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Essays on investment behavior in agricultural producer cooperatives

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Tiivistelmä Maatalouden rakennemuutos sekä maatalousmarkkinoiden kansainvälistyminen ovat korostaneet viljelijöiden roolia tuottajaosuuskuntien omistajina ja niihin pääomaa sijoittaneina tahoina. Kiristynyt kilpailu, kansainvälistyminen ja osuuskuntien kasvu edellyttävät investointipääoman lähteiden ja saatavuuden tarkasteluun uutta näkökulmaa, koska perinteinen osuuskuntamuoto ei tarjoa riittäviä sijoittamisen kannustimia jäsenille osuuskunnan pitkäjänteiseen kehittämiseen sitoutumiseksi. Vaikka kansainvälisessä tutkimuskirjallisuudessa on esitetty havaintoja uudenlaisista tuottajaosuuskuntien rakenteista eri näkökulmista tarkastellen, osuuskunnan jäsenten näkemyksiä niistä ei tunneta. Tämän lisäksi jäsenkunnan ulkopuolisten sijoittajien näkemyksiä osuuskunnista potentiaalisina sijoituskohteina ei ole tutkittu aiemmin. Tämä väitöskirja koostuu neljästä esseestä, jotka käsittelevät sijoituskäyttäytymistä maatalouden tuottajaosuuskunnissa. Analyysi perustuu kahteen kyselyaineistoon, joista ensimmäisen otoksessa oli suomalaisia maidontuottajia ja toisen otoksessa rahoitusalan ammattilaisia edustaen potentiaalisia sijoittajia. Tuottajakyselyllä tutkittiin jäsenten preferenssejä koskien osuuskunnan ylijäämän käyttöä investointeihin sekä jäsenten näkemyksiä uusista osuuskuntien rahoitusinstrumenteista. Sijoittajakyselyllä tutkittiin jäsenkunnan ulkopuolista kiinnostusta maataloustuotantoa kohtaan sijoituskohteena sekä sijoituspäätökseen vaikuttavia käyttäytymisen motiiveja. Väitöskirjassa käytetyt menetelmät edustavat uudenlaista lähestymistapaa osuuskuntiin sijoittamista käsittelevässä tutkimuskirjallisuudessa. Kasvua tavoittelevat maatalouden tuottajaosuuskunnat voivat hyödyntää väitöskirjan tuloksia ja johtopäätöksiä käytännössä pääomanhankinnan strategioita suunnitellessaan. Sijoittajien käyttäytymisen ja preferenssien ymmärtäminen – niin jäsenkuntaan kuuluvien kuin jäsenkunnan ulkopuolisten sijoittajien – luo edellytykset uudenlaisten rahoitusvälineiden kehittämiselle osuuskuntien käyttöön.

Asiasanat: tuottajaosuuskunnat, sijoituspäätökset, käyttäytyminen, valintakoemenetelmä, rahoitusinstrumentit

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Abstract: In the wake of the modernization of agriculture and agricultural markets, the role of the farmer has increasingly moved towards that of an owner and investor in agricultural producer cooperatives. Competitive pressures, internationalization, and the growth of cooperatives call for an examination of new avenues for acquiring investment capital, as the traditional cooperative structure may fail to provide sufficient incentives to urge members to contribute to the long-term success of the cooperative. Despite an emerging multitude of new cooperative structures, the investment preferences of cooperative members are not sufficiently understood. Moreover, the preferences of potential non-member investors beyond cooperative boundaries remain practically unexplored. This dissertation consists of four essays around the theme of investment behavior in agricultural producer cooperatives. The analyses are based on questionnaire data from Finnish dairy farmers and financial market professionals. The farmer survey examined member preferences concerning the use of cooperative surplus for investments as well as

their views on new cooperative investment instruments. The investor survey studied the willingness of non-members to invest in agricultural production and the behavioral motivations affecting their investment decisions. The study methods applied here are novel to the context of investment in cooperatives. The results offer insights into new possibilities to develop capital sourcing strategies for use by growth-seeking agricultural producer cooperatives. An understanding of investor preferences will facilitate the design of new financing mechanisms for cooperatives.

Sisällys

LIST OF ESSAYS

This dissertation is based on the following essays. The articles are reprinted with the permission of the publishers.

1. Alho, E. Revealing loss aversion and horizon in farmer preferences: The case of Finnish dairy cooperatives. Unpublished manuscript.
2. Alho, E. 2019. Farmers' willingness to invest in new cooperative instruments: A choice experiment. Annals of Public and Cooperative Economics, 90(1), 161–186.
3. Alho, E. 2017. Assessing the willingness of non-members to invest in new financial products in agricultural producer cooperatives: A choice experiment. Agricultural of Food Science, 26(4), 207–222.
4. Alho, E. 2015. The effect of social bonding and identity on the decision to invest in food production. Journal of Behavioral and Experimental Economics, 59, 47–55.

SUMMARY

1   Introduction

This dissertation focuses on the investment behavior of cooperative members and of potential non-member investors in Finland, particularly with respect to their willingness to invest in agricultural producer cooperatives. The purpose was to increase the understanding of the factors influencing the decisions of farmers regarding whether to finance their cooperative's growth plans with retained earnings or with members' new equity contributions. If new equity capital is required, they are confronted, both at the theoretical and practical level, with the question: what incentives do they have to provide long-term capital voluntarily in a traditional form of cooperative. The member perspective in this study is that of Finnish dairy cooperative members. So far, these cooperatives have not adopted new, innovative financing instruments, in contrast to some of their foreign counterparts, which have adjusted their capital structure in various ways to overcome limitations for investment and growth. In case of limited possibilities to source growth capital from the members, the cooperative may consider modifying its ownership structure to allow external investors. Thus, the aim of the dissertation is to increase the current knowledge of the behavior and preferences of potential non-member investors, and pave the way for the introduction of new, versatile cooperative investment instruments in Finland.

The globalization of agricultural markets and consequent tightening of competition both in the consumer and input markets pose increasing challenges to producer cooperatives. It is also affecting the relation of farmers in their dual role as patrons and owners of the producer cooperative, and its success is critical to them. The cooperative's financial distress would most likely trickle down to the farm through its weakened ability to provide benefits to its members. Thus, the cooperative's long-term competitiveness is crucial to enable it to carry out its primary function of benefiting the members. An inescapable consequence of the structural change that has taken place in Finnish agriculture over the past few decades is that the membership of producer cooperatives is dwindling. Farmers who continue as producers are facing competing investment needs on their own farms. Such developments emphasize the role of these farmers as cooperative owners and highlight the question of incentives to motivate them to commit long-term capital for the cooperative. As the title of this dissertation implies, the members of producer cooperatives are also considered as investors in financing cooperative growth.

Discussion on incentives to encourage Finnish farmers to provide capital for their cooperatives has been practically non-existent. Each farmer's ownership role in the cooperative has traditionally been determined in proportion to their patronage. The literature recognizes several property rights problems in this context. New ownership structures have been proposed as a solution and have already been adopted in some European countries. Prior empirical studies have concentrated on describing the new models as they emerge, but without considering the views of cooperative members. Farmers may find the idea of opening their cooperative to outside investors as controversial at first, fearing it might threaten their control over the cooperative. However, the evidence provided in this dissertation can help growth-seeking agricultural cooperatives to find a model which

overcomes the capital constraints and also reconciles the preferences of members and investors alike.

The approach in this dissertation utilizes the choice experiment (CE) method, which enables to test the willingness of farmers and investors to provide financing for cooperatives. The CE method is a novel technique in the context of farmer cooperatives, particularly regarding investment in cooperatives. Further, this dissertation contributes to the behavioral economics literature by showing how rich data can be obtained to test investor behavior in the field of cooperatives. In general, stated preference and survey methods are not widely used in economics, despite their potential to increase the understanding of people's financial decisions. Even though the chosen analysis method has evident merits in studying the policy choices of individuals at the planning stage by revealing the relative importance of different attributes influencing their decisions, an obvious limitation is that their actual behavior may differ from the stated preferences depending on the current context. Thus, the purpose here is only to describe the relative preferences of cooperative members and non-members for various investment attributes and the factors affecting their investment behavior – not to take any stand on the investment capital of cooperatives in monetary terms.

This dissertation consists of four essays, each of which is interlinked to sourcing of investment capital for agricultural producer-owned cooperatives and to behavioral factors contributing to investor willingness to finance cooperative growth. The rest of this introductory chapter is organized as follows. Section 2 presents the theoretical perspectives on the topic of the dissertation, including a description of the position of cooperatives in European agriculture and a review of non-traditional cooperative forms. Section 3 discusses the empirical findings in the prior literature on the effect of behavioral aspects on people's investment decisions, with specific focus on two themes: social influences and loss aversion. Section 4 summarizes the results of each essay and discusses their practical implications for agricultural producer cooperatives and marketing of new financial instruments within the domestic food chain.

2 Literature on agricultural producer cooperatives

This section focuses on the theoretical and empirical literature dealing with agricultural producer cooperatives. The main theories and explanations concerning the organization of processing and marketing of agricultural production into cooperatives are first presented, helping to understand the prevalence of cooperatives in the European food chain. Thereafter, insights from the property rights theory are used to highlight the challenges faced by modern agricultural cooperatives in gathering equity capital for investments. The section ends with a review of current cooperatives structures in Finnish and in European agriculture, particularly in the dairy sector.

2.1 *Organizing of agricultural cooperatives*

As an organizational form, the cooperative is based on member participation both as customers and as providers of capital for the cooperative. Cooperatives are the predominant form of organizing the market access of agricultural production in Europe (Bijman et al. 2012a), and are characterized by member ownership, member use, and member benefits (LeVay 1983; Sexton and Iskow 1988). Farmers as the members of a cooperative are responsible for agricultural production, while cooperatives are involved in processing and marketing the products that farmers have produced. Various theories of organizational economics and transaction cost economics have pointed out the advantages of this organizational form. In the organizational economics literature, cooperatives are reported to benefit their members by creating countervailing market power, reducing information asymmetries, helping to economize on transaction costs, and reducing price risk (LeVay 1983; Staatz 1987; Hansmann 1988; Sexton and Iskow 1988). Indeed, cooperatives traditionally emerge to provide a mechanism to compensate for market failures or depressed prices (Cook 1995).

By organizing their market access through a cooperative, farmers benefit from the lower transaction costs compared to bargaining with buyers independently. Transaction costs are affected by the uncertainty and frequency of transactions, as well as their asset specificity (Williamson 1989; Ménard 2004). Cooperatives offer various advantages particularly in the agricultural sector, by safeguarding farmers against opportunistic behavior on the part of their trading partners and by protecting their private investments (Sexton and Iskow 1988; Ollila and Nilsson 1997; Valentinov 2007).

These cooperative benefits continue to be valid, although modern agriculture differs considerably from the early days of farmer cooperatives. Their rationale is still the same: to enable producers to gain market entry, to strengthen their bargaining power, to bring information advantages, and to capture economies of scale (Hendrikse and Bijman 2002; Valentinov 2007). The main types of producer-owned agricultural cooperatives, based on their functions, include: marketing cooperatives, which market the members' farm produce; supply cooperatives, which provide farm inputs; and service cooperatives, which offer different farming-related services (Ortmann and King 2007; Valentinov 2007; Bijman et al. 2012a). The focus in this dissertation is on agricultural marketing cooperatives. These can be characterized as a form of vertical integration within the agri-food

chain, with farmers owning assets in the product distribution channel through the cooperative (Hendrikse and Bijman 2002).

The traditional cooperative form relies on the principles of user benefit, user control, and user ownership (Barton 1989). Residual claims and control rights define the farmer's role as a member of the cooperative. Unlike shareholders in investor-oriented firms (IOFs), each cooperative member-owner has one vote irrespective of their capital contribution. Residual claim refers to the owner's right to the net income generated by the firm, after the deduction of claims of creditors, employees, taxes, etc. (Chaddad and Cook 2004; Chaddad and Iliopoulos 2013). In a cooperative, members receive a residual that is proportional to their patronage or use of the cooperative. Members of an agricultural producer cooperative are entitled to benefits in proportion to their transaction volume, determined as the amount of produce they sell to the cooperative. These benefits are typically referred to as a patronage refund, which is the residual claim of the member-owners to the cooperative's surplus and reflects their role as customers of the cooperative.

Apart from this customer role, members also have an investor's role in the cooperative. Upon joining the agricultural cooperative, members are obligated to contribute capital in order to gain voting and patronage rights. This contribution is called cooperative equity. In addition to patronage refunds, some refunds may be determined in proportion to the members' capital contribution, reflecting their role as owners. Depending on the cooperative, the residual returns on capital are referred to as dividends or interest. However, there is a clear difference from the ownership rights and equity claims in an IOF. Ownership in traditional cooperatives is collective: they are formed as a coalition of members whose equity shares are not transferable, since their residual claims are tied to their patronage and, thus, are not marketable (Nilsson 2001).

Retained earnings, i.e., the surplus resulting from patronage that is not refunded to members, form the main source of long-term capital in the cooperative. This surplus is either allocated or unallocated retained capital (Nilsson et al. 2009; Barton et al. 2011; Chaddad 2012), and relates to the collective ownership nature of traditional cooperatives. Allocated equity refers to retained capital held in an individual member's name in proportion to the member's patronage, while unallocated equity is the portion of earnings retained in the cooperative for investments (Russell and Briggeman 2014). Unallocated equity serves as a buffer against business risks and will not be paid out to member-owners, should the cooperative dissolve.

The use of cooperative surplus has to strike a balance between short-run and long-run sustainability (Barton et al. 2011). Members may prefer to maximize the distribution of patronage income, if they wish to invest the refunds in their own farm operations rather than retaining them in the cooperative to strengthen its long-term ability to provide services to its members (Russell and Briggeman 2014). While the payment of patronage refunds may help to attract new members, retaining a sizeable proportion of unallocated equity will improve the financial health of the cooperative (Zhang et al. 2013). The differing interests towards patronage refunding give rise to the horizon problem discussed in the next section. However, retaining a large amount of unallocated equity to finance the cooperative may weaken the incentives of for members to participate in its governance and may lead them to refrain from investing in the cooperative (Österberg and Nilsson 2009). Even though the traditional view of cooperatives emphasizes that the financial performance of the cooperative should be reflected in the members' income statement

instead of in the economic rent to its investors, the residual return on capital is justifiable as an incentive to encourage members to act as the cooperative's long-term owners.

2.2 Property rights problems in traditional cooperatives

The sources of financing in traditional cooperatives are restricted to internally generated funds and equity contributions from members, while sourcing of risk capital from non-member outside investors is not possible (Chaddad and Cook 2004; Chaddad et al. 2005). This is the key difference in funding between cooperatives and investor-owned firms. The restriction is argued to form a handicap for agricultural cooperatives in the competition against food industry firms operate as limited liability companies and can source external investment capital (Chaddad et al. 2005).

The organizational limitations of traditional cooperatives described above are theoretically explained by vaguely defined property rights, illiquid ownership rights, and conflicting residual rights between active and inactive cooperative members (Staatz 1987; Cook and Iliopoulos 1999). Inadequately defined property rights offer low incentives for participation in the control of the cooperative and for investing in it (Vitaliano 1983). A lack of incentives together with insufficient member capital may jeopardize the growth of the cooperative (Staatz 1989), and even result in its failure (Fulton and Hueth 2009).

The agricultural economics literature specifies a number of property rights problems which undermine investment incentives in producer-owned cooperatives: the free-rider problem, horizon problem, portfolio problem, control problem, and influence cost problem (Vitaliano 1983; Ollila 1989; Cook 1995; Cook and Iliopoulos 1999; Valentinov 2007). All of these problems originate from the ambiguously defined property rights in traditional cooperatives as well as from the characteristics of open membership, capital generation through patronage, and illiquid ownership rights, which are particularly relevant to agricultural cooperatives (Cook 1995; Cook and Iliopoulos 2000). A free-rider problem – also referred to as a common property problem – arises when gains accrue to individuals who have not participated in the efforts that produced the gains. This problem is particularly pronounced between current and new members, as the latter get a claim to assets generated by the old members. This creates potential for an intergenerational conflict in traditional cooperatives, where cooperative shares are non-tradable and residual rights are equal (Cook 1995).

Cook (1995) defines the horizon problem as a consequence of ill-defined property rights, which, in theory, create a disincentive for agricultural cooperative members to contribute to cooperative growth opportunities and to favor current payments instead of retained earnings (Cook and Iliopoulos 1999). Thus, a horizon problem occurs when the lifespan of an investment is longer than the members' horizon (Vitaliano 1983). In other words, a member's residual claim right terminates when the member exits and stops patronizing the cooperative, but the economic life of the investment is much longer than the expected membership period (Vitaliano 1983; Cook 1995; Sykuta and Cook 2001; Valentinov 2007). An equity structure without tradable shares that would have sufficient liquidity in secondary markets and without an appreciation mechanism exacerbates the horizon problem (Cook 1995; Cook and Iliopoulos 2000). This can result in a general tendency to favor short-term investments and hold back organizational growth.

The portfolio problem refers to the risk that members bear because their investments are tied to the cooperative's investment portfolio (Vitaliano 1983; Cook 1995; Sykuta and Cook 2001). Due to the nature of cooperative equity, the cooperative investment is determined by the members' patronage, which restricts their chances to make portfolio decisions according to subjective risk preferences (Cook 1995). Again, the portfolio problem also relates to the lack of transferability, liquidity, and appreciation mechanisms for residual claims in traditional cooperatives (Cook and Iliopoulos 2000).

The free-rider, horizon, and portfolio problems constitute the key investment problems that plague the acquisition of equity capital in cooperatives (Cook and Iliopoulos 2000). Two other property rights problems – those related to control and influence costs – are intertwined with governance aspects and agency costs. The control problem is relevant to any organization where ownership and control are separated, creating a potential for divergence of interests between residual claimants and the management. Cooperatives, in particular, lack the equity market mechanisms by which to discipline managers and alleviate agency costs (Sykuta and Cook 2001; Ortmann and King 2007). An influence cost problem arises when diverse views among members lead to attempts to influence cooperative decision making in a way that incurs costs and misallocation of resources (Cook 1995; Royer 1999).

Cook and Iliopoulos (2000) provide empirical evidence on the dependency of member-patrons' investment incentives on the cooperative's property rights structure. Studying the variation in property rights in a sample of US agricultural cooperatives, they demonstrated that transferable and appreciable equity shares enhanced the investment incentives for the membership. The attributes of transferability and appreciability offer solutions to the horizon and free-rider problems, as members are able to benefit from long-term payoffs of their cooperative investments. The portfolio problem is also ameliorated by the transferability of equity shares and the potential for capital appreciation, since members then have a better chance to choose their level of risk (Cook and Iliopoulos 2000).

2.3   New cooperative forms in literature

To overcome the above problems inherent in traditional cooperatives, a strand of the literature is dedicated to emerging new cooperative models. From the property rights perspective, these new innovative organizational forms reflect the need to improve the incentives for cooperative member-patrons. The theory of firm ownership argues that new organizational forms emerge for the purpose of economizing on transaction costs (Hansmann 1988). Thus, the emergence of new, non-traditional organizational models of farmer-owner cooperatives stems from a need to minimize the costs of ownership.

The emergence of new cooperative forms represents a response to competitive pressures from the market (Hendrikse and Bijman 2002; Cook and Chaddad 2004; Valentinov 2007; Barton et al. 2011). On the other hand, organizational innovations also arise as a consequence of diverging interests and heterogeneity among the members as well as patron drift (Cook 1995; Chaddad and Cook 2004; Hogeland 2006; Nilsson et al. 2009). The diminishing number of agricultural producers within the past few decades means that cooperatives have to refund the capital of leaving members at a faster rate than new capital

flows in. Due to the capital intensity of farming, producers may prefer to invest in their own farm instead of in the market channel, i.e., the cooperative. In the face of such challenges, the options of traditional cooperatives are either to exit, to continue, or to transform into a new generation structure (Cook 1995). As markets evolve, reorganization may become inevitable (Royer 1999).

The new forms of cooperatives are increasingly resemblant of investor-oriented firms in their attempt to reconcile the trade-off between member control and the need for risk capital (Valentinov 2007; Iliopoulos 2014). Gaining access to growth capital from external investors has, in several cases, been the main reason to depart from the traditional cooperative organizational structure (Chaddad and Iliopoulos 2013). Indeed, many of the new structures relax some of the restrictions on residual claims in agricultural cooperatives (Chaddad and Cook 2004). Producer-owned organizations are typically looking for a model that retains the cooperative form and ideology, yet enables access to non-member equity capital (Hendrikse and Bijman 2002).

Chaddad and Cook (2004) place the new cooperative forms analytically on a continuum based on the degree of ownership rights assigned to members, patrons, and investors. The starting point for their typology is the traditional cooperative structure, which is characterized by: ownership rights restricted to member-patrons; non-transferable, non-appreciable, and redeemable residual rights; and benefit distribution in proportion to patronage. By relaxing these restrictions one by one – proportionality, benefit basis, redeemability, and transferability – and opening the cooperative to non-member investment, the typology arrives at five non-traditional innovative cooperative forms. These are: 1) proportional investment cooperatives; 2) member-investor cooperatives; 3) new generation cooperatives; 4) cooperatives with capital-seeking entities; and 5) investor-share cooperatives. The new cooperative models differ in terms of the residual rights of control and residual claims of their members. Ownership grows more individualized as we move from the traditional cooperative model towards the investor-oriented firm (IOF) in the cooperative typology. At the end of the continuum is the conversion to an IOF. (Chaddad and Cook 2004)

In first three non-traditional cooperative models, ownership rights are limited to member-patrons (Chaddad and Cook 2004). Proportional investment cooperatives resemble traditional cooperatives with their non-transferable, non-appreciable, and redeemable ownership rights, but their members are obligated to invest in the cooperative in proportion to their patronage. Member-investor cooperatives detach the benefit distribution from patronage and allow returns to members to be distributed in proportion to their investment. New generation cooperatives relax the restriction of transferability, and thus, equity shares are no longer redeemable. These features enable members to benefit from the appreciation of their cooperative investment. Ownership rights, in turn, are defined as delivery rights that are restricted to member-patrons.

The two remaining non-traditional cooperative models allow also non-members to invest in the cooperative. Cooperatives with capital-seeking entities differ from investor-share cooperatives in terms of whether the outside risk capital is partitioned off to a separate entity or whether investors are able to hold shares directly in the cooperative. In an investor-share cooperative model, different classes of shares can be issued for different owner groups (Chaddad and Cook 2004).

The rationale for new cooperative models is to overcome the financial constraints of traditional cooperatives and to facilitate organizational growth by resolving the property rights problems. However, cooperative expansion, whether through horizontal or vertical integration, may have reverse effects on member commitment to the cooperative and their willingness to invest in it. Vertical integration has, in fact, been observed to reduce the members' investments (Nilsson et al. 2009). Another potential threat in the emergence of new structures is that agricultural producers may find themselves in large and complex cooperative chains without sufficiently understanding the operations, which can create dissatisfaction among them (Nilsson et al. 2009). This is likely to erode their involvement and their interest and incentives to invest in the cooperative (Nilsson and Ollila 2009).

Shrinking member involvement in large cooperatives leads to diminished investment capital from members, and this can be solved by inviting outside investors. The further a cooperative diverts from the traditional model, the larger becomes the risk of a divided membership (Ollila et al. 2014). Some members emphasize the expected return on capital over patronage-related benefits to the extent that the divergent interests among the members cannot be reconciled inside the cooperative. However, the heterogeneous preferences of the members do not necessarily mark the end of the cooperative; instead, new structures can be developed to cater for their differing interests regarding financing and governance (Kalogeras et al. 2009; Höhler and Kühl 2017). A positive avenue might be to split the cooperative into two or more organizations based on the distance of the members from the cooperative's business activities at different stages of the processing chain (Nilsson 2001).

2.4   Current forms of producer cooperatives in Europe

Agricultural cooperatives play an important role in present-day agribusiness within the food supply chains of all EU member states (Bijman et al. 2012a). A large-scale EU-wide project called Support for Farmers' Cooperatives (SFC), conducted in 2012, provided comprehensive data on the position of producer cooperatives in European agriculture, which continued to be relatively up-to-date. The project's final report (Bijman et al. 2012a) and several sectoral and other themed study reports serve as the main sources of industry information in this section. The focus here is on the dairy sector, which accounts for about 13 percent of the total turnover of the food and drink industry in Europe, with Germany and France as the largest producers (Hanisch et al. 2012). In Finland, the dairy sector is the most important agricultural sector in terms of the value of production (Pyykkönen et al. 2012). The majority of Finnish milk-producing farms are specialized dairy farms.

Farmer-owned cooperatives are an important distribution channel for European agricultural producers. They enable farmers to capture a higher portion of the value adding activities in the food chain and provide economies of scale benefits to their members (Bijman et al. 2012a). Finnish cooperatives are estimated to hold the highest market share among all the EU member states, when measured by farm gate sales in the eight agricultural sectors covered by the SFC study: dairy, cereals, sugar, pig meat, sheep meat, fruit and vegetables, olives, and wine (Bijman et al. 2012a). The average market share in the EU area is 40%, whereas in Finland it is as high as 75%. Finland also ranks first in member

intensity, i.e., the total number of cooperative members divided by the number of agricultural holdings.

Of the eight major agricultural sectors examined in the SFC project, the market share of cooperatives was highest in the dairy sector (Bijman et al. 2012a): 57%, on average, of the total dairy sector turnover in the EU area (Hanisch et al. 2012). Cooperatives are strongly represented among the largest European dairies (Heyder et al. 2011). Dairy cooperatives are positioned throughout the food supply chain, from milk collection and processing to direct sales of branded or private label products to retailers (Kühl 2012). The organization of dairy production into cooperatives can be explained by sector-specific characteristics and by the transaction cost advantages mentioned earlier. In dairy farming, the high perishability of the product together with the high frequency of transactions, also require highly asset-specific investments (Ollila 1989; Williamson 1989; Masten 2000; Bijman and Hanisch 2012). As members of a dairy cooperative, farmers are able to benefit from the economies of scale from collective investments by the cooperative, which cut back the costs of transportation, processing, and quality control of their products (Bijman et al. 2012a).

At the dawn of the new millennium, European dairy production was subjected to decontrolling measures aimed at higher market orientation and internationalization in the sector (Hanisch et al. 2012). In parallel with the imbalances experienced by individual dairy farmers in their bargaining power in the supply chain, the sector-wide structural changes accentuated the role of producer organizations in providing support to them (Hanisch et al. 2012). The increasingly internationalized product market has simultaneously given impetus for the internationalization of dairy farmers' producer organizations (Heyder et al. 2011). Mergers of producer cooperatives has also taken place in an effort to strengthen their position in the food supply chain. The largest dairy cooperatives in the EU include FrieslandCampina (Netherlands), Arla Foods (Sweden), DMK (Germany), Sodiaal (France), Glanbia (Ireland), Valio (Finland), Kerry Group (Ireland), and Hochwald (Germany) (Hanisch et al. 2012). Many of them have international operations, and some even emerged as a result of international mergers. Transnational cooperatives represent a special type of international cooperatives, having members in more than one country (Hanisch et al. 2012). Internationalization is reported to be associated with better agribusiness performance and positive returns (Heyder et al. 2011).

In connection with the SFC study, European cooperatives also underwent an extensive cluster analysis, which revealed four typical cooperative profiles in the dairy sector (Ton 2012). The most common of these was large agribusiness cooperatives which engage in primary processing but also produce final consumer goods: bulk and private labels as well as branded products. Two other important types of cooperatives included smaller dairy cooperatives that specialize in branded goods or focus on differentiated products and niche markets. The fourth important type of dairy cooperatives was one that serves mainly as a bargaining agent but is not as vertically integrated as the other profiled cooperatives. The typical membership in these cooperatives were highly specialized dairy producers.

The position of a dairy cooperative in the food chain is linked to its financial structure. The higher is the degree of vertical integration and the more the cooperative concentrates on processing and marketing of branded goods, the more the need for equity capital increases (Bijman and Hanisch 2012). Internationalization has also contributed to changing

organizational structures and motivated the emergence of hybrid and holding cooperative models (Harte 1997; Heyder et al. 2011). In one form of hybrid listed cooperatives, external investors are invited to participate through a separate class of shares (investor-share cooperatives), but these have not been observed in the European dairy sector. A more common model in Europe involves participation through a separate capital-seeking entity, implying a holding structure. Larger cooperatives are likely to be organized into a holding company structure, which is more frequent in the dairy sector than in any other agricultural sector (Hanisch et al. 2012).

The dairy sector in the EU is characterized by cooperatives with a subsidiary organizational structure (Bijman and Hanisch 2012; Hanisch et al. 2012). A subsidiary structure enables the cooperative to invite outside investors to a separate legal entity, which can even be listed on a stock exchange as a public limited company (PLC). The cooperative usually remains as a holding company in the PLC, whereas the majority of the assets and business operations are transferred to the subsidiary (Bijman and Hanisch 2012). The rationale is to retain the cooperative core while raising capital from external sources (van Bekkum and Bijman 2006). Two distinct types of hybrid listed European cooperatives can be identified: the Finnish and the Irish. The Finnish model has two separate series of shares: one for outside investors with preferential return rights, and the other for farmers with higher control rights. In the Irish model, the income and control rights are symmetric for both investor groups (van Bekkum and Bijman 2006). The Irish model is in use in the dairy sector in Ireland, whereas in Finland, hybrid organizational models are only found in the meat and forestry sectors.

The foremost example of the Irish model is the Kerry Group. The cooperative was restructured from a traditional cooperative into a holding company in 1986, with the aim of designing a new funding mechanism (Harte 1997; Chaddad and Cook 2004). The cooperative received the majority of the shares of Kerry Group plc, which was listed to attract external equity capital. The proportion of ownership and shares held by the cooperative has diminished over the years as a consequence of new stock issues. Gradually, the Kerry cooperative has become a minority shareholder in Kerry Group, holding about one-fifth of its shares (Hanisch et al. 2012). Cooperative members not only receive patronage-based dividends, but also their share of PLC dividends as well as bonus shares (O'Shaughnessy et al. 2012).

The Irish dairy company Glanbia is another example of the Irish hybrid model. However, the holding cooperative's ownership share in Glanbia plc is higher than respectively in the Kerry Group. In 2012, the cooperative held a 55% share of Glanbia plc (Bijman et al. 2012b), but by 2015, its ownership had eroded to 36.5% (Glanbia 2015). Some of the cooperative's holdings have been spun out to its members. Besides utilizing the subsidiary structure to collect external equity, Glanbia also set up a financing mechanism in the form of members' individualized capital contributions to the cooperative (van Bekkum and Bijman 2006). This scheme is called the Revolving Share Plan (RSP), and has been launched several times since (Glanbia 2015).

Dairygold is another Irish example of an innovative capital structure within the cooperative form. The cooperative split its business into two operations, and then listed the created value-added company and its appreciable internally tradable cooperative shares (van Bekkum and Bijman 2006; Nilsson and Ollila 2009). Dairygold also introduced a compulsory member-financing mechanism through a revolving fund, in which farmers'

contributions are collected from their milk supply proceeds. As compensation, members receive a fixed interest accrued on an annual basis (Dairygold 2017).

The Dutch dairy cooperative FrieslandCampina was formed as a merger of two cooperatives, Friesland and Campina, both of which had prior experience of using individualized capital as a financing mechanism. In contrast to the Irish hybrids, which are more reminiscent of an IOF, FrieslandCampina represents a cooperative model that has made use of various innovative financial instruments. One method of collecting member financing in the former Campina were compulsory subordinate bonds, which were proportional to the members' milk delivery volume and transferable to non-members as well (Nilsson and Ollila 2009). Campina also tapped the use of non-voting participation units, which members could subscribe on a voluntary basis, but the value of these units was determined yearly in relation to company growth (Chaddad and Cook 2004). The appreciation value of the participation units was set by the cooperative board, depending on the amount of additions to the general reserves (van Bekkum 2003). The average annual return was 1.9% (van Bekkum and Bijman 2006). Participation unit holders could also enjoy a better price on their milk deliveries (van Bekkum 2003).

