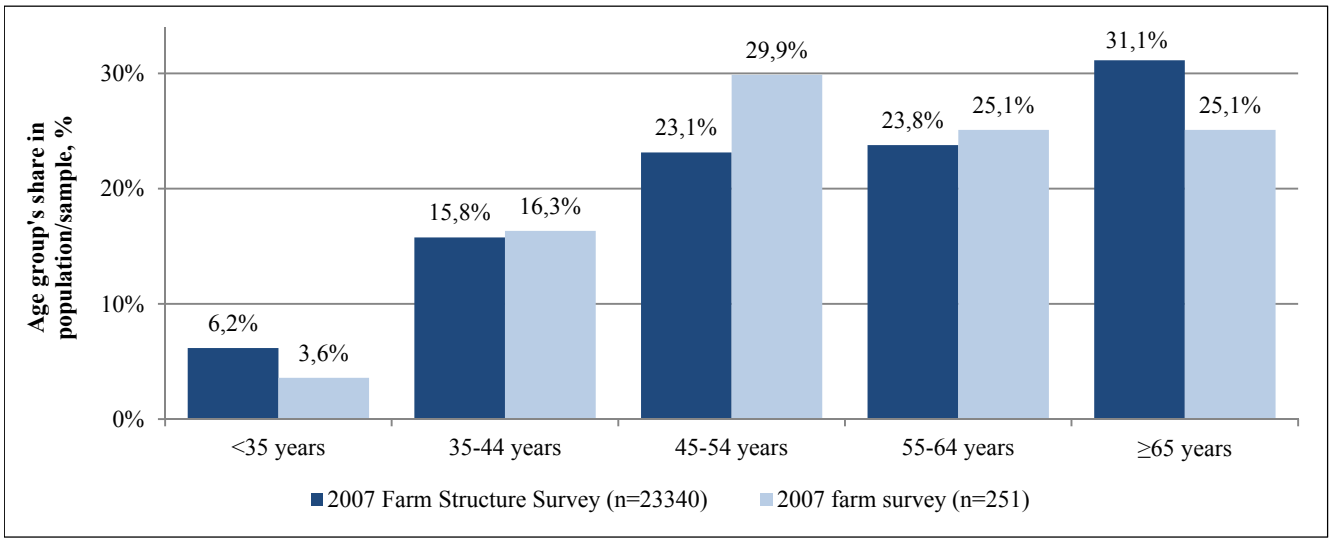
Annex

Annex I Percentiles of farms that retained agricultural production according to the changes in the agricultural area in 2007-2010 (N=198)

Percentile	N	Range (index of agricultural area)	Average agricultural area in 2007, ha	Average agricultural area in 2010, ha
0.1	20	0.126-0.756	46.9	23.8
0.2	20	0.756-0.874	249.2	204.9
0.3	20	0.874-0.961	204.9	191.5
0.4	19	0.961-0.985	328.7	321.1
0.5	21	0.985-1.000	52.0	51.8
0.6	19	1.000-1.012	133.6	134.1
0.7	19	1.012-1.037	102.1	104.5
0.8	20	1.037-1.083	185.3	196.1
0.9	20	1.083-1.268	292.7	339.0
1	20	1.268-5.185	127.6	248.6

Source: own calculations

Annex II Distribution of age groups of farm operators according to agricultural census of 2007 and in 2007 farm survey



Source: SOE (2013); own calculations