Product Diversification of Cooperatives and Corporations
Evidence from the Netherlands

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Abstract

This paper investigates the influence of governance structure on product diversification behavior. The allocation of decision rights and income rights in traditional cooperatives makes them less diversified than corporations. However, when cooperatives change their income rights and decision rights structure in order to adapt to the changing external and internal situations, they become similar to corporations in terms of product diversification. We compare the product diversification level of Dutch cooperatives and public listed companies in 2001 and 2012. The results show that in 2001 cooperatives are less diversified than public listed companies, whereas in 2012 the product diversification levels of these two types of companies are statistically comparable. With the flexibility in governance structure, cooperatives may actually behave no differently from other types of enterprises.

Keywords: Governance Structure, Product Diversification, Cooperative, Corporation

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1. Introduction

Diversification has long been a central topic of strategic management research (Ramanujam and Varadarajan, 1989). However, most empirical studies about product diversification have been based on (public) corporations. The studies about product diversification strategies of cooperatives are sparsely covered in literature. The neglect of cooperatives can be viewed as a shortcoming in the research into product diversification because cooperatives are an important part of many economies (Rey and Triole, 2007). For example, cooperatives in Europe represent 160 thousand enterprises, 5.4 million employees and 123 million members (Cooperatives Europe, 2012). Globally, the United Nations estimated in 1994 that the livelihood of nearly 3 billion people, or half of the world's population, was made secure by cooperative enterprises (International Co-operative Alliance, 2012). Given the important economic role cooperatives play, more insight into the product diversification strategies of cooperatives is warranted.

Many cooperative researchers have compared the organizational characteristics of cooperatives to those of corporations or investor-owned firms (IOF), and a common conclusion is that cooperatives are different from corporations in terms of governance structure (Staatz, 1987; Cook, 1995; Hakelius, 1996; Van Bekkum and Van Dijk, 1997; Hendrikse, 1998; Royer, 1999; Nilsson, 2001; Hendrikse and Veerman, 2001). Traditional cooperatives, owned and controlled by their members, are designed to serve the needs of members rather than generate profits for investors. Cooperatives have “an orientation to provide benefits to members and satisfy their needs, democratic goal setting and decision-making methods, special rules for dealing with capital and profit, and general interest objectives (in some cases)” (Commission of the European Communities 2001, 12). These features in governance structure may have various implications on cooperatives' product diversification strategies.

As previous research suggests, a company's ownership and organizational structure have effects on its product diversification (Belkaoui and Pavlik, 1992; Bethel and Lieberskind, 1993). Cooperatives with their distinguishing governance structure may adopt different product diversification strategies than corporations do. Dunn et al. (1979) point out that in general farmer cooperatives tend to be less diversified than IOFs. A few existing empirical studies on cooperatives seem to support this argument. Sporleder et al. (1977) investigate the diversification of regional marketing cooperatives over the period from 1960 through 1973 in the U.S. The results suggest that the portion of diversified regional marketing cooperatives is small (less than 10%) and there is no substantial trend toward product diversification. Chen et al. (1985) compare 32 large cooperatives and 35 large proprietary firms in five food industries in the U.S. from 1975 to 1980. The results suggest that cooperatives were less diversified than proprietary firms. Oustapassidis (1988) also finds that the overall diversification of marketing agricultural cooperatives in Britain is uniformly low. And based on the comparison between cooperatives and IOFs in the Greek dairy industry, Oustapassidis and Notta (1997) confirm that cooperatives do not effectively apply diversification strategies in contrast to the IOFs. Van Oijen and Hendrikse (2002) also conclude that Dutch cooperatives are less diversified than corresponding Dutch public corporations.

The findings of previous empirical studies all indicate that cooperatives tend to be less diversified than corporations. According to these studies, several characteristics of the traditional cooperative governance
structure provide explanations for the lower level of product diversification of cooperatives. For example, cooperatives have less financial resources at their disposal for product diversification because their equity shares are not transferable and they are not able to raise capital from stock markets (Vitaliano, 1983; van Oijen and Hendrikse, 2002). In addition, traditional cooperatives used to be production-oriented. The members, who control the cooperatives collectively, may not be interested in investing in new activities. As a consequence, cooperatives tend to focus on the strategy of cost leadership and invest in enlarging their current operations (Nilsson, 2001).