The former Friesland cooperative, in turn, had divided its equity into two series of shares. A-shares represented unallocated equity, whereas B-shares were available to members without patronage-based proportionality, but with no voting power attached to them (Nilsson and Ollila 2009). B-shares were tradable between members on a bimonthly market facilitated by a banking service, and provided an average annual return of 3.5% (van Bekkum 2003; van Bekkum and Bijman 2006). In the typology of Chaddad and Cook (2004), this structure is an example of a member-investor cooperative (Hanisch and Müller 2012).

In the merged FrieslandCampina, a portion of the member capital is individualized and appreciable (Zaalmink and Lakner 2012). The cooperative pays a part of the company's profit to its members by issuing subordinated bonds in proportion to the value of their milk supplies (FrieslandCampina 2017), thus increasing the members' capital holdings. Apart from these interest-bearing, non-tradable member bonds, members and former members can participate with free member bonds (FrieslandCampina 2018). The perpetual subordinated bonds are traded on an internal market on set trading days annually, with an external market maker providing the liquidity (FrieslandCampina 2018). Fixed member bonds are automatically converted to free member bonds upon the member's resignation as a capital retention mechanism. Both types of member bonds are recorded as equity in the company's balance sheet.

Externally tradable bonds are an alternative that makes it possible to source outside capital without loss of member control (van Bekkum and Bijman 2006; Nilsson and Ollila 2009). The Arla Foods cooperative has utilized these kinds of subordinated bonds in addition to individual, delivery-based member equity capital (Arla Foods 2017).

The review of capital structure innovations presented in this section is not intended to be all-inclusive, but to give an overall picture of some new models within the European dairy sector, with a focus on departures from the traditional cooperative model. Further examples can be found outside the EU and in other agricultural sectors.

3 Behavioral aspects of economic decisions

There is an extensive body of literature on the role of behavioral factors in economic decisions. This section first concentrates on a few focal aspects that have been found to explain individual behavior in economic decisions. These are covered in the essays of this dissertation and include social influences such as social interaction and social capital, trust, and familiarity effects. There is wide evidence that such factors are positively related to the economic performance and financial market decisions of individuals. The second part of the section describes the phenomenon of loss aversion, which is analyzed in one of the essays.

3.1 Social influences

Cooperative organizations are characterized by a high level of social capital and trust. It has been argued that, because they are built on collective action for mutual benefit, they are dependent on this social capital, i.e., the members' commitment and loyalty (Hakelius 1996; Bhuyan 2007). Social capital can be defined as shared norms, affinity, reciprocity, and relations, formed in interaction between individuals and fostering cooperation between them (Bourdieu 1986; Coleman 1988; Putnam 1993; Fukyuama 1995). For the purposes of this dissertation, it is not meaningful to elaborate on the mechanisms of social capital and trust, although it is worth mentioning that there are different schools of thought with differing views on the mechanisms that create social capital. They also differ in their conception of social capital and trust either as an individual characteristic or at the level of groups, communities, or societies.

Trust is a core manifestation of social capital. It is formed in close social networks and interaction between individuals. In a cooperative organization, it facilitates transactions, breeds member commitment and loyalty, and motivates members to patronize the cooperative (Fulton and Adamowicz 1993; Fulton 1999; James and Sykuta 2006). The cooperative principles and ideology serve to strengthen the commitment of the members (Morfi et al. 2015), benefit them by reducing their transaction costs (Nilsson 2001). On the other hand, a growing body of evidence in the literature on agricultural producer cooperatives shows that members' trust, involvement, commitment, and social capital tend to erode in complex organizational structures (Fulton 1999; Svendsen and Svendsen 2000; Nilsson et al. 2009, 2012; Österberg and Nilsson 2009; Feng et al. 2015). At the same time as the cooperative ideology may be losing its importance as the glue that binds member commitment, farmers' relationship with their cooperative appears to be increasingly driven by business and economic considerations. Despite the fact that the economic literature abounds in studies on the role of social capital and other social influences in economic activity and performance, the prior literature has not investigated whether non-members also perceive the social capital of cooperatives as a trust-generating mechanism.

Micro- as well as macro-level analyses have shown that the effects of social capital on economic growth and financial development are robust (Knack and Keefer 1997; Guiso et al. 2004). Economic agents are more inclined to make long-term investments in a society with a higher degree of trust (Knack and Keefer 1997). The notion that higher trust frees individuals and firms from the need to seek protection against potential exploitation

offers an explanation for the higher stock market participation and venture capital investment observed in more trusting contexts (Guiso et al. 2008; Bottazzi et al. 2016). Besides trust, social activity and interaction are also reported to promote stock ownership (Hong et al. 2004).

Physical proximity between individuals and their social interaction tend to generate trust and trustworthy behavior. The effects of social capital and trust on people's financial decisions are, thus, interwoven with the effects of familiarity. Individuals appear to rely on a heuristic in their decision making, and favor the known over new, unknown situations or things. The term familiarity can refer to practically whatever an individual has prior experience in – anything from, e.g., physical proximity to social influences. In the context of financial decision making, a familiarity bias occurs when people fail to diversify their investments, and instead, are likely to overweight assets that are domestic, proximate, local, or otherwise familiar. They may also prefer familiar investments over higher returns or over lower risks (Huberman 2001). Empirical studies show that investors tend to prefer familiar assets, whether in international stock markets, domestic portfolios, or personal savings (French and Poterba 1991; Kang and Stulz 1997; Coval and Moskowitz 1999; Huberman 2001; Duflo and Saez 2002; Portes and Rey 2005). An affective regional attachment, such as patriotism and loyalty to the community, can also determine the portfolio allocations of individual investors (Morse and Shive 2011).

The familiarity effect illustrates the mechanisms through which personal experiences and social identity affect people's economic outcomes. The environment in which they grew up is known to influence their preferences and beliefs later in life (Guiso et al. 2004; Malmendier and Nagel 2011). Past experiences shared by different individuals contribute to the creation of social capital and trusting behavior, and this, in turn, affects their financial behavior and facilitate the flow of capital for economic development (Guiso et al. 2004). There is rich real-world evidence in support of the social identity theory, which argues that belonging to the same group fosters bonding between people, as exemplified by the binding ties between members of a family, school, workplace, or community (Tajfel and Turner 1979; Akerlof and Kranton 2000; Akerlof and Kranton 2005). Social bonding is based on shared common characteristics. Prior evidence indicates, e.g., that farm-born individuals develop strong emotional ties to rural values, lasting throughout their lives (Cassidy and McGrath 2014). Moreover, it is argued that individuals derive economic utility by acting in adherence to an identity that matches certain specific values (Akerlof and Kranton, 2000). This finding is supported by observations of consumption decisions, which imply that people's identity affects their brand choices (Lam et al. 2010) and breeds customer loyalty (Homburg et al. 2009).

Hence, social preferences are obviously very closely attached to values. Several studies indicate that consumers' choices favoring local foods are driven by perceptions of local products as being of better quality, as well as by concerns over the carbon footprint and valuation of the local as such (La Trobe 2001; Darby et al. 2008; Dentoni et al. 2009; Grebitus et al. 2013). In the context of investments, the impact of subjective values can be seen in a growing interest in ethical and socially responsible investments. Such decisions may be guided by other preferences than merely by financial returns. Both empirical and experimental findings support the role of prosocial identity and ideology in ethical investments (Webley et al. 2001; Bauer and Smeets 2015). Some ethically minded investors are even prepared to take financial losses in their portfolio choices for the sake of complying

with their morals (Lewis 2001). Furthermore, those who rely on values in their financial decisions may be more committed to ethical investing also in times of poor financial performance (Webley et al. 2001).

3.2   Loss aversion

Ample empirical evidence shows that many economic decisions made under uncertainty are characterized by behavior that is inconsistent with the theory of expected utility, which assumes that people behave rationally when the outcome is uncertain. The theory argues that people will make the decision that yields the highest utility on the expected terms, i.e., weighted by the probability of the outcome. Yet, an individual's personal risk preferences also influence the decision.

Loss aversion is one of the most widely documented behavioral concepts in economics. This is an inherent element of the prospect theory formulated by Kahneman and Tversky (1979). The theory relies on three pillars: 1) individuals have a cognitive tendency to evaluate uncertain outcomes against a certain reference point; 2) deviations from the reference point are coded as gains or losses (reference dependence); and 3) losses are felt as causing more pain than gains of the same size give joy (loss aversion), and the marginal utility of changes is diminishing, i.e., the utility of changes in wealth decreases the more they deviate from the reference point (diminishing sensitivity). Loss aversion entails that the perceived utility of changes around the reference point is perceived asymmetrically: losses are felt as larger than equivalent gains. Thus, the value function in the prospect theory is concave in the domain of gains and convex in losses, and steeper for losses than for gains. The S-shaped value function implies diminishing sensitivity. People weight their gains or losses in wealth in relation to the reference point, rather than the level of wealth as such. The current position, the status quo, is a natural point of reference, but the goals and aspirations of the individual are other possible reference points (Heath et al. 1999; Hoffmann et al. 2013).

Since the formulation of Kahneman and Tversky's (1979) prospect theory, a growing body of literature has tested it empirically in economic decision making in various contexts: e.g., in experimental and financial economics and consumer behavior studies. There is robust evidence outside of laboratory settings showing that people's behavioral tendency is to be more sensitive to losses than to gains. Empirical findings indicate that loss aversion can help to explain the observed stock market returns and actual trading behavior of individual investors (Shefrin and Statman 1985; Thaler and Johnson 1990; Benartzi and Thaler 1995; Odean 1998). Loss aversion can also affect people's decisions on household savings from their disposable income (Thaler and Benartzi 2004; Kőszegi and Rabin 2009). Apart from the economics context, applications of the prospect theory have emerged in the fields of health (Neuman and Neuman 2008) and transport (Stathopoulos and Hess 2012).

While there is growing interest in agricultural economics to draw from behavioral sciences in explaining farmers' choice behavior, yet corresponding studies incorporating the prospect theory are not as abundant as in the field of financial economics. The presence of loss aversion has, however, been established in a number of agricultural contexts.

Bocquého et al. (2014) argue that agriculture is actually fertile ground for observing the type of preferences discussed in the prospect theory. This is largely attributable to the omnipresence of uncertainty in agriculture and the fact that farmers typically have various reference points. In their experiment (Bocquého et al. 2014), farmers were found to be twice as sensitive to losses as to gains. Moreover, their intentions regarding production in response to increases and decreases in payments under the reform of EU Common Agricultural Policy (CAP) exhibited loss aversion, implying cutbacks or even exits from farming, if payments were reduced (Barnes et al. 2016). This study is, to the best of my knowledge, the first to examine loss aversion in the context of agricultural cooperative members.

4   Summary of the essays

This section presents the objectives of the dissertation, briefly describes the data and methods used in the analyses and summarizes the main results of the four essays constituting the dissertation. The section concludes with a discussion on the implications of the results and proposes avenues towards the introduction of new cooperative investment instruments in Finland.

4.1   Objectives

The dissertation consists of four essays, all of which are intertwined with the theme of how to finance the growth of agricultural producer cooperatives. The essays examine potential sources of equity capital: e.g., retained earnings, voluntary member capital contributions, and equity from non-member investors. Figure 1 describes the perspective of each essay to the central theme of the dissertation. Essays 1 and 2 focus on the role of members in financing investments in cooperatives, whereas Essays 3 and 4 approach the question from the perspective of an outside, non-member investor.
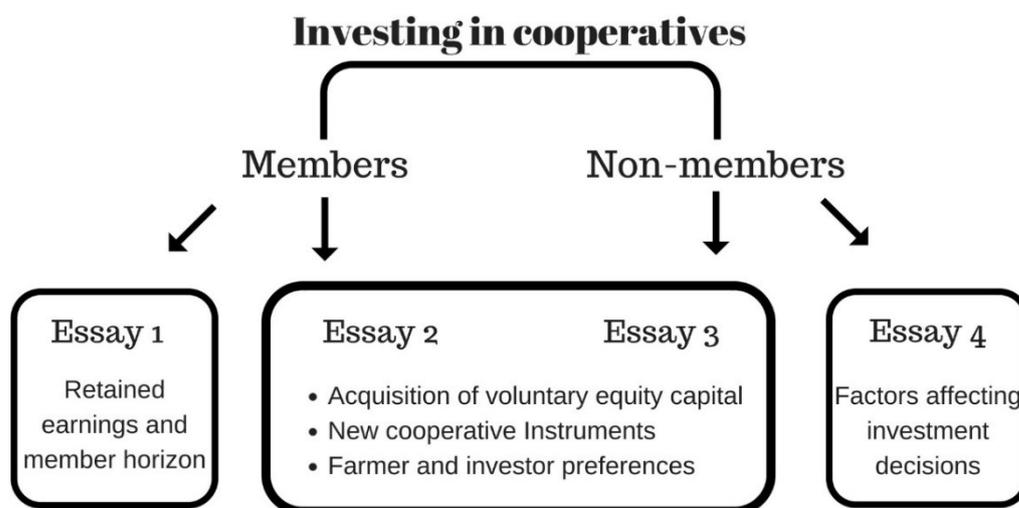
Figure 1. Structure of the dissertation and perspective of the essays to potential sources of financing.

The current organizational form of Finnish dairy cooperatives does not allow equity contributions from non-members. The purpose of this dissertation was to uncover the views and willingness of outside investors to invest in Finnish agricultural cooperatives, should the restrictions be relaxed to enable them to participate in financing cooperative growth with equity capital. This bundle of essays, thus, has a threefold significance: it contributes to the literature on agricultural and behavioral economics, with specific focus on investment in cooperatives. The essays provide useful information for growth-seeking producer cooperatives on new potential sources of member and non-member equity, to facilitate the design of new cooperative investment instruments in Finland.

The four essays of this dissertation are:

- – Essay 1: Revealing loss aversion and horizon in farmer preferences: The case of Finnish dairy cooperatives.
- – Essay 2: Farmers' willingness to invest in new cooperative instruments: A choice experiment.
- – Essay 3: Assessing the willingness of non-members to invest in new financial products in agricultural producer cooperatives: A choice experiment.
- – Essay 4: The effect of social bonding and identity on the decision to invest in food production.

Essay 1 examines the primary source of cooperative equity, i.e., retained earnings, with the aim of revealing the views of farmer members on retaining unallocated equity in their cooperative to finance its operational investments. The essay also tests whether the horizon problem plays a role in their investment preferences. The methodological approach is to elicit the valuations of cooperative members by contrasting cuts in their instant pecuniary benefits with improved long-term competitiveness and strengthened ability of the cooperative to deliver benefits to its members later. The attitudes of farmers towards the use of cooperative surplus are studied using a factor analysis method.

Essay 2 addresses the question of ownership right adjustment by investigating the preferences of farmers for new cooperative investment instruments. The aim is to reveal their opinions on non-traditional equity shares as well as their preferred modifications to the current control and residual rights, if new investment instruments were to be implemented. Essay 3 approaches the same subject, but from the perspective of non-member investors. The objective is twofold: to shed light on the investor perspective towards cooperatives as potential investment targets, and to discover the terms on which investors with different motivations would be prepared to finance cooperative growth.

Essay 4 explores the individual characteristics that contribute to a positive disposition towards investing in domestic food production firms. The essay seeks to profile potential investors by identifying their characteristics and motivations, in order to facilitate the marketing of new investment opportunities to investors outside the farmer community.

A central theme running through the essays is the role that behavioral factors play in investment decisions. The behavioral focus in Essay 1 is loss aversion, a widely reported phenomenon influencing individual decision making and cognition in relation to gains and losses in cooperative benefits. Essay 2 makes its behavioral contribution by using modeling methodologies to discern potential differences between farmer segments in terms of their investment preferences, and to see which of them would be likely to behave differently, if the cooperative were to issue voluntary shares to its members. In a similar vein, Essay 3 identifies different investor types but shifts the focus to non-members, providing evidence on how their identity affects their investment choices. Finally, Essay 4 examines how various social factors influence the investment decisions of non-member investors. This last essay centers on the effects of familiarity and values on their attitudes regarding investment in cooperatives.

4.2 Data and methods

The data for this dissertation are derived from two questionnaires: one for members of farmer cooperatives (Essays 1 and 2) and one for non-member investors (Essays 3 and 4), with 406 and 845 respondents, respectively. The farmer data comprise the responses of members of five Finnish dairy cooperatives, two of which belong to the Valio Group, the largest dairy cooperative in Finland, while the other three are smaller independent marketing cooperatives. The investor sample consists of Finnish financial market professionals holding a certified financial advisor's diploma. This group of respondents represents a financially literate pool of potential investors, who can be expected to be more capable of evaluating hypothetical new investment instruments than the average citizen with no attachment either to producer cooperatives or investing. The farmer survey was conducted in February 2014 and the investor survey in October 2014.

Dairy farming is the most important agricultural sector in Finland, both with respect to its share of agricultural income and prevalence throughout the whole country (Pyykkönen et al. 2012). The Finnish dairy market has a three-tier structure. Firstly, there is the leading processor Valio, a limited company owned by milk producers' cooperatives, and thus, organized in a holding structure. Valio was initially established to facilitate butter exports (Ollila and Pyykkönen 2012) by creating economies of scale in the processing and marketing activities of primary cooperatives (Bijman, Iliopoulos, et al. 2012). The second largest processor is Arla Foods, with a considerably smaller share of the Finnish dairy market when measured by the amount of milk received (Ollila and Pyykkönen 2012; Pyykkönen et al. 2012). Arla is an IOF, which transacts with local dairy cooperatives on supply contracts. Thirdly, there are a few regional marketing cooperatives, which can be characterized as independent, as they take care of the whole dairy chain from milk collection to wholesale of consumer products.

Beyond the federated structure of Valio, Finnish dairy cooperatives are very traditional as to their organizational form and ownership rights structure. Valio is fully controlled by its cooperative shareholders and has no outside owners. Member cooperatives are the only owners of Valio, and only dairy farmers are members of the cooperatives. The prevailing practice in Finnish dairy cooperative is that each member has one vote, and ownership is not individualized. The main mechanism of member remuneration is a patronage refund paid annually as a price correction based on the cooperative's performance. Upon joining the cooperative, members have the obligation to contribute equity capital, which is determined by the amount of milk delivered. Most dairy cooperatives pay a dividend – or interest, as it is called in Finland – on the member's equity share. The level of the annual dividend is not fixed but depends on the cooperative's performance. The rate of return on member equity has traditionally been very competitive, and thus, forms an incentive for members to pay the capital obligation in full. Besides this obligatory capital contribution, Finnish agricultural cooperatives can also issue voluntary shares for their members as investment instruments, although these have not been employed in dairy cooperatives. Pricing policies and adjustment of surplus refund rates are currently the main mechanisms for accumulating equity capital for cooperative investments.

The approach used in both the farmer and investor surveys to analyze preferences on investment in cooperatives is the choice experiment (CE) method, which draws on the theories of consumer choice and random utility. According to Lancaster (1966),

consumers derive utility from the attributes of goods rather than from the goods as such. Hence, CE questionnaires present a number of choice sets with several alternatives characterized by a set of attributes. In each choice task, respondents are requested to choose their most preferred alternative, which is assumed to give the greatest utility to them.

The CE method is a stated preference method, which is often used to test people's preferences in a hypothetical situation when empirical preference data are not available – e.g., their preferences on new products or policies. The method was initially introduced in the marketing and transportation literature, but is today used increasingly in non-market valuation to estimate prevailing attitudes towards policy changes in environmental and health economics (Louviere 2000). In agricultural economics, choice experiments are also frequently employed to study preferences for different production methods (Lusk et al. 2003; Michaud et al. 2013) and food attributes (Scarpa et al. 2005; Balcombe et al. 2014), as well as to evaluate agri-environmental policies (Scarpa et al. 2009; Schulz et al. 2014).

Given the primary objective of this dissertation – to examine preferences in hypothetical investment situations without available empirical market data – the CE method offers an ideal tool for that purpose. The choice experiment method is a novel approach in the context of farmer cooperatives. Grashuis and Magnier (2018) are among the few who have applied the CE method to study farmer cooperatives; yet, their aim was to elicit the preferences of consumers instead of farmers. Zemo and Termansen (2018) studied farmers' investment preferences outside the cooperative context, utilizing the CE method to reveal their willingness to invest in biogas. Qin et al. (2011) also used the method to assess the preferences of forest farmers for different property rights attributes in a forestland contract within the Chinese decentralization reform.

In the field of investment, however, the CE approach has so far been underutilized. Previous analyses of investor behavior have traditionally been based on market prices, transactions, or holdings, and more recently, also on field experiments. The use of surveys to study financial decision making has gradually gained ground (Nagy and Obenberger 1994; Kruse and Thompson 2003; Glaser et al. 2007), as their value in generating new datasets is being recognized more widely. The key challenge in choice experiments is that the studied options must be decomposed into attributes and levels of attributes. This simplifying of real-life investment situations may prove an almost insurmountable task. However, there are a few CE studies which have successfully applied the method to investment decisions and utilized latent class models to identify investor heterogeneity (Bateman et al. 2011; Anastassiadis and Musshoff 2013).

4.3   Results

This section presents an overview of the results of each essay.

Essay 1

In Essay 1, the question of cooperative financing is approached from within the cooperative: from the standpoint of internal financing and retaining of cooperative surplus as unallocated equity. This represents the first step in the accumulation of investment capital, before measures to acquire new equity contributions from cooperative members – or

potentially, from outside investors. The surplus that the agricultural producer cooperative makes during the year may be distributed out as member benefits, but the rate at which the surplus is paid out or retained has to strike a balance between the investment needs of the cooperative and the members' satisfaction with the level of their benefits. A determining factor in the willingness of the members to retain surplus in the cooperative is how their horizon is aligned with that of the cooperative. Another influencing aspect has to do with the expected benefits of their investment over next few years.

The horizon problem is tested with a novel approach by means of a questionnaire survey using CE methodology. Farmers are asked to make tradeoffs between the current level of the patronage refund and interest (dividend), and the possibility to gain improved benefits in the future, in the form of better producer price, increased amount of milk processed, or quality of production-related services. The farmers' relative preferences for the different benefits provided by the cooperative are then estimated from the choice data. Figure 2 illustrates the study frame of Essay 1.
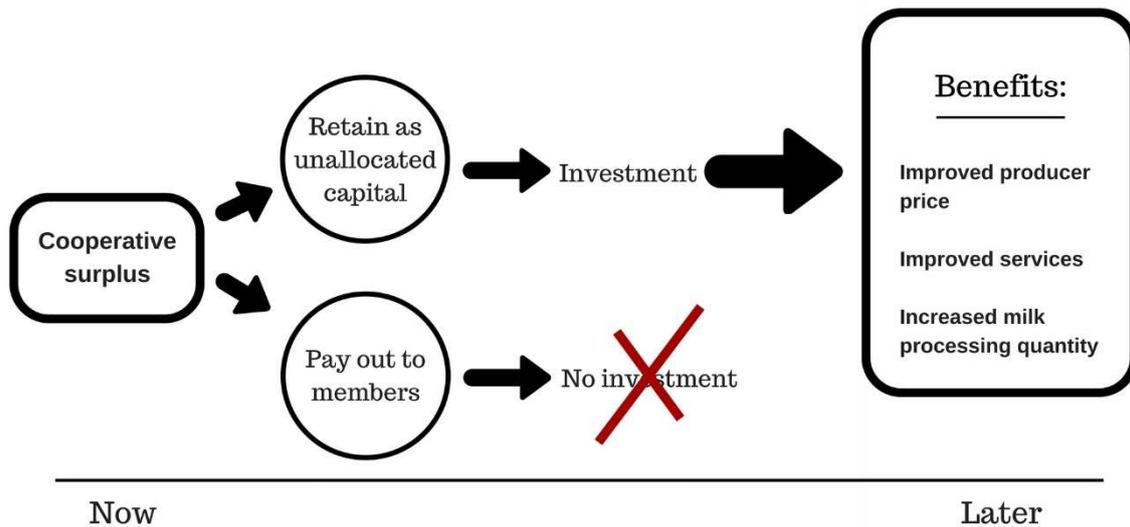
Figure 2. Financing cooperative investments with retained surplus.

The results reported in Essay 1 indicate that dairy farmers were, on average, willing to retain surplus in the cooperative, even if it means that their current refund levels would have to be cut. This finding is contradictory to the prediction of the horizon problem and signifies the high importance of the cooperative's long-term competitiveness to its members. However, there was some heterogeneity in the responses, since a group of farmers seemed to find the idea of forsaking instant benefits quite inconceivable. These farmers were more reluctant to give up their patronage refunds than their dividends. Although the refunds were not modelled in monetary terms in the CE design, the observed relative valuations actually reflect the much higher economic significance of patronage refunds over dividends at many dairy farms.

While respondents appeared to prefer policy alternatives where the cooperative's surplus refunds were reduced in order to restore its long-term competitiveness, there was strong opposition towards a situation where current refunds would be withheld altogether. The

result implies that the residual distributions of the cooperative constitute an important source of income for dairy farms. Therefore, even if the cooperative pursues a growth strategy and decides to finance it with retained earnings, it is necessary to maintain some level of remuneration to satisfy the membership.

As for accrued benefits, the results show a strong preference for competitive producer prices relative to the cooperative's production-related services and processed milk volumes. This finding underscores the importance of understanding the different expectations that members attach to the role of the cooperative in carrying out its purpose. The analysis revealed both asymmetry and loss aversion in farmers' preferences for benefits. Their relative valuations indicate that the potential gains of an investment were not valued as highly as potential losses were avoided. The result is consistent with the prospect theory and with a vast amount of empirical evidence on loss averse behavior in decisions under risk. However, this is a phenomenon that has not previously been documented in the context of farmer cooperatives. The tendency of cooperative members to avoid possible losses, even if they viewed the planned cooperative investment favorably, is a question that needs to be recognized by cooperative managements.

The factor analysis identified three farmer groups which differ in terms of their attitudes towards membership and the use of cooperative surplus: farmers who emphasized the cooperative ideology, farmers for whom the cooperative was mainly a means to gain market access, and farmers who appreciated the economic benefits of cooperative membership. Yet, residual returns were considered by all of the groups to strengthen the members' commitment to the cooperative. This can be understood as a need to consider setting a limit on the speed of cooperative growth, if financed with internal funds, so that the level of refunds satisfies the membership and the amount of retained funds is not too high.

Essay 2

Essay 2 broadens the question of member financing from internally generated funds to new investment instruments. The typology of cooperative models (Chaddad and Cook 2004) was used as a framework to test whether Finnish dairy farmers would support the relaxation of some of the restrictions inherent in the traditional cooperative model. The following attributes were tested: ownership rights limited to members only or allocated also to non-members; redeemability and transferability of shares; residual returns based on patronage or investment; and expected level of risk and return. To lessen the cognitive burden on the respondents, the attributes were kept relatively simple. The current form of member equity was used as the baseline alternative in designing the CE tasks, and two other policy alternatives were offered based on varying levels of the investment attributes. All of these attribute levels, including the proposed new innovative cooperative investment instruments, are feasible to implement in practice, thanks to an enabling cooperative law which came into force in Finland in January 2014 (Pellervo-Seura ry 2013). However, should a producer cooperative intend to implement any novel investment options, its articles of association would probably have to be changed.

The choice data were analyzed by means of the random parameter latent class model. This method has the advantage of discerning preference heterogeneity in an easily

interpretable way using a fixed number of respondent classes, while it also allows taste variation within classes. Figure 3 illustrates the study frame of Essay 2.
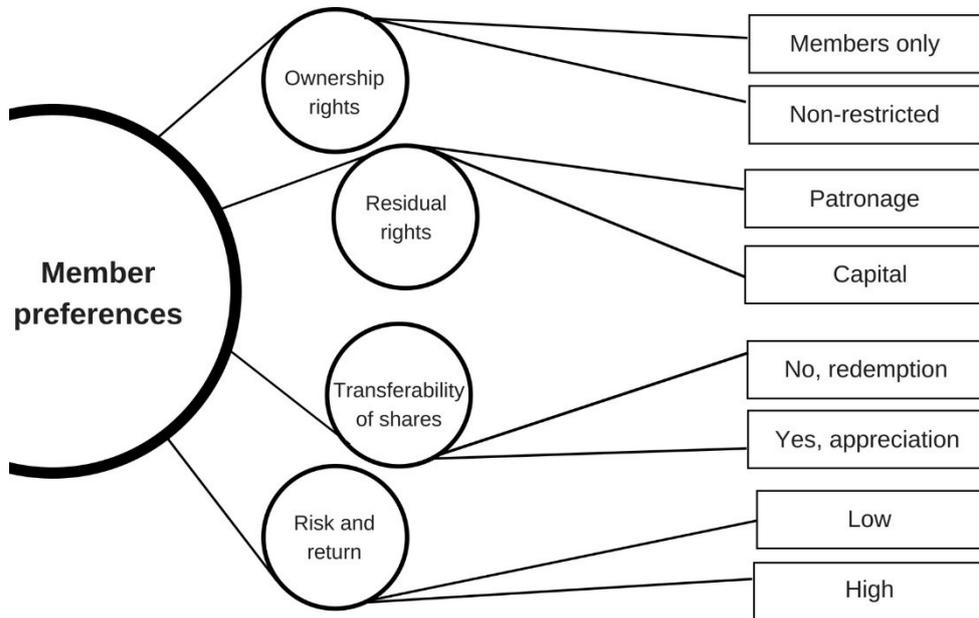
Figure 3. Alternative attributes regarding new cooperative investment instruments in the farmer survey.

The results of Essay 2 can be summarized in terms of three areas of interest: 1) respondents' willingness to choose new investment instruments over the basic form of cooperative capital; 2) their preferred attributes; and 3) detected latent investor classes. Regarding the first point, farmers appeared positively disposed towards new cooperative investment instruments, as about 70% of respondents fell into classes where new policy alternatives were preferred over the status quo. This means that around 30% of the dairy farmers in the sample favored the current situation and rejected the proposed ownership structure innovations.

Some of the ownership structure adaptations gained wide support among the respondents, whereas their opinions on some investment attributes were sharply divided. A clear majority preferred restricting voting rights to members only. Of the offered new features, the transferability of equity shares, with a mechanism for appreciation based on firm value, was widely favored. The investor role of the members was seen in their preference for capital-based residual returns. They also supported the possibility to capitalize the returns, defined in the questionnaire as issuing of bonus shares from the cooperative's reserve funds. The capitalization of returns would, in effect, offer a mechanism for increasing the share of individualized cooperative equity. On the other hand, farmers unanimously shied away from high risk and return.

In light of the responses, the question of non-member ownership seems controversial. Farmers were clearly reluctant to give equal voting rights to outside investors, although some groups of respondents were indifferent between whether or not to invite non-members with preferential return, but without voting rights. The question of opening the cooperative to outsiders was, in fact, the key issue which set apart the three observed latent

classes. The main finding was that while one class opposed the introduction of new financial instruments, the other two classes with fairly similar investment preferences were in favor of them. The status quo preferers stood out as a distinct preference class (class 1), but the two classes of respondents (classes 2 and 3) who preferred the policy alternatives were did not differ much from each other. Yet, the farmers in class 2 would not allow any ownership rights to non-members, whereas those in class 3 would welcome non-members with preferential return, although without voting rights.

Implementation of the new instruments characterized in Essay 2 would shift Finnish dairy cooperatives towards investor-share cooperatives or member-investor cooperatives, depending on the role of external investors, as described in Chaddad and Cook's (2004) typology. A feasible model might be one where member-investors could benefit from residual returns in proportion to their shareholdings and appreciation of their cooperative shares, and there would be some kind of secondary market for voluntary cooperative shares. Such member investment instruments bear resemblance to the B-shares in the former Friesland cooperative, as described in Section 2.4. One of the policy implications of this essay is that, in an ideal case, cooperatives should not opt for just one new type of cooperative equity shares, but design at least two alternatives to acknowledge member heterogeneity.

An important conclusion regarding the survey methodology is that the perceived difficulty of respondents in making their choices has an effect also on the estimation results. The results reported here as the main findings were weighted by difficulty, since the standards errors of the estimated parameters were smaller if choices that were easier to make were weighted more in the estimation. An interpretation could be that respondents are likely to make more educated choices when they find the task easy, i.e., their preferences are more precise. Thus, the difficulty of the choice appears to be an important aspect to consider in designing future choice modelling studies.

