THE USE OF ECONOMETRIC METHODS IN FAMILY FARM SUCCESSION STUDIES

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Abstract
The use of econometric methods in family farm succession studies
Farm succession is an important issue for any family farm, for the future structure of farming and for rural policy makers. This is the process whereby the skills, traditions and capital of farming are passed from one generation to the next. Scientists realized the importance of scientific investigation of succession on family farms no more than thirty or forty years ago, as the earliest studies bear dates from 1968 on (see i.e. Nalson 1968). There are many different scientific methods used to process surveys' data or to represent the process of farm succession; this paper offers a review of foreign and Slovene studies from the last 15 years, in which econometric methods are used to describe and analyse the family farm succession process.

Key words
family farm, farm succession, econometric methods

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1. Introduction

Scientific research on family farm succession has become more and more important presently, as many farms, especially in transition countries, face big structural changes (Potter and Lobley 1996, 172; Bohak and Borec 2008, 1).

According to Fennell (1981, 19-21), family farm succession is a process occurring over a long or short duration of time, during which a farm family plans a transfer of knowledge, labour, skills, management, control and ownership of the farm business from the retiring generation to the next generation. It involves the creation, preservation and, finally, the ultimate transfer of the farm business assets to achieve personal, family and business goals (Glauben et al. 2004, 1 and 2). Each family farm business is unique and there are no uniform instructions on how to accomplish succession. It is important to understand that many different factors affect the process; the most important are structural characteristics of the farm and the farm family (Kimhi and Nachlieli 2001, 49; Corsi 2004, 5; Kerbler 2007, 2 and 15). Which factors are really significant and how they work is the subject of interest of many international studies.

The literature on this topic was mainly published by social scientists, while agricultural economists mostly tackled farm succession from the fiscal point of view. Nowadays, agricultural economists focus more on various factors affecting succession by using econometric methods; while rural sociologists (by applying classical statistical methods) try to shed light on various practices and patterns of the process of farm succession, farm transfer and farmers` retirement.
This paper comprises a review of studies (authored by agricultural economists) in which econometric methods were used as a tool for the analyzing of statistical data from a survey.

The aim of this article is not to make a detailed analysis of the application of econometric methods or to estimate whether the chosen method in each presented study is appropriate or not. Our intention is only to present which questions concerning the succession process are researched with the use of various econometric methods.

2. The use of econometric methods in the family farm succession process- the case of 5 foreign and 2 Slovene studies

2.1. Foreign studies
Kimhi (1995) theorized about the choice of successor in family farms. He outlined the theoretical farmer's dynastic utility model and presented a solution for its maximization. Finally, the writer suggested that the farm should be attractive to the children and that sometimes it might be optimal for the family to choose a successor who is not the best candidate for running the farm.

The problem of optimal time for transferring the farm belongs to the family of intergenerational transfer problems; a Miljkovic (1999) paper attempted to disentangle this problem. The aim of Miljkovic's work was to model the optimal time for transferring the family farm from parents to children in less developed economies using the option value approach. The results of his work are dependent on culture/county and family specific implications, but, generally, parents will likely be ready to transfer the farm if they perceive that losses from the delay of transfer

due to lack of their ability to adjust to new technology/market conditions are increasing, while their more educated succeeding child has a better chance of improving farm operations.

The exit from farming was studied by Kimhi and Lopez (1999). These authors presented farmers´ retirement decisions in connection with succession considerations. The household survey was conducted using a questionnaire administered by mail; almost 500 farmers from Maryland (USA) answered the questions. In order to estimate determinants of the retirement decisions, respondents were asked to rate several possible considerations that may affect their retirement decision. To find out what is the relative importance of succession considerations, data was processed using descriptive statistics and by presenting a regression of the importance of succession considerations. The authors found that retirement and succession decisions are not separable and that the relative importance of succession considerations is positively related to the importance of the farm enterprise relative to other income-generating activities of the family.

In 2000, Taylor and Norris published a paper about fairness and conflict over the transfer of the farm from the perspective of the younger generation in Canadian farm families. The authors interviewed 36 successors (35 sons and 1 daughter) aged from 20 to 47 years and their 36 off-farm siblings (25 sisters and 11 brothers), who ranged in age from 25 to 46. A multiple regression analysis was carried out in order to determine the predictive effect of the three independent variables, respondents' agreement on the rule of fairness, agreement on fairness of transfer and perception of family warmth or conflict. The authors concluded that higher levels of conflict were predicted particularly when the farm successor and off-farm siblings do not agree that the farm transfer is fair.

Mann (2007) developed a theoretical model for farm succession in which identity-related variables gain in importance at the outset of the process and environmental factors become more significant during the later stages of succession. To test the model, a mailed survey of 731 potential farm successors between the ages of 14 and 34 was carried out in Switzerland (questionnaire). Data was processed in three steps. The first step involved a factor analysis to identify the core variables that affected occupational choice. Then, an ordered probit analysis was developed in order to check how attitudes towards farming changed during adolescence. A third step was an attempt to verify the theoretical model through another ordered probit analysis. The results revealed that for both men and women, the prospect of working alongside their parents is an important factor in the decision to take over the family farm.

2.2. Slovene studies

Juvančič (2002) developed an econometric model that quantifies the impact of determinants of structural changes on agricultural holdings in Slovenia. Two sub-models closely connected to the problem of farm succession, i.e. a model of farm survival and a model of farm growth were presented. The author decided to use a probit equation for the first model and an OLS (Ordinary Least Squares) equation for the second. Data for the research was taken from the Census of the population, households, housings and agricultural holdings in the Republic of Slovenia in 1991. The author found that the probability of farm survival is higher in less favoured areas, as the basic characteristic of such areas is lower accessibility of off-farm employment.