However, substantial restructuring has taken place in the cooperative business sphere in recent years in many countries, and the traditional cooperative model is being questioned (Nilsson, 1998). In order to adapt to the changes in market conditions, cooperatives have to modify their strategy to be more market-oriented. They need to extend their activities to value-added processing, satisfying the market demand for innovative and differentiated products, and to compete in international markets. Given the fact that the governance structure of traditional cooperatives is not designed for these tasks, some cooperatives have transformed into other cooperative organizational models, for example by introducing individual ownership by the members (Nilsson and Ohlsson, 2007) or by restructuring their internal organization (Bijman, Hendrikse and van Oijen, 2013). Due to these changes in cooperatives’ governance structure, some crucial aspects that make cooperatives different from corporations may no longer exist in many cooperatives. Nowadays, cooperatives may become similar to corporations in some certain respects.

The purpose of this paper is to investigate the difference between cooperatives and corporations regarding their levels of product diversification. It may be explained by the specific governance structure characteristics of cooperatives versus corporations. More specifically, we try to analyze the impact that the characteristics of cooperative governance structure may have on cooperatives’ choice of product diversification. We investigate whether cooperatives are becoming similar to corporations in terms of product diversification over time. The empirical base for this study consists of data from Dutch cooperatives and corporations regarding their product portfolio in 2001 and 2012. Hence, the dataset aims at revealing the difference between the product diversification levels of cooperatives and corporations and identifies the change in this difference.

The article is structured as follows. Section 2 focuses on the characteristics of the governance structure of traditional cooperatives and elaborates their effects on cooperatives’ product diversification. In Section 3, we address the changes in cooperative governance structure and discuss the impact of these changes on cooperatives’ diversification strategies. In Section 4, we describe the empirical method and dataset, and we present the results in Section 5. Section 6 discusses the results and the last section concludes.

2. Cooperative Governance Structure and Diversification

A standard way of characterizing a governance structure is to distinguish income and decision rights (Hansmann, 2000). The allocation of income and decision rights is implemented through asset ownership and/or contracts (Baker, Gibbons and Murphy, 2008). Each governance structure represents an unique allocation of them among the involved parties. A cooperative is characterized by Dunn (1988) as used-
owned, user-controlled and user-benefited, i.e. “a cooperative belongs to the people who use its services, the control of which rests with all members, and the gains of which are distributed to the members in proportion to the use they made of its services”. It entails that the ownership rights of cooperatives reside with their patron members. The two aspects of the governance structure of traditional cooperatives, in terms of decision and income rights allocation, and its impacts on product diversification will be analyzed in this section.

**Decision Rights**

Decision rights in the form of authority concern all rights and rules regarding the deployment and use of assets (Hendrikse, 2011). Decision rights specify who directs the enterprise’s activities. A prominent feature of cooperatives’ decision rights allocation is member dominance (Feng and Hendrikse, 2012). The allocation of decision rights in cooperatives is different from corporations in several respects, among which we highlight two features, i.e. the democratic decision making and stricter internal control mechanism. They both may influence cooperatives’ product diversification strategies.

First, as a cooperative is owned by its members, collective ownership requires a method for collective decision making. The decision making process in cooperatives is regarded as more democratic than in corporations (Núñez-Nickel and Moyano-Fuentes, 2004). In corporations, voting power is based on the principle of one-share-one-vote, but in most of the traditional cooperatives, the voting for decisions is based on the principle of one-member-one-vote (Hansmann, 2000). More importantly, the strategic decisions in corporations are mainly around the company’s profitability and growth, whereas in cooperatives the decision making scope is wider, including both the questions of how to serve the member interests and how to generate maximum value at the cooperative enterprise. This creates a challenge for the collective decision making in cooperatives. The first consequence of the more democratic nature of cooperatives is that the decision-making is more arduous and time-consuming, especially when members’ interests are diverse. This may very well result in a competitive disadvantage (Henehan and Anderson, 1994) and lost opportunities (van Oijen and Hendrikse, 2002). Cooperatives members are regarded as conservative and they often favor a conservative investment strategy in order to stabilize member returns (Staatz, 1987; Henehan and Anderson, 1994). Peterson and Anderson (1996) also claim that the conservative investment strategy entails that only the most secure projects are considered as investment options by members. The first consequence of the democratic control structure of cooperatives is that it may amplify the risk aversion (Staatz, 1987). Conservationism is an impediment for cooperatives to initiate new and risky activities, such as product diversification. Therefore, the decision making process in cooperatives is expected to lead to a lower level of product diversification of cooperatives.