Essay 3

Essay 3 examines the preferences of non-member investors for currently hypothetical investment instruments, which could be designed to attract growth capital for agricultural cooperatives. The essay represents a mirror image of Essay 2, as it provides new information on the willingness of non-members to contribute equity capital for cooperatives and the terms on which they would be willing to do so. The tested investment attributes were: voting rights; the form of return rights; capital appreciation; and expected risk and return. The first level of these choice attributes corresponded to the terms of an ordinary stock investment, and the two alternative levels represented shifts towards cooperatives as an investment option.

The levels of the voting rights attribute were designed to test the impact of the firm's ownership structure on investment preferences. More specifically, the controlling block of producer-owners might reduce the attractiveness of agricultural firms as an investment for outside shareholders, as suggested by the theory of the firm as well as by prior empirical studies (Fama 1980; Bolton and von Thadden 1998; La Porta et al. 1999). The baseline level of the voting rights attribute was no voting right. The two other levels both gave

external investors the right to vote, but one, described farmer members as holding a control block position, and in the other, the ownership structure was dispersed.

The choice experiment was so designed that respondents had to choose between three options: two policy alternatives and opting out. The risk of hypothetical bias was reduced by including the option of no interest in agricultural investment instruments, rather than forcing respondents to choose between given policy alternatives, Thus, their choices could be expected to better reflect their true preferences. This CE was part of a larger survey investigating the overall attitudes of investors towards investment opportunities in agriculture, the food production chain, and producer cooperatives. Some of the background variables elicited by the larger survey were used in this dissertation to explain the investment preferences of potential investors. Drawing on the prior literature on the effects of familiarity and identity on economic decisions, Essay 3 also explores whether a rural identity and rural living environment had any influence on the respondents' preferences for agricultural investments. Figure 4 illustrates the study frame of Essay 3.
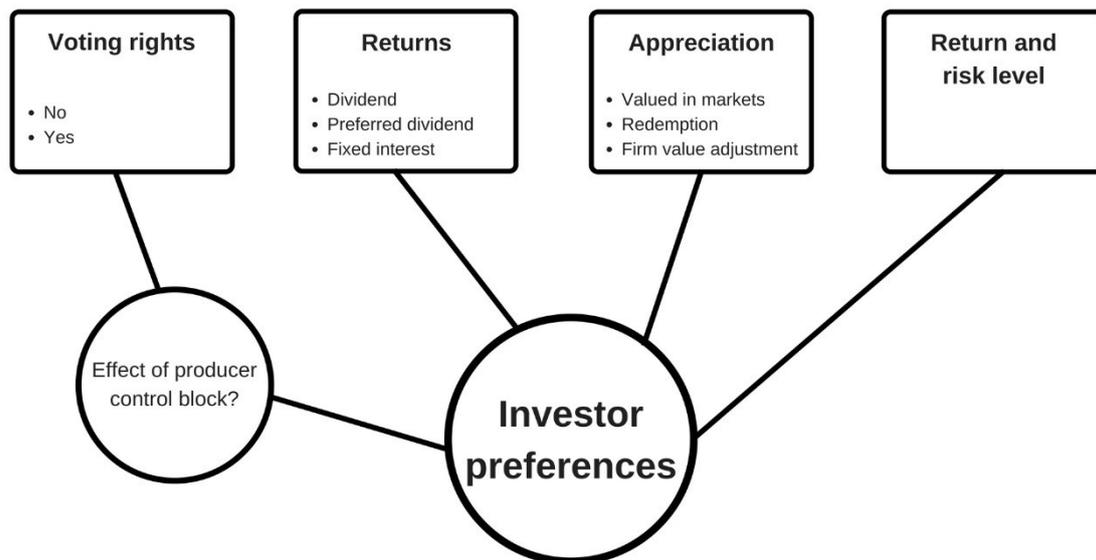
Figure 4. Alternative attributes regarding new financial products of agricultural producer cooperatives in the investor survey.

The objective in Essay 3 was to identify different types of investors based on their preferences. The responses were analyzed using a latent class model (LCM), which revealed three latent investor classes. These could be characterized as: return-seeking investors (class 1), ownership-oriented investors (class 2), and risk-averse investors (class 3). On the whole, investors falling into classes 1 and 2 were positively disposed to agricultural investment instruments, and together accounted for 89% of all responses. This suggests that the prospects for implementing new investment opportunities in agriculture look quite promising. In contrast to classes 1 and 2, the risk-averse class 3, representing the remaining 11% of respondents, preferred to refrain from agricultural investments and chose the opt-out.

The main differences between the investors in classes 1 and 2 were related to their preferences for voting rights and expected risk and return levels. The ownership-oriented

investors in class 2 exhibited a strong preference for voting rights, rather than pursuing high returns and risk. By contrast, the dominant factor influencing the investment decisions in class 1 was the potential for high returns, defined on a par with the average long-term stock market return. These investors were prepared to accept riskier investment attributes, such as dividends and valuation in secondary markets. They did not require low-risk features, such as fixed interest return or security of capital with appreciation based on firm value, as did class 2 investors. However, both classes were in favor of the redemption of shares at their nominal value.

The block ownership by agricultural producers turned out to have no relevance for outside investors. They did not seem to perceive any risk that the producers would make decisions that might worsen their position as minority investors. Or, in the case of cooperatives, they saw no risk that the members would exercise their control to maximize producer prices in such a way that the residual returns to non-member investors would be jeopardized.

Interestingly, when the investor classes were analyzed further with respect to their characteristics, rural identity proved to be an explanatory factor for class 2 membership. Investors in class 1, in turn, were less likely to identify with a rural lifestyle. However, it is noteworthy that the investors' current domicile, whether urban or rural, had no influence on their investment preferences. Female respondents as well as those with fairly long work experience in financial sector were more often categorized into the ownership-oriented investor class (class 2). The profiling of potential investors, which is described in more detail in Essay 3, has several practical implications. Investment capital would apparently also be available for agricultural producer cooperatives from investors who neither identified with a rural lifestyle nor with agriculture, but whose motivation to invest rested on the good return potential in the food production sector. Another group of investors were motivated by affective reasons and expected voting rights in return for their capital contribution. They seemed likely to sympathize with agricultural producers which would alleviate the risk of conflicting interests in cooperative decision making.

To conclude, the choice tasks analyzed in Essay 3 constitute a test of the invest-share cooperative model in Chaddad and Cook's (2004) typology. Allowing ownership rights to non-member investors could help to solve the financial constraints of agricultural cooperatives and facilitate their growth. However, for producers this would mean giving up at least a part of their control in the cooperative.

Essay 4

Essay 4 elaborates further on the behavioral and social aspects that may influence the investment decisions of non-member investors. The analysis approach was based on a broad set of attitudinal statements in the investor questionnaire. The theoretical framework was built on a large body of evidence on the role of values, social issues, and familiarity in economic decisions. The practical purpose of the study in the context of the growth of agricultural cooperatives was to increase the understanding of what motivates non-producers to participate in financing investment in cooperatives. The results can be utilized in marketing new financial instruments within the agricultural sector.

The variables of interest were constructed from a set of statements which respondents were asked to evaluate on a Likert scale. Respondents' self-reported rural identity was measured by the statement "Rural life forms an important part of my identity", and social bonding by "I feel bonding with the rural population". Their values regarding the consumption of domestic food and the vitality of the countryside were measured by two statements: "I prefer food of domestic origin in grocery stores" and "Maintaining the vitality of rural areas is important to me". Two measures for respondents' investment attitudes were derived from the statements: "Food production firms provide an attractive investment opportunity", and "Farmer-owned firms have social capital that is valuable to an investor".

Unless explicitly specified as cooperatives, the investment targets in the questionnaire were described more generally as food production firms. This was done to prevent any bias in investors' responses, in case some of them were unfamiliar with the cooperative form of organization or associated it strongly with a certain firm. Investors' attitudes on the presence of social capital in farmer-owned firms were examined because these firms are usually organized as cooperatives. This question was relevant for the topic of this dissertation to see if non-members also viewed social capital as an inherent part of agricultural cooperatives with economic significance. The relation between the observed investment attitudes and the studied behavioral variables was analyzed using cross-tabulations and probit models. Figure 5 illustrates the study frame of Essay 4.
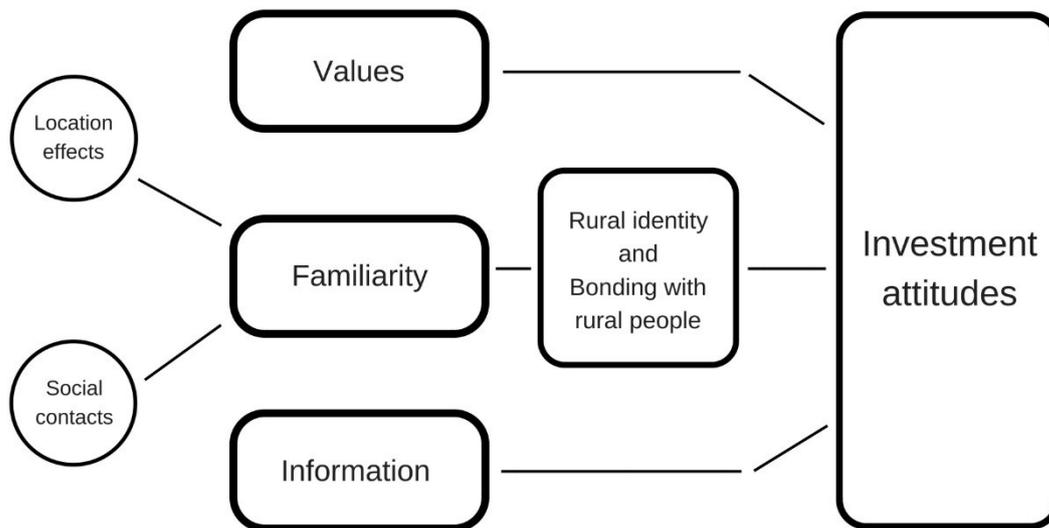
Figure 5. Formation of investor preferences for agricultural investments.

An analysis of the survey responses provided valuable new information on the formation of a rural identity and affective bonding with rural people. The probability of respondents reporting a rural identity could be seen to increase if they were born or were currently living in a countryside environment. The importance of agriculture for local employment in their home region as well as having farmer relatives were also positively related to a rural identity. Familiarity with a rural environment, either in childhood or in adulthood,

contributed to the creation of bonding ties, as did rural work contacts. In addition, personal leisure contacts also played a role in building a rural identity and rural bonding.

When the investment attitudes of rural-minded investors towards agriculture and food production firms were compared with those of non-rural-minded respondents, respondents with rural bonding ties or a rural identity were more likely than the others to view the sector as an attractive investment. A similar, but even stronger difference between rural-minded and other respondents was found for their appreciation of the social capital in producer-owned firms. The role of information on investment attitudes was studied by comparing respondents who were professionally involved in agricultural financing or had a relevant education to those who had no corresponding work experience or sector-specific training. Probit regression models confirmed that informational factors did not explain the differences observed in their investment attitudes, as opposed to the positive impact of familiarity and social influences on these attitudes.

Inclusion of the value variables, i.e., support for domestic food and the vitality of rural areas, into the probit regression model indicated their important effect for positive investment attitudes. This result implies that investors' food-shopping habits and their political stance on agriculture may show stronger predictive power for their agricultural investment attitudes compared to a rural identity as such. However, the probit estimation method did not consider any potential causality between these factors. The results further confirmed the significance of social bonding in the perceived social capital of producer-owned firms, in addition to the value variables. A general trust in people and self-reported risk aversion were also positively associated with an appreciation for social capital. This is consistent with prior evidence in the literature on the role of social capital as gluing individuals together and lubricating economic transactions. This finding suggests that farmer ownership can, in fact, decrease the perceived risk in agricultural investments.

The results imply that the provision of capital for agriculture and food production does not necessarily rest on rural-minded individuals alone. Despite the generally more positive investment attitudes of these respondents towards the sector, the attitudes of non-rural-minded respondents were also relatively favorable. Nonetheless, priming of rural ties and emphasizing the value of providing support to local farmers can promote investors' participation in new capital issues by domestic food production firms. According to the findings reported in Essay 4, familiarity and subjective values act as powerful drivers of financial decisions.

4.4   Conclusions

Various changes in agricultural policies, together with the internationalization of the food industry and retail markets, imply that competition in the market for dairy products is intensifying (Nilsson and Ollila 2009). The abolition of the EU milk quota system in 2015 has further accelerated this development, calling for strategic repositioning of agricultural producer cooperatives and implementation of new growth strategies (Hanisch et al. 2012). Yet, despite the growing investment needs of farmer cooperatives and the emergence of new cooperative models, the attitudes of potential investors have so far remained unexplored. This dissertation is, to my knowledge, the first effort to investigate the

preferences of cooperative members and non-members regarding investments in agricultural producer cooperatives.

The four essays of this dissertation provide new knowledge on investment behavior in the context of Finnish agricultural producer cooperatives. The essays are based on an extensive questionnaire survey and analysis of the investment preferences of cooperative members and outside investors. The results offer useful information to practitioners, helping them to understand the factors that affect the willingness of farmers for long-term commitment to their cooperative through retained earnings, and to recognize the behavioral aspects that influence their investment decisions. The findings will facilitate the design of new equity instruments by which both members and non-members can make voluntary investments.

While the responses to the hypothetical survey questions should always be interpreted with caution, without making far-reaching interpretations about the actual demand in the investment market, the results of this dissertation are quite reassuring for growth-seeking producer cooperatives in Finland. Cooperative members appeared willing to give up some of the surplus distributions to finance their cooperative's growth with retained funds and they also seemed positively disposed to new financing mechanisms. Implementation of such mechanisms would require modifications to the ownership rights structure and articles of association of the cooperative to offer sufficient incentives to potential investors. According to the results of this dissertation, these incentives could include, e.g., residual rights based on the amount of invested capital, the possibility to gain from increased firm value, and the transferability of cooperative equity shares. The establishment of a secondary market for voluntary cooperative shares would enable the cooperative to access long-term equity capital that would not have to be redeemed. A key question for the success of such financial instruments is related to securing sufficient liquidity in the secondary market and making the appreciation mechanism transparent.

The rationale for inviting outside investors centers on the need to diversify the sources of capital for producer cooperatives. If the cooperative decides to accept non-member investors instead of setting up a separate capital-seeking entity, a critical consideration relates to the allocation of control rights in the cooperative. The results of this dissertation suggest that a part of the farmer respondents would approve outside shareholders, but without endowing them with voting rights, and likewise, a part of the investor respondents would refrain from voting rights, provided that the expected return is attractive. However, the attitudes among the farmers and investors varied. A notable fraction of farmers would prefer not to open the cooperative to external investors. There was also a group of non-member investors who exhibited interest towards gaining control rights in the cooperative. Taking into account the heterogeneity of investment preferences among both farmers and investors, the obvious conclusion is that there are no ready-made solutions to the ownership rights question in agricultural producer cooperatives. New investment instruments need to be tailor-made to meet the specific objectives and requirements of the cooperative. The current Cooperative Act provides adequate flexibility – and opportunities that are bound only by innovativeness.

One way to reconcile the need for growth capital and member control of production-related decisions would be to invite outside investors to provide financing for the value adding activities of cooperatives. The return potential is likely to be higher further downstream in processing, marketing, wholesales, and exports compared to primary

production. On the other hand, there is a risk in issuing cooperative shares and setting up a secondary market. Even without voting rights, external investors may potentially exert significant influence on the decisions of the cooperative management, should the share value come under pressure and the management be inclined to take corrective measures to please investors (van Bekkum 2003). However, an ownership structure which allows the cooperative members themselves to benefit from actions that increase firm value would probably be more acceptable to members and would encourage them to open the cooperative to outside investors.

The observations of this dissertation regarding investment behavior can be summarized as follows. Firstly, farmer cooperative members may be averse to losses, even when their horizon is aligned with the cooperative's horizon and they would otherwise be willing to contribute to the cooperative's long-term sustainability. Secondly, because the cooperative can be viewed as an extension of the farm business, the economy of dairy farmers is tightly dependent on its success. Thus, any uncertainty regarding the farmers' cooperative investments understandably creates loss aversion when the stakes are high. Thirdly, the findings of this dissertation may inspire producer cooperatives to leverage on the notion of social capital in their efforts to attract external investors. The values and rural connections of potential investors may materialize as economic decisions to participate in supporting domestic agricultural production. Sourcing of local capital, not only from investors who are physically close to the cooperative but also from rural-minded investors, can mitigate potential conflicts of interest which opening to outside investors might bring about. And finally, this dissertation proves the usefulness of survey methods in profiling different investor types. A good understanding of the preferences and behavior of both cooperative members and non-members can pave the way for new investment opportunities for cooperatives in Finland.

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Revealing loss aversion and horizon in farmer preferences: The case of Finnish dairy cooperatives

Eeva Alho

Abstract

This paper examines preferences of farmers regarding cooperative investments from the viewpoint of the horizon problem. A large farmer questionnaire is conducted to find out, whether members are willing to retain unallocated equity in the cooperative to finance its operational investments. The choice experiment contrasts instant pecuniary member benefits against the ability of the cooperative to accumulate investment capital, to restore its competitiveness, and to provide improved benefits to members in future. Our results refute the horizon problem as the farmers are on average positively disposed to cuts in surplus distribution for the sake of cooperative investment, although significant heterogeneity in preferences was detected. Asymmetry in preferences was found with respect to gains and losses in benefits, which gives support to loss aversion. The results contribute to agricultural economics literature by providing evidence on asymmetric preferences in a choice experiment setting pivoted around the real economic endowments of farmers. Our results are significant more generally to the management of producer organizations. The potential benefits of growth and investment policies need to be communicated clearly to the members so that aversion to potential losses would not impede decisions that would facilitate restoring competitiveness.

Keywords: Food production, preferences, choice experiment, agricultural cooperatives, investments, horizon problem

1.Introduction

Empirical evidence amounts showing that many economic decisions under uncertainty are characterized by behavior inconsistent with the expected utility theory. One of the most powerfully demonstrated phenomenon is loss aversion, which is a property of the prospect theory formulated by Kahneman and Tversky (1979). In prospect theory, individuals evaluate uncertain outcomes against a reference point, deviations from the reference point are coded as gains or losses (reference dependence), and losses are felt more painful than gains of equal size give joy (loss aversion) and the marginal utility of changes is diminishing (diminishing sensitivity).

Despite the growing interest in agricultural economics to draw from behavioral sciences (e.g. Menapace et al., 2013; Hellerstein, Higgins et al., 2013; Trujillo-Barrera et al., 2016) few studies incorporate prospect theory in the study of farmer behavior (Bocquého et al., 2014), while evidence on preference asymmetry with respect to the deviations from the farmers' actual wealth position is nonexistent. Members of agricultural cooperatives are an underutilized subject pool in the studies of farmer behavior and behavioral economics in general. However, this group of individuals provide an interesting testing ground for behavior with real economic endowments as the producers have typically invested significant wealth in the cooperative.

The financing of agricultural cooperatives has drawn growing interest in recent years (Fahlbeck, 2007, Bijman et al., 2012), with emphasis on the new cooperative forms that have emerged in response to the needs to improve the competitiveness of the producer organizations (Nilsson, 1998; Cook and Chaddad, 2004; Valentinov 2007). However, the question of member contributions to the financing of the agricultural cooperatives has drawn less interest in the academic literature. Member financing is yet important

means for the cooperative to accumulate equity financing. Agricultural producers (patronize) put member capital when joining the cooperative. They receive compensation for their patronization, which constitute one of the member benefits in agricultural cooperatives. The financial benefit is typically in the form of patronage refund or remuneration on member equity (Boland and Barton, 2013; Briggeman et al., 2016). The question of how much of the cooperative earnings are to be retained in the cooperative and how much to be distributed to members as benefits goes theoretically back to the so-called horizon problem (Staatz, 1987, 1989; Cook, 1995; Sykuta and Cook, 2001).

This paper examines the preferences regarding the use of cooperative surplus and the other benefits provided by the cooperative to its farmer members. A large farmer questionnaire conducted among milk producers enables us to find out, whether farmers are willing to give up the cash refunds in order to accumulate investment capital in the cooperative, which would enable them to gain in future from the improved competitive position of the cooperative. Choice experiment methodology is suitable for contrasting benefits against each other and forcing the respondents to make choice between the most preferred and least preferred attributes. Our setting, which contrasts instant benefits with future benefits, is intended to test the members' horizon. Cook (1995) defines horizon problem as one the consequences of ill-defined property rights, which in theory creates a disincentive for members of agricultural cooperatives to contribute to growth opportunities and to favor current payments instead of retained earnings (Cook and Iliopoulos, 2000). Methodologically the choice experiment allows the testing of asymmetry and linearity of preferences regarding improvements and deteriorations under the tenets of the prospect theory.

The contribution of this paper is twofold. First, we provide evidence on the horizon of the members in agricultural cooperatives and their preferences regarding the use of unallocated equity. To our knowledge, this is the first study using choice experiment in examining preferences regarding cooperative benefits, while Royer and Shihipar (1997) and Russell and Briggeman (2014) analyze realized distributions. Secondly, our results add to the growing evidence from stated preference analyses in environmental and transportation economics literature an asymmetry of preferences (Hess et al., 2008; Masiero and Hensher, 2010; Glenk, 2011; and Ahtiainen et al., 2015) and introduces the application of prospect theory in the field of agricultural economics. In contrast to the prior studies, our study models the preferences in a setting in which the subjects have own wealth at stake. The farmers in our choice experiment face choice situations in which their current position is deteriorated or improved, while e.g. in, Masiero and Henser (2010), Glenk (2011), and Ahtiainen et al. (2015) the attributes describe policy programs, which do not describe direct changes in the monetary endowments of the respondents.

The rest of the paper is organized as follows. Section 2 presents the theoretical framework. Section 3 describes the questionnaire data and the methodology. Section 4 presents the results after which they are discussed in Section 5. Section 6 concludes the paper.

2. Theoretical framework

The theoretical framework of this study is built on two pillars: (1) the benefits of membership in agricultural producer cooperatives to farmers, and (2) prospect theory that describes how individuals decide between alternatives in situations involving risk. In this study, the approach to the former is more specifically, how cooperative investments benefit members. The study builds on the prior literature discussing the property rights problems in agricultural cooperatives. The second pillar of the theoretical framework, prospect theory, gives us predictions on how members evaluate any changes in their current benefits if a cooperative needs to redesign its benefit policy.

Cooperatives offer several advantages as a means of organizing agricultural production (Staatz, 1984; van Bekkum, 2001; Bijman et al., 2012; Hanisch and Rommel, 2012). In organizational economics literature, cooperatives are described as benefiting their members by creating countervailing market power, reducing information asymmetries, helping to economize on transaction cost, and reducing price risk (LeVay, 1983; Staatz, 1987; Sexton and Iskow, 1988; Hansmann, 1988, 1996; Ollila, 1989). Further advantages particularly in agriculture are recognized as the protection for farmers against opportunistic behavior on part of their trading partners and to protect farmers' private investments (Sexton and Iskow, 1988; Ollila and Nilsson, 1997; Valentinov (2007).

Cooperative organizational form is based on the member participation both as a customer of the cooperative and as a provider of capital. Cooperatives are characterized by members' collective ownership, members' use of the cooperative and members receiving benefits (LeVay, 1983; Sexton and Iskow, 1988). The residual claim and residual control rights define the farmer's benefits as members of the cooperative. A

member of an agricultural cooperative receives benefits in proportion to the use of the cooperative, which is generally referred to as patronage refunds or distributions. This reflects the farmers' customer role in the cooperative. Stock refunds are also possible, and they are determined in proportion to the capital contribution of the member.

In the traditional cooperative form, the own capital is restricted solely to the internally generated funds and equity contributions from members (Chaddad and Cook, 2004; Chaddad et al. (2005). This is the key difference between cooperative finance and the financing of investor-owned firms. It may jeopardize the growth of the cooperative if members are not able or willing to provide investment capital (Staatz, 1989). Vitaliano (1983) postulated that the members may have low incentives to participate in the control of the cooperative and to invest in it because of improperly defined property rights. According to Cook (1995), the success of agricultural cooperatives is threatened by five particular property rights problems, which describe in effect incentive problems and appear as institutional disadvantages for cooperatives (Vitaliano 1983, Cook and Iliopoulos 1999, Sykuta and Cook 2001, and Valentinov 2007): free-rider problem, horizon problem, portfolio problem, control problem, and influence-cost problem. Horizon problem describes a situation in which cooperative members perceive that they do not benefit from long-term investments made by the cooperative. Returns of the investment accrue later, while the members may demand benefits earlier. Therefore, they are reluctant to make capital contributions to finance those investments.

In practice, some agricultural cooperatives have changed their surplus distribution policies and started to accumulate cooperative equity in order to remain competitive. Briggeman et al. (2016) observe that grain marketing and farm supply cooperatives in the U.S. have employed strategies to generate equity by retaining a greater portion of

both local profits and distributions from regional cooperatives as unallocated equity. These strategies for preparing for infrastructure investments reflect the view of cooperative as a continuation of the farm business. Moreover, the policy reflects the objective of agricultural cooperative to maximize the members' combined profits from the farm business and their share of the cooperative profits, as described in Boland and Barton (2013).

The prior literature gives a testable hypothesis on the willingness of farmers to leave surplus as retained earnings into their cooperative. The starting point is that an agricultural producer cooperative needs capital for making an investment, whose benefits accrue over long term. The investment is needed in order to improve the competitiveness of the cooperative and its ability to provide benefits to its members in future. The traditional cooperative model does not allow the sourcing of equity from outside (non-member) investors. Moreover, the capability of the members to invest more cooperative capital may be restricted because of the need to invest in their own farms or capital constraints for other reasons. The first-hand source of investment capital is the retained earnings, i.e. the cooperative surplus, which is not paid out to members as benefits. The research question is, whether members of a producer cooperative are willing to give up the (some of) the refunds in order to accumulate investment capital in the cooperative. Horizon problem gives a prediction that members are not willing to give up current benefits in order to make long-term cooperative investments.

Hypothesis 1: Horizon problem exists, and farmers prefer cooperative surplus to be refunded to members instead of retaining it in the cooperative for its long-term investments.

The second pillar of the theoretical framework of this study, prospect theory formulated by Kahneman and Tversky (1979), gives us predictions on how members evaluate any changes in their current benefits if the cooperative needs to redesign its benefit policy. The cognitive tendency of individuals to make evaluations against reference points is an inherent property of prospect theory of Kahneman and Tversky (1979). A natural reference point is the current position of an individual i.e. the status quo (Kahneman and Tversky 1979; Samuelson and Zeckhauser, 1988; Munro and Sugden 2003), but expectations, goals and aspirations may also serve as reference points (Heath et al., 1999; Ericson and Fuster, 2011; Hoffmann et al., 2013).

According to prospect theory, preferences are formed toward the changes (gains or losses) with respect to the reference, instead of wealth levels. Second property of prospect theory is called loss aversion, which entails that the perceived utility of the changes around the reference point is felt asymmetrically, and losses are felt larger than the gains. The prospect theory value function is thus concave in the domain of gains and convex in the domain of losses, and it is steeper for losses than for gains. The S-shaped value function implies diminishing sensitivity, meaning that the effect of further losses or gains is experienced smaller.

Drawing on prospect theory, a hypothesis on farmer preferences regarding changes in benefits can be made. The benefits of the cooperative investments are uncertain. The investments are intrinsically intended to improve the potential of the cooperatives to provide benefits to their members in future, but due to market uncertainty some of the benefits may deteriorate.

Hypothesis 2: Farmer preferences regarding cooperative benefits abide by prospect theory and, thus, sensitivity to losses in benefits is larger than to respective gains.

Farmers may prefer some benefits more than others. Therefore, if the cooperative has to change its benefit policy, understanding of farmer preferences is key for formulating policies which satisfy the members. Choice experiment method provides a setting to test farmers' sensitivity to gains and losses benefits with respect to their current level.

3. Data and methods

3.1 Farmer sample

The data consists of the members of five Finnish dairy producer cooperatives. The cooperatives were chosen to represent variety in the sample. Two larger cooperatives act as milk supply cooperatives and they also have a holding role as shareholders of the limited liability company Valio, which is a joint processing and marketing company owned by the dairy cooperatives. Three smaller independent cooperatives that were included in the sample take care of the processing and marketing of milk. The total number of dairy producers in Finland was 8,767 at the end of year 2014 (Natural Resources Institute Finland).

The questionnaire was delivered in February 2014. The initial sample consists of 2408 farmers including the pilot study of 160 farmers. The questionnaire was delivered by mail but also the possibility to answer online on a web-based version was given. Response rate turned out 16.8% yielding 406 farmers in the final sample. Table 1 reports the summary statistics of the dairy producers in the sample. The most typical herd size in the sample was 20–29 cows. That corresponds to the population of Finnish dairy farmer, as a quarter of dairy farms in Finland were of that size in 2014. The average herd size in the sample was 32 dairy cows.

Several reasons for the low participation rate can be identified. First, the member registers that were received from the cooperatives and constituted the basis for the survey sample included some members who may had already exited farming. Second, the questionnaire was rather heavy as it contained also another choice experiment regarding cooperative investments and quite extensive sets of statements eliciting

attitudes towards cooperatives. Further loss in the participation rate could be attributed to general survey fatigue and administrative burden caused by agricultural reporting, which was voiced in the open feedback by our respondents. The subjects were not remunerated for taking part in the study, except for random draw of ten gift tokens at approximate worth of 50 euros each.

Table 1. Descriptive statistics of the sample, N = 406

Variable	Description	Mean	Standard deviation	Population mean[1]
Liters	Milk production volume of the farm, liters per year.	266,743	330,003	261,040
Cows	Number of dairy cows.	32.35	30.51	32
Productivity	Milk production in per cow, liters in year	7330	1864	8,201
Hectares	Field area of the farm, hectares.	59.29	49.95	43
Age	Farmer age, years.	51.05	10.08	
Gender	Dummy variable, 1 = Female.	0.24	0.43	
Education	The highest completed degree, range 1–5 where 1 = Primary school, 2 = Vocational, 3 = Secondary school, 4 = Polytechnic, 5 = University.	1.51	1.35	
Independent cooperative	Dummy variable, 1 = a cooperative independent of Valio group.	0.18	0.39	
Intend to exit farming	Dummy variable, 1 = a farmer reports being sure about quitting farming within five years.	0.22	0.41	

[1] Population mean denotes the national average among Finnish dairy farmers in 2014, field area is for all farms, source Natural Resources Institute Finland (Luke) statistics.

3.2 Choice experiment design

The choice experiment was conducted as a part of a larger farmer questionnaire. As an introduction to the choice tasks, the respondents were briefed about the hypothetical situation in which they would have to decide on the preferred treatment of the

cooperative surplus. They were explained that the choice tasks aimed at finding out whether the members are willing to leave surplus in to the cooperate as unallocated equity to cover future investment needs. This means that the members would refrain from instant monetary benefits in order to gain from improved benefits which accrue as a result of the investment.

The briefing continued with describing that the competitive position of the cooperative is eroding and the cash flow financing and solvency are jeopardized. Meanwhile the number of producers has diminished and the cooperative has had to redeem cooperative equity to the exiting members faster than it has accrued new contributions from new members. To restore competitiveness and to be able to satisfy its members now and in the future, the cooperative wants to react to the competitive pressures coming from international food industry. Cooperative or a cooperative-owned processing company could restore competitiveness by investing in expanding operations or in raising the degree of processing. The potential benefit from the investment materializes in a few years' time, and the members would gain in the following way:

- the cooperative is able to upgrade its production-related services,
- the price competitiveness improves, i.e. the producer price and the refunds are markedly better than those of the competitors, and
- the cooperative boosts the quantity of milk processed.

Future outcomes from the investment are uncertain, but if the cooperative sticks to the current policy and does not invest, its ability to maintain the services, producer prices, and processing capacity deteriorate inevitably.

