The succession effect within management decisions of family farms

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Abstract— **The preparation of the farm transfer or farm exit is a process that starts in the consolidation stage of the farm life cycle. In this stage, the decision to transfer the farm or not is taken and the farm management is adapted to this decision. The objective of this paper is to model the succession effect on farm management. The results show that the succession effect plays a role from the age of 45. An early designation of the successor gives an incentive to invest and to improve the management.**

Keywords— **farm transfer, successor, farm life cycle**

I. INTRODUCTION

The designation of a successor opens farm perspectives. Within the same phase of their life cycle, farms can differ from each other, because of different expectations about the future. Farm management during the current farm life cycle, is influenced by succession perspectives. Calus, et al. [1] reveals that this difference between farms is reflected by the Total Farm Assets (TFA) and that the TFA is positively correlated with the designation of a farm successor. In this paper an econometric model estimates the influence of the successor on the farm management. This model is based on the concept of the succession effect [2].

II. LITERATURE REVIEW

A. Farm life cycle

Family farms tend to have a cyclical history in which the early, middle and late stage are determined by certain family life cycle events [3]. The significant points in the farm family cycle (marriage, children, death) may be marked by substantial changes in farm size, location or farming practice. If none of these solutions is pursued, the fluctuating labour supply will lead to considerable variation in labour productivity, with family members being over-stretched (with attendant stress and poor workmanship) over certain portions of the family cycle and underemployed at others [4].

The choices made in the different stages of the farm life cycle are reflected in the farm management. The decision taking within the family farm is not only based on the attempt to maximise the present value of their disposable income and optimise the net worth of their farm [5, 6]. Also other goals such as maintaining control and passing on a secure and sound business to the next generation [7] are important for the farming family. This has both business and family implications. It means that the business has a longer planning horizon, measured in generations rather than years, and that securing long-term survival may be more prominent among the firm's objectives than maximizing short-run gains. For the family this implies that the farm structure might be adapted to the coexistence of two families during the transfer period.

At the end of the farm life cycle, succession perspectives play an increased role in farm management decision-making and the optimisation will be as follows:

- If the farm is transferred within the family, the viability of the farm will be optimised.
- If there is a farm exit, the liquidation value will be optimised.

B. Succession effect

The succession status of the farm family household is important in describing the way the farm business develops over time [8, 9]. The presence of a successor provides an incentive to expand the farm, to invest in capital and to increase the output over longer periods than would be the case if succession is uncertain or has been ruled out [3]. This 'succession effect' was suggested by Kimhi, et al. [2]. They argue that the occurrence of a successor within the family farm might motivate the principal decision maker (PDM) to invest and raise the current farm size. This link might become stronger as the event of succession comes

closer. But Kimhi, et al. [2] did not find empirical evidence for the succession effect. Potter and Lobley [8] suggest that the succession effect may operate throughout a farmer's career, and not only on retirement or in old age: an expectation or non-expectation of succession by younger farmers could have a strong impact on the way decisions are made. They state that a successor can be seen as a driving force for the PDM. A successor provides a constant incentive for expansion and forward planning; the PDM without a successor has no such interest. Elderly farmers without successor may thus proceed to run down their businesses and begin consuming capital in old age, if only to reduce the workload and hours worked. Opposite to these theory, Stiglbauer and Weiss [10] find a negative relationship between previous farm growth and the probability of farm succession, referring to the possible aversion of PDM to make long-term decisions immediately before farm transfer.

Within this article, the succession effect is measured by means of the Total Farm Assets indicator [1]. Total farm assets are seldom used in the literature as an indicator of farm value, although they reflect the total present value of the farm, form the basis of investment evaluation and they do not take into account the way the farm is financed (liabilities or owners' equity).

III. METHODOLOGY

Based on the theory of Kimhi, et al. [2], our hypothesis is that farmers with a reasonable assured expectation of succession develop their businesses in a more positive context compared to farmers who are more pessimistic about succession perspectives. The related research question tests whether there exists a positive influence of a designated successor on the TFA value development.

To test the hypotheses of a positive succession effect, an ordinary least square panel data regression models is performed on the Flemish Farm Accounting Data Network (FADN) data. We hereby assume – based on literature – that TFA is influenced by the financial position of the farm, and the succession effect. Other aspects of the farm management will also have an impact on the TFA development, but these effects are captured as unobserved heterogeneity within the fixed effect panel data models. Therefore we can include only a limit number of independent variables in our model: the group dummy variables capture the unobserved heterogeneity of each group, in this case, each farm.

The financial position is reflected in the farm solvency (SOLV), calculated as the own capital divided by the total liabilities of the farm (%). It indicates the burden of debt by the farm, i.e. possible financial difficulties in the future. A high solvency involves that most of the farm property is owned by the PDM and loans from the bank are limited. In our model the lagged variable is used to overcome endogeneity problems: $SOLV_{t-1\ i}$ is not influenced by $TFA_{t\ i}$.