Second, while an enterprise’s formal rights of control reside with it owners, the real authority is usually delegated to the management (Baker, Gibbons and Murphy, 1999). This is also the case for cooperatives. However, the CEOs of cooperatives are less powerful and the Board of Directors, who are representatives of the members, plays a more prominent and independent role than it does in corporations (van Oijen and Hendrikse, 2002). In a corporation, the CEO is usually in a position of control over both setting and implementing company policies, and often has a large, if not dominant voice, in selecting the Board of
Directors (Bebchuk and Fried, 2003; USDA, 2002). From an agency theory perspective, managers of corporations may have the tendency to diversify the firm in order to promote their personal interests (Montgomery, 1994; Ahimud and Lev, 1999). In contrast, the board of a cooperative is democratically elected by and from its membership and the CEO has almost no influence on the board composition (Cook and Burress, 2011). The Board of Directors of cooperatives is sufficiently independent to question management’s decisions and to reject its recommendations (USDA, 2002). As Hendrikse (1998) claims, the members of a cooperative have an incentive to structure the internal organization in such a way that they have confidence that their substantial (financial) stakes are protected and their interests are advanced. In addition, the involvement of members in cooperatives’ business also helps to ease the agency problem. As users, members and directors have frequent contact and communication with the cooperative enterprise, while the owners of a corporation may have no relationship with the company’s business other than as investors. The involvement of members in cooperatives’ business leads to effective monitoring and constraints the power of the management. In general, the difference between cooperatives and corporations is that more extensive decision-making power is retained by cooperative members than by the shareholders of corporations. Therefore, a corporation can be conceived as consisting of one decision unit, whereas a cooperative consists of two decision units with each having veto power. The investment decisions in cooperatives are subject to double screening (Hendrikse, 1998). Thus, the internal control mechanism in cooperatives is stricter than in corporations and managers of cooperatives have fewer opportunities to pursue their personal interests by diversification as what the agency theory suggests.

In general, the characteristics of the decision rights allocation in traditional cooperatives place a constraint on product diversification. With stricter internal control, more conservative and risk adverse decision making, cooperatives are relatively reluctant to enter new businesses.

**Income Rights**

Income rights specify the rights to receive the benefits and the obligations to pay the costs associated with the use of an asset, thereby creating the incentive system faced by the decision makers (Hendrikse, 2011). Among the features of cooperatives’ income rights structure, the dual relationship between members and cooperatives and non-tradable shares are supposed to have important effects on the product diversification of cooperatives.