The choice tasks presented three alternatives in which both the patronage refund and the interest payment vary. Cooperative can distribute out to members the surplus accrued during the accounting period either in the form of capital interest or patronage refund. If the members perceive the investment as important to safeguard cooperative's competitiveness in the future, they would have to choose the way how to cumulate unallocated equity in the cooperative. Alternatives are to refrain from interest refund by halving the current interest level or by forgoing interest altogether, and similarly, to refrain from patronage refund either by halving it or by forgoing it altogether.

The surplus attributes, i.e. interest and patronage refund, represent the common instruments for distributing cooperative surplus to members (Boland and Barton, 2013; Briggeman, et al., 2016). As literature on the non-pecuniary benefits provided by modern agricultural cooperatives is non-existing, the benefit attributes we derived from field experience. Therefore, a focus group interview was conducted prior to the questionnaire design. The most relevant benefits of cooperative membership to dairy farmers were found to be producer price, production-related services, and the milk quantity received and processed by the cooperative (i.e. a market channel for the milk production of a farm).

The choice set consisted of two unlabeled policy options and the status quo option that represented the scenario of not investing and the resulting deterioration in the competitive position of the cooperative. The alternatives in the choice experiment were composed of five attributes. Two attributes described the form of the surplus refund (i.e. **1. interest** and **2. patronage refund**) and three attributes described the dimensions how benefits could materialize as a result of the investment (i.e. **3. production-related services, 4. producer price level**, and **5. milk quantity**). The choice task, thus, presents

a two-period model in which two surplus attributes relate to $t=0$ and three benefit attributes describe the outcomes at $t=1$.

Each attribute takes three levels. The attributes are described in Table 2. The situation, in which a member prefers not to forgo any of interest or patronage refund, no investment is made and the services, producer price level, and milk quantity processed will deteriorate. These represent the base level of attributes in the choice experiment.

Table 2. Description of choice experiment attributes

Attribute	Description	Levels
Surplus refund to members now in the form of:		
1. Interest	Cooperative surplus is distributed to members as interest on the capital contribution made by a member, i.e. ownership return received by the farmer.	**1. Unchanged** 2. Halved 3. Forgone altogether
2. Patronage refund	Cooperative surplus is distributed to members as patronage refund in proportion to milk quantity sold to the cooperative, i.e. customer return received by the farmer.	**1. Unchanged** 2. Halved 3. Forgone altogether
After the investment, impacts on:		
3. Service level	Benefit from the investment accrues to members as a potential for improvements in the production-related services offered by the cooperative.	**1. Deteriorates** 2. Unchanged 3. Improves
4. Price level compared to competitors	Benefit from investment accrues to members as a potential for improvements in the producer price and the refunds paid by the cooperative.	**1. Deteriorates** 2. Unchanged 3. Improves
5. Processed milk quantity	Benefit from investment accrues to the members as a potential for production expansion and increase in the processed milk quantity.	**1. Decreases** 2. Unchanged 3. Increases

The base level is indicated in **boldface**.

Experimental design with five attributes, each consisting of three levels, was carried out using Ngene software. Fractional orthogonal design generated 72 choice sets, which were allocated to eight blocks. Thus, each respondent confronted a questionnaire with nine choice sets. In an orthogonal design the attributes of alternatives are uncorrelated

between the choice sets. A pilot study was conducted as an internet questionnaire to 160 randomly chosen farmers, who are members of those 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 analyzed. Orthogonal design was thus retained. Figure 1 presents an example of a choice task.

	NO INVESTMENT	ALTERNATIVE 1	ALTERNATIVE 2
	SURPLUS REFUND	**SURPLUS REFUND**	**SURPLUS REFUND**
Interest	Unchanged	Halved	Unchanged
Patronage refund	Unchanged	Forgone altogether	Halved
		AFTER THE INVESTMENT	**AFTER THE INVESTMENT**
Service level	Deteriorates	Improves	Deteriorates
Price level compared to competitors	Deteriorates	Unchanged	Improves
Processed milk quantity	Decreases	Unchanged	Decreases

Figure 1. Example of a choice task.

3.4 Methods and the modelling approach

We analyze the choice experiment data using the mixed logit model with random parameters (RPL) that allows for preference heterogeneity (Hensher and Greene, 2003). RPL is nowadays a standard model in the analysis of choice data. RPL is not restricted by the independence of irrelevant alternatives (IIA) property and it can accommodate a panel structure of repeated choices (Revelt and Train, 1998). The underlying assumption of the IIA is that the error terms are independently and identically distributed (IID). That is likely violated if there is unobserved preference heterogeneity among respondents

(Louviere et al., 2000). Therefore, RPL relaxes the assumption of conditional logit model about homogeneous preferences across the respondents, which is found to improve the model fit (Breffle and Morey, 2000; Birol et al., 2006). RPL allows the coefficients to vary randomly instead of being fixed for every individual (Train, 1998). Taste variation is represented by the continuous distribution of preferences from which the individual utility parameters are drawn.

The economic framework is the random utility model of McFadden (1974). A respondent i is assumed to choose the alternative j, described by five attributes X_k ($k = 1, 2, ..., 5$) and three attribute levels l, which offer the greatest utility $U_{ij} = V(X_{1l}, X_{2l}, ..., X_{kl}) + e_l$, where $V(X_{1l}, X_{2l}, ..., X_{kl})$ is the systematic part of utility and e_l is the random component. The utility of the respondent i is described as

$$V_{kt} = \beta_0 ASC + \beta_1 X_{1t} + \beta_2 X_{2t} + ... + \beta_k X_{kt}, \tag{1}$$

where ASC is the alternative specific constant that equals one for the policy options (i.e. alternatives in which the cooperative makes an investment) and zero for the status quo option, and t denotes the number of choice tasks t ($t = 1, ..., T; T = 9$). β_k are the parameter values for the surplus attributes (interest and patronage refund) and the benefit attributes (services, price, and quantity).

The choice experiment attributes enter the basic RPL model as linearly coded variables so that the base level, i.e. a decrease in the benefit, is coded as 0, the benefit remaining unchanged is coded as 1, and an increase in the benefit is coded as 2. The basic model defines thus preferences regarding the deteriorations and improvements in benefits as symmetric.

The analysis of loss aversion and diminishing sensitivity to losses is based on the estimated coefficients of the RPL models. To test whether the preferences comply with the prospect theory value function, we follow the approach used in Masiero and Hensher (2010), Glenk (2011) and Ahtiainen et al. (2015) and divide the benefit attributes into decrease and increase parts. By doing so, we are able to test the asymmetry of preferences over increases and decreases, when $X_k(inc)$ and $X_k(dec)$ are defined as the difference in attribute levels between the policy and the status quo options for the benefit attributes, thus

$$X_k(inc) = max \ (X_k - X_{SQ}, \ 0), \text{ and}$$

$$X_k(dec) = max \ (X_{SQ} - X_k; \ 0). \tag{2}$$

The utility function for the asymmetric preference model is specified as

$$V_{kt} = \beta_0 ASC + \beta_1 X_1 + \beta_2 X_2 + \beta_3^+ X_{3(inc)} + \beta_3^- X_{3(dec)} + \beta_4^+ X_{4(inc)} + \beta_4^- X_{4(dec)}$$

$$+ \ \beta_5^+ X_{5(inc)} + \beta_5^- X_{5(dec)} \qquad . \tag{3}$$

Variables are dummy coded for the asymmetric specification, i.e. the benefit variables (services, price, and quantity) are divided into increases and decreases taking the value of 1 respectively, and zero otherwise.

The third model introduces a modification to the linearity of the utility function with respect to the surplus attributes. To test diminishing sensitivity to losses in relation to the reference point, we identify two decrease levels for interest and patronage refund as in Masiero and Hensher (2010). Halving the surplus distribution represent one-step decrease (–) and forgoing it altogether represent two-step decrease (– –). These are coded as mutually exclusive dummy variables following the approach of Ahtiainen et al.

(2015). The utility function for the nonlinear asymmetric preference model is specified as

$$V_{kt} = \beta_0 ASC + \beta_1^- X_1^- + \beta_1^{--} X_1^{--} + \beta_2^- X_2^- + \beta_2^{--} X_2^{--} + \beta_3^+ X_{3(inc)} + \beta_3^- X_{3(dec)}$$

$$+ \beta_4^+ X_{4(inc)} + \beta_4^- X_{4(dec)} + \beta_5^+ X_{5(inc)} + \beta_5^- X_{5(dec)}. \qquad (4)$$

As each respondent confronts nine choice tasks, the panel structure of the data is accounted for in the RPL model by imposing the condition that the random parameters are constant over choice tasks but vary over respondents as in Masiero and Hensher (2010).

4. Results

4.1 Choice experiment results

Data from the choice experiment was estimated in random parameter logit (RPL) specification. Table 3 reports the results of the RPL estimations for three different models. The basic model serves as the baseline for analyzing farmers' horizon and asymmetry in the preferences regarding benefits. Loss aversion and diminishing sensitivity are tested by introducing asymmetry and nonlinearity to the estimated models.

The alternative specific constant (ASC) is specified to take the value of zero for the alternative of not investing (i.e. status quo) and the value of one for the investing alternatives. The RPL models are run with 500 Halton draws from the normal distribution, and all the variables are specified as random.

In model 1, all the variables obtain a statistically significant coefficient in the estimation of the basic RPL model. The positive coefficient on the ASC indicates that the farmers are on average willing to retain unallocated equity in cooperative by refraining from surplus distributions if it enables the cooperative to make investments that improve its competitive position and may benefit the farmers later as the potential for improvements in service level, producer price, and the milk processing quantity. However, there is significant heterogeneity among the respondents' horizon as indicated by the statistically significant and large standard deviation of the ASC. This means that some farmers in the sample prefer the current surplus distributions and the instant pecuniary benefits instead of receiving less surplus for the sake of retaining unallocated equity in the cooperative.

Table 3. Estimation results for random parameter logit model

	(1) Basic model		(2) Asymmetric			(3)Nonlinear asymmetric		
	Coefficient (std. error)	Standard deviation (std. error)	Coefficient (std. error)	Standard deviation (std. error)	Diff.	Coefficient (std. error)	Standard deviation (std. error)	Diff.
ASC	0.364* (0.208)	3.161*** (0.211)	2.955*** (0.265)	3.779*** (0.200)		2.842*** (0.264)	3.905*** (0.209)	
Interest	-0.278*** (0.06.)	0.491*** (0.096)	-0.259*** (0.058)	0.431*** (0.101)				
Refund	-1.077*** (0.088)	0.997*** (0.093)	-1.073*** (0.084)	0.967*** (0.090)				
Services	0.310*** (0.050)	0.277** (0.115)						
Price	1.020*** (0.076)	0.943*** (0.093)						
Quantity	0.382*** (0.051)	0.362*** (0.091)						
Services inc			0.001 (0.100)	0.201 (0.323)	-3.83[a]	0.019 (0.109)	0.488** (0.194)	-3.72[a]
Services dec			-0.561*** (0.105)	0.391* (0.219)		-0.605*** (0.114)	0.425* (0.225)	
Price inc			0.486*** (0.096)	0.651*** (0.164)	-7.98[a]	0.507*** (0.102)	0.681*** (0.176)	-8.09[a]
Price dec			-1.983*** (0.161)	1.478*** (0.179)		-2.092*** (0.167)	1.641*** (0.162)	
Quantity inc			0.268*** (0.102)	0.493*** (0.187)	-2.62[a]	0.197* (0.110)	0.496** (0.207)	-3.53[a]
Quantity dec			-0.653*** (0.106)	0.054 (0.311)		-0.774*** (0.121)	0.285 (0.303)	
Interest (–)						-0.138 (0.108)	0.271 (0.286)	-1.05[b]
Interest (– –)						-0.483*** (0.123)	0.643*** (0.177)	
Refund (–)						-0.934*** (0.144)	1.151*** (0.179)	-0.71[b]
Refund (– –)						-2.051*** (0.160)	1.385*** (0.162)	
Log likelihood	-2318.3		-2297.7			-2305.7		
AIC	1.371		1.362			1.369		
McFadden pseudo R	0.379		0.385			0.383		
N of observations	3654		3654			3654		

*** 1% significance level, ** 5% significance level, * 10% significance level.
ASC is defined a 0 for status quo choice and 1 for the alternatives.
[a] t-ratio for the difference between increase and decrease parameters using absolute values.
[b] t-ratio for the difference between one-step and two-step change parameters using absolute values.

The coefficients on the interest and refund variables are negative as predicted, since the attribute levels entail halving the surplus distribution or forgoing it altogether. Cutting of the patronage refund is evidently less preferred as the means to accumulate unallocated equity in the cooperative. This indicates that the current pecuniary benefits are important to members even if the members perceived cooperative investment as beneficial.

The coefficients of the other benefit variables (services, price, and quantity) show the predicted sign, and they are statistically significant. Farmers prefer improvements in future benefits over deteriorations which is a logical result. Gain from the cooperative investment in the form of better producer price is relatively more preferred than service and quantity benefits. There is again significant heterogeneity in farmer preferences regarding the future benefits.

By introducing asymmetry to the model in the benefit variables, we are able to test the difference in utility for gains and losses, defined as deviations from the farmers' current position of cooperative benefits. Model 2 splits the benefit attributes to two different variables to reflect an increase or a decrease relative to the status quo. The pecuniary benefit attributes (interest and patronage refund) enter the model similarly as in the basic model. Model 2 exhibits a slight improvement in the model fit relative to the symmetric specification. The interpretation of the ASC and the interest and refund variables is unchanged, whereas asymmetric utility in increases and decreases in benefits is detected. All variables except the increase in service level are statistically significant and they are of expected sign as the coefficients on the increase variables are positive and the coefficients on the decrease variables are negative. The absolute values of the coefficients on decreases are larger than the respective increases in service level, producer price, or milk processing quantity. The result indicates that the losses in cooperative benefits relative to the status quo loom larger than the potential benefits, which is commensurate with loss aversion (Kahneman and Tversky, 1979). T-ratios for the difference in parameter coefficients between increases and decreases corroborate the significance of the difference.

Random parameter standard deviations are significant except for the service level increases and milk quantity decreases. The result is interesting as it suggests that there is heterogeneity among farmers regarding the increases in processing capacity of the cooperative, while preferences are homogeneous regarding the quantity decreases. It is possible that the detected heterogeneity is related to the future plans of the farmers about their own farm. Those farmers, who intend to expand their own production, may derive utility from the increased processing capacity of the cooperative as a result of the investment. On the contrary, cooperative is an important market channel to the dairy farmers and therefore our respondents generally disapprove diminishing milk processing quantity.

Model 3 takes into account the nonlinearity in utility for the reductions in the surplus distribution received by the farmer. The piecewise transformation is made in the interest and patronage refund attributes, while the other attributes are defined as in model 2. We do find that larger reductions in pecuniary benefits are associated with larger utility losses as the estimated coefficients for forgoing the interest or refund altogether are larger (in absolute values) than the coefficients for halving them. However, contrary to diminishing sensitivity to losses we find increasing marginal utilities indicating that the farmers disapprove forgoing the patronage refund or interest, while the halving of refund or interest hurts but to a lesser extent. The statistical significance of nonlinearity cannot be confirmed as the t-ratios for the difference between one-step and two-step decreases. The model fit is not improved, when nonlinearity is introduced. Thus, we conclude that the asymmetric specification of utility is the best in describing farmers preferences regarding cooperative benefits.

4.2 Farmer attitudes regarding cooperative surplus

The questionnaire contained a section measuring attitudes regarding cooperative membership. The set of questions included statements to which the farmers responded by expressing on a Likert scale from 1 to 5 expressed their agreement (5) or disagreement (1) with the statement. The responses were employed in an exploratory factor analysis with the aim of identifying groups of farmers with respect to their expectations for the cooperative. The statements, the results of the factor analysis, and the clustering of the respondents based on the extracted factors and factor scores are presented in Appendix 1.

Three distinct groups were formed: 1) farmers to whom the cooperative ideology is an important aspect of the cooperative membership, 2) farmers who emphasize the stability and market access through the cooperative, and 3) farmers who focus on economic benefits received from the cooperative.

Another set of questions contained statements about the use of cooperative surplus. These questions were intended to shed light on the importance of cooperative benefits to farmers and the views on surplus distribution policies. Table 4 presents the attitudes regarding cooperative surplus and how they differ in three farmer groups. In the total sample, the majority of farmers view that receiving surplus funds strengthens their commitment to the cooperative, but that is more pronounced among the group 1 farmers. Those farmers, who are ideology-minded cooperative members, also view that the distribution of surplus must be determined based on patronage, i.e. those members who use the cooperative the most, are entitled to the highest surplus.

Table 4. Attitudes regarding the use of cooperative surplus by farmer groups, % of respondents agree

Statement	Group 1 Cooperative ideology (n=158)	Group 2 Market access (n=82)	Group 3 Economic benefit (n=111)	Total sample (n=351)
1. Surplus distribution strengthens my commitment to the cooperative.***	88	72	72	74
2. Surplus distribution has to be determined based on the patronage, i.e. delivered milk quantity.***	86	71	68	71
3. It is important for me that the level of patronage refund does not vary a lot from year to year. **	44	45	59	46
4. I prefer higher producer price during the season instead of patronage refund.	32	23	21	26
5. The cooperative must prepare for future investments even though the producer price would have to be decreased.***	43	28	18	30

Group 3 exhibits a lower tolerance of fluctuations in the level of patronage refund compared to other farmer groups. This group of farmers is clearly against the distribution of surplus as interest instead of as patronage refund. Due to many missing values on capital information, we are not able to refute the potential explanation that farmers in that group have made a lower capital contribution relative to the other two groups. However, the attitudes were not explained by size differences when measured as herd size, i.e. the number of cows. Herd size is quite good proxy for capital contribution as the correlation coefficient between cow and capital variable is 0.62. Thus, we conclude that the relative preference for patronage refund among economic benefit seeking farmers (group 3) is likely explained by other than monetary motives.

A clear difference between the farmer groups is observed in the attitudes towards the cooperative investments (statement 5). Farmers who emphasize the economic benefits in the cooperative membership are most frequently against the accumulation of capital into the cooperative as a reserve for future investments through the lowering of producer price, while almost a half of the ideology-oriented farmers support the

collection of reserves. In unreported analysis, we find that the attitude towards the future investments of the cooperative are related to the farmer's own future plans.[1] The majority of those farmers who do not intend to expand their own farm production disagree with the statement 5. However, almost a half of the farmers who plan to expand their production, are positively predisposed to cooperative investment although it meant temporarily lower producer prices. Therefore, we can conclude that the horizon is aligned among expanding farmers with that of the cooperative, and that the farmers perceive gaining from the investments in strengthening of the competitive position of the cooperative. The difference is statistically significant.

The different economic significance of interest and patronage refund is likely to explain some of our findings. Generally, the patronage refund received by a farmer corresponds to a milk sale of one month. The average milk production per year is 266,743 litres in the sample. This is slightly higher than the national average production per dairy farm in Finland at the time of the questionnaire (Natural Resources Institute Finland). The patronage refund paid by the cooperatives included in the sample was about 3.8 cent per litre in 2013. An approximate patronage refund received by a dairy farmer was thus 10,000 euros. On the contrary, using the median capital contribution reported by the respondents, 15,000 euros[2], and the average interest rate paid by those cooperatives included in the sample, 5.1% in 2013, the interest income per member was less than 1,000 euros. Therefore, it is obvious that the monetary value of patronage refund is much higher for an average respondent than that of interest.

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[1] We cross-tabulated all the statements with farmer specific background information. Significant differences were found in few cases. To save space, these results are omitted, but the results are available from the authors upon request.

[2] Only a little less than 50% of the respondents answered to the question, while the non-response was rare in case of other elicited background information. The average reported cooperative capital held by the members was 22,384 euros. While the high amounts bias the sample average, the median of 15,000 euros corresponds quite well with the average capital per member calculated from the annual reports, which was 16,569 in the sample cooperatives in 2013 (Pellervo-Seura, 2014).

5. Discussion

This paper utilized the choice experiment method to study willingness of the members of agricultural cooperatives to refrain from instant pecuniary benefits in favor of accumulating capital for cooperative investment and the potential for receiving improved benefits later. The choice experiment design allowed the testing of the properties of the prospect theory of Kahneman and Tversky (1979) and the farmers' loss aversion in particular. Our results provide empirical evidence regarding both the cooperative and behavioral theories.

The two-period design of the choice experiment was intended to test the presence of the horizon problem among the sample of dairy cooperative members. In theory, the horizon problem manifest itself in the reluctance of farmers to contribute to the growth opportunities of the cooperative if payoffs will accrue later than what is the horizon of the farmer (Valentinov, 2007). Our results do not support the theory of horizon problem as the respondents preferred the policy alternatives over the status quo, which was defined as no investment. It should be noted that the time period over which the profits of the investment will accrue was not defined explicitly in the choice task. If the benefits of investment were presented to accrue over a longer time period, we would expect the willingness to invest to erode and the horizon problem eventually to show up the longer the time frame.

Regarding the benefits provided by the agricultural cooperative, competitive producer price is strongly preferred relative to production-related services and milk quantity processed by the cooperative, while the estimation of the random parameter standard deviations revealed significant heterogeneity towards each. We conclude that some benefits are more valuable to certain farmers than for some others. Asymmetry in

preferences towards the increases and decreases in all benefit attributes was found. Potential gains of an investment are not valued as highly as potential losses are avoided. However, as the respondents were on average positively disposed to the investment and the improvements brought by it in terms of services, producer price and milk quantity were preferred, we rule out an overall loss averse behavior towards cooperative investments. That could be the case if the status quo was preferred over investment alternatives, i.e. then the ASC would have a negative coefficient.

The finding that the potential for losses in cooperative benefits loomed larger than the potential for gains is consistent with the prospect theory and vast amount of empirical evidence on individuals' loss averse behavior in decisions under risk. The testing of who are the risk averse farmers is left for further study and would probably require more data on members' capital endowments and incomes. Our result is consistent with the studies on preference asymmetry in choice experiment settings (Hess et al., 2008; Masiero and Hensher, 2010; Glenk, 2011; Ahtiainen et al., 2015) and support the loss aversion property of the prospect theory (Kahneman and Tversky, 1979), while nonlinearity was not confirmed.

In addition to the value of our findings as contributing to the literature on behavioral economics, the detected asymmetry has managerial implications for agricultural cooperatives, or any producer organizations, which consider growth and investment policies. The potential benefits of a large-scale investment planned by the cooperative management need to be communicated clearly to the members so that the aversion to potential losses would not override in their decision making. Moreover, if the cooperative were in a situation in which the member benefits had to be cut down, the

management should be aware of resistance of farmers although some other benefits would be offered in place.

In comparing the relative preference for patronage refunds and interest, we found that farmers were more reluctant to give up patronage refunds, while heterogeneity in preferences imply that there may be farmer clienteles in favor of each surplus distribution means. By comparing the approximated averages of patronage refund and interest based on the milk production volume and capital contribution stated by the respondents, it appeared clearly that the economic significance of patronage refund is much higher for an average farmer in our sample.

When testing the nonlinear effects in preferences regarding interest and patronage refund, we observed increasing sensitivity to losses, which is contradictory with the presumption of prospect theory stating that marginal utility is decreasing in both positive and negative domains. Our result is however intuitive as the two-step decrease is defined as forgoing the surplus distribution altogether. This is a drastic loss in comparison to the designs of Masiero and Hensher (2010) who find nonlinear preferences regarding non-monetary attributes and Ahtiainen et al. (2015) who define deteriorations qualitatively for water quality attributes. The implication of our finding to the cooperative management is that, when accumulating investment capital through cutting down surplus distributions, it would be advisable to retain at least some remuneration level in order to satisfy the members.

Further research is warranted on how individual reference points may affect farmer preferences. The analysis presented in this paper would benefit from the incorporation of the actual endowments of milk sales and capital of each farmer as individual status

quo. Unfortunately, currently our data suffers from high number of missing values for the cooperative capital, which would enable the calculation of the reference values only for less than a half of the respondents.

6. Conclusion

Our novel setting that employs the choice experiment methodology to study cooperative horizon problem provided evidence on the willingness of dairy farmers to forgo instant benefits in favor of the cooperative being able to invest, to restore its competitiveness, and to provide better benefits to its members in future. This refutes the horizon problem that in theory hinders the growth of agricultural cooperatives. Modelling of asymmetric preferences improved the model fit and revealed loss aversion in farmer preferences. The paper showed that agricultural producer cooperatives provide a fruitful ground for testing economic behavioral in field.

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Appendix 1. Factor analysis of farmers attitudes

Table 6. Factor pattern matrix and variable communalities

	Factors			
	1.Ideology	2. Stability & market access	3. Benefits	
Statement variable		Factor loadings		Communality
Cooperative membership gives me a sense of solidarity.	0.946			0.788
I can have an influence in the decision making of the cooperative.	0.799			0.582
It feels to me that the cooperative is like my own company.	0.626			0.600
Sense of community is important for me in the cooperative.	0.596			0.600
Cooperative ideology is important to me.	0.337	0.328		0.387
Cooperatives have a good reputation.		0.778		0.631
The capital I have invested is secure in the cooperative.		0.724		0.558
Cooperative decreases the volatility of milk delivery amounts.		0.632		0.383
Cooperation is more equitable than other business models.		0.497		0.381
Investments of the company to export markets secure the continuation of my farm production.		0.388		0.241
I could consider changing to a competing cooperative.		-0.338		0.259
Interest return on the cooperative capital has been too low in recent years.			0.541	0.287
Other companies carry out better corporate social responsibility than cooperatives.		-0.305	0.520	0.354
The service level of the cooperative should not be diluted.			0.464	0.344
The offerings of producer services influence my decision to join the cooperative.			0.449	0.313
Eigenvalue	5.431	1.895	1.027	
Explained variance %	36.206	12.632	6.850	
Cronbach alpha	0.861	0.777	0.550	

Extraction method maximum likelihood, rotation method Promax, factor loadings less than 0.3 are suppressed.

Table 7. Clustering of farmers based on attitudes regarding cooperative membership

Factor	Factor scores			F	Significance
	Ideology	Market access	Economic benefit		
1. Ideology	0.629	-1.241	0.022	204.0	0.000
2. Stability and market access	0.514	0.472	-1.081	205.9	0.000
3. Benefits	-0.240	0.143	0.236	8.868	0.000
Number of respondents	158	82	111		

FARMERS' WILLINGNESS TO INVEST IN NEW COOPERATIVE INSTRUMENTS: A CHOICE EXPERIMENT

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ABSTRACT:　　*Globalization of agricultural markets put pressures on producer co-operatives to invest in expansion and growth to safeguard their competitiveness. Availability of capital is limited if farmers do not have incentives to increase their capital contribution. Cooperative literature recognizes the residual rights, transferability, and the appreciation potential of the investment as the potential solutions for the problems that may impede cooperative investments. The objective of this study is to understand farmer preferences regarding investment attributes and the potential for attracting investment capital from members and non-members. We employ a choice experiment method to test new cooperative investment instruments. The data consist of a questionnaire conducted with 406 Finnish dairy farmers. Random parameter latent class logit model is used in the estimation of the data. The results indicate that most of the respondents regard the new investment instruments positively. However, farmers prefer restricting ownership rights to members. Incentives for members to participate in financing cooperative growth could be designed with capital-based residual rights, mechanisms for transferability and for the appreciation of firm value. Estimation that considered choice difficulty improved model fit, which highlights the need to address respondent burden also in future studies of hypothetical investments in order to produce unbiased estimates.*

1　　Introduction

Locally operating agricultural cooperatives constitute important marketing channel for farmers to sell their production in Europe. Producer cooperatives play an important role in present-day agribusiness in the food supply chain of all EU member states (Bijman et al. 2012). 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

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the capacity to maintain services to their members. Consequently, the traditional model of agricultural producer cooperatives is challenged by such changes in the operational environment and structural changes ongoing in agriculture.

The financing of organizational innovation and growth is a critical factor for producer-owned organizations. The possibilities of farmer cooperatives to acquire equity capital are restricted, which poses cooperatives a financial handicap in competition against food industry firms, whose organizational form allows the sourcing of outside investment capital (Chaddad et al. 2005). Financial structure has in many cases been a decisive factor to depart from traditional cooperative organizational structure (Chaddad and Iliopoulos 2013). Dynamics inside of the agricultural cooperatives put additional pressures on their financial position. (Chaddad and Cook 2004, Valentinov 2007). Namely, diminishing number of agricultural producers implies that cooperatives need to redeem the capital of exiting members and refund that of continuing 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. Such upstream bias results from the fact that farmers are the 100 per cent owners of their own farms, but their stake at the cooperative is inherently lower (Liang and Hendrikse 2013).

Innovations in organizational structures and cooperative financing have emerged as response to competitive pressures. The objective is typically to find a model which retains the cooperative form and ideology but enables accessing non-member equity capital (Hendrikse and Bijman 2002, van Bekkum and Bijman 2006). Chaddad and Cook (2004) developed a typology of five non-traditional cooperative models describing transformations in the ownership right structures of agricultural cooperatives. The polar opposites in the typology are the traditional cooperative and the investor-oriented firm. In between, five new cooperative models may be adopted by user-owned organizations to ameliorate financial constraints. The models differ in terms of the residual rights of control and residual claims. There is gap in existing cooperative literature as the farmers' dual role as members and investors in producer cooperatives is not thoroughly understood, although few conceptual studies discuss this issue (Feng and Hendrikse 2008, Grashuis and Cook 2017).

This paper examines the farmers' willingness to invest in cooperative growth utilizing a choice experiment (CE). To our knowledge, this is the first paper studying the farmers' preferences regarding the type of the cooperative capital instruments in dairy sector, which is characterized by traditional cooperatives. Alho (2016) provides survey evidence on the preferences of members in Finnish meat cooperatives that have already adopted hybrid structures and in which the investor role of farmers is more perceptible. The CE is employed to elicit the preferences for the structure of new cooperative instruments, which are currently hypothetical but could be in future utilized as member participation mechanisms in growing agricultural cooperatives. The data includes members of five Finnish dairy cooperatives, which represent the traditional cooperative form. Traditional dairy cooperatives cannot therefore acquire equity on terms which would deviate from the principles of redeemable and non-transferable residual rights that are based on patronage. The Finnish cooperative law, however, allows making innovative adjustments to cooperative ownership rights. Thus, the implementation of new financial instruments is a matter of acceptance and preferences of the current members, i.e. the farmers. The purpose of the new member investment instruments defined in the choice tasks of this study is to look for alternatives to the basic cooperative capital

investment that may not provide sufficient incentives for farmers to invest in the growth of the agricultural cooperative.

The contribution of this study is twofold. First, the paper adds to the scarce but emerging empirical literature on the new cooperative models. While a few previous studies describe the existing ownership structure models that have been adopted in modern farmer cooperatives, this paper shows how members' views on such cooperative restructuring can be tested at a design phase. Second, the application of the choice experiment method is novel to the field of farmer cooperatives. The results are of importance not only to academics, but also to cooperative members – current, former, and future – and to the managers of growth-oriented agricultural cooperatives.

The article is structured as follows. Section 2 gives an overview of the related literature on agricultural producer cooperatives. Section 3 describes experimental design, farmer data, and estimation methods. Results and the implications of the findings are discussed in Section 4 after which Section 5 concludes.

2 Literature

2.1 Collective action problems

The cooperative literature recognizes several advantages for farmers to organize and sell their agricultural production through cooperatives. As a member of producer cooperative, farmers for example benefit from gaining market entry, improved bargaining power, and reduced information asymmetries, transaction costs and price risk LeVay 1983, Staatz 1987, Sexton and Iskow 1988, Hansmann 1988, Ollila 1989, Cook 1995, Hendrikse and Bijman 2002, Valentinov 2007).

Despite the obvious advantages of cooperatives to farmer members, this organizational form is limited in its capacity to source capital, which may impede expansion and growth. The traditional cooperative form is restricted solely to internally generated funds and equity contributions from members, while the sourcing of risk capital from non-members, i.e. outside investors, is not possible (Chaddad and Cook 2004, Chaddad et al. 2005). This is the key difference between cooperative finance and the financing of investor-owned firms. Other important differences include that members are more dependent on cooperatives than individual shareholders are on firms, and also the fact that cooperatives face credit constraints on the debt market. The growth of a cooperative may be jeopardized if members are not able or willing to provide investment capital (Staatz 1989).