Tab. 1: Overview of family farm succession studies using econometric methods.

Study	Data collection method and sample	Data processing methods	Objectives	Type of publication
1. Kimhi (1995)	no data	derivation of equations to build a model of differential human capital investments (model of simultaneous equations)	to present a model for specific human capital investments in an altruistically motivating farming society with a heterogeneous population	article in a journal
2. Miljkovic (1999)	no data	option value model (derivation of equations)	to model the optimal time for transferring the family farm from parents to child(ren) in less developed economies	article in a journal
3. Kimhi and Lopez (1999)	household survey in Maryland; use of a questionnaire in spring 1992; 469 respondents	ranking of retirement considerations, descriptive statistics, regression of the importance of succession considerations	to present and discuss retirement and succession considerations of family farm operators in Maryland	article in a journal
4. Taylor and Norris (2000)	interview, 36 (35 sons, 1 daughter) successors aged between 20 and 47, 36 off-farm siblings (25 sisters, 11 brothers) aged between 25 and 46	paired t-test. Chi-square test, correlation matrix, multiple regression analysis	to examine fairness and conflict over transfer of the family farm from the perspective of the younger generation	article in a journal
5. Mann (2007)	from the Farm Transfer Data Network and questionnaire for farmers (775 respondents) and their children (454 respondent boys, 277 respondent girls)	3 steps: (i) factor analysis (ii) ordered probit analysis: how attitudes towards farming changed during the time (iii) ordered probit analysis to verify the theoretical model	to develop a theoretical model for farm succession in which identity-related variables influence occupational choice at the beginning of the process and environmental factors gain in importance during the later stages of succession	article in a journal
SLOVENE AUTHORS				
6. Juvančič (2002)	census of the population, households, housings and agricultural holdings in the Republic of Slovenia in 1991	probit equation for the model of farm survival and OLS equation for the model of farm growth	to examine the factors affecting labour allocation and dynamics of labour supply on agricultural holdings in Slovenia	dissertation
7. Kerbler (2007)	questionnaire; 789 mountain farms with farm operators aged 45 or more	probit model, tobit model	to study the relationship between succession on mountain farms in Slovenia and their socio-geographical structure	dissertation

Kerbler (2007) researched the relationship between succession on mountain farms in Slovenia and their socio-geographical structure. He tried to uncover how succession status and decisions on farms are influenced by the factors of the socio-geographical structure of mountain farms with the use of the bivariate probit model and how the same factors influenced timing of succession using the tobit model. The survey was mailed to 3000 Slovene mountain farms with farm operators aged 45 and over. The final sample included 789 mountain farms. The results suggested that succession status and decisions on farms are influenced by almost all studied factors (the position of the farm, the size of the farm and the farm family, the farm income, the presence/absence of the successor, the age/education of the family members, machinery, etc.). Tab. 1 briefly shows the presented studies on the family farm succession process.

3. Conclusions

In the case of presented papers, scientists apply econometric methods when they want to answer questions about optimal timing of farm transferral from parent to child, optimal timing for retirement, choice of successor, fairness over farm transfer, key succession considerations and possibilities or necessity of farm exit.

In the other family farm succession studies (i.e. Kimhi and Nachlieli, 2001, 42-58; Väre, 2003, 2-12, etc.), the econometric method is used to investigate the discrepancy between planned and actual succession or to ascertain the likelihood to retire or to have a successor.

In our opinion, we can expect more studies on family farm succession in the future since this issue is of vital importance for farm survival, as most farms without a declared successor often end up in decay.

The process of farms disappearing could kick start the beginning of other losses such as abandoning of farmed areas, the loss of farming tradition and the loss of employment. For this reason, it is necessary to study the factors that may influence the succession status on a farm and to acquaint agricultural policy makers with those results in order to plan new policy measures or to assess the validity of the old ones.

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Summary

In this paper, we presented 5 foreign and 2 Slovene studies on the family farm succession process. The econometric method was used to describe and analyze the process in all presented papers, although the research questions were quite different.

Kimhi (1995) presented the problem of the choice of a suitable successor in family farms. Using the econometric method, he developed the theoretical farmer's dynastic utility model and presented a solution for its maximization.
The aim of Miljkovic´s (1999) paper was to model the optimal time for transferring the family farm from parents to children in less developed economies using the option value approach.

The exit from farming was studied by Kimhi and Lopez (1999). To find out what the relative importance of succession considerations was, authors presented a regression of the importance of succession considerations.
As emotions also play an important role within the family farm succession process, Taylor and Norris (2000) prepared a study about fairness and conflict over transfer of the farm. A multiple regression analysis was carried out in order to answer the scientific question.

Mann (2007) carried out a survey in order to test the theoretical econometric model for tracing the process of becoming a farm successor on Swiss family farms. The results revealed that for both men and women, the prospect of working alongside their parents is an important factor in the decision to take over the family farm.
In Slovene scientific space, we found only two econometric studies connected with the problem of family farm succession.

Juvančič (2002) developed two econometric models closely connected with the problem of farm succession, i.e. a model of farm survival and a model of farm growth. The author decided to use the probit equation for the first model and the OLS equation for the second.

Kerbler (2007) researched the relationship between succession on mountain farms in Slovenia and their socio-geographical structure. He tried to find out how succession status and decisions on farms are influenced by the factors of the socio-geographical structure of mountain farms by using the bivariate probit model and how the same factors influenced timing of succession using the tobit model.

In this contribution, we presented a few problems connected with family farm succession that were disentangled with the use of econometric methods. In the other family farm succession studies, the econometric method is also used to investigate the discrepancy between planned and actual succession or to ascertain the likelihood to retire or to have a successor.

In our opinion, we can expect more studies on family farm succession in the future since this issue is of vital importance for farm survival, as farms without a declared successor often end up in decay.