First of all, while shareholders have only a singular relationship with corporations, members have a dual relationship with their cooperatives or a double-set of income rights (Bijman, Hendrikse and van Oijen, 2013). On the one hand, members own the cooperative as they supply the equity capital and have rights to the net earnings and net assets of the enterprise (Hansmann, 2000). One the other hand, members have a transaction relationship with the cooperative, i.e. they supply inputs or obtain outputs from the cooperative (or do both), and receive benefits from patronizing the cooperative (Evans and Guthrie, 2006). This feature implies that cooperative members’ interests differ from those of the shareholders of a corporation. From an investment perspective, cooperatives are creating patronage cash flows, cooperative asset cash flows, or both (Peterson, 1992). In traditional cooperatives, the dividends of equity shares are limited and have been subordinated to the patronage cash flows (Bijman, Hendrikse and van Oijen, 2013), their members are
therefore more interested in optimizing the volumes and prices of their transactions with the cooperatives (Hansmann, 2000). This leads to free riding and underinvestment problems as members have the tendency to invest less than optimal because their payoffs are based on their patronage instead of their investment in the cooperatives. Another consequence of the dual relationship is that cooperatives are less subject to disciplining from markets for inputs or outputs (or both) than corporations. The reason is that inputs or outputs are transferred between the cooperative and its members. Even when prices and quality are not satisfactory, alternatives are not considered and the parties remain locked into the relationship. This is referred to as the "single origin constraint" (Cook, 1997, p. 87; Hendrikse and Smit, 2007). Cooperatives are run for the needs of members, not the market. Therefore, diversification into new businesses is more probable for corporations, which aim to maximize the net returns of their investors, than it is for cooperatives. Traditional cooperatives usually focus on processing higher volumes of the members' outputs or inputs at better prices instead of diversifying product portfolio. Diversification may lead to economies of scope. However, cooperative members’ income rights focus on receiving patronage refunds, driving cooperative enterprises to pursue economies of scale instead of economies of scope.

Second, the residual claim rights or shares of traditional cooperatives are not tradable without restriction because the majority of the shares has to stay with the membership. The first consequence is that the ownership of cooperatives is restricted to patron members (Vitaliano, 1983) and owned collectively. Cooperatives are not able either to attract capital from external investors or to raise capital from stock markets by issuing public stocks. Hence, cooperatives have to rely mainly on internal equity sources, i.e. by convincing members to invest new capital, by retaining earnings, or by extending the membership (Hansmann, 2000; USDA, 2002). The second consequence of the non-transferability of cooperative shares is that it depresses members’ incentive to invest in cooperatives, leading to notably the free rider problem, the portfolio problem, and the horizon problem (Cook, 1995). In general, without external equity sources and being confined to the equity from members, who are commonly less able and willing to provide new equity, the most important challenge facing traditional cooperatives is accumulating equity capital (USDA, 2002). Therefore, as members are reluctant to finance new initiatives, especially unfamiliar and risky activities, and no external source for capital, we expect that traditional cooperatives are less diversified than corporations because of the lack of financial resources.

In summary, we discuss four characteristics of traditional cooperatives’ governance structure which may reduce their production diversification: (a) democratic decision making; (b) stricter internal control; (c) dual relationship; and (d) non-tradable shares. These arguments lead to the following hypothesis:

**Hypothesis 1**: Cooperatives are less diversified than corporations.

### 3. Flexibility of Cooperative Governance Structure

The traditional type of cooperative has generally been successful. Cooperatives compete with corporations in many sectors of most modern economies for market share, especially in the agricultural sector where cooperatives have played an active role for a very long time in many countries (Hendrikse, 2007). However, the conditions in the market and in society have been changing quickly during the last decades (Hendrikse
The need for differentiation, innovation and value-added in business has the tendency to increase member heterogeneity. Cooperatives now must adapt to a more diverse membership that requires different services, products, and structures (USDA, 2002). The traditional cooperatives may have difficulties when facing these external and internal changes. They need to adapt new strategies and realign their organizational structures accordingly (Kyriakopoulos et al., 1999; Hendrikse, 2011). A different allocation of ownership rights such as contractual production, merger and acquisition, and demutualization may be needed to deal effectively and efficiently with the increasing heterogeneity between members and/or increasing price competitions and increasing concentration at the retail level (Feng and Hendrikse, 2012). However, the flexibility of the cooperative bylaws in terms of the allocation of income and decision rights also creates a number of possibilities for cooperatives to adapt to new circumstances, while maintaining the allocation of ownership rights with members. In this section, we discuss the adaptation of the cooperative governance structure in terms of decision rights and income rights allocation and their potential impacts on product diversification.