From the property rights perspective, the traditional cooperative model suffers from organizational limitations such as 'vaguely defined property rights', illiquid ownership rights, and conflicting residual rights between active and inactive members (Staatz 1987, Cook and Iliopoulos 1999, 2000). Vaguely defined property rights is a term used in the literature to refer to the cooperative model because property rights are collective rather than individual, residual claims are interwoven with the customer role of the member instead of investor role, and the rights are not tradeable and transferable – all in contradiction with the neoclassical view on property rights (Cook 1995, Royer 1999, Gray 2004). Improperly defined property rights produce low incentives to participate

in the control of the cooperative and to invest in it (Vitaliano 1983). Cook (1995) distinguished five property rights problems facing agricultural cooperatives, which mark the options of cooperatives either to exit, continue, or to transform to a new generation structure. These institutional disadvantages characterizing cooperatives give rise to incentive problems that have also been analyzed by Vitaliano (1983), Cook and Iliopoulos (1999) Sykuta and Cook (2001), and Valentinov (2007). They are the free-rider problem, horizon problem, portfolio problem, control problem, and the influence-cost problem. The three first-mentioned problems are the most relevant to the question of how to finance new investments of a cooperative.

The free-rider problem characterizes a situation in which certain individuals enjoy the gains produced by the cooperative while they have not participated in the efforts that have produced the gains. The problem is pronounced between current and new members (Sykuta and Cook 2001). Cook (1995) noted that such an intergenerational conflict is more likely, when the cooperative shares are untradeable, and the residual rights are equal.

The horizon problem arises when the lifespan of investments is longer than the members' horizon (Vitaliano 1983). Returns accrue later, while the members expect higher current payments. The return right of a member terminates when a farmer exits and stops patronizing the cooperative. The horizon problem is exacerbated by the lack of tradable shares and appreciation mechanisms for member capital.

The portfolio problem refers to the fact that the investment risk of a member is tied to the investment portfolio of the organization. The member's ability to make portfolio decisions according to subjective risk preferences is restricted, because the cooperative investment is tied to the patronage decisions (Cook 1995).

2.2   Ownership structure adaption

A strand of more recent literature has investigated the emergence of new agricultural cooperative forms as a response to the competitive pressures from the market (Valentinov 2007, Barton et al. 2011, Hendrikse and Bijman, 2002, van Bekkum and Bijman 2006), but also because of the divergence of interest and heterogeneity among members, and patron drift (Cook 1995, Hogeland 2006, Chaddad and Cook 2004, Nilsson et al. 2009). The emergence of innovative cooperative organizational structures reflects the need to improve incentives for member-patrons. New cooperative forms resemble increasingly investor-oriented firms (Valentinov 2007) as they attempt to reconcile the trade-off between member control and the need for risk capital (Iliopoulos 2014).

Chaddad and Cook (2004) placed the new cooperative forms on a continuum based on degree of how ownership rights are assigned to members, patrons, and investors. The starting point for the typology is the traditional cooperative structure, which Chaddad and Cook (2004) characterized in terms of ownership rights restricted to member-patrons, non-transferable, nonappreciable and redeemable residual rights, and benefit distribution in proportion to patronage. By relaxing these restrictions one by one – proportionality, benefit basis, redeemability and transferability – and by opening the cooperative to non-member investments, the typology arrives at five

innovative cooperative forms. At the other extreme in the typology of Chaddad and Cook (2004) is the transformation into an investor-owned firm, which detaches the producer organization from its cooperative principles (the user owns, benefits, and controls).

Cook and Iliopoulos (2000) described the nontraditional forms emerging in US agriculture. They observed that the incentives for members to invest are enhanced when the cooperative equity shares are transferable and appreciable. These characteristics of an investment offer solutions to the horizon and free-rider problems. Through transferability and the possibility for appreciation of the equity capital, members can benefit from the long-term payoffs that accrue from the cooperative investments. Furthermore, Cook and Iliopoulos (2000) noted that the portfolio problem is also ameliorated by transferability and the potential for capital appreciation, since then the members are better able to choose the level of risk with these new investment instruments.

While aimed at ameliorating property rights problems inherent in the traditional cooperative model, new investor-oriented attributes have some disadvantages, which explains why not every cooperative makes adjustments to their ownership structure. Decoupling of residual rights from patronage is a fundamental deviation from the cooperative principles. Due to heterogeneity of members, there are likely conflicting views within the cooperative regarding the allocation of residual rights. The abandoning of redeemability and introducing transferable equity shares is potentially the least controversial attribute among members, since it helps balance a farmer's portfolio and may thus facilitate investment at own farm. Redemption minimizes the risk associated with member capital, which may be important for at least a part of farmers. By contrast, any modifications to the 'one member–one vote' rule and introducing investment-based control rights is potentially controversial among members because it would be in contradiction with the use control principle. Perhaps the most drastic ownership rights adjustment would be the decision to open the cooperative to outside equity investors. While expanding the capital acquisition possibilities of a cooperative, that strategy would entail the risk that members become alienated from the cooperative if they perceive that their control is diluted.

3   Data and methods

3.1   Experimental design

The study utilized the choice experiment (CE) method. The approach draws from the theoretical background in consumer choice and random utility theory. According to Lancaster (1966), consumers derive utility from the attributes of the goods. The CE is initially applied in marketing and transportation literature, but it is increasingly used in non-market valuation for estimating policy changes in environmental and health economics (Louviere et al. 2000). In agricultural economics, choice experiments are increasingly employed in studying consumer preferences for production methods (Lusk et al. 2003, Michaud et al. 2013) and for food attributes (Scarpa et al. 2005, Balcombe et al. 2014), in rural landscape valuation, and in agri-environmental policies (Scarpa et al. 2009, Schulz et al. 2014).

Grashuis and Magnier (2018) are among the few who have used the CE method to study farmer cooperatives, yet their approach was to elicit consumer preferences for product origin attributes instead of farmer preferences. Alho (2017) studied the willingness of non-member investors to invest in cooperative equity shares in a CE setting. As for farmer's investment preferences outside of cooperative context, Zemo and Termansen (2018) utilized CE methods for investigating the willingness of farmers to participate in biogas investment, while Qin et al. (2011) assessed the forest farmers' preferences for property rights attributes in the forestland contract in connection with the Chinese decentralization reform. However, to our knowledge, this is the first application of the CE method to the topic of cooperative ownership structure and the design of cooperative investment instruments.

In the CE studies, individuals are presented with a series of choice tasks describing often hypothetical alternatives that consist of a set of attributes. The levels of the attributes differ between the alternatives and the choice tasks. Therefore, an individual has to make trade-offs between the relative importance of different attribute levels and to choose the alternative he or she prefers the most.

The experiment was conducted as a large farmer questionnaire in which the respondents were requested to compare given investment alternatives. The purpose was to find out whether farmers are willing to invest in new financial instruments issued by their cooperatives and what are the preferred attributes of the new financial instruments. The objective was to test the possibilities for implementing new cooperative structures and financial instruments in Finnish dairy cooperatives that are currently structured as traditional cooperatives but may need to reconsider their structure in the future in order to acquire growth capital. The new cooperative instruments would enhance the possibilities of farmers to participate in financing cooperative investments. Alternatives consisted of four qualitative attributes that described the terms of the investments. The baseline alternative, which represents the status quo, corresponded to the basic cooperative capital investment. Two alternative investments presented in the choice tasks, represented a move from the traditional cooperative capital terms towards more market-oriented, share-like investment instruments.

Before the choice tasks, the questionnaire included an introductory statement in which the choice situation was described. It requested the respondent to consider a situation in which the members have decided on a large and inevitable investment to be made by the cooperative to restore competitiveness. Further, it described that to avoid overleverage, the investment will be financed with equity, and the members are offered several alternative investment instruments as a means to place additional capital to own cooperative. Thereafter the attributes were described briefly, and the respondents were advised to choose the alternative they preferred the most in each choice task.

We are interested in the relative attractiveness of investment attributes, when farmers are offered alternative forms for investing in cooperative. It is current practice that members have an obligation to contribute member capital when joining the cooperative, on terms that are defined in the constitution of the cooperative. The size of the capital obligation depends on the amount of milk delivery of a farmer. Typically, the Finnish dairy cooperatives collect the capital incrementally over a certain period of time by deducting a specified fraction from a farmer's monthly sales proceeds. A cooperative may retain some or all of its yearly surplus and thereby accumulate investment capital.

Table 1 – Attributes in the choice experiment on investment instruments

Attribute definition	Attribute levels	Variable name
Ownership rights: Are non-members entitled to voting in the cooperative	1. Restricted to members	Baseline
	2. Voting restricted to members, preferential return to non-members	OWNP
	3. Voting right for all	OWNV
Residual right: How the refund of cooperative surplus is determined	1. Patronage	Baseline
	2. Patronage and capital	REFB
	3. Capital	REFC
Risk and return: Risk associated with the investment and the expected return	1. Low risk and return	Baseline
	2. High risk and return	EXPH
	3. Return is capitalized	EXPC
Transferability: Marketability of the investment and its valuation	1. Non-transferable, redemption at par	Baseline
	2. Transferable, nominal adjusted for appreciation of firm value	TRANSA
	3. Transferable, valued at markets	TRANSM

However, additional voluntary capital for financing the cooperative growth could be collected from members if their preferences are known. In addition, a new cooperative structure could enable collecting capital also from non-members if members prefer such an adjustment to ownership rights.

The hypothetical investment instruments were constructed of four attributes. The theoretical framework for the hypothetical new investment instruments is the typology of Chaddad and Cook (2004). The attributes represent various combinations from the cooperative model typology, but they were adapted to the Finnish context. The attributes were ownership right, residual right, expected risk and return, and transferability (Table 1). Each attribute takes three levels.

The starting point for the typology is the traditional cooperative structure, which Chaddad and Cook (2004) characterized in terms of ownership rights restricted to member-patrons, surplus is refunded in proportion to patronage, and the investments are non-transferable, redeemable, and non-appreciable. This corresponds to the base-line level in our CE design and also to the current situation in the dairy cooperatives. The other attribute levels are constructed by relaxing the restrictions of the traditional cooperative in terms of ownership and residual rights. Level 2 of the ownership rights attribute allows non-members to invest in the cooperative, but non-members are not entitled to voting rights and are compensated with preferential return. Level 3 endows all investors – both members and non-members – with the same voting rights which are based on the amount of invested capital, analogously to stock market investments.

The expected level of risk and return associated with the investment is an attribute that is not derived from the cooperative typology, but it is relevant for any investment and financial decision. The levels were defined here only qualitatively to avoid fixing the respondents' attention to arbitrary numbers. Rather, with the qualitative description of the risk and return levels the choice tasks highlighted differences between making an investment in a cooperative or the stock market.

	Cooperative capital	**Investment 1**	**Investment 2**
Transferability	No, redemption at par	Yes, valued at markets	Yes, valued at markets
Ownership rights	Restricted to members	Voting right for all	Voting restricted to members, preferential return to non-members
Residual rights	Patronage	Capital	Patronage and capital
Risk and return	Low	Return is capitalized	Return is capitalized

Figure 1 – Example of a choice task.

Historically, the interest return received by the members of Finnish dairy cooperatives on their member capital has been rather high. The average interest rate on the cooperative capital was 5.1 per cent among the sample cooperatives in 2013. However, the associated risk has been minor as the nominal is redeemed at par value upon the resignation of the member. Therefore, the baseline level of the attribute 'risk and return' is defined as low. The level 'high risk and return' indicates that the return offered by the investment may be higher than the return on cooperative capital, but it is associated with risk that the investment depreciates, and its return is uncertain. The level 'return is capitalized' means that no cash return is payable to the investor, but the capital grows by the amount of the return.

Levels 2 and 3 of the 'transferability' attribute imply that there is some kind of a secondary market for the instruments, and the cooperative does not redeem the capital. While level 3 corresponds to the stock market investments in which the value is determined daily based on buy and sell bids, level 2 offers a middle way between redemption at par and mark-to-market valuation. The possibilities to operationalize level 2 in practice are various. For example, the appreciation mechanism could be tied to certain financial statement items of the cooperative or the development of net sales if more frequently reported data is desired. If the growth of the cooperative raises its firm value, the value of capital provided by the investors could be adjusted accordingly. Thus, both members and non-members would have better incentives to invest in the growth of the cooperative.

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.

The choice task presented three alternatives of which the first described the basic cooperative capital investment including the baseline attribute levels as shown in Table 1. That represents the status quo and it remains the same in all choice tasks. Two other alternatives consisted of varying combinations of the attribute levels, i.e. these two alternatives represented the new cooperative investment instruments. An example of a choice task is presented in Figure 1.

A pilot study was conducted as an internet questionnaire delivered to 160 randomly chosen farmers who are members of the dairy 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 analyzed. Orthogonal design was thus retained. The attributes were effects coded for estimation purposes.

3.2 Data

The data consisted of the members of five Finnish dairy producer cooperatives. The cooperatives were chosen to represent variety in the sample. Two larger cooperatives act as milk supply cooperatives and they also have a holding role as shareholders of the limited liability company Valio, which is a processing and marketing company owned by the dairy cooperatives. Three smaller cooperatives included in the sample take care of the processing and marketing of milk themselves, i.e. they can be characterized as independent marketing cooperatives.

The initial sample consisted of 2408 farmers including the pilot study. The total number of dairy producers in Finland was 8767 at the end of year 2014 (Natural Resources Institute Finland statistics), and nearly all dairy farmers are organized in cooperatives in Finland. The questionnaires were delivered by mail but also the possibility to answer online on a web-based version was given. Response rate was 16.8 per cent, yielding 406 farmers in the final sample. Table 2 reports the summary statistics of the respondents.

3.3 Methods

The choice experiment data was analyzed using a random parameter logit model (RPL) and a random parameter latent class logit model (RPLCL). Dependent variable was the choice. Independent variables were the choice attributes. Status quo, defined as the investment in the form of basic cooperative capital, was omitted from the estimations. Alternative specific constant (ASC) was defined to take value of 1, when either of the new investment alternatives was selected, and zero 0 for the status quo. The utility of a chosen alternative $i = 1, 2,$ or 3 for a respondent was estimated as

$$U_{kt} = ASC + \beta_1 X_{it} + \beta_2 X_{it} + \cdots + \beta_k X_{it} , \qquad (1)$$

where attributes X_k ($k = 1, 2, 3, 4$) refer to transferability, ownership rights, residual rights, and risk and return, and their associated levels $l = (1, 2, 3)$. Here t indicates the number of choice tasks a respondent confronts. The estimated models are presented in Appendix A in more detail.

The RPL has become the main modeling approach for choice data since it accounts for preference heterogeneity (Hensher and Greene 2003, Greene and Hensher 2012). The basic multinomial logit model (MNL) assumes homogeneous preferences for the attributes and captures only heterogeneity in terms of observable respondent

Table 2 – Descriptive statistics of the sample

Variable	Description	Mean	Standard deviation	Population mean[a]
Liters	Milk production volume of the farm, liters per year.	266,743	330,003	261,040
Cows	Number of dairy cows.	32.35	30.51	32
Hectares	Field area of the farm, hectares.	59.29	49.95	43
Age	Years.	51.05	10.08	
Gender	Dummy variable, 1 = Female.	0.24	0.43	
Independent	Dummy variable, 1 = a cooperative independent of Valio group.	0.18	0.39	
Difficulty	Stated response difficulty, 1 = very difficult, 5 = very easy.	2.64	1.02	
Observations		406		

[a]Population mean denotes the national average among Finnish dairy farmers in 2014, field area is for all farms.
Source: Natural Resources Institute Finland statistics.

Table 3 – Estimation results of random parameter (RPL) and random parameter latent class (RPLCL) models and the model accounting for choice difficulty

	(1)	(2)			(3)		
	RPL	RPLCL			RPLCL with difficulty weighting		
Variable		Class 1	Class 2	Class 3	Class 1	Class 2	Class 3
Random parameters							
ASC	0.220	−1.900***	0.611*	1.532***	−1.591***	0.833***	1.194***
	(0.184)	(0.572)	(0.317)	(0.327)	(0.334)	(0.187)	(0.181)
OWNP	−0.403***	0.208	−0.572***	−0.073	0.003	−0.586***	0.038
	(0.094)	(0.379)	(0.174)	(0.126)	(0.267)	(0.111)	(0.076)
OWNV	−0.588***	−1.221**	−0.310**	−0.323**	−0.971***	−0.484***	−0.347***
	(0.095)	(0.563)	(0.148)	(0.130)	(0.356)	(0.116)	(0.077)
REFB	−0.108	−0.328	−0.087	−0.020	−0.667**	−0.096	−0.030
	(0.079)	(0.362)	(0.124)	(0.107)	(0.270)	(0.090)	(0.064)
REFC	0.166**	−0.089	0.169	0.220**	0.045	0.243**	0.271***
	(0.072)	(0.329)	(0.124)	(0.111)	(0.203)	(0.100)	(0.066)
EXPH	−0.577***	−0.343	−0.687***	−0.180	−0.485***	−0.707***	−0.275***
	(0.091)	(0.331)	(0.159)	(0.119)	(0.226)	(0.108)	(0.071)
EXPC	0.277***	0.041	0.389***	0.127	0.306	0.386***	0.163*
	(0.075)	(0.326)	(0.136)	(0.123)	(0.232)	(0.108)	(0.075)
TRANSA	0.311***	0.597*	0.172	0.301***	0.319	0.296**	0.291***
	(0.074)	(0.330)	(0.159)	(0.137)	(0.232)	(0.146)	(0.084)
TRANSM	−0.428***	−0.395	−0.464***	0.009	−0.271	−0.731***	0.114
	(0.088)	(0.352)	(0.146)	(0.128)	(0.232)	(0.139)	(0.080)
Standard deviations of random parameters							
ASC	2.376***	0.003	0.001	0.000	0.001	0.003	0.000
	(0.189)	(0.148)	(0.077)	(0.153)	(0.088)	(0.053)	(0.086)
OWNP	0.517***	0.001	0.004	0.005	0.000	0.004	0.001
	(0.131)	(0.146)	(0.066)	(0.069)	(0.088)	(0.045)	(0.041)
OWNV	0.689***	0.001	0.000	0.001	0.007	0.001	0.003
	(0.106)	(0.193)	(0.056)	(0.069)	(0.106)	(0.040)	(0.041)
REFB	0.411***	0.003	0.003	0.000	0.005	0.006	0.001
	(0.127)	(0.142)	(0.057)	(0.070)	(0.096)	(0.040)	(0.042)

(Continued)

Table 3 – Continued

Variable	(1) RPL	(2) RPLCL Class 1	(2) RPLCL Class 2	(2) RPLCL Class 3	(3) RPLCL with difficulty weighting Class 1	(3) Class 2	(3) Class 3
REFC	0.056	0.013	0.000	0.001	0.000	0.001	0.008
	(0.183)	(0.126)	(0.054)	(0.073)	(0.072)	(0.037)	(0.043)
EXPH	0.549***	0.001	0.001	0.001	0.008	0.001	0.003
	(0.103)	(0.142)	(0.066)	(0.065)	(0.084)	(0.046)	(0.039)
EXPC	0.136	0.010	0.003	0.001	0.004	0.000	0.001
	(0.240)	(0.117)	(0.055)	(0.062)	(0.063)	(0.038)	(0.037)
TRANSA	0.462***	0.008	0.001	0.010	0.002	0.002	0.001
	(0.116)	(0.096)	(0.055)	(0.072)	(0.060)	(0.037)	(0.043)
TRANSM	0.609***	0.011	0.004	0.001	0.004	0.004	0.009
	(0.119)	(0.124)	(0.057)	(0.070)	(0.074)	(0.041)	(0.041)
Class membership probability		0.286***	0.423***	0.290***	0.295***	0.386***	0.319***
		(0.059)	(0.060)	(0.050)	(0.037)	(0.037)	(0.031)
Loglikelihood	−1840.91	−1552.95			−3809.57		
McFadden R	0.249	0.366			0.372		
N	2436	2436			2436		

Notes: Standard errors are in parentheses. RPL is estimated with 500 Halton draws.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

characteristics included as interactions in the model. The mixed logit models and the RPL are more flexible in assessing unobservable preference heterogeneity. Relaxing the assumption of homogeneous preferences and using the RPL gives unbiased estimates of individual preferences (Greene 1997, Breffle and Morey 2000, Birol et al. 2006).

The main advantage of the mixed logit models is that they are not restricted by the independence of irrelevant alternatives (IIA) property and can accommodate a panel structure of repeated choices (Revelt and Train 1998). The assumption in the IIA is that error terms are independently and identically distributed (IID). It is likely violated if there is unobserved preference heterogeneity among respondents (Louviere et al. 2000). The RPL generalizes the MNL by allowing the coefficients to vary randomly instead of being fixed for every individual (Train 1998). Taste variation is represented by the continuous distribution of preferences from which the individual utility parameters are drawn.

In our choice data, the estimation accounts for the panel structure consisting of a sequence of six choice questions answered by each respondent. The distribution of the random parameters is specified as normal. The models were estimated by simulated maximum likelihood using 500 replications of Halton draws.

An often used alternative to the RPL is the latent class logit model (LCM), which models preference heterogeneity across a fixed number of distinct classes. The preferences are assumed homogeneous within the classes, but they differ between the classes (Boxall and Adamowicz 2002, Greene and Hensher 2003). The class membership of each membership is latent, i.e. not observed, and it is determined based on the stated preferences. Each class is characterized by class-specific parameter estimates. The LCM can be extended to allow for within class heterogeneity similar to the random parameter approach (Greene and Hensher 2012). The RPLCL allows for continuous variation of the parameters within classes (Hensher et al. 2015). Greene and Hensher (2012) note that RPLCL outperforms RPL and LCL in terms of model fit, and they recommend RPLCL for identifying within and across class heterogeneity of preferences. Therefore, besides RPL, we estimate also RPLCL to test, whether a model which treats farmer heterogeneity discretely rather than only continuously fits better to our data. In addition, the latent class framework identifies groups of farmers for whom different kind of new investment instruments could be designed. These two modeling techniques can be considered as complementing each other and the use of both enriches the analysis of preference heterogeneity.

The preference parameters elicited in a CE framework may be influenced by the choice environment and task demands (Swait and Adamowicz 2001). The increasing complexity of choice task decreases the ability of an individual to make accurate choices, which may be a source of heterogeneity. The economics literature acknowledges that the information processing capabilities of individuals is limited. Decisions under uncertainty require cognitive efforts, and uncertainty makes evaluation tasks more difficult. The more complex the choice environment, the more disposed individuals are to try to avoid the effort by deferring the choice or reverting to the default alternative (Tversky and Shafir 1992, Beshears et al. 2008). Subjective choice difficulty, which encompasses both choice task complexity and respondent abilities and characteristics, is found to be related to willingness-to-pay (WTP) estimates (Schkade and Payne 1994, Duquette

Table 4 – Reasons for preferring the status quo

Reason	Number of responses
I think only members have a right to be owners of the cooperative.	42
For me it is important that producers retain the vote control.	35
The right to residual income distribution resides with the members.	25
I want to avoid the risk of losing capital.	12
Total	74

2010). Therefore, a policy maker may make misguided interpretations of the results if choice difficulty is not considered in the analysis.

To account for potential choice difficulty effects, our questionnaire asked the respondents to state the subjective difficulty they experienced in choosing. That was asked separately after each choice task. Difficulty was elicited on scale 1 to 5, where 1 indicated very difficult and 5 indicated very easy. The difficulty information was used as an exogenous weighting variable in the estimation of the RPLCL model. The objective was to test, whether giving more weight in estimation to easier choices improves the model fit. Some of the attribute levels may be difficult for farmers to evaluate since neither those features nor their combinations are currently in use in the Finnish agricultural cooperatives.

4   Results and discussion

4.1   Estimation results

The choice experiment data was estimated first with the RPL. The results are reported in the first column of Table 4. The signs of the coefficients reflect how trade-offs are made between the attributes. A positive and statistically significant coefficient indicates that farmers prefer that attribute level. A negative coefficient, by contrast, indicates that the attribute level is disliked. The main result is that farmers appear to prefer return that is capitalized (EXPC) and transferability of the investment instrument so that its value is adjusted for the appreciation of firm value (TRANSA). Residual rights based on the capital contribution (REFC) also gets support.

The attribute levels that farmers do not prefer in the cooperative investment instruments are: entitling non-member investors to voting right in the cooperative (OWNV and OWNP), high expected risk and return (EXPH), and transferability so that the cooperative shares were valued at a market (TRANSM). The result suggests that the dairy farmers would not be willing to open the cooperative to non-member investors as the ownership and voting rights are preferred only for members. The result may also reflect the fact that the ownership right attribute is defined so that changes from the status quo embody impairment of members' position, i.e. having to give up control or residual claims, while the three other attributes are not directional per se.

Model 1 reveals unobserved heterogeneity in preferences among farmers. Preference heterogeneity is indicated by the estimates of the standard deviations of random

parameters. In model 1, all standard deviations except REFC and EXPC are statistically significant. The larger the variance of the estimated random parameters, the more heterogeneity of preferences exists among the respondents. The interpretation is that the individual preferences are dispersed within the sample – some farmers like an attribute and some dislike.

The estimation of the RPLCL (model 2) improves the model fit in comparison with the RPL. We estimated the model with different number of classes, and based on the BIC criteria, the specification with three distinct classes appeared best. Therefore, the estimated coefficients and random parameter standard deviations are presented for three classes in Table 4. From the differences in estimated coefficients between the classes, we can identify farmer segments. Within the segments, the investment preferences are quite homogeneous but between the classes they differ. Class 1 marks clearly the opponents of the new investment instruments, which is indicated by the large negative and statistically significant coefficient on the ASC. Farmers in this class are against the idea of giving outside investors voting right in the cooperative, i.e. they conversely prefer to restrict ownership and control only to members. Despite the strong preference for the status quo, class 1 farmers are positively disposed to the new transferability feature which would introduce nominal appreciation as per firm value.

In classes 2 and 3, the positive coefficient on the ASC indicates that farmers prefer the new investment instruments. There are a few differences, however, between the classes. Farmers in class 2 do not to prefer entitling non-members to the same voting rights as members. The estimated coefficient on the attribute level OWNP signifies that also giving ownership right to non-members with preferential return is strongly resisted in class 2. Thus, a group of farmers does not prefer non-members to become owners of the cooperative neither by giving them preferential return nor voting right as compensation for their capital contribution. Farmers in class 2 appear averse to risk, as implied the negative and statistically significant coefficient on EXPH. However, farmers prefer the attribute in which return is capitalized over the low expected risk–return attribute. Transferability with market valuation is resisted in class 2.

Farmers in class 3 can be characterized as capital-oriented investors and favorable to non-members investing in the cooperative. However, similarly to other farmer classes, they do not prefer voting rights to be given to non-members. While farmers in other classes did not exhibit any clear preferences for the mode of residual rights, farmers in class 3 prefer that the cooperative surplus is refunded based on the capital contribution. A strong preference for the transferability of the investment, associated with the nominal being adjusted to the appreciation of firm value, is observed.

The estimated class probabilities indicate the proportion of the respondents that were classified into each class. The largest proportion is observed in class 2 which represents 42.3 per cent of respondents. Two other classes are of almost equal size at 29 per cent.

The standard deviations of the random parameters are not statistically significant anymore in the RPLCL specification. The result indicates that modeling preference heterogeneity discretely fits our data better rather than assuming a continuous distribution. McFadden pseudo-R is better in model 2 than in model 1, which gives support to the RPLCL. Significant heterogeneity towards the ASC that was identified model 1, i.e. divided opinions among the farmers regarding the new cooperative investment

instruments in general, disappears in model 2. The latent class specification allows the identification of those farmers, who prefer status quo into class 1 and those who prefer the policy alternatives to two other classes, which appears to dissipate within class preference heterogeneity. Therefore, we may conclude that the classes describe investment preferences that are quite homogeneous within a class but differ between the classes.

Utilizing the information on the stated choice difficulty, we estimated model 3, which is otherwise similar to model 2, but the choices were weighted by the individual difficulty ratings. Choices that were easier to make, were weighted more in the estimation. The model fit is improved as implied by a slightly better pseudo-R. The increased number of parameters is reflected in the loglikelihood statistic. The standard errors of the estimated coefficients on the attributes are smaller down the line, which indicates that the estimations become more precise when choice difficulty is considered. However, the estimated coefficients and interpretation remain mainly unchanged. In model 3, the preferences for REFB and REFC become clearer. Farmers in class 1 appear to oppose the determination of surplus refund based on both patronage and capital. Therefore, class 1 farmers prefer the volume of the milk delivery to cooperative as the residual right basis. In model 3, farmers in class 2 are observed to prefer capital-based refund, which was not observed in model 2. Likewise, transferability with the possibility to capital gains through adjustment for firm value (TRANSA) becomes statistically significant, when the easier choices are given more weight in the estimation. Risk aversion is observed also in class 3 as the negative coefficient on EXPH is statistically significant, although in model 2 that was not observed.

The estimated class probabilities do no change substantially when the choice difficulty is accounted for. The fraction of farmers classified to the class 3 increases to 32 per cent, while the fraction in the class 2 drops correspondingly by some three percentage points. The size of the class 1 also grows slightly.

Of 406 respondents, 74 farmers (18%) always chose the status quo, i.e. the cooperative capital in its basic form. To understand their motivations, an additional question presented after the series of choice tasks requested to indicate reasons for preferring the status quo. The question consisted of four statements. Table 4 reports the responses. The most frequently mentioned reason was that only members have a right to be owners of the cooperative. The second most important reason was to retain the voting power in producer control. Less important reason to avoid the new investment instruments was the risk of losing capital.

4.2   Discussion

The choice experiment method enabled studying farmers' investment preferences in choice situations that are currently hypothetical but which farmers may encounter in future. This is particularly relevant in the transition to the new cooperative law in Finland which changed in January 2014. So far, the agricultural cooperatives have not made use of the flexibility enabled by the new legislation, but the pressures to redesign the traditional cooperative model grow in parallel with the structural change in agriculture. The attributes were kept simple to reduce cognitive burden on the respondents, but also to keep the focus on the key elements that Finnish cooperative law enables to be modified. The main changes from the basic cooperative capital were described with the

ownership and residual right attributes and with transferability. These attributes connected the choice experiment to prior literature and the cooperative typology presented by Chaddad and Cook (2004). As a result, we were able to test farmer preferences for the alternative ownership structure models.

Our results show that the question of allowing non-members to invest in cooperative is the critical for growth-seeking agricultural cooperatives. A latent class of farmers, for whom the new investment instruments appeared undesirable, was estimated to represent about 30 per cent of the respondents. Majority of those respondents, who always chose the status quo, stated they wished to restrict ownership rights only to members and for that reason they did not choose the new instruments. However, more than two thirds of the respondents appeared positively disposed to the new investment instruments in cooperative.

The main difference between classes 2 and 3 regarding the extension of ownership rights to non-members is that farmers in class 2 would not allow any ownership right to non-members, while farmers in class 3 would welcome non-members with preferential return but not give them voting rights. This study was the first time when the idea of outside ownership is tested among dairy farmers, which may explain the preference to restrict voting rights on for members. The idea of giving control in the cooperative to non-members may sound too drastic at first. Further, if the cooperatives were in a middle of an acute financial distress, the members might welcome outside capital even more frequently despite the loss of control.

Transferability of the cooperative investment gained clear support in our study. New investment instruments that were transferable, would ameliorate property rights problems as discussed by Cook and Iliopoulos (2000). Our result indicates that there is need to develop a secondary market for cooperative equity shares. Transferability is tightly interwoven with the question, how the valuation of the cooperative shares would be organized. Daily marking to market as in a stock exchange was not preferred in our study. A mechanism that enables the appreciation of the investment along the firm value is preferred in both classes 2 and 3, representing together more than two thirds of farmers. The details of how to implement transferable and appreciable cooperative investment instruments in practice is left for future studies and to be sketched by the cooperative management.

