Do members derive value from cooperative growth? Experimental evidence on farmers' horizon and willingness to invest

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Abstract

Globalisation of food markets pressures agricultural cooperatives to seek growth strategies to safeguard competitiveness and the capacity to maintain services. Farmers as the owners of the cooperative are the principal party to provide investment capital. The availability of member financing is however undermined by structural changes in agriculture. The capital intensity of farming discourages voluntary contributions if farmers do not have incentives to commit capital to the cooperative. Choice experiment is employed to uncover preferences for investment attributes among Finnish milk producers. Results indicate that farmers prefer reserving control rights to members, but they could be incentivised to contribute capital on terms which include capital-based residual rights, low-risk return, and compensate for appreciation of firm value. Policy implications of the findings describe the need to redefine member capital instruments innovatively in growing producer cooperatives.

Keywords: producer cooperatives, investments, choice experiment.

1. Introduction

The traditional model of agricultural producer cooperatives is challenged by the structural changes in agriculture. Locally operating agricultural cooperatives constitute still an important marketing channel for farmers to sell their production in Europe. However, the concept of home markets for cooperatives has broadened in parallel with the globalization of agricultural markets and the food industry. Cooperatives adopt growth strategies to safeguard competitiveness, profitability, and the capacity to maintain services to the members.

The possibilities of cooperatives to acquire equity capital are restricted, which poses cooperatives a financial handicap in competition. The financial structure has in many cases been a decisive factor to depart from a traditional cooperative organizational structure. Dynamics inside of the agricultural cooperatives put additional pressures on their financial position. Diminishing number of agricultural producers implies that cooperatives need to refund the capital of exiting members. Due to the capital intensity of farming, producers may prefer to invest in own farm instead of in the market channel, i.e. the cooperative.

Innovations in cooperative financing and organizational structures have emerged as response to the competitive pressures. The objective is typically to find a model which retains the cooperative form and ideology but enables accessing non-member equity capital (Bekkum and Bijman, 2006). At the other extreme in the Chaddad and Cook (2004) typology, is the transformation into the investor-owned firm, which detaches the producer organization from its cooperative principles (the user owns, benefits, and control). However, there is a gap in the existing agricultural economics literature in that the farmers' dual role as members and investors in producer cooperatives is not thoroughly understood.

This paper examines with stated preference methods the farmers' willingness to invest in cooperative growth. To our knowledge, this is the first paper studying the farmers' preferences regarding the type of the cooperative capital instruments, i.e. investment incentives. An experimental questionnaire setting is employed to elicit the preferences for the structure of instruments that could be designed as member participation mechanisms in growing agricultural cooperatives. Heterogeneity of farmers is expected to produce differences in preferences. Producers who have invested heavily in their own farms may be capital-constrained to contribute financing the cooperative, although they are hypothesised to be more positively predisposed to cooperative growth and enlarging the marketing channel. On the other hand, other producers may have excess capital and be interested in investing voluntary more in the cooperative, while exiting producers may not see benefits from patronage based return rights.

2. Data and methods

The study utilizes the choice experiment (CE) method. The approach draws from the theoretical background in consumer choice and random utility theory. According Lancaster (1966), consumers derive utility from the attributes of the goods. CE is initially applied in marketing and transportation literature, and it is increasingly used in non-market valuation in estimating policy changes environmental and health economics (Louviere et al., 2000). In agricultural economics, choice experiments are employed e.g. in studying consumer preferences regarding food attributes or production methods (Michaud et al., 2012). In financial economics the method is still sparsely utilised even in the behavioural strand that studies investors decision making and heterogeneous preferences. One of the few is Bateman et al, 2009, using CE for testing retirement investor risk tolerance.

CE is suitable method for uncovering the relative valuation of the investment attributes. We are interested in the relative attractiveness of investment attributes when farmers are offered alternative forms in which to invest in the cooperative. Members have an obligation to contribute member capital but incentives that match the preferences could be constructed to collect voluntary growth capital from members. The experiment is conducted as farmer questionnaires in which the respondents are requested to compare given investment alternatives. Alternatives consist of qualitative attributes that describe the investments. The baseline alternative, which represents the status quo, corresponds to the basic cooperative capital investment. Two alternative investments presented in the choice task, move from the cooperative capital terms towards more market-oriented, share-like investment instruments. The investments are defined in terms of four attributes: Ownership right, return right basis, expected return, and transferability (Table 1). Each attribute takes three levels.