**Adaptation of Decision Rights Allocation**

Cooperatives may respond to the changing market conditions by changing the allocation of decision rights between the various bodies inside the cooperatives (Feng and Hendrikse, 2012). In order to be more responsive to market competition and reduce the costs of collective decision-making, cooperatives have to move the decision power closer to the final product market and centralize the decision power to a larger degree than what they used to apply. For achieving this goal, members may delegate the formal authority regarding more aspects of the cooperative enterprise to the management, separate the society of members and the cooperative enterprise, or do both. This adaptation in decision rights allocation reflects a shift of the decision rights from cooperatives' board of directors to the management. This may make cooperatives' management become increasingly autonomous and reduce the influence of members on the cooperatives' decision making (Bager, 1996; Harte, 1997; Bhuyan, 2007; Bijman, Hendrikse and van Oijen, 2013). As a consequence, “the aspirations of the managers, rather than those of the farmers, are realized” (Hind, 1999). Hendrikse (2005) observes the change of cooperatives' character in its governance structure and public appearances that members do have a less influential position in decision making and cooperatives nowadays behave sometimes like ordinary enterprises.

As cooperatives become more management driven, the management has more freedom in making diversification decisions. The change of cooperatives' internal organizational structure follows this adaptation progress regarding the allocation of decision rights. For example, the agency relationship between the board and the management is changing in Dutch cooperatives: Nowadays most of the expertise, and thus the real authority lies with the professional management, which increasingly makes more strategic and operational decisions, pushing the board into a supervisory role (Bijman, Hendrikse and van Oijen, 2013). They also observe that cooperatives with the traditional board model are least diversified, while those with the management board model are most diversified. The adaptation of the decision rights allocation supports cooperatives' market-oriented strategies and makes the decisions for product diversification easier. Sexton and Iskow (1993) concluded already regarding the empirical findings on cooperative performance that cooperatives are generally no less efficient than other firms. As such, we
expect that the difference of product diversification between cooperatives and corporations nowadays is smaller than before.

**Adaptation of Income Rights Allocation**

There are many degrees of freedom to structure the income rights in a cooperative. LeVay (1983, p5) states even that ‘...cooperatives may behave no differently from other types of enterprise’. It turns out that the income rights in informal, repeated relationships can be structured in such a way that exactly the same distribution of power results in a cooperative as in other enterprises (Baker et al., 2002; Hendrikse, 2007). Starting from the 1990s, many traditional cooperatives have taken steps to restructure their income rights structure by replacing the collective capital structure by a more “individualized” capital structure (Nilsson, 1998). To acquire external equity capital, some cooperatives have converted to the model with a capital-seeking entity or the model of investor-share cooperatives (Chaddad and Cook, 2004). Both of these new models of cooperatives attenuate the restriction of cooperative ownership rights only to members. In the model with capital-seeking entity, a cooperative introduces a separate legal entity, which is wholly or partially owned by the cooperative, to acquire external equity. The investor-share cooperatives issue separate classes of equity shares (in most instances, these shares have no voting rights) for external nonmember investors. To generate incentives for members to provide equity, some cooperatives convert to proportional investment cooperatives or new generation cooperatives (Chaddad and Cook, 2004). In proportional investment cooperatives, although the ownership of cooperatives is still nontransferable, the distribution of net earnings of cooperatives is proportional to member shareholding rather than patronage. The new generation cooperatives model relaxes the non-transferability of cooperative shares and the shares are appreciable as well as transferable among well-defined member-patron group. These two models maintain the principle that the owners of cooperatives must be members, but the appreciation and transferability of cooperative shares enhance members' incentive to invest in their cooperatives. The traditional cooperatives that have restructured to these new models are expected to be capable of raising sufficient equity for participating in value-added processing and product diversification.

Another consequence is that the restructuring of income rights makes the asset cash flow become important because not only the external investors will demand a high return on their investment but also the members' payoff relies more on the return on investment. Various studies indicate already that the financial performance of cooperatives is generally as strong as that of IOFs (Harris and Fulton, 1996; Parliament, et al., 1990; Lerman and Parliament, 1990). In new generation cooperatives, members can realize additional benefits from their equity investment in the cooperatives (USDA, 2002). This change reinforces the financial relationship between members and cooperatives, and makes cooperatives more ready for adopting good diversification projects that will result in high profitability. Meanwhile, cooperatives also restructure their income rights by spending considerable efforts in developing member benefit programs to