Preference for the attribute level EXPC found in both classes 2 and 3 indicated that the cooperative might not have to distribute out the cooperative surplus in order to compensate the providers of the growth capital, but the return could be capitalized so that the nominal grows by the amount of the return. Those farmers can be characterized as patient and may be committed to finance the growth of the cooperative. It is not surprising that the residual right based on capital contribution was preferred of the new instruments, since it would directly compensate for the additional investment made to the cooperative. However, there may be farmer-specific differences in preferences for residual rights. For example, the volume of patronage and the plans for exiting farming are likely to affect preferences, but they were not revealed by our background variables (unreported model specifications included also farmer specific variable, but no relationship to preferences was found).

When the choice difficulty was taken into account, the investment preferences among class 2 and class 3 farmers converge. The main differences remain with respect

to voting rights and aversion to risk. The result is reassuring because if we found many latent classes that were very distinct in preferences, it would be difficult to reach a decision in the cooperative to implement new investment instruments. Our main result regarding farmers' investment preferences is that one class opposes new instruments, and two classes with rather similar investment preferences support them. While the results are analyzed at the pooled data and not separately for different cooperatives, factors specific to individual cooperatives may explain some between-class heterogeneity.

Preference heterogeneity may arise from several dimensions (Höhler and Kuhl 2017), as members' situation and characteristics are likely to produce differences in the investment preferences. Producers, who have invested heavily in their own farms, may be capital-constrained to contribute additional financing the cooperative, although they may be positively predisposed to cooperative growth and enlarging the marketing channel. On the other hand, some producers may have excess capital and they be interested in investing voluntary more in the cooperative. Exiting producers may be incentivized to stay connected to the cooperative and to provide growth capital if the residual rights permitted purely capital-based returns as compensation. Further studies could examine farmer preferences for cooperative investments with respect to the farmer, farm, and cooperative specific characteristics.

In comparison to the alternative cooperative models presented by Chaddad and Cook (2004), new instruments characterized in this study would move the Finnish dairy cooperatives towards 'investor-share cooperatives'. In that model, the ownership rights of the cooperative are not restricted to members, but the shares are not converted to publicly traded common stock. By relaxing some of the restrictions on the traditional cooperative form, the disincentive of members to invest in the cooperative could be relieved. However, our results showed that the opening of agricultural cooperatives to non-member investors is not accepted unanimously. If the incentives were constructed so that the members also have a possibility to gain from the opening of the cooperative, success of the new instrument becomes likelier. 'Member-investor cooperative' model of the typology of Chaddad and Cook (2004) could also be adopted. In that model, the members-investors could benefit from residual returns in proportion to shareholdings and the appreciation of cooperative shares.

Our results provide relevant implications for the wider audience, both academics and practitioners, outside the Finnish context. It is important for the management of any 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.

5   Conclusion

According to the results of this paper, the members of Finnish agricultural cooperatives appear positively disposed to new cooperative investment instruments. In our sample of 406 dairy farmers, 70 per cent of the respondents preferred the new investment instruments that are currently hypothetical but could be taken in use in cooperatives to facilitate their sourcing of growth capital. With a transferable investment instrument,

whose value may appreciate, incentives for farmers to provide voluntarily growth capital to cooperative can be improved.

Those farmers, who preferred the new instruments, appeared favorable to capital-based determination of residual returns, and capitalization of the return gained support. The finding suggests that the cooperative may not necessarily have to pay out the surplus to investors, because the members appear patient as investors. This is related to the long-term horizon of cooperatives and the need for long-term commitment also from the members. A farmer may become more involved in the control of the cooperative if the cooperative performance is reflected to the value of his or her equity share. Long-term perspective in the member ownership and control enhances the ability of a cooperative to carry out its purpose to benefit farmers also in future.

The key question that arises from the results of this study is, how to reconcile the heterogenous preferences among farmers regarding the opening of the cooperative to outside investors. A latent class representing 32 per cent of the respondents was found to prefer allowing non-members to invest in the cooperative, but without endowing the with voting rights. However, the majority preferred restricting ownership right solely to members.

All in all, the results of this study are encouraging for the introduction of ownership structure adjustments to Finnish dairy sector. While the topic was new to the farmers at the time of the survey, the respondents showed extensive interest towards new investment attributes. However, it is an empirical question, how much investment capital is in practice available from members, although theoretically the attributes that appeared to be most preferred are such that should improve investment incentives. It is an obvious limitation of this study that it does not take a stand on the sufficiency of new instruments to cover cooperative investment need in monetary terms. Further research is needed on that.

The next step in practice is to start the discussion on the details of instrument implementation inside each cooperative and to tailor the combinations of investment attributes that the members in that specific cooperative aspire. One policy implication of our results is that a cooperative may not ideally opt for just one new type of cooperative equity share but at least two alternatives could be designed acknowledging heterogeneity among members. Future studies could explore the heterogeneity of members in terms of their investment objectives and in relation to farm and farmer specific factors.

Methodologically, the findings of the paper contribute to the choice modeling literature by providing evidence on the usefulness of the random parameter latent class model in revealing farmer classes with differing preferences. The modeling of heterogeneity in three discrete classes has the advantage of gaining easily interpretable results for the policy makers. Additional contribution shows that the exogenous weighting of choices by the stated difficulty reduced standard errors and improved model fit. That is, easier choices are assumed to be more informative of preferences, because hypothetical new financial instruments may be difficult to assess. The finding calls for addressing respondent burden also in future studies of hypothetical investments in order to produce unbiased estimates.

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Appendix A: Methodology

The economic framework of the discrete choice modeling is the random utility model of McFadden (1974). A consumer is assumed to choose the alternative I, described by a number of attributes X_k ($k = 1, 2, \ldots, K$) and a number of attribute levels X_{kl} ($l = 1, 2, \ldots, L$), which offers the greatest utility $U_I = V(X_{1l}, X_{2l}, \ldots, X_{kl}) + e_l$, where $V(X_{1l}, X_{2l}, \ldots, X_{kl})$ is the systematic part of utility and e_l is the random component. Following this notation, utility is estimated in the choice experiment of this study as

$$U_{kt} = \alpha_i + \beta_1 X_{it} + \beta_2 X_{it} + \cdots + \beta_k X_{it} , \tag{1}$$

where α_i is the alternative specific constant, and $\alpha_{i\ =1}$ referring to the new investment alternatives, and t denotes the number of choice questions t ($t = 1, \ldots, T; T = 6$), which allows for a panel structure.

The random parameter logit in builds on the multinomial logit (MNL) model. Following the notation of Hensher et al. (2015), the choice probability of an alternative j for individuals $i = 1, \ldots, N$ is expressed as

$$P\left(y_{it} = j_t\right) = \frac{\exp(\alpha_{ji} + \beta_i{}' x_{jit})}{\sum_{q=1}^{J_i} \exp(\alpha_{qi} + \beta_i{}' x_{qit}}\tag{2}$$

The RPL model emerges through the individual specific parameter vector β_i, which is specified as

$$\beta_{ki} = \beta_k + \sigma_k v_{ik}\tag{3}$$

and

$$\sigma_{ji} = \alpha_j + \sigma_j v_{ji} \,,\tag{4}$$

where β_k is the population mean, v_{ik} is the individual specific heterogeneity, with mean zero and standard deviation one, and σ_k is the standard deviation of the β_{ki} around β_k. The choice specific constants σ_{ji} and the elements of β_i are distributed randomly across individuals with fixed means.

A random parameter latent class logit (RPLCL) model extends the RPL by allowing for both within and between group heterogeneity (Greene and Hensher 2012). Following their notations, the within-class heterogeneity is expressed as

$$\beta_{i|q} = \beta_q + w_{i|q} \,,\tag{5}$$

where the within-class heterogeneity $w_{i|q}$ is assumed normally distributed with mean 0 and covariance matrix Σ. The class probabilities for an individual being in class q is obtained by

$$\pi_q\left(\theta\right) = \frac{\exp\left(\theta_q\right)}{\sum_{q=1}^{Q} \exp\left(\theta_q\right)} \,.\tag{6}$$

The probabilities of an individual i choosing alternative J is

$$f\left[y_{it}|\left(\beta_q + w_i\right), X_{it}\right] = \frac{\exp\left[\sum_{j=1}^{J} y_{it,j}\left(\beta_q + w_i\right){}' x_{it,j}\right]}{\sum_{j=1}^{J} exp \sum_{j=1}^{J} y_{it,j}\left(\beta_q + w_i\right){}' x_{it,j}]}\tag{7}$$

in which $y_{it,j}$ denotes the observed vector of outcomes. $y_{it,j} = 1$ indicates that the alternative is chosen and 0 for all other alternatives and $x_{it,j}$ indicates the vector of attributes for alternative j for individual i in a choice situation t.

The generic model for the RPLCL is expressed as

$$f\left(y_i|X_i, \beta_{i, \ldots,}\beta_Q, \theta, \sum_i, \ldots, \sum_Q\right) = \sum_{q=1}^{Q} \pi_q\left(\theta\right) \int_{w_i} \prod_{t=1}^{T_i} f\left(y_{it}|\beta_q + w_i\right), X_{it}]h\left(w_i|\sum_q\right). \tag{8}$$

To allow for the effect of choice difficulty, we follow the approach presented in Hensher et al. (2015). The utility function associated with each alternative is weighted exogenously by the difficulty variable *diff*, which indicates the stated level of choice difficulty in each choice task,

defined on a 5-point scale, where 5 is the lowest level of choice difficulty. More weight is given to choices that the farmers experienced easier to make.

Appendix B: Questionnaire

Translated from the original Finnish version. The choice experiment was one part of a larger survey. Two first parts asked about the significance of a cooperative members, but those responses are not analyzed in this paper. Only the relevant part of the questionnaire is presented here.

Survey of producer cooperatives: Part C. Cooperative as investment

INSTRUCTIONS TO QUESTIONS C1–C6:

In the following questions, you are given choice tasks, which describe hypothetical situations in which you are asked to decide, whether to invest in your cooperative voluntarily additional capital above the member capital obligation. The purpose of the questions is to examine the factors affecting your willingness to invest.

Description of the choice situation

Consider the following situation. The cooperative, to which you deliver the milk production of your farm, has reached a decision about a necessary investment. The investment is unavoidable to restore the competitiveness of the cooperative as the yearly repair investments are not sufficient. To remain profitable and sustainably viable, the cooperative needs to invest in product development or growth.

However, the current financial situation of the cooperative does not enable expansion of operations. To avoid overleverage, the cooperative aims to finance the investment with equity capital. Members are offered alternative ways to make extra capital contributions. Alternatively, possibilities to invite outside investors are considered.

Instructions for answering

You are presented six different choice situations. Each choice task contains three alternatives. The first alternative is always the same "Cooperative capital". That corresponds to the terms of the member capital as it is currently defined in your cooperative.

Two other alternatives differ from the current cooperative capital in terms of ownership rights, residual rights, transferability, and the expected return. Transferability means, whether the investment is redeemed or transferable to another person, and how its value is determined.

Please consider the situations independently. If you do not find a perfect alternative, please choose an alternative that in your opinion has the best attributes. Please choose only one alternative and indicate your choice by ticking the box.

Example of a choice task

	Cooperative capital	Investment 1	Investment 2
Transferability	Non-transferable, redemption at par	Transferable, valued at markets	Transferable, valued at markets
Ownership rights	Restricted to members	Voting right for all	Voting restricted to members, preferential return to non-members
Residual rights	Patronage	Capital	Patronage and capital
Risk and return	Low	Return is capitalized	Return is capitalized

(Page turn. Then the questionnaire continues by presenting six choice tasks with varying attribute levels. Each task is on a separate page. Because of eight different questionnaire versions, only one example of choice tasks is presented below.)

C1. Compare the alternatives below. Of three alternatives, choose the investment mode that you prefer the most. Then indicate your choice by ticking the box (only one alternative).

	Cooperative capital	Investment 1	Investment 2
Transferability	Non-transferable, redemption at par	Transferable, valued at markets	Transferable, valued at markets
Ownership rights	Restricted to members	Voting right for all	Voting restricted to members, preferential return to non-members
Residual rights	Patronage	Capital	Patronage and capital
Risk and return	Low	Return is capitalized	Return is capitalized

C1. I choose

☐ Cooperative capital   ☐ Investment 1   ☐ Investment 2

How easy or difficult it was to choose?

☐ Very difficult
☐ Difficult
☐ Neither
☐ Easy
☐ Very easy

(After six tasks, a follow-up question.)

If you prefered the cooperative capital alternative in the choice tasks, please indicate why.

☐ I think only members have a right to be owners of the cooperative.
☐ For me it is important that producers retain the vote control.
☐ The right to residual income distribution resides with the members.
☐ I want to avoid the risk of losing capital.
☐ Other reason, please describe. (Open ended question)

Assessing the willingness of non-members to invest in new financial products in agricultural producer cooperatives: A choice experiment

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The sourcing of outside investment capital from non-members has motivated the emergence of innovative cooperative structures, but the literature on these new organizational forms omits the perspective of an outside investor. This paper reports a study that applied a choice experiment method in a novel setting to increase understanding of the preferences of investors in agricultural firms. A large questionnaire dataset consisting of 845 financially literate subjects enabled testing of the form in which residual and control rights provide incentives for non-producer investors to invest in agricultural firms. The choice experiment data were analyzed using a latent class model. The results demonstrate that the subjects were interested in the currently hypothetical, new types of investment instruments in agricultural producer cooperatives. Three investor classes were distinguished based on the preferences: return-seeking, ownership-oriented and risk-averse investors. Who controls the firm appears to be irrelevant concerning willingness to invest, while the rural ties of the respondent are positively related to the preference for voting rights.

Key words: agricultural cooperative, agribusiness, investment decisions, Q13, Q14, G11

Introduction

Producer cooperatives play an important role in present-day agribusiness in the food supply chain of all EU member states (Bijman et al. 2012). However, the traditional model of agricultural cooperatives is being challenged. The opportunities of cooperatives to acquire growth capital are restricted to member contributions, which poses a financial handicap in competition against investor-owned firms (Chaddad et al. 2005). The organizational innovations seen in many agricultural cooperatives reflect the overall structural change that is ongoing in agriculture (Chaddad and Cook 2004, Valentinov 2007).

Innovative cooperative structures have emerged as a response to the competitive pressures (Chaddad and Cook 2004). Gaining access to growth capital from investors has for many been the reason to depart from the traditional cooperative organizational structure (Chaddad and Iliopoulos 2013). The objective of producer organizations is typically to find a model that retains the cooperative form and ideology but enables access to non-member equity capital (van Bekkum and Bijman 2006). The presence of a prominent shareholder, i.e. the agricultural producers, may give rise to agency problems between controlling shareholders and outside shareholders (Fama 1980, La Porta et al. 1999), while reduced liquidity as a consequence of block ownership may also make producer-owned firms unattractive for outside investors (Bolton & von Thadden 1998). Moreover, if the cooperative attempts to compete with other firms for the raw material by offering a higher price to farmers, the lower rate of return on equity may make them unattractive as investments for outside investors. On the other hand, social capital inherent in agricultural cooperatives may motivate some producer-minded investors through the trust mechanism (Svendsen and Svendsen 2000). This study employed a choice experiment to elicit the preferences of non-farmer investors for various investment instruments that could be designed and brought into operation in order to attract growth capital for agricultural cooperatives.

In their sourcing of investment capital, agricultural organizations could benefit from findings in the existing literature that the investment decisions are to some extent driven by values and social influences. Presently, the literature in agricultural economics lacks evidence on the participation of non-producer investors in agribusiness firms. In this paper, we examine the link between the willingness of individuals to invest in different kinds of investment instruments of an agribusiness firm and their personal rural ties. A choice experiment method was employed to understand what types of attributes the non-producer investors would expect of the financial instruments in agribusiness and to identify preference heterogeneity among investors regarding agricultural production organizations. The objective was twofold: to examine investor preferences for the attributes of the financial instruments in agribusiness firms, and secondly, to identify different investor segments in order to facilitate the capital acquisition of the firms. The theoretical background of the paper is in behavioral finance and the literature on social influences in economic decisions.

There is extensive empirical evidence for the role of behavioral factors in investment decisions and the preference of investors for familiar assets (French and Poterba 1991, Kang and Stulz 1997, Coval and Moskowitz 1999, Portes and Rey 2005). The effects of social capital and interpersonal interaction on economic outcomes are widely recognized in the economics literature (Knack and Keefer 1997, Guiso et al. 2004). Evidence on social influences has been established among individual investors in their personal savings and stock market participation decisions (Duflo and Saez 2002, Hong et al. 2004), but also in the contexts of professional decision making in financial markets (Lehmann and Neuberger 2001, Pool et al. 2014). Geographical bias may result from investors' preferences for familiar investments (Huberman 2001). Morse and Shive (2011) found that group identity, i.e. the sense of belonging to a specific group of people, affects portfolio choices.

Individuals derive economic utility if they act in adherence to an identity that matches particular values (Akerlof and Kranton 2000). The phenomenon is manifested in consumption decisions, when identity affects brand choices and switching (Lam et al. 2010) and breeds customer loyalty (Homburg et al. 2009). Evidence from agricultural economics corroborates the notion that subjective values are powerful drivers of economic and consumption decisions: Attitudes explain consumer aversion to hormone-treated beef (Lusk et al. 2003) and the preference for genetically modified (GM) vs. non-GM food (Baker and Burnham 2001).

Some of the mechanisms underlying how personal experiences and social identity affect economic outcomes relate to the environment in which a person grows up, which affects preferences and beliefs later in life (Guiso et al. 2004, Malmendier and Nagel 2011). Social identity theory states that belonging to the same group fosters bonding between people, with binding ties forming between members of a family, school, work place, or community (Tajfel and Turner 1979, Akerlof and Kranton 2000). Prior evidence indicates that farm-born individuals develop strong emotional ties to rural values that remain throughout their lives (Cassidy and McGrath 2014). Building on the previously discussed evidence on the effects of personal experience and social identity on economic decisions, we hypothesize that a similar mechanism may be at work in investment decisions regarding agricultural firms involved in food production. More specifically, this study investigated the effects of the living environment and identity on investment preferences. These variables were defined as person currently living in an urban or rural area and the self-reported rural identity. These social influences on investment preferences were tested in a large sample of professional financial advisers using a survey that included a choice experiment regarding the attributes of financial instruments.

The attributes represent currently available stock investments as well as hypothetical, yet possible, new features under the Finnish cooperative law, which would enable agricultural producer cooperatives to source investment equity capital from non-farmer and non-member investors. The objective of this study was twofold. First, this study sought to identify the preferred attributes that would assist the cooperative management to design such new instruments. The latent class model enabled the discerning of investor profiles and distinct investment preferences for investment instruments in agribusiness firms. Second, the relationship between investment preferences and personal factors, i.e. a self-reported rural identity and a rural domicile, was investigated in the three observed investor classes with a logit regression.

The pool of experimental subjects represented potential retail investors and was composed of Finnish financial market professionals who held the diploma for certified financial advisers (i.e. the Finnish national equivalent of the international CFA diploma). The sample formed a group of informed and financially literate individuals. Many of them were likely to have personal experience of investing either their own wealth or in their work position. Using this pool of respondents mitigated the common problems observed in the literature on economic decisions if they draw conclusions on market behavior from laboratory studies or experiments involving student subjects (Harrison and List 2004). However, the prevailing practice in the choice experiment literature is to use a representative sample of the population in order to elicit preferences in the field. The respondents were, however, advised to express their preferences as private investors and considering their own portfolio choices instead of in their possible role as delegated portfolio managers. The choices were analyzed with a latent class model, which enabled the analysis of preference heterogeneity.

The contribution of this study to the existing literature is twofold. First, this is the only study that has examined cooperative finance from the perspective of non-member investors. Second, the choice experiment method has been scarcely utilized in studies on financial preferences and on the design of investment instruments in agribusiness. Similarly to this study, Anastassiadis and Musshoff (2013) presented hypothetical investment alternatives to farmers and examined how investment profitability, risk, and financial flexibility affect the farmers' decisions. Their approach with the choice experiment was to uncover preferences for the use of debt capital in adaptation

investments in agricultural production, while we were interested in the availability of investment capital among non-farmer investors. To our knowledge, this paper reports the first study employing the choice experiment method to examine non-farmer investment preferences in the agribusiness sector. The rest of the paper proceeds as follows: The data and methods are described in section 2. Section 3 presents the results, which are discussed in section 4.

Data and methods

We used the discrete choice experiment method, in which the subjects are presented with a number of choice sets that represent several alternatives characterized by a set of attributes. The method is presented, for example, in Hensher et al. (2015). The subjects are requested to choose the most preferred alternative in each choice task, which is assumed to give the greatest utility to the individual. The theoretical framework is the random utility theory and neoclassical consumer theory (Thurstone 1927, Lancaster 1966, McFadden 1986), according to which the trade-offs made by the respondent in the choice tasks and the relative preferences for attributes of the alternatives can be estimated. As a stated preference method, the choice experiment method is often used to test the preferences of individuals in a hypothetical situation, for example regarding new products or policies, when revealed preference data are not available.

Choice experiments have been extensively employed in the fields of transport (Hensher and Rose 2007), recreation (Train 1998, Boxall and Adamowicz 2002), marketing (Batsell and Louviere 1991, Louviere et al. 2010, Probst et al. 2012), health (McIntosh and Ryan 2002, Hole et al. 2013, Lagarde 2013), and various environmental valuation contexts (Scarpa et al. 2009). In agricultural economics, choice experiments have increasingly been used in the assessment of farm management policies and environmental schemes (Jaeck and Lifran 2014, Kragt and Llewellyn 2014, Schulz et al. 2014), as well as in the estimation of consumer demand for various food quality attributes (e.g. Lusk et al. 2003, Scarpa et al. 2005, Caputo et al. 2013, Emberger-Klein et al. 2015). Recently, a number of studies have also used choice experiments to explore behavioral issues related to consumer choices (Swait and Adamowicz 2001, Balcombe et al. 2014, Caputo et al. 2016, De Marchi et al. 2016).

In the field of investments, the choice experiment method is underutilized. Analyses on investor behavior have traditionally relied on time series of market prices, transactions, or holdings, but more recently also on field experiments. The use of surveys in the study of financial decision making has gained ground (Nagy and Obenberger 1994, Kruse and Thompson 2003, Glaser et al. 2007), as their value in generating new datasets is being recognized and the potential hypothetical bias is being addressed. Choice experiments require the decomposition of the options into attributes and their levels, which may be an almost insurmountable task of simplifying real-life investment situations. A few choice experiment studies have, however, successfully applied the method to investment decisions and utilized latent class models to identify investor heterogeneity (Bateman et al. 2011, Anastassiadis and Musshoff 2013).

Data

The data consisted of responses to a questionnaire targeted at Finnish financial market professionals, who represented a group of informed subjects. The sample was based on the register of persons who had completed the diploma for certified financial advisers during the period from January 2009 to June 2014. The diplomas are administered by the Finnish Association of Securities Dealers and Aalto Executive Education, which provided confidential access to the register. The certification diplomas have two levels: the General Securities qualification (APV1) and the Investment Adviser qualification (APV2). In Finland, individuals in the investment adviser profession are not required to hold the diploma, but in practice many professionals in banks and customer service positions in the finance sector take the examination at some stage in their career. The subjects were briefed to respond to the questionnaire as private persons and not in their possible role as bank representatives, since the questions were not intended to analyze the investment or customer policies of their employers.

In total, approximately 13000 persons have completed the diploma since the introduction of the examinations, which equals roughly a third of employees in the financial sector in Finland (Federation of Finnish Financial Services 2015). The financial industry has undergone such major structural changes in recent years that the contact information may be outdated if the sample were extended to before 2009. A request to complete the Internet-based questionnaire was sent to 7200 persons via email in October 2014. Approximately 1200 email addresses returned a non-reception message, and these persons were thus lost from the initial sample. After one reminder, 845 individuals responded to the questionnaire, yielding a response rate of 14%. The final data included the first-phase responses, which were collected from a pilot sample of a hundred randomly chosen financial advisers.

The sample was slightly unbalanced in terms of gender, as 540 (64%) respondents were females and 305 (36%) were males. However, this reflects the gender distribution in the financial sector in Finland, as 70% of employees in banking were females in 2011 (Federation of Finnish Financial Services 2013). The average age of all respondents was 41 years, and the average age for females and males, respectively, was 43 and 38 years. The median age in the financial sector in Finland was 45 years (Federation of Finnish Financial Services 2013).

The questionnaire gathered background information on the characteristics of the respondents. These variables described the work experience of the investment professionals included in the sample. The majority of the respondents were employed in a bank or brokerage. The typical position was an investment adviser, while approximately one-fifth of respondents were currently in a management position. In line with the overall demographics of the sector, bank management positions are male dominated, and typical job titles of female employees are in customer service and service advisory positions. The final sample consisted of rather experienced financial professionals, as about half had over 15 years of work experience in the sector and 30% had over 25 years of experience. Table 1 reports the variables and the sample averages.

Table 1.Definition and measurement of variables

Variable	Explanation and measurement	Average (SD)
Identity	Qualitative measure, indicating the person's agreement with the statement 'Rural life forms an important part of my identity', range 1–5 where 1 = strongly disagree… 5 = strongly agree	3.35 (1.40)
Risk aversion	Qualitative measure, indicating the person's agreement with the riskiness of stock investments, range 1–5 where 1 = strongly disagree… 5 = strongly agree	2.48 (1.16)
Living rural	Dummy variable indicating the place of domicile, whether the person is currently domiciled in a rural community	0.26 (0.44)
Production structure	Workplace structure in the person's current place of domicile, % of inhabitants in the postal code area employed in the agriculture sector	5.11% (10.86)
Work in agrifinance	Frequency variable indicating whether the work duties involve agricultural finance, range 1–5 where 5 = once a week or more often, 4 = at least once a month, 3 = a couple of times a year, 2 = less frequently, 1 = never	1.96 (1.13)
Training	Dummy variable indicating whether the person has participated in training in agricultural finance	0.17 (0.38)
Sex	Dummy variable, 0 = male, 1 = female	0.64 (0.48)
Age	Years	42 (10.99)
Experience	Work experience in the sector, years	16 (12.14)
Education	The highest completed degree, range 1–5 where 1 = primary school, 2 = vocational, 3 = secondary school, 4 = polytechnic, 5 = university	4.0 (0.83)
Manager	Dummy variable indicating whether the person is in a managerial position	0.25 (0.43)
Number of respondents		845

Survey design

This survey was conducted as part of a larger research project whose overall purpose is to develop new ways to diversify the financing opportunities of agricultural producer cooperatives. As the first part of the project, a large farmer survey employed a choice experiment to determine the preferred attributes of the new financial instruments that would enhance the possibilities of farmers to participate in financing the cooperative investments. The attributes used in the farmer survey were theoretically based on the Chaddad and Cook (2004) ownership–control rights typology of agricultural cooperatives, but they were adapted to the Finnish context. This survey was instead designed to similarly test the preferred attributes of the new financial instrument, but now from the perspective of non-members, i.e. outside investors. The objective of this choice experiment for investors was to test as closely as possible the same attributes that were tested with the farmers. The farmer and the investor surveys

thus ideally served as mirror images of each other. The selection of the attributes in the farmer choice experiment was based on a focus group interview in addition to the Chaddad and Cook (2004) typology, and the farmer survey had already been conducted and analyzed prior to the design of this investor choice experiment. Thus, the selection of the attributes in the investor choice experiment was thoroughly grounded, and, in addition, the design of the choice experiment, as well as the whole survey, was pre-tested with a small sample before sending it out to the financial adviser sample.

The four choice attributes of financial investments in agricultural producer cooperatives were the voting right, return right, capital appreciation, and expected return and risk (Table 2). The attributes that were selected capture the main components inherent in any type of financial investment were the risk and return levels, the right to exercise control through voting, and the mechanism for capital returns. The objective of these attributes was to test the appeal of non-traditional stock investment instruments, while at the same time, these attributes could be used to construct investment instruments bearing some resemblance to the cooperative capital investments that cooperative members subscribe to. The attributes were kept simple to reduce the cognitive burden on the respondents, but also to keep the focus on the key elements that Finnish cooperative law enables to be modified from the basic cooperative capital to allow non-members to invest in the cooperative. Each attribute had three qualitative levels. In the case of the return right, capital appreciation, and expected risk and return attributes, the first level corresponded to the terms of an ordinary stock investment and the two alternative levels represented shifts towards cooperatives. In case of the voting right attribute, the levels were chosen to describe the control structure of the firm so that the attribute levels defined how the votes were balanced between farmers and investors.

Table 2. Attribute description and levels used in the investment choice experiment

Attribute	Description	Levels
Voting right	The entitlement to vote. In the first option, the votes are exclusively restricted to the producers. In the other options, non-producer investors are endowed with voting rights, but the control block held by the producers varies.	1. No voting right 2. Voting right, ownership is dispersed 3. Voting right, producers have majority ownership
Return right	The form of the payment of the investment return	1. Dividend 2. Preferred dividend 3. Fixed interest return
Capital appreciation	The treatment of the invested capital. The value may fluctuate daily in a marketplace or the nominal may be safe and returned at nominal value or appreciate through bonus issues following the firm results.	1. Valued in a secondary market 2. Capital remains and is returned at nominal value 3. Capital remains and nominal is adjusted for the appreciation of firm value
Expected return and risk	Annual rate of return	1. 8%, high risk 2. 5% moderate risk 3. 2% low risk

Prior to the choice sets, an introductory statement explained that the objective of the questions was to examine how the investment attributes affect the investment decision. The respondents were briefed that the choice situations represent equity claims in food chain companies in which the agricultural producers are also owners. The term 'agricultural producer cooperative' was not directly mentioned in the briefing for two reasons. First, the choice experiment included attribute levels that defined cooperatives unconventionally compared to what is typically associated with the traditional cooperative form. Secondly, the attribute levels were defined as generally as possibly in order to avoid tying them explicitly to any organizational form. If any respondent had prejudice against cooperatives, the absence of this term from the briefing should not discourage anyone from stating their preferences regarding the investment attributes in a firm, which may now be a cooperative but may perhaps transform into an investor-oriented firm later.

The attribute levels were then presented in the briefing, after which the respondents were instructed to weigh the choice tasks with regards to their own surplus savings that could be allocated to investing and were not set aside for consumption. The standard cheap talk script was included in the instructions to mitigate the hypothetical bias that always constitutes a risk in stated preference studies (Landry and List 2007, Hensher 2010). The benefits of including a cheap talk script in choice experiment instructions are evidenced in Ladenburg et al. (2010). The level of wealth and size of the surplus savings of a respondent may have an impact on his or her choices, but these potential effects were not controlled for in the modeling. The reason is twofold. First, as the purpose of the choice experiment was to determine the relative preference for the investment attributes as such, the level of the

available investment capital of the respondents was not the main focus here. Second, self-reported amounts of investment capital could be subject to hypothetical bias, and they could suffer from differences in how individuals define their surplus wealth amounts that could be available for placing in new investment instruments. Having to think about the portfolio allocations and the exact amounts of investable assets would have made the choice task very burdensome for the respondents, which might have reduced the response rate.

To form the choice experiment tasks, a fractional factorial design was generated with Ngene software (Choice-Metrics Ltd, Sydney). We used a D-efficient design with no prior information. The final design achieved a D-error of 0.024. This was the design that produced the lowest D-error: it was expected to produce smaller parameter variances and covariances, and was therefore considered D-efficient (Scarpa and Rose 2008). A total of 36 choice sets was generated and split into six blocks to limit the number of tasks per respondent. Thus, each respondent was presented with six choice sets that each offered three alternatives. A two-staged task was used: first, a forced choice included only two investment alternatives describing the new instrument and asked the respondent to choose between these, after which an unforced choice also incorporated the third alternative, the opt-out or no-choice alternative. Previous studies using a two-stage choice task include those by Hensher (2004), Hess and Rose (2009), and Hensher (2010). The opt-out was defined as keeping the investment wealth in a bank account earning 1% return instead of allocating wealth to either of the new instruments. This represents a riskless alternative. The interest level approximated the level offered by Finnish banks for time deposits or savings accounts of retail customers at the time when the questionnaire was conducted (the rates are available via the Bank of Finland statistics website).