Table 1. Attributes in the choice experiment on investment instruments

Attribute definition	Level definition
Ownership rights Whether non-members are entitled to ownership and voting rights in the cooperative	*Base level:* Restricted to members; *Alternative 1:* Voting restricted to members, preferential return to non-members; *Alternative 2:* Non-restricted proportional voting
Residual right basis How the refund of cooperative surplus is determined	*Base level:* Patronage; *Alternative 1:* Patronage and capital equally; *Alternative 2:* Capital
Expected return Level of risk associated with the invested capital and expected rate of return	*Base level:* Low risk and return; *Alternative 1:* High risk and return; *Alternative 2:* Return is capitalised
Transferability Marketability of the invested capital and how its value is determined	*Base level:* Non-transferable, redemption at par; *Alternative 1:* Transferable, nominal adjusted for appreciation of firm value; *Alternative 2:* Transferable and valued at secondary markets

The choice experiment enables studying farmers' preferences regarding investing in choice situations that are currently hypothetical but which the subjects may encounter in future. This is particularly relevant in the transition to the new cooperative law in Finland which is in effect from January 2014. It is important also for the management of an expanding cooperative to recognize what kind of capital contribution mechanisms the members prefer and how the capital investment instruments should be designed to incentivize member-owners to participate in financing the cooperative growth.

A focus group discussion was carried out to find the most relevant attributes to the choice experiments. The session with field experts representing milk, meat, and forest producer cooperatives and central organizations confirmed that cooperative members derive value from their membership through monetary mechanisms such as producer price, patronage refund, and interest on capital. But also their membership value consists of non-monetary elements for example services provided by the cooperative, control rights, and access to market. Concerns from the field were voiced that producers indeed weigh carefully the gains from investing in the cooperative when they are capital-drained of farm investments.

Experimental design with four attributes, three levels each, was carried out with Ngene software. Fractional orthogonal design generated 48 choice sets, which were allocated to eight blocks. Thus each respondent confronted a questionnaire with six choice sets. To control for order effects, the order of attributes was rotated in every second block. A pilot study was conducted as an internet questionnaire delivered to 160 randomly chosen farmers who are members of the milk cooperatives included in the sample. The objective was twofold; to pre-test the relevance of the attributes but also to obtain priors for attributes that could be employed in generating an efficient experimental design for the main survey. However, the pilot study yielded only 15 responses unbalanced over versions, so the pilot data could not be analysed. Orthogonal design was thus retained.

The data consists of members of five Finnish milk producer cooperatives. The cooperatives were chosen to represent variety in the sample: two larger that act as milk supply cooperatives (also have a holding role as shareholders of the limited liability company Valio), and three smaller, independent cooperatives that take care of the processing and marketing of milk. The initial sample consists of 2408 farmers (including the pilot). The questionnaires were delivered by mail but also the possibility of answering online was given. Response rate turned out rather low (16.8%) yielding 406 farmers in the final sample.

3. Results

The effects coded CE data is analysed with the multinomial logistic (MNL) model. Alternative specific constant (ASC) is defined to take value of 1 when either of the investment alternatives 1 or 2 was selected, and zero 0 for the status quo, i.e. the basic cooperative capital form. Estimated coefficients for the choice attributes are shown in the first column of Table 2. Although the overall fit of the model is low (5.03% explained by the attributes), the attributes have significant coefficients, except for RBOTH, which indicates that the attributes are relevant factors in the farmers' choice of an investment instrument.

The signs of the coefficients reflect how trade-offs are made between the attributes. Negative coefficients on VPRE and VALL indicate that farmers prefer to retain the ownership and control in the hands of the cooperative members instead of welcoming outside investors and endowing them either preferential return or proportional voting rights. The result makes sense as the ownership right attribute is defined so that changes from the status quo embody impairment of members' position, while the three other attributes are not directional per se.

The estimation indicates that farmers prefer the residual rights to be determined based on capital as RCAP has a statistically significant positive coefficient. While the coefficient on the middle-level of the residual rights attribute (RBOTH) in not significant, we conclude that return based on the capital contribution is the mode how farmers prefer cooperative surplus to be refunded over return calculated based on patronage (i.e. the volume of milk supply to the cooperative). As to the expected return, farmers prefer receive it in form of low risk and low rate of return as defined in the status quo. The coefficient on EHIGH is negative and statistically significant, implying an aversion to high expected risk-return investments. Yet, based on the estimated coefficients, farmers prefer the attribute in which return is capitalised over the low expected risk-return attribute. Milk producers exhibit a strong preference for a transferable, appreciable, investment instrument as MADD attribute receives positive and significant coefficient. However, transferability is not preferred in the form of an exchange-traded investment instrument, as defined in attribute MMARK that receives a coefficient of similar magnitude but with a negative sign.