A succession effect means that depending on the designation or non-designation of a successor, different patterns of farm development are followed. The designation or non-designation is based on the indication of the PDM that he has designated a successor, that succession is not yet certain, or that no successor is designated. This indication is made within the FADN database. In order to test the pre-succession effect, two dummies are added to the model. The dummy D_{succ} represents the effect of the designation of a successor. The dummy D_{nysucc} indicates that succession is uncertain (i.e. not yet successor designated). So the base category is a farm that states not having a successor. Lagged variables are used to overcome the problem of endogeneity: $TFA_{t\ i}$ has no influence on the dummies $D_{succ\ t-1\ i}$ and $D_{nysucc\ t-1\ i}$. The time effect is included by the variable AGE, that represents the age of the PDM. The model below indicates the OLS fixed effect panel data regression model.

$$TFA_{t\ i} = \alpha_1 + \beta_1\ SOLV_{t-1\ i} + \beta_2\ D_{succ\ t-1\ i} + \beta_3\ D_{nysucc\ t-1\ i} + \beta_4\ AGE$$

IV. DATA

The empirical analysis is based on data for Flemish farms extracted from the Belgian FADN. Flanders is the northern part of Belgium, and contains 67 per cent of all Belgian farms [11]. Our data represents an unbalanced panel over a 15-year time period (1989-2003) resulting in a total of 4995 observations on 767

farms. The maximum number of observations per farm is 15, the minimum is 1. Only farmers aged 40 or older are included in the dataset. During the 15-year time period, the designation of a successor was observed on 197 farms. 351 PDMs had decided not to have a successor. On the remaining farms succession was uncertain. Table 1 gives some descriptive statistics for the sampled farms, based on the 2003 accounting year.

Table 1 Descriptive statistics of the data set of farms in the sample (2003)

		Mean	SD
Successor designated (n=44)	TFA[a]	632,719	314,312
	SGM[b]	3,265	2,224
	farmer's age	57	5
	land use (ha)	53	37
	labour (full-time equivalent)	1.93	0.64
Successor uncertain (n=105)	TFA[a]	471,876	294,627
	SGM[b]	2,550	1,430
	farmer's age	52	6
	land use (ha)	38	23
	labour (full-time equivalent)	1.56	0.44
No successor designated (n=86)	TFA[a]	336,926	227,596
	SGM[b]	1,993	1,294
	farmer's age	53	6
	land use (ha)	30	20
	labour (full-time equivalent)	1.37	0.38

[a] TFA = Total Farm Assets

[b] SGM = Standard Gross Margin

V. RESULTS

The succession effect reflects the influence of the designation of a successor on the farm investments. Due to the lack of observations for all farms over the 15-year time period, all econometric analyses were performed on unbalanced panels. The Hausman-test [12] indicates fixed effect models and not random effect models. This is also confirmed by the t-statistics of all group dummy variables that are significant. The use of the group dummy variables within the fixed effect models corrects for the unobserved heterogeneity [12]. The group dummy variables cover the farm specific characteristics that are not included in the independent variables of the model (e.g. soil type, farm environment, ...) and enable us to estimate a general model related to the succession effect, not depending on farm type, farm size etc.

Table 2 provides the descriptive statistics of the sample used in the analysis. There is only a moderate correlation between the variables related to succession perspectives (Table 3). Within these OLS fixed effect panel data regression models, no problems of multicolinearity, heteroscedasticity or endogeneity are observed.

Table 2 Descriptive statistics of the sample succession effect

Variable	Mean	Std. Dev.	Cases
TFA	349,496	242,369	4357
SOLV	81.27	16.76	3646
Dsucc	0.21	0.40	4357
Dnysucc	0.39	0.49	4357
AGE	53.35	5.70	4357

Table 3 Correlation matrix of the independent variables of the succession effect model

	SOLV	Dsucc	Dnysucc	AGE
SOLV	1.000			
Dsucc	-0.121	1.000		
Dnysucc	-0.003	-0.529**	1.000	
AGE	0.266**	0.176*	-0.178*	1.000

**: significant at 0.01 level

*: significant at 0.05 level

Table 4 indicates that three independent variables are statistically significant at the 0.000 alpha level. The dummy variable D_{nysucc} is not significant at the 5 per cent level. The independent variables of the model account for 14 per cent of the variance in the dependent variable and group effects account for 93 per cent of variance. This results in an overall score of 94 per cent of the variance in the dependent variable.