The idea of providing the opt-out choice in the form of a bank account instead of constructing the reference alternative from the attribute levels describing the ordinary stock investment is that an investor in reality also has the opportunity to hold the savings in his or her bank account instead of allocating them to (risky) investments. This 'no-choice' alternative represents a standard alternative way of designing the choice situations (Louviere et al. 2000, Hensher et al. 2015), and in this design, the no-choice alternative is devoid of attribute levels. The opt-out or no-choice alternative remains, however, an alternative with an associated utility that can be estimated (Hensher et al. 2015). If the reference alternative were given in the form of traditional stock investment, the choice task would have had to meticulously define the sector and other characteristics for the alternative, because there is no generic 'stock' in the market. Indeed, the objective of the choice experiment design was not to test the portfolio allocations of the investors over different sectors, but rather to investigate the relative preferences regarding the attribute levels, which vary the terms and conditions regarding how much control and residual rights investors would require in order to place their investment capital in the new cooperative instruments. In addition, the design reflects the fact that the majority of (other than the residential) assets of Finnish households are held in savings accounts (Statistics Finland 2013), and the definition of the status quo as a bank account rather than as a stock holding is more likely to represent the current situation of a respondent.

The two-staged task aimed at getting the respondents to concentrate on the attributes, but to mitigate the problems associated with forced choice tasks (Rose and Hess 2010). If the opt-out were given outright, it might have provided an easy escape for the respondents from a difficult choice task and distorted the preference estimation (Kontoleon and Yabe 2003). It is worth noting the possibility that in the two-stage choice task, the respondents might have adhered to the initial choice that they made in the forced choice task when the opt-out option was not present. The inclusion of an opt-out or no choice alternative is essential in addressing the potential hypothetical bias, although in the absence of a payment attribute, the potential bias would not cause harm as inflated willingness-to-pay estimates in this study. Dhar and Simonson (2003) argue that if the inclusion of the opt-out draws more responses from some options relative to others, it indicates a violation of the independence of irrelevant alternatives (IIA). Their findings imply, for instance, that an alternative that is average by its attribute levels loses relative share, because when consumers who are uncertain about their preferences are forced to make a choice, they tend to avoid regret by opting for a compromise alternative. The implications of the inclusion of the opt-out alternative are not analyzed further in our paper, but are left for future research. The unforced task with an opt-out provided the main data used for analysis.

The choice data are effects coded in order to allow coefficients to be estimated for all levels of the attributes (Louviere et al. 2000). The choice sets were organized in a random order to mitigate any effects on the estimates from the ordering of the attributes. The first section of the questionnaire presented a set of introductory questions about the investment criteria in general and the significance of agriculture and the countryside. The second section comprised the choice experiment tasks. Figure 1 presents an example of a choice task. The final section included statements about the ownership of a firm on a Likert scale, after which the respondents were requested to fill in their background information. The online questionnaire consisted of 16 pages, and on average, it took 16.5 minutes to complete the whole questionnaire.

	INVESTMENT A		INVESTMENT B
Capital appreciation	Valued in a secondary market		Capital remains & adjusted for appreciation of firm value
Expected return	8%, high risk		2%, low risk
Voting right	Voting right, producers have majority ownership		No voting right
Return right	Dividend		Fixed interest return

B11. Please choose from the alternatives presented above the investment that you prefer the most. I choose

    X Investment A

    X Investment B.

B12. Now you have also the possibility to choose the bank account earning 1% return. Which alternative do you choose now?

    X Investment A

    X Investment B

    X Neither. I save the money in a bank account and earn 1% interest.

Fig. 1. Example of a choice task

Econometric modeling

The choice experiment data were analyzed with a latent class logit model (LCM). This has been employed in many fields of applied economics, for instance in studies on recreation choices (Boxall and Adamowicz 2002), environmental economics (Birol et al. 2006, Morey et al. 2006), preferences for travel modes (Greene and Hensher 2003, Wen and Lai 2010), farmer preferences for production technologies (Jaeck and Lifran 2014), and consumer preferences for food products (Bechtold and Abdulai 2014, Yue et al. 2015). Latent class models are used to identify preference heterogeneity among consumers (Boxall and Adamowicz 2002). Accounting for heterogeneity gives a more realistic description of the preferences for goods and services and thus enables unbiased estimation models (Boxall and Adamowicz 2002). In an LCM, the consumers are grouped into classes, within which the preferences are relatively homogeneous but between which the preferences are assumed to vary. These latent classes correspond to underlying market segments characterized by different tastes (Louviere et al. 2000), which is why the method has appeal in marketing literature.

Multinomial logit (MNL) models are frequently used as a baseline to estimate the choice experiment data and the preferences for the attributes (e.g. Lusk et al. 2003, Kragt and Llewellyn 2014, Schultz et al. 2014). These models have an implicit assumption that all the respondents possess similar preferences. A latent class model is ideal for identifying investor segments in which individuals possess similar attribute preferences that are distinct from the other segments (Swait 1994, Boxall and Adamowicz 2002). Latent class models provide an alternative to MNL models and are an approach to capture preference heterogeneity. In comparison to mixed logit models, which also relax the assumption of independence from irrelevant alternatives (IIA), an LCM approximates the underlying distribution of preferences with a discrete approach, but no assumptions about the distribution have to be made (Greene and Hensher 2003). Parameter heterogeneity across individuals is modeled with a fixed set of classes (Greene 2007). As the membership of an individual in a class is latent, and cannot therefore be observed by the analyst, it is determined based on the preferences for the attributes. Each class is characterized by class-specific parameter estimates.

There is no absolute answer concerning which modeling approach is suitable for the data and research question at hand, and the choice rests with the researcher. In an LCM, a researcher does not need to take a stand on which of the variables produce heterogeneity in preferences (Greene and Hensher 2003). Shen (2009) compared LCMs with mixed logit models, finding that LCMs performed better in two transport mode choice datasets. Examples in the field of environmental economics include Boxall and Adamowicz (2002), Morey et al. (2006), and Birol et al. (2006), who estimated both random parameter logit and latent class models. Consistently with Shen (2009), their findings suggest that LCMs are superior, and that the heterogeneity is more interpretable than in random parameter models with interactions.

In this study, it was realistic to assume preference heterogeneity among investors, and another modeling approach to accompany the MNL was thus needed. We preferred the latent class model over mixed logit models, because the estimation result is not influenced by the selection of the underlying distribution (Greene and Hensher 2003), and the result gives easily interpretable discrete classes of investors. As the LCM estimation represents heterogeneity between the discrete classes but assumes homogeneous preferences within a class, the results may advise policy makers on the actions needed when targeting investment products at different investor segments. Thus, targeted marketing efforts can be planned regarding the investments in agribusiness if the investor groups are identified.

Although the investment alternatives of the choice tasks were composed of rather general investment attributes comparable to any sector, the framing of the choice situation in agricultural production and the food industry may have appeared more preferable to some segments of respondents. Risk tolerance is also expected to affect the choices and the relative valuations of the attributes, causing another source of heterogeneity. The class membership of the respondents was explained with sociodemographic variables, identity, rural ties, and risk aversion using a binary probit model in order to profile the investors.

The analytical framework of discrete choice models is the economic theory of consumer behavior and random utility theory (Lancaster 1966, McFadden 1974). A consumer is assumed to choose the alternative I, described by a number of attributes A_k (k = 1, 2, … , K) and a number of attribute levels A_{kl} (l = 1, 2, … , L), that offers the greatest utility $U_l = V(A_{1l}, A_{2l}, … , A_{kl}) + e_l$, where $V(A_{1l}, A_{2l}, … , A_{kl})$ is the systematic part of utility and e_l is the random component (Carson et al. 1994).

The latent class model used in this study is defined as follows:

$$U_{jit|c} = \beta_c{}'x_{jit} + \varepsilon_{jit} \tag{1}$$

in which investor i (i = 1, 2, …, N) selects the alternative j with the preferred set of ownership right attributes $\mathbf{x}_{jit}$ from the given M alternatives (j = 1, 2, … M). The alternatives are described with four attributes and the alternatives give two policy options, i.e. new investment instruments in agricultural cooperatives and the opt-out. The utility U_{jit} maximizing choice is made in t choice tasks (t = 1, 2, …T). ε_{jit} describes the unobserved heterogeneity for individual i and alternative j in choice situation t and β_c is the class-specific parameter vector. Utility associated with the opt-out does not consist of any other attributes apart from the risk-free deposit account interest. The alternative specific constant (ASC) was defined to take the value of one for the investment alternatives.

The latent class model estimates the taste parameters β_c within each class and the class probabilities θ_c. Within the class, choice probabilities are assumed to be generated by the multinomial logit model, when

$$P[y_{it} = j|c] = (\exp(\beta_c{}' x_{jit}))/(\textstyle\sum_{j=1}^{Ji} \exp(\beta_c{}' x_{jit})). \tag{2}$$

Class probabilities are determined by

$$P[c] = Q_{ic} = (\exp(\theta_c{}'z_i)) / (\textstyle\sum_{c=1}^{C} \exp(\theta_c{}'z_i)), \theta_C = 0, \tag{3}$$

where z_i is a set of individual-specific characteristics. The probabilities may be determined without the characteristics, as a function of only parameters θ_c.

For a given individual, the probability of a specific choice is estimated as the expected value of the class-specific probabilities, given by

$$P(y_{it}=j) = \textstyle\sum_{c=1}^{C} P(c) [(\exp(\beta_c{}' x_{jit}))/(\textstyle\sum_{j=1}^{Ji} (\beta_c{}' x_{jit}))] \tag{4}$$

BIC and AIC criteria are used to determine the optimal number of classes (Boxall and Adamowicz 2002). The lower the AIC or BIC, the better is the fit of the specification. The latent class and multinomial logit models were estimated using Nlogit 4.0 (Econometric Software Inc., Plainview).

Results

This section first reports the results of the latent class estimation, which distinguished investor groups based on their choices. Class membership was then explained in a binary logit model with individual background factors.

Latent classes and the membership of respondents in the classes are identified based on the choices they make. The BIC and AIC criteria indicated that the preferred model in this study has either three or four classes. (The values are available from the author upon request.) The model with three classes, in which the BIC value is minimized, yields clearly identifiable investor classes, so this model is reported here as the main result.

Investor preferences for the investment instruments were distinguished by three latent classes, whose estimated coefficients are presented in Table 3. A positive (negative) sign for an attribute coefficient indicates an increasing (decreasing) probability of choosing the investment alternative. Rather than the absolute values of coefficients, the relative differences and preferences among the chosen attributes are of interest. A negative coefficient for the opt-out alternative indicates that a respondent derives utility from choosing a bank account deposit over the investment alternatives A or B. A positive ASC indicates that an individual prefers the new investment instruments over keeping the investment wealth in a bank account.

Table 3. Estimates of the multinomial and latent class models

Variable	Baseline MNL (SD)	Latent class model (SD)		
		Class 1 Return seeking	Class 2 Ownership	Class 3 Risk averse
ASC[1]	1.20*** (0.07)	2.38*** (0.26)	3.08*** (0.13)	−1.03*** (0.14)
Voting right	0.13* (0.07)	-0.31 (0.31)	0.65*** (0.18)	0.04 (0.10)
Producer majority	0.01 (0.05)	0.20 (0.16)	−0.02 (0.78)	0.02 (0.10)
Preferred dividend	−0.15*** (0.04)	−0.16** (0.08)	−0.35*** (0.06)	−0.21** (0.10)
Fixed interest	0.12*** (0.04)	−0.08 (0.07)	0.56*** (0.06)	0.30*** (0.10)
Returned at nominal	0.33*** (0.04)	0.27*** (0.09)	0.51*** (0.07)	0.85*** (0.08)
Appreciates	−0.01 (0.04)	−0.09 (0.07)	0.17*** (0.05)	−0.23* (0.12)
Expected return	0.12*** (0.01)	0.36*** (0.02)	−0.11*** (0.01)	−0.05* (0.03)
Probability of class		0.55***	0.34***	0.12***
N of observations	5070	5070		
Log likelihood	−4568.13	−3677.31		
Pseudo R squared	0.03	0.34		

SD = standard error; MNL = multinomial logit; ASC = alternative specific constant; 1 = ASC is specified as taking the value of 1 for the new investment instruments and zero for the opt-out. The expected return and risk is continuous, and other attributes are effects-coded discrete variables. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

The ASC is positive in both classes 1 and 2, meaning that these investor types were willing to invest in the given alternatives of the agricultural producer cooperatives. The first identified class comprised 55% of the respondents. The preferences of this class can be characterized as return seeking. The dimension that most clearly sets apart these respondents from other classes is the strong preference for a higher expected return and risk. A higher risk inherently goes hand in hand with the return, so we conclude that these respondents were more risk tolerant in their investments than the others. Investors in class 1 were not interested in voting rights, as both of the voting attribute levels were statistically nonsignificant. However, although the block ownership of the producers was no obstacle to investing, neither was it a valued attribute. A preference for returning the nominal value of the investment suggests the valuing of capital security, but this disposition was observed in all three classes, while the coefficient was relatively smaller in class 1.

In class 2, the investors exhibited a strong preference for the voting right attached to the investment instrument, which is in stark contrast to class 1. The share of the respondents belonging to this class was 34%. Class 2 investors were also indifferent to the block ownership of producers. In addition to a preference for a lower expected return and risk, and thus also for a lower risk level, investors in this class had a tendency to choose the alternatives that feature the safety of the capital and return. The investors preferred a fixed return over a variable dividend. Both treatments of the capital, which promised either the return of the capital or the adjustment of the nominal for the appreciation of firm value, were preferred over the market-to-market valuation of the instruments in a secondary market.

In contrast to classes 1 and 2, investors belonging to class 3 refrained from choosing the new instruments, but instead preferred a deposit account yielding a 1% annual return. In line with the negative ASC, the other estimated coefficients indicate a preference for deposit-like investments that entitle the return of the nominal at the end of the investment period and a fixed interest return. We conclude that the choice of the opt-out may indicate risk aversion rather than a bias towards the sector or farmer ownership, since the investors in this class were indifferent to the attributes regarding the voting rights in the firm. Specifically, if the investors shied away from cooperative investments due to aversion to the farmer block in firm control and the perceived inferior position of minority investors, this should be revealed by a negative coefficient for the attribute level 'Producer majority', which is not the case.

Class 3 included 12% of the respondents. The class probability corresponds with the proportion of respondents who disagreed with the statement "Food production firms provide an attractive investment opportunity", which was included in one section of the questionnaire measuring investment attitudes. Measured on a Likert scale from 1 to 5, in which 5 indicated strongly agree and 1 indicated strongly disagree, 11.6% of the respondents disagreed with the statement, while 63.8% of the respondents agreed with the statement. This finding corroborates our conclusion that the general attitude towards investment in agribusiness was positive in our sample of financial advisers, as manifested by the positive coefficient on the ASC for the investment alternatives in classes 1 and 2, which in total accounted for 88% of the respondents. On the other hand, the number of respondents who chose the bank account in all six choice tasks, the so-called serial opt-outers, was 18, i.e. 2% of all respondents. However, their opt-out preference appears not to be systematically related to aversion to agribusiness, because only 3 of those 18 respondents disagreed with the statement on the attractiveness of food production firms as investment target. The number of opt-out choices varied between 56 and 84 in six choice tasks, which corresponds to 6.6–9.9% of respondents in a choice task. Therefore, the reverse describes the number of investors who were in principle interested in agricultural cooperatives, and this appears be more than 90% of all respondents.

Observed characteristics could be included in the LCM to explain class membership with, for instance, socio-economic or demographic information, attitudes, or perceived values. However, if the observed respondent characteristics were used in the LCM, the class allocation of the respondents would not be purely based on their choices, but rather a function of the respondent characteristics. Incorporating individual characteristics as covariates in the LCM would restrict the parameters of one of the classes to zero in order to explain the class membership (Boxall and Adamowicz 2002). By using the logit model, we were able to directly present the effects for all three latent investor classes. This method has also been employed, for example, by Czajkowski et al. (2014).

The latent class model estimates the conditional class probabilities for each individual. These probabilities are used to identify the class membership, which is then explained in a logit regression model with the individual-specific background factors. Table 4 reports the results of the logit models separately run for all three investor classes. While the explanatory power of the included variables is rather low, a set of key variables appears to profile the investors in clearly separate dimensions. The identity and risk aversion variables were elicited from the responses to the statements "Rural life forms an important part of my identity" and "Direct stock investments are too risky". The subjects were requested to indicate on a Likert scale from 1 to 5 their agreement with the statements, where 1 denotes strong disagreement and 5 denotes strong agreement. The identity variable was dichotomized so that 1 denotes that an individual has agreed with the statement. The higher the subjective risk evaluation, the more risk averse a person is interpreted to be.

Both a self-reported rural identity and risk aversion were found to be relevant determinants of class membership. Individuals with a rural identity had a greater probability of belonging to class 2. On the contrary, investors in class 1 were more likely to be those respondents who did not identify with a rural lifestyle. Rural identity did not affect the probability of opting out or membership of class 3.

Corroborating our earlier interpretation of the differences in risk tolerance between the latent classes, the risk aversion coefficient indicates that investors belonging to classes 2 and 3 were more risk averse based on their own judgment. The coefficients for risk aversion were positive and statistically significant. The opposite was true in class 1, as the negative coefficient suggests that investors in this class were more willing to take risks in pursuing higher returns. Of the other explanatory variables, only female gender and a higher number of years in the sector (i.e. more experience) profiled the investors in class 2. Male respondents were more likely to belong to class 1. Being in a manager position did not explain class membership. Class membership was not explained by locational variables, a dummy for a rural living environment, or the workplace structure in the person's current place of domicile, measured as the share of inhabitants in the postal code area employed in the agricultural sector.

Table 4. Binary logit for investor class membership

Variable	Class 1 (SD)	Class 2 (SD)	Class 3 (SD)
Constant	1.84*** (0.23)	−2.18*** (0.25)	−2.76*** (0.34)
Identity	−0.30* (0.18)	0.37** (0.18)	−0.11 (0.27)
Risk aversion	−0.45*** (0.07)	0.37*** (0.07)	0.24** (0.10)
Female	−0.38** (0.18)	0.39** (0.20)	0.16 (0.28)
Experience	−0.01 (0.01)	0.01* (0.01)	−0.005 (0.01)
Manager	0.12 (0.19)	−0.21 (0.20)	0.17 (0.28)
Living rural	−0.12 (0.23)	−0.10 (0.24)	0.41 (0.31)
Production structure	−0.03 (0.03)	0.04 (0.03)	−0.03 (0.06)
Living rural x production structure	0.03 (0.03)	−0.04 (0.03)	0.04 (0.06)
N of observations	782	782	782
R squared	0.08	0.07	0.02
Chi squared	85.46	66.97	11.37

SD = standard error. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Discussion

This study applied the choice experiment method in a novel setting of investments in agricultural firms. The globalization of agricultural and food markets has also intensified the competition faced by agricultural producer organizations. The sourcing of outside investment capital from non-members has motivated the emergence of innovative cooperative structures (Chaddad and Cook 2004). However, the strand of the literature focusing on these new organizational forms omits the perspective of an outside investor and the question of in which form the residual and control rights provide sufficient incentives for them to invest. A large questionnaire dataset comprising the responses of professional financial market subjects enabled testing of the instrument design. The choice experiment data were analyzed using a latent class model, which uncovered preference heterogeneity among the investor sample.

In our pool of 845 non-member investors, the majority of the respondents expressed interest in the currently hypothetical, new kinds of cooperative investment instruments and willingness to invest in producer-owned firms that are involved in food production. Three investor classes were distinguished based on their attribute preferences: return-seeking, ownership-oriented and risk-averse investors. The latent class modeling of the choice experiment data allocated some 88% of the respondents to the two first classes, in which the investors on average preferred the given investment instruments, while the remaining 12% were classified into the third category, in which no investment was preferred over the investment instruments. Only two percent of investors opted out in all the choice tasks presented in the questionnaire, and less than 10% chose the opt-out in one choice task.

These findings suggest that the implementation of new investment instruments in Finnish agricultural cooperatives might be received with positive demand in the market. The attributes that were most preferred in the choice experiment appeared to be the return of capital at a nominal value, i.e. the capital is secured during the investment period, while the opportunity to gain from the appreciation on the firm value was preferred among investors found in class 2, and a fixed interest return, voting rights, and a high expected return, also accepting the high associated risk, was preferred among investors found in class 1. In comparison to the alternative cooperative models presented by Chaddad and Cook (2004), these new instruments would move the Finnish cooperatives launching them towards 'investor-share cooperatives' presented in the typology. In that particular model, the ownership rights of

the cooperative are not restricted to members, but the shares are not converted to publicly traded common stock. By relaxing some of the restrictions on the traditional cooperative form, the disincentive of members to invest in the cooperative could also be relieved. A modification of the 'member-investor cooperative' model of the typology of Chaddad and Cook (2004) could be introduced in conjunction with the investor-share model, since in that model, the members could also benefit from the distribution of returns in proportion to shareholdings and the appreciability of cooperative shares. By also allowing the ownership rights for non-member investors, agricultural cooperatives could solve financial constraints and facilitate their growth efforts. However, the producers would have to give up part of their control, as suggested by the preference for voting rights in our choice experiment.

Preferences elicited in choice experiment studies are conditional on the design of the choice tasks. In this study, the willingness to invest in new cooperative instruments was contrasted with the given alternative to keep the savings in a bank account. There may be respondents who chose the given investment alternatives only because they are expected to yield a higher rate of return than a deposit in a bank account. However, this choice design is more realistic than if the alternatives were described as any other stock investments, because that would have required a detailed description of the reference sector and it would have changed the setting to agribusiness versus some other sector. Instead of that, the objective of this design was to test the attributes and their feasibility if the new instruments were implemented, and for this purpose, the definition of the reference alternative as a bank account yielding low interest is suitable and not a source of significant bias. The question of portfolio allocations between different sectors is worth including in future studies, which could investigate the amount of investment capital that agribusiness firms can potentially attract from outside investors.

A self-reported rural identity was positively related to membership of the ownership class in which the investors preferred a 'producer-like' position. This finding is line with prior evidence that investment decisions are affected by social characteristics (Coval and Moskowitz 2001, Huberman 2001, Morse and Shive 2011). While Morse and Shive (2011) focused on cross-country differences in local group identification and patriotism and found that patriotism is related to home bias in equity selection, this study established the relationship between identity and the preferred features of investment instruments. Of the social influence factors that we tested, the identity variable was specifically found to explain class membership positively in class 2 and negatively in class 1, whereas the current place of domicile of the respondent was not associated with investment preferences. Therefore, we cannot confirm the effects on economic decisions of familiarity through the living environment. Our findings thus differ from those of Coval and Moskowitz (2001), who reported a preference for investing close to home, although this paper did not test the home bias as such, but rather the link between the proximity of agriculture in the living environment and preferences for agricultural investments.

Who controls the firm appears to be irrelevant concerning the willingness to invest. The majority ownership of producers does not even drive away the return-seeking, least rurally-minded investors. The concern that a strong block owner would divert returns at the expense of minority investors does not gain support in this survey dataset. Investment capital for agricultural producer cooperatives also appears to be available from those investors who do not identify with rural lifestyle and agricultural producers. This class of investors is not motivated by voting rights, but rather prefers a good return potential. Only the risk-averse class, representing the minority of the respondents, would refrain from investing in the new instruments. Nevertheless, for these investors, the forms of investment instruments that offer security of the capital and a riskless return may be prospective alternatives for participating in the financing of agricultural producer cooperatives.

Overall, the results of this study are potentially useful in the marketing and design of financial instruments in agribusiness. Our results demonstrate how new features of investments can be tested and how distinct investor clienteles can be identified. For managers of capital-seeking agricultural firms, the results indicate that investment capital could potentially be sourced from outside investors using new financial strategies if the terms and conditions of cooperative investor shares are designed properly. While caution is needed in the generalization of stated preferences derived from choice experiment studies to eventual outcomes, the hypothetical cooperative investment instruments presented in this study were not rejected outright in our sample of informed investors. Although the financial advisers were requested to assess the attributes and to express their preferences as private persons, by presenting the idea of introducing new kinds of investment instruments in agricultural cooperatives, the questionnaire served as a means to pre-test the feasibility of their launching in markets. If financial market professionals did not have expressed interest towards them at all, the opening of Finnish agricultural cooperatives to outside investors could be a mission impossible.

By linking the self-reported rural identity variable that was elicited in the questionnaire to the investment choices, our results encourage the promotion of agricultural organizations and food production as investments. When re-designing the agricultural cooperative model and the new investment instruments, the decision makers in cooperatives should be informed of our findings that one size does not fit all, as some investors expect good returns, some seek capital security, and voting rights are more important to some investors than others. Instead of creating one new share class for outside investors, our results on investor heterogeneity suggest that the financing strategy would be more successful in attracting new equity capital if many share classes are designed with different levels of ownership rights. With respect to members having to forfeit voting power to outside investors, our results may be reassuring, as in the investor class in which voting rights were preferred, the class members were found to have a rural identity and were not seeking high returns. Thus, the interests of those outside investors might be quite well aligned with producers. However, in order to attract investors like those segmented in class 1, who represented 55% of the respondents, some tranche of the new instruments should be able to provide an attractive rate of return, even though these investors may not require voting rights.

Conclusion

Being the first study in examining the preferences of investors, who are not members in agricultural producer cooperatives, our results provide two-fold implications regarding the availability of new investment capital for growing cooperatives. First, the investors in our showed interest towards the new cooperative investment instruments developed in this study. The majority of the respondents in the choice experiment chose the provided investing alternatives over the option of not investing in the agricultural cooperatives and food production. Second, the results of the latent class model indicate that about one third of the respondents would be interested in voting rights as a prerequisite of investing in the cooperative, while the half of the investors appear to prefer return over the voting attributes. The rural ties of the respondent are positively related to the preference for voting rights among those respondents who are classified as ownership-oriented investors.

Further research could investigate the required rate of return for new cooperative investments, the potentially available investment amounts, and how they are related to the other portfolio holdings and the characteristics of the investors.

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The effect of social bonding and identity on the decision to invest in food production

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ABSTRACT

Consumer interest in locally produced food is a growing trend. Like the preference for local in food consumption decisions, an individual may be motivated to support the local community by participating with investment capital. This paper draws on the phenomenon of home bias in financial decisions and hypothesizes that familiarity with agricultural production generates a positive attitude towards investing in the domestic food chain. Using a dispersed sample of 845 financial market professionals, we find that locational effects and social proximity contribute to self-categorized rural identity and bonding. Individuals who identify themselves as rural are more positively disposed to investing in firms that operate in the food chain. Consumption preference for domestically produced food and preference for maintaining the vitality of rural areas increase the probability of perceiving food production as attractive investment. The evidence reconciles with the familiarity and patriotism hypotheses. The findings are relevant for agricultural producer firms that seek outside equity and may prove useful for effective marketing of financial products.

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1. Introduction

The demand for locally grown food and traceability is a booming trend among rural and urban consumers worldwide. The growing interest in local food is widely documented in consumer studies in the U.S and in several European countries (La Trobe, 2001; Darby et al., 2008). The preference for food of domestic origin has also gathered strong evidence in the experimental literature, which has documented higher willingness-to-pay values (WTP) for country of origin attributes (Dentoni et al., 2009; Lusk and Briggeman, 2009). Food choices in favor of local are driven by consumer perceptions that local products are of better quality and healthier (La Trobe, 2001), or due to concern over the carbon footprint (Grebitus, Lusk, and Nayga, 2013). Furthermore, some consumers perceive the social effects as important, and food choices are seen as means to support local agriculture and contribute to the benefit of the economy and the livelihood of rural communities (Onozaka, Nurse, and Thilmany, 2010; Marsden, Banks, and Bristow, 2000).

In parallel to the increasing interest in local production is the ongoing demographic change towards greater urbanization, which is lengthening the physical distance between producers and consumers (Åsebø et al., 2007). This means that fewer people have roots in rural areas and many more people are citizens by birth. Even fewer have relatives working and living in rural areas because of the intensifica-

tion of agriculture, leading to a decline in the number of agricultural producers and the concentration of production in larger farms. Socio-demographic changes alter the forms of social interaction and interpersonal relationships. Consequently, the social bonding ties within rural communities have changed (Carmo and Santos, 2014). However, the growing popularity of farmers' markets and alternative food networks manifest the revival of consumer willingness to bond with producers (Vecchio, 2010; Gumirakiza, Curtis, and Bosworth, 2014).

This paper investigates whether positive attitude towards domestic food production carries over to willingness to support it by investing in the firms that operate in the domestic food production chain. Similar affective motivations that contribute to the preference for local in food choices may induce a person to act in support of the local community not only through purchases but also in decisions over how to allocate investment wealth. The paper links the literatures on social identity and on investor behavior testing if self-categorized identity and bonding variables correlate with individual agricultural investment preferences. In the finance literature, social effects in investment decisions are evident in community level preferences (Demarzo, Kaniel, and Kremer, 2004), geographical bias resulting from investors' preference for the familiar (Huberman, 2001), and group identity breeding patriotic portfolio choices (Morse and Shive, 2011). We draw on the phenomenon of home bias in financial decisions and hypothesize that familiarity with agricultural production generates a positive attitude towards investing in it.

The effects of social capital and interpersonal interaction on economic outcomes were widely recognized in cross-cultural studies

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(Knack and Keefer; 1997; Guiso, Sapienza, and Zingales, 2004), among individual investors with personal savings (Duflo and Saez, 2002; Hong, Kubik, and Stein, 2004), and in professional decision making in financial markets (Lehmann and Neuberger, 2001; Pool, Stoffman, and Yonker, 2014). We extend this line of research studying the link between food and agricultural attitudes and the investment behavior. This paper fills a significant gap by providing evidence that social identity not only affects consumption but also investment decisions. Moreover, we use a non-standard sample of more than 800 certified financial advisers studying the link between social identity and investment interests of a relevant sample of Finnish professional decision-makers.

Rural exposure was measured with objective factors such as growing up in a rural community, having a relative who is an agricultural producer, and the share of inhabitants employed in agriculture in the current place of domicile. The findings of Cornaggia, Cornaggia, and Israelsen (2014) led us to hypothesize that the birthplace has a stronger impact in the construction of geographic identity than the characteristics of the current domicile. The questionnaire also elicited variables describing rural ties, as we asked the respondents to state whether they identified themselves as 'rural persons'. Another variable measured the sense of agricultural-sector solidarity and whether a respondent felt an affective bonding relationship with the rural population. We used Probit regression models to examine the variables that affect rural identity and bonding, and then tested the role of proclaimed agricultural identity (and bonding) on investment behavior. The identity and bonding variables were then used to explain the investment attitudes. Prior evidence indicates that farm-born individuals develop strong emotional ties to rural values that remain throughout their lives (Cassidy and McGrath, 2014). In line with this finding, we made a prediction that the self-categorized identity and social bonding of the respondents are constructs of rural ties, and further, that they produce a positive attitude to investing in agricultural production. We also built on the finding of Williams (2007) that prosocial consumption attitudes extend to investment decisions by testing whether investment attitudes are associated with consumption preferences for domestic food.

The geographically extensive sample of this study consisted of 845 financial advisers who hold the diploma for certified financial advisers (i.e. the Finnish national equivalent of the international CFA diploma). The use of a financially literate sample in which most of the respondents are employed as professionals in the financial sector mitigated the common problems with experiments involving student subjects (Harrison and List, 2004). The respondents were, however, advised to express their preferences as private investors and to think about their own portfolio choices instead of acting in their possible role as delegated portfolio managers.

The remainder of the paper is organized as follows. Key literature on familiarity effects, identity and the role of values in investment decisions is presented in Section 2. Section 3 describes the data and methods in more detail, and Section 4 presents the results, after which Section 5 concludes the study.

2. Familiarity, social identity, and values in economic decisions

Extensive empirical evidence demonstrates the role of behavioral factors in investment decisions. Investors have the tendency to overweight familiar assets in both the domestic setting and international portfolio choices (French and Poterba, 1991; Kang and Stulz, 1997; Portes and Rey, 2005; Coval and Moskowitz, 1999). As an explanation for local bias (national) and home bias (international context), familiarity with the assets is suggested to play a role. Familiarity motivations may explain why an investor fails to hold a diversified portfolio and gives up higher returns or lower risks (Huberman, 2001). Both geographical and professional proximity contribute to the sense of familiarity, which results in a preference for the stocks of local firms (Coval and Moskowitz, 1999, Massa and Simonov, 2006).