In addition to the choice attributes, individual farmer characteristics are expected to influence the investment choices. The impact of farmer-specific effects that do not vary across the choice tasks is tested by adding them as explanatory variables in the MNL model. The second column in Table 2 shows that the producers who are members in a smaller independent cooperative, or have an intention to quit farming within next five years, or have a

Table 2. Estimation results

Variable	MNL model		RPL model	
	Coeff. (st. error)	Coeff. (st.error)	Coeff. (st. error)	Std. Coeff. (st.error)
ASC	-0.045 (0.100)	-0.955*** (0.122)	-1.068*** (0.130)	-
VPRE	-0.241*** (0.056)	-0.241*** (0.056)	-0.262*** (0.067)	0.412*** (0.104)
VALL	-0.313*** (0.053)	-0.318*** (0.053)	-0.325*** (0.062)	0.401*** (0.097)
RBOTH	-0.049 (0.053)	-0.049 (0.053)	-0.074 (0.057)	-
RCAP	0.102** (0.051)	0.101* (0.052)	0.122** (0.056)	-
EHIGH	-0.371*** (0.056)	-0.370*** (0.056)	-0.407*** (0.064)	0.395*** (0.100)
EGROW	0.201*** (0.051)	0.199*** (0.051)	0.230*** (0.056)	
MADD	0.230*** (0.049)	0.232*** (0.050)	0.274*** (0.055)	
MMARK	-0.256*** (0.052)	-0.254*** (0.052)	-0.280*** (0.061)	0.434*** (0.102)
Farm size, cows	-	0.008*** (0.002)	0.008*** (0.002)	
Large capital dummy	-	-0.490*** (0.175)	-0.573*** (0.186)	
Intention to quit dummy	-	0.552*** (0.113)	0.598*** (0.119)	
Independent coop dummy	-	0.510*** (0.129)	0.528*** (0.136)	
Female dummy	-	0.184* (0.103)	0.187* (0.108)	
Farming years	-	-0.010** (0.004)	-0.010** (0.004)	
Log likelihood	-2199.83	-2169.19	-2152.95	
Pseudo R	0.0503	0.0655	0.1216	
N observations	2231	2231	2231	

Dependent variable is the choice. Independent variables are the choice attributes. Status quo defined as the investment in the form of basic cooperative capital is the omitted attribute level from the estimations. VPRE and VALL denote the levels of the ownership rights attribute (preferential return, non-restricted voting, respectively), RBOTH and RCAP denote the levels of the residual right basis on both patronage and capital or only capital, EHIGH and EGROW denote the levels of the expected return attribute, and MADD and MMARK denote the levels of the transferability attribute. *** 1% significance level, ** 5% significance level, * 10% significance level.

larger number of cows, are more likely to choose the alternative investment instruments than the basic cooperative capital. Female-dummy also has a positive coefficient that is marginally significant. On the contrary, longstanding farmers and those with a large capital claim in the cooperative are more inclined to opt for the status quo investment instrument.

Random parameter logit (RPL) model is estimated to account for heterogeneity in farmers' preferences for the investment attributes. The distribution of the random parameters is specified as normal. Preference heterogeneity among the farmers in indicated by the RPL estimates in the third column of Table 2 as the standard deviations of random parameters are statistically significant. To identify farmer types who could be affected by a policy change to alternative investment instruments, demographic interaction terms are included in the RPL model. Interaction terms capture in what extent the variation in preferences for the choice-specific attributes is explained by respondent characteristics. *(RPL is work in progress)*

Preliminary results from the test of attribute non-attendance show that the precision of the estimates is improved when the estimation corrects for the elicited information on attributes that the respondent considered in the choice tasks. In a question on attribute attendance for the series of choice tasks, farmers most often stated considering the ownership rights attribute, and secondly the residual rights basis, while expected return and transferability received less attention. This can be interpreted as reflecting the familiarity of the first two attributes for the members of traditional agricultural producer cooperatives, whereas the latter two attributes are still uncharted in member-financing instruments of Finnish milk cooperatives.

4. Discussion

Based on the estimations, farmers exhibit clear preferences for investment attributes different from the basic cooperative capital investment. The results suggest that milk producers could be incentivised to contribute capital to their cooperative with an investment instrument that has following characterics: Return is determined based on capital, expected risk and return are low, or return is alternatively capitalised, and the investment is transferable and appreciable instead of redeemed at nominal value, but not subject to free valuation at an exchange. It is not surprising that in the sample of milk cooperative members, which can be characterised as traditional agricultural cooperatives, the ASC gets a negative coefficient, which is interpreted as a predisposition towards the status quo. While this may reflect the failure of the alternative investment instruments to incentivise choosing more market-oriented investments, familiarity bias offers another, probably intertwined explanation.

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