Table 4 Parameters of the OLS fixed effect panel data regression of the succession effect model

Variable	Coefficient (β)	St. Error	β/st.er.	P[|Z|]>z
SOLV	-2,862.17	164.48	-17.401	0.000
D_{succ}	37,762.54	6,173.10	6.117	0.000
D_{nysucc}	13,568.84	5,548.68	2.445	0.015
AGE	8,936.85	387.88	23.040	0.000
Adjusted R^2	0.93			
Model test	F(625, 3020)		= 80.54	0.000

TFA is negatively correlated with solvency. If the solvency increases with one per cent, ceteris paribus, the TFA decreases with €2,862. Or put differently, at the end of the farm life cycle, farmers developing their farm do this partially with external sources, such as bank loans, or invest their own capital to develop the farm. Farm investments are vital to remain competitive in the contemporary farm environment.

The influence of the age of the PDM on the TFA indicates an increase of the TFA of €8,937 if the age of the farmer increases one year, ceteris paribus.

During the farm life cycle, the TFA increases as the PDM gets older: a continuous development of the family farm is necessary to remain a competitive and viable farm.

The succession effect is reflected by the positive sign of the coefficients of the dummy variables related to the designation of a successor. A certainty about farm succession is increasing the TFA with on average €37,763, compared to the TFA of a farm without designated successor, ceteris paribus. The effect of not yet having certainty about a successor is reflected in an average increase of TFA by €13,569 compared with the TFA of a farm without designated successor. This result confirms a succession effect of both the designation of a successor and the uncertainty about designation of a successor. Although the latter is to a smaller extent. A timely designated successor stimulates the PDM to make extra farm investments (Figure 1). Uncertainty about farm succession stimulates limited farm investments.

Making use of the Total Farm Assets (TFA) as an indicator of farm development, we are able to confirm econometrically the succession effect based on empirical evidence for Flanders: the PDMs take into account the possibilities of farm transfer within the investment decisions. The designation of a farm successor has a more pronounced influence on the investment decisions than in case the succession is still uncertain, but both the designation of a successor and the uncertainty about farm succession, increases the TFA statistically significant compared to a non designation of a farm successor.

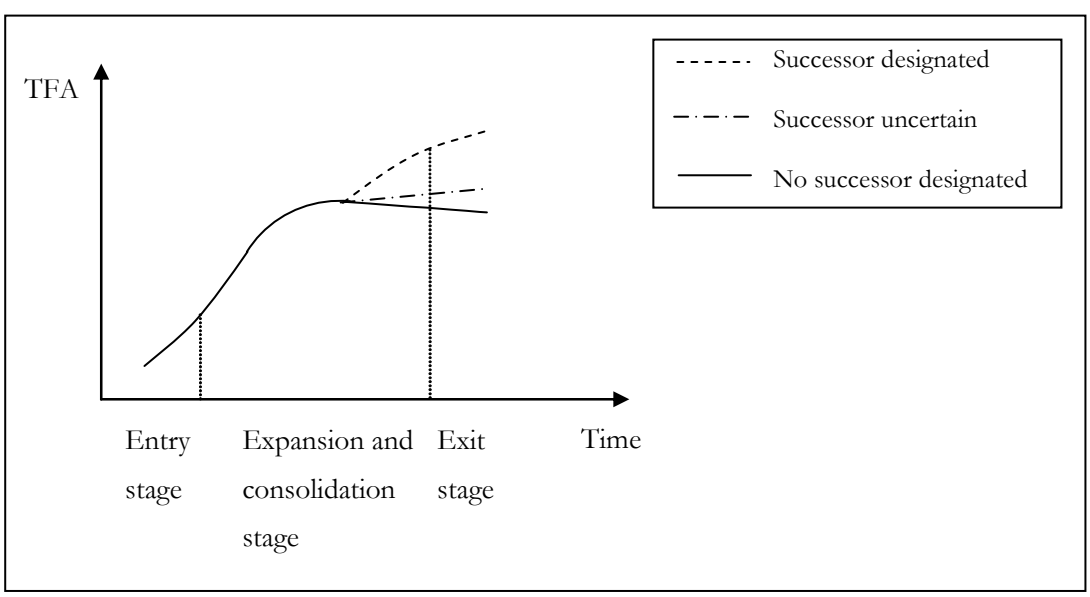

Figure 1 Conceptual model of the succession effect

VI. CONCLUSIONS

Making use of the Total Farm Assets (TFA) as an indicator of farm development, we are able to confirm econometrically the succession effect at least for the farms represented in the FADN set of Flanders. Our results clearly confirm the existence of a succession effect. From an age of 45 years, PDMs take succession perspectives into account in the farm development. The age of the PDM and the way the farm is financed influence the growth rate of TFA, but also the designation of a successor is a positive stimulus for farm investments. The TFA will increase if own capital or external financial sources can support the farm expansion. The fact that there is a certainty or possibility of farm succession stimulates farm development by the PDM.

VII. REFERENCES

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