The tendency to overweight local assets may also be explained with information advantages and superior knowledge of the region (Ivković and Weisbenner, 2005). On the other hand, for some investors, familiarity per se may motivate investment, similarly to the decision to support the local sports club. Favoritism has even been observed for professional financial analysts (Cornaggia, Cornaggia, and Israelsen, 2014), who assign higher bond ratings, reflecting higher credit quality, to local issuers. Furthermore, an affective regional spirit, such as patriotism and loyalty to the community, are found to determine the portfolio allocations of individual investors (Morse and Shive, 2011; Demarzo, Kaniel, and Kremer, 2004).

The familiarity effect illustrates the mechanisms of how personal experiences and social identity affect economic outcomes. The environment in which a person grows up is found to affect preferences and beliefs later in life (Guiso, Sapienza, and Zingales, 2004; Malmendier and Nagel, 2011). Shared experiences in the past contribute to social capital and trusting behavior, while trust in turn facilitates the flow of capital to economic development (Guiso, Sapienza, and Zingales, 2004). Social identity theory states that belonging to the same group fosters bonding between people, of which binding ties that form between members of the family, school, work place, and community, for example, provide rich real world evidence (Tajfel and Turner, 1979; Akerlof and Kranton, 2000, 2005). Shared common characteristics form the basis for social bonding. An individual may also choose an identity through club memberships, brand choices, or behaving in a prosocial way, diminishing the social distance between the individual and the specific social group (Glaeser, Laibson, and Sacerdote, 2002). Priming and making the identity salient is found to induce an individual to change behavior in order to conform to that prescribed by social identity or stereotype (Benjamin, Choi, and Strickland, 2010; D'Acunto, 2014).

Bonding social capital, which Putnam (2000) describes as inward-looking between homogeneous groups of people, reinforces identities. Individuals who identify themselves with a social group are motivated by the group goals. Furthermore, individuals derive economic utility from acting in adherence to an identity that matches their values (Akerlof and Kranton, 2000, 2005). This is observed in consumption decisions, for instance, when identity affects brand choices and switching (Lam et al., 2010) and breeds customer loyalty (Homburg, Wieseke, and Hoyer, 2009).

Evidence from various fields corroborates the notion that subjective values are powerful drivers of economic decisions. Consumption choices related to health and the environment, in particular, are laden with sentiment. For instance, attitudes are found to explain consumer aversion to hormone-treated beef (Lusk, Roosen, and Fox, 2003), pro-environment attitudes are found to materialize in lower energy consumption (Sapci and Considine, 2014), and attitudes are observed to be integral factors even in organized food procurement (Klein, 2015).

In the field of investments, the impact of subjective values on decisions is evident in socially responsible investments (SRI) or in ethical investing. Such decisions may be driven by other preferences than those regarding financial returns (Riedl and Smeets, 2014). Both empirical and experimental evidence support the role of prosocial identity and ideology in ethical investing (Webley, Lewis, and Mackenzie, 2001; Bauer and Smeets, 2014). Some ethically minded investors are even prepared to take financial losses for the sake of complying with their morals in portfolio choices (Lewis, 2001). Furthermore, investors who lean on attitudinal values in financial decisions may be more committed in times of poor financial performance, even to the extent of escalation of commitment (Webley, Lewis, and Mackenzie, 2001). A key conclusion on the attitudinal investment motivations is that investors enjoy the 'warm glow' from investing ethically or being part of a social movement (Lewis, 2001).

The hypothesis regarding the correlation between local food consumption and preference for agricultural related investment also gains support from studies that find general link between prosocial portfolio choices and socially-concerned consumer behavior (Williams, 2007).

3. Data and methods

3.1. The survey design and participation

The call for participation was distributed amongst all the persons that earned the diploma for certified financial advisers (CFA) between January 2009 and June 2011. The diplomas are administered by the Finnish Association of Securities Dealers and Aalto Executive Education, which provided confidential access to the register. The certification diplomas have two levels: the general investments examination (APV1) and the investment adviser examination (APV2). In Finland, individuals in the investment adviser profession are not required to hold the diploma, but in practice many professionals in banks and customer service positions in the finance sector take the examination at some stage in their career. The subjects were briefed to respond to the questionnaire as private persons and not in their possible role as bank representatives, since the questions were not intended to analyze the investment or customer policies of their employers. Rather, the register of professional financial advisers served only as a means to reach a group of potential retail investors.

In total, approximately 15,000 persons have earned the diploma since the introduction of the examinations. The industry, however, has undergone major downsizing following the 2008 financial crisis so that the contact information would have been largely irrelevant if we expanded the distribution further back in history. The request to complete the Internet-based questionnaire was sent to 7200 persons via email in October 2014.

The questionnaire's goal was described as "studying the attractiveness of agriculture and bioeconomy as investment targets" (see Supplementary Appendix 1 for the translated version). In addition to the variables that are analyzed in the next sections, the questionnaire included an investment-instruments choice experiment which is not analyzed in the current paper. About 1200 of the 7200 distributed emails bounced and a similar number of messages returned an automatic out-of-office reply. After one reminder, 845 individuals had filled in the questionnaire, yielding a response rate around 14%. The very low response rate is typical of voluntary email surveys of this kind (Deutskens et al., 2004; Kämäräinen, Rinta-Kiikka, and Yrjölä, 2014). The subjects were not remunerated for taking part in the study, except for random draw of two gifts at approximate worth of 100 euros each. Fatigue could be another reason for the low response rate. The number of respondents that had clicked on the link and started to view the survey was about twice larger than the final sample. The complete questionnaire was quite long and responding to all questions was mandatory. The average completion time was about 20 min.

The sample is slightly unbalanced in terms of gender, as 540 (64%) responses were from females and 305 (36%) from males. However, this reflects the gender distribution in the financial sector in Finland, as 70% of employees in banking were females in 2011 (Federation of Finnish Financial Services, 2015). The average age of all respondents was 41 years, and the average for females and males was 43 and 38 years, respectively. Table 1 presents the variables for the whole sample and separately for those born in rural areas and those born outside rural areas.

The questionnaire collected diverse information on the sociodemographics, education and other personal characteristics of the participants. The majority of the respondents were employed in a bank or brokerage. The typical position was an investment adviser, while about every fifth respondent was currently in a managerial

position. In line with the overall sector demographics, the bank management positions in the sample were male dominated, and the typical job titles of female employees were in customer service and service advisory. The final sample consisted of rather experienced financial professionals, with about a half having over 15 years of work experience in the sector and 30% having over 25 years of experience. In comparison with the sector statistics (Federation of Finnish Financial Services, 2015), it appears that the pool of respondents was rather well representative of financial sector professionals, despite the low response rate. Therefore, the low response rate did not cause any severe sample bias, and with the sufficiently large sample of 845 individuals the results are rather well representative of the certified financial adviser population.

Our main variables of interest were the background variables that describe the spatial and social proximity to agriculture and rural living. These are referred to as location and relationship variables. The questionnaire elicited information about whether the respondent was born or currently domiciled in a rural area. These variables were collected as self-reported rural vs. urban location indicators, but the postal code of the current place of domicile was also requested. A variable measuring the importance of the agricultural sector in the environment in which the respondent lives was formed based on statistics on the workplace structure in the postal code areas. This variable was intended to capture the dependency of the community on agricultural production. Altogether, 26% of respondents reported currently living in countryside, about half of the participants were born in a rural community. One-fifth reported both being born and currently domiciled in a rural area.

The relationship variables measure the respondents' exposure to agriculture and rural areas through social interaction. They were requested to state whether they had an agricultural producer in the immediate family. In addition, social ties to agricultural production may be formed in encounters in the workplace or in social interaction with friends and relatives in leisure time. The respondents indicated the frequency of encounters with agricultural producers both at work and in leisure using a qualitative range variable (scale from 1 to 5), where 5 indicated regular weekly contacts and 1 indicated never. On average, social exposure to agriculture is less frequent through work contacts than through leisure contacts. Reflecting the facts that Finland is a relative young country in terms of urbanization and the half of the respondents were born in countryside, as many as 43% of investment professionals in our sample reported having an agricultural producer among their own relatives. Farmer relatives were particularly frequent among the older respondents, and the correlation between these two variables was 59%. However, a rural birthplace was not correlated with age. Supplementary Appendix 2 presents a comprehensive correlation table disclosing the correlations between all major variables of interest.

Nearly 20% of the respondents were in weekly contact with agricultural producers at work, and an equal proportion reported never encountering them at work. On the contrary, only 6% of the respondents stated they were never in contact with rural people in their leisure time. Those individuals who were born in a rural area or whose current place of domicile was in a rural area had more frequent contacts with agricultural producers in both their work and leisure, as indicated by the correlation coefficients in the range of 0.34–0.46. The contact variables exhibited similar correlations with the agricultural production structure in the community.

In addition to exposure to agriculture through a rural location and social interaction, information motives may be influential in investment decisions. Although understanding of the farming business accumulates inherently through personal experiences and environmental influences throughout life, valuable information about the sector's investment potential is expected to accrue in professional contexts. Therefore, we proxied for information effects with two variables: the subject's involvement in agricultural financing tasks at

Table 1
Definition and measurement of variables.

Variable	Explanation and measurement	Average (std. dev.)		
		All	Born rural	Others
	Number of respondents	845	430	415
Location variables				
Birthplace	Dummy variable indicating whether the person was born in a rural community	0.51	1.00	0.00
		(0.50)	(0.00)	(0.00)
Place of domicile	Dummy variable indicating whether the person is currently domiciled in a rural community	0.26	0.38	0.13
		(0.44)	(0.49)	(0.34)
Production structure	Workplace structure in the person's current place of domicile, % of inhabitants in the postal code area employed in the agriculture sector	5.11%	7.25%	2.79%
		(10.86)	(12.73)	(7.89)
Relationship variables				
Relatives in farming	Dummy variable indicating whether the person has an agricultural producer in the immediate family.	0.50	0.66	0.33
		(0.50)	(0.47)	(0.47)
Work contacts	Frequency of contacts with agricultural producers at work, range 1–5 where 5 = once a week or more often, 4 = at least once a month, 3 = a couple of times a year, 2 = less frequently, 1 = never	3.0	3.44	2.53
		(1.36)	(1.33)	(1.22)
Leisure contacts	Frequency of contacts with friends or relatives living in rural areas or working in farming, range 1–5 where 5 = once a week or more often, 4 = at least once a month, 3 = a couple of times a year, 2 = less frequently, 1 = never	3.6	4.17	3.01
		(1.25)	(1.03)	(1.19)
Information variables				
Work in agrifinance	Frequency variable indicating whether the work duties involve agricultural finance, range 1–5 where 5 = once a week or more often, 4 = at least once a month, 3 = a couple of times a year, 2 = less frequently, 1 = never	1.96	2.41	1.81
		(1.13)	(1.33)	(0.47)
Training	Dummy variable indicating whether the person has participated in a training of agricultural finance	0.17	0.24	0.14
		(0.38)	(0.43)	(0.35)
Control variables				
Gender	Dummy variable, 1 = female	0.64	0.71	0.57
		(0.48)	(0.46)	(0.50)
Age	Years	42	44	40
		(10.99)	(11.83)	(10.47)
Experience	Work experience in the sector, years	16	18	14
		(12.14)	(12.69)	(11.04)
Education	The highest completed degree, range 1–5 where 1 = primary school, 2 = vocational, 3 = secondary school, 4 = polytechnic, 5 = university	4.0	3.95	4.08
		(0.83)	(0.83)	(0.82)
Manager	Dummy variable indicating whether the person is in a managerial position	0.25	0.24	0.26
		(0.43)	(0.42)	(0.44)
Risk aversion	Qualitative measure, indicating the person's agreement with the riskiness of stock investments, range 1–5 where 1 = Strongly disagree… 5 = Strongly agree	2.48	2.61	2.33
		(1.16)	(1.13)	(1.17)
General trust	Qualitative measure, indicating the person's agreement with the statement that most people can be trusted, range 1–5 where 1 = strongly disagree… 5 = strongly agree	3.60	3.59	3.60
		(0.86)	(0.87)	(0.84)

work and an indicator of whether the subject had participated in special training on agricultural financing.

Empirical evidence on individual investment behavior urged us to take into account subjective risk aversion. Subjects were requested to indicate on a Likert scale from 1 to 5 their agreement with the statement "Direct stock investments are too risky", where 1 denotes strongly disagree and 5 denotes strongly agree. Therefore, the higher the subjective rating, the more risk averse a person was interpreted to be. In order to capture the effect of general trust on stock market participation as documented in the literature (Guiso, Sapienza, and Zingales, 2008), the questionnaire applied the standard World Values Survey (WVS) statement for measuring trust empirically: "Generally speaking in my opinion most people can be trusted". Despite the contradictory evidence of its power in measuring trust (Sapienza, Toldra-Simats, and Zingales, 2013; Glaeser et al., 2000), the statement is easy to use in a questionnaire study. The interpretation of the Likert scale responses is that a higher rating indicates a person to be more trusting towards other people.

3.2. The main variables

The experimental setting of this study elicits questionnaire responses from participants who differ in terms of their backgrounds. These were measured as the degree of agreement with statements on identification and bonding using a Likert scale. The statements translated from Finnish were as follows: (1) "Rural life forms an important part of my identity", and (2) "I feel bonding with the rural population" (Table 2). The extent of agreement was expressed by choosing 1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, or 5 = strongly agree. For analysis purposes, the Likert scale responses were transformed to binary indicators. The sample was divided into those who reported a strong rural identity (i.e. responses 5 or 4) and those who did not, and similar categorization was used with the bonding statement.

Self-rated bonding with rural people was found to be slightly more pervasive among the investment professionals than a rural identity, as 537 (64%) agreed with the bonding statement and 435

Table 2
Frequencies of responses to the statement variables.

Statement	Strongly agree	Agree	Neither	Disagree	Strongly disagree	No. of obs.
Identification and bonding						
Rural life forms an important part of my identity	235	200	152	139	118	845
I feel bonding with the rural population	275	262	149	121	38	845
Value measures						
Food: I prefer food of domestic origin in grocery stores	434	294	68	42	7	845
Vitality: Maintaining the vitality of rural areas is important to me	502	270	51	16	6	845
Investment attitudes						
Measure 1: Food production firms provide an attractive investment opportunity	134	405	208	86	12	845
Measure 2: Farmer-owned firms have social capital that is valuable to an investor	114	405	220	80	26	845

(51%) with the identity statement. Self-categorized rural identity was strongly correlated with affective bonding, as the correlation coefficient between the Likert scale responses to these two measures was 80% and almost 70% for the binary variable.

To establish the effect of values on investment preferences, values regarding food choices and maintaining the vitality of rural areas were also measured using the five-point Likert scale. The respondents were asked to indicate their preference for food of domestic origin in grocery shopping and the importance of the vitality of rural areas. These particular aspects of agricultural production were selected as value indicators because consumption and investment preferences may share a common patriotic component, while vitality captures the value assigned to the existence of viable countryside. With the term vitality, we refer here to keeping rural areas inhabited and also ensuring that these areas provide jobs and well-being.

Table 2 presents the distributions of responses to the value statements, which we have labeled as 'Food' and 'Vitality'. The majority of respondents appeared to value domestic food and rural vitality very highly, since only few disagreed with the statements. The main interest in this study was, however, in whether the values turn into action and into investment decisions in particular. The high share of respondents who considered the vitality of rural areas important may raise doubts about selection bias in the final sample. The attitudinal scores, however, reflect the findings of general value surveys carried out in Finland that Finns value nature, the countryside and the vitality of rural areas very highly (e.g. Finnish Business and Policy Forum EVA, Attitude and value survey 2003). The majority of Finnish citizens have roots in the countryside, so that for many current city dwellers, the childhood home or at least the grandparents' place was on a farm. The countryside has a high symbolic value for Finns. Similarly, the value surveys among the Finnish population show that the mindset is still pro-countryside, irrespective of the place of domicile. These reflect the relatively recent onset of structural change in Finnish society, as Finland is one of the latest urbanized societies in Western Europe, and the value basis consequently remains rather rural for many. To put the distribution of responses reported in Table 2 into perspective, an EVA value survey conducted in 2003 with the focus on perceptions of the countryside evidenced that 59% in a large panel of Finns agreed with the statement that the countryside is the basis for Finnish identity and culture. An even higher share, 89%, expressed the view that it is important to secure the vitality of countryside.

The support for domestic food is also in line with previous survey studies in Finland. For instance, a study conducted in 2014 found that 91% of Finns consider domestic food production very important. Therefore, we conclude that the self-reported identities and valuations elicited in this research surprisingly well represent the values of the Finnish population outside of the sample. In addition, as we noted above in the discussion of the data characteristics, the respondents were found to be representative of the finance professional sector with regard to age, gender, and work positions. Consequently, selection bias does not appear as a severe issue. We conclude that the low response rate is not indicative that only a se-

lected pool of rurally minded individuals took the trouble to respond to the questionnaire.

Investment attitudes were measured with two statements that are presented in the lower panel of Table 2. Indicator variables for a positive investment attitude were constructed from the responses by coding the Likert scale ratings 4 and 5 as taking the value of one, and zero otherwise. These formed the dependent variables in our analysis. Investment attitudes were elicited both towards the attractiveness of food production firms (dependent variable 1 'Food production firms') and the perception of social capital in farmer-owned firms (dependent variable 2 'Social'). We used a Probit regression model to explain the investment attitudes with respondent characteristics, self-reported rural identification and bonding, and the subjective rural values. The background variables included age, gender, education, indicators for a managerial position, work with agricultural financing, and participation in training on agricultural finance. In addition, the control variables for general trust and risk aversion were included in the model, as specified in Table 1. The work experience variable was omitted, because age and experience were correlated (correlation coefficient is 0.878) and only age was entered in the model.

4. Results

Table 3 compares the investment attitudes of respondents by rural affinity. Proximity to the rural sector is measured in three dimensions: a self-categorized rural identity, self-reported bonding, and birth in a rural area. A similar pattern was observed in all three dimensions. Subjects who were the least rural – in terms of identity, bonding, and a non-rural birthplace – were on average less willing to invest in agricultural production compared to the most rural groups.

The difference was largest for the bonding categorization, and almost as large for identification. The smallest difference was observed for rural birthplace, but the difference was still statistically significant. Individuals born in a rural environment had more positive attitudes towards investing in food production and farmer-owned firms. It is noteworthy that the average scores reported by the subjects with no bonding and no identification were lower than the scores in the group with non-rural birth place. This pattern hints that affective ties are powerful determinants of investment preferences.

Investors categorized as rural may have a preference for the familiar due to information reasons. It is likely that individuals whose relatives are employed in farming and who are exposed to agriculture in their daily life are also more knowledgeable about the business. This may contribute to a more positive predisposition towards the sector as an investment target. To control for information effects, Table 3 also presents a similar comparison of investment attitudes between the groups of respondents whose work involved agricultural financing weekly and never, and the respondents who had and had not participated in training on agricultural finance issues. Individuals working frequently in agricultural finance were slightly more positively disposed to food production firms as investment targets, but the difference was not as pronounced as with identity, bonding, and rural birthplace variables. Training, on the contrary, turned the

Table 3
The *t*-test on differences in investment attitudes between respondent groups.

Investment attitude	Average score Respondent group		*t*-test
Identity	No identification	Rural identity	
N	257	435	
Food production firms	3.210	3.936	10.553***
Social capital in farmer-owned firms	3.167	3.844	9.367***
Bonding	No bonding	Bonding	
N	159	537	
Food production firms.	3.025	3.900	11.280***
Social capital in farmer-owned firms.	3.057	3.797	9.135***
Rural birthplace	No	Yes	
N	415	430	
Food production firms	3.533	3.795	4.236***
Social capital in farmer-owned firms	3.443	3.737	4.590***
Agricultural finance training	No training	Training	
N	688	157	
Food production firms	3.672	3.643	−0.350
Social capital in farmer-owned firms	3.615	3.497	−1.418*
Work in agricultural finance	Never	Weekly	
N	334	54	
Food production firms	3.587	3.833	1.784**
Social capital in farmer-owned firms	3.533	3.685	1.062

Table 4
Marginal effects of Probit model of self-categorized rural identity and bonding.

Variables	Identity	Bonding	Mean
Work contacts	0.001 (0.019)	0.035 (0.017)**	2.998
Leisure contacts	0.149 (0.022)***	0.129 (0.018)***	3.603
Relatives farming	0.085 (0.044)*	0.005 (0.039)	0.502
Rural birthplace	0.035 (0.039)***	0.282 (0.036)***	0.510
Rural domicile	0.154 (0.069)**	0.149 (0.057)**	0.263
Production structure	0.018 (0.010)*	0.017 (0.010)	5.111
Production structure–domicile rural	−0.007 (0.011)	−0.008 (0.011)	4.093
Log likelihood	−347.527	−399.859	
Pseudo R^2	0.352	0.241	
N	812	812	

Standard errors are in parentheses. Standard errors are adjusted for clustering at the zip code level with the three first digits. Constant included. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Identity and bonding are binary variables that take the value of one if the subject expressed strong agreement with the statement on rural identity and bonding with the rural population, respectively, and zero otherwise. The number of observations is lower than the initial sample 845 due to missing values.

difference upside down, so that the individuals without an agricultural finance training exhibited more positive investment attitudes, but the differences were not statistically significant. Hence, we conclude that information effects cannot explain the identity and bonding effects.

To extract the background factors that affect the identity variables Probit regressions are run on the binary rural identity and agricultural boding variables. Table 4 summarizes the results, reporting the marginal effect of each variable, while Supplementary Appendix 3 presents the estimated Probit coefficients. Rural birthplace and domicile show positive significant effect on self-categorized rural identity and agricultural sector boding. Leisure contacts similarly show positive significant interaction with both variables, while work contacts show marginal positive effect on the bonding variable but do not affect proclaimed identity. The domicile production structure, on the contrary, does not affect bonding significantly, but shows marginal positive effect on identity. Overall, the results suggest that rural identity is primarily a product of rural birthplace and an agriculturally intensive neighborhood, whereas a rural living environment breeds affective bonding in addition to early experiences from childhood. The relatively weak results for the production structure may suggest that personal ties are more important than the surrounding environment in shaping rural identity and bonding. However, the production structure results should be taken with

caution since postal-codes may cover too large areas to really affect respondents

One should note that the Probit models do not expose causality from the individual background variables to identity and bonding, because some of the variables may be endogenous (e.g. the decision to reside in agricultural domicile). Only the birthplace can be considered truly exogenous. On the contrary, the choice of living in a rural community is likely to be an endogenous decision that is influenced by self-perceived identities and affections.

The probability of bonding ties with rural population increased if the respondent was exposed to a rural location either in childhood or in the current surroundings, as the marginal effects of birthplace and rural domicile were positive and statistically significant. In contrast to identity, rural bonding ties appeared to be formed from the mere effect of living in a rural area, while the share of agricultural employment was not relevant. The findings suggest that a rural identity is primarily a product of a rural birthplace and an agriculturally intensive neighborhood, whereas a rural living environment breeds affective bonding in addition to the early experiences from childhood. Personal contacts are relevant to both identity and bonding.

Table 5 reports the results of Probit estimations on personal investment attitudes towards food producing and farmer-owned firms. The main explanatory variables of interest are identity, bonding, food

Table 5
Marginal effects for Probit models explaining investment attitudes.

(a)	Dependent variable 'Food production'					
Independent variables	1	2	3	4	5	Mean
Identity	0.176***		0.132***		0.079	0.517
	(0.038)		(0.041)		(0.048)	
Bonding		0.195***		0.143***	0.094*	0.643
		(0.040)		(0.045)	(0.052)	
Value food	0.081***	0.081***			0.058***	4.312
	(0.021)	(0.021)			(0.022)	
Value vitality			0.128***	0.122***	0.089***	4.482
			(0.028)	(0.029)	(0.030)	
Control variables						
Agrifinance work	0.020	0.015	0.015	0.013	0.010	2.135
	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)	
Manager	0.056	0.060	0.057	0.058	0.062	0.227
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	
Age	0.006***	0.006***	0.005***	0.005***	0.005***	41.723
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Female	0.090**	0.098**	0.084**	0.092**	0.075*	0.640
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	
Education	−0.041*	−0.040*	−0.038	−0.037	−0.036	4.023
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	
Training	−0.121**	−0.102*	−0.104*	−0.090	−0.103*	0.192
	(0.057)	(0.056)	(0.057)	(0.057)	(0.057)	
Trust	0.021	0.017	0.023	0.021	0.017	3.600
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	
Risk aversion	−0.009	−0.008	−0.008	−0.007	−0.008	2.419
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	
Log likelihood	−476.937	−475.562	−474.227	−474.031	−469.096	
Pseudo R^2	0.107	0.110	0.112	0.113	0.122	
N	812	812	812	812	812	

(b)	Dependent variable 'Social capital'					
Independent variables	1	2	3	4	5	Mean
Identity	0.159***		0.117***		0.030	0.517
	(0.039)		(0.042)		(0.051)	
Bonding		0.223***		0.178***	0.152***	0.643
		(0.041)		(0.046)	(0.055)	
Value food	0.134***	0.130***			0.109***	4.312
	(0.023)	(0.024)			(0.025)	
Value vitality			0.155***	0.135***	0.090***	4.482
			(0.033)	(0.033)	(0.034)	
Control variables						
Agrifinance work	0.022	0.013	0.019	0.013	0.009	2.135
	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)	
Manager	−0.065	−0.062	−0.068	−0.065	−0.064	0.227
	(0.046)	(0.047)	(0.018)	(0.046)	(0.047)	
Age	−0.002	−0.002	−0.002	−0.002	−0.003	41.723
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Female	0.110**	0.111**	0.110**	0.114**	0.094**	0.640
	(0.044)	(0.044)	(0.045)	(0.045)	(0.045)	
Education	−0.050**	−0.047*	−0.049**	−0.047*	−0.045*	4.023
	(0.025)	(0.025)	(0.024)	(0.025)	(0.025)	
Training	−0.137**	−0.121**	−0.123**	−0.111**	−0.121**	0.192
	(0.057)	(0.057)	(0.055)	(0.056)	(0.057)	
Trust	0.045**	0.040*	0.052**	0.048**	0.042*	3.600
	(0.021)	(0.022)	(0.021)	(0.021)	(0.022)	
Risk aversion	0.049***	0.052***	0.050***	0.051***	0.053***	2.419
	(0.018)	(0.018)	(0.017)	(0.018)	(0.018)	
Log likelihood	−465.221	−458.512	−469.387	−465.336	−453.730	
Pseudo R^2	0.141	0.153	0.133	0.140	0.162	
N	812	812	812	812	812	

Standard errors are in parentheses. Standard errors are adjusted for clustering at the zip code level with the three first digits. Constant included. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Dependent variables 'Food production' and 'Social capital' are binary variables constructed from the responses on the five-point Likert scale to the respective investment attitude statements that take the value of one if the respondent agreed with the statement and zero otherwise. The number of observations is lower than the initial sample 845 due to missing values.

and vitality values. The table discloses the results for 5 different models - with model (5) representing the comprehensive estimation including all relevant explanatory variables. The results for the value variables are strong and significant. Individuals who preferred domestic products in food choices also exhibited more positive invest-

ment attitudes compared to the respondents who did not proclaimed preference for local production. Belief in vitality of the agricultural sector similarly showed positive significant effect on both types of investment attitudes. The results for the identity and bonding variables however turned generally weak when values were accounted (model

5). Bonding significantly affected the belief in agricultural social capital, but showed weaker marginally significant effect on food production. The identity variable did not show significance when bonding and values were accounted. By way of interpretation, food-shopping habits and political stance on agricultural issues may show stronger predictive power for agricultural investment attitudes compared to rural identity per se.

Estimated effects of the control variables are smaller relative to the effects of the main variable of interest. The results in the upper panel indicate that older (more experienced) respondents perceived food production firms attractive more often than younger subjects. The effect appears to be distinct from professional expertise, as the indicators for work in agricultural financing and managerial positions were not statistically significant. The result is consistent with observations in the literature that experience attenuates behavioral influences in financial decision making (Barberis and Thaler, 2003), and that familiarity affects the less informed investors the most (Massa and Simonov, 2006). Those subjects who had participated in agricultural finance training and had a higher educational level expressed lower preference for investing in food production. A gender effect was observed in all model specifications. Female respondents were more positively disposed to investing in agricultural production. Prior studies document that women are more risk averse than men and make more conservative financial investments (Croson and Gneezy, 2009; Barber and Odean, 2001; D'Acunto, 2014).

The results for the social capital investment measure reported at the lower panel of Table 5 were similar, except for age (experience) that was not significant in the regressions for the social capital investment attitude. Trust and risk aversion appear to be positively related to the perception that social capital in farmer-owned firms is valuable for an outside investor. This suggests that some investors may perceive agricultural social capital as risk-reducing. The risk aversion effect was not observed in the first model, which measured investment attitudes towards food production firms. This suggests that investment professionals do not consider the food sector per se as low risk investment. The relationship found between risk aversion and the value of social capital resembles the predictions of the 'risk-as-feelings' hypothesis (Loewenstein et al., 2001) that emotions influence subjective valuations of risky situations. The results also provide tentative support for the hypothesis that people value locally grown food because of their willingness to support local farmers and the economy in their home community.

5. Conclusions

Utilizing geographical and social variation in the field, this study finds that location and social interaction contribute to self-categorized social identity and affective bonding. Furthermore, the paper makes a contribution to the rather scarce literature on how identities shape financial decisions. A geographically dispersed sample of 845 financial market professionals enabled us to examine whether investment attitudes towards agricultural production are associated with a rural identity and affective bonding with the rural population.

According to our results, individuals who identify themselves as rural are more positively disposed to investing in firms that operate in the food production chain. Consumption preferences for domestically produced food stated by the survey respondents and the subjective value of maintaining the vitality of rural areas increased the probability of perceiving food production firms as attractive investments. The association between food and investment preferences should be interpreted with caution, since in survey questions individuals may want to give an impression of an ideal self by responding in a socially desirable way and thus sugar coat their true consumption patterns. The findings reconcile with the familiarity hypothesis. Rural identity is a product of familiarity with agricultural production in early child-

hood and surrounding neighborhoods. It is also shaped by interactions with relatives and friends who live in rural areas. Investors who feel a bonding tie with the rural population are more likely to appreciate the social capital inherent in farmer-owned firms. The correlation with risk-aversion (and trust) suggests that farm ownership may decrease the perceived risk in agricultural investment. Women have on average a more positive attitude towards food production as an investment target than men.

However, despite the confirmed association between a rural identity and investment attitudes, the average investment score was also high in the subsample with a non-rural identity. This finding suggests that the provision of capital to agricultural production does not only rest on the rural population, but that investors with no personal connections to the sector are also willing to participate in financing the firms. Priming of rural identity and referencing the values of supporting local farmers may, however, promote participation in new capital issues of domestic food production firms. The findings of the study have managerial implications for the marketing of financial instruments in general, suggesting that familiarity and subjective values are powerful drivers of financial decisions.

The question of the sources of outside capital for agricultural production firms is highly topical given the repercussions for banking and corporate lending following the recent financial crisis in Europe and the U.S. To a great extent, food production is organized in agricultural cooperatives owned by farmers. The ownership rights are typically restricted to members of the cooperative, and its equity capital is thus contributed solely by the farmer members. The globalization of agricultural markets and the structural change in agricultural have provided a strong impetus for new organizational structures. Competitive pressures have pushed the members and managers in many agricultural producer cooperatives to reconsider the ownership boundaries (Hendrikse and Bijman, 2002; Cook and Chaddad, 2004). Producer cooperatives are more frequently adopting structures of investor-owned firms (IOF) due to pressures to find outside equity capital. In Finland, the focus of this study, the new cooperative law effective from January 2014 enables cooperative owners and managers to design new financial instruments that help in attracting growth capital from investors. The next step would be to understand preferences for the financial instruments that would attract investors to enter as co-owners of farmer-owned firms.

Supplementary Materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.socec.2015.09.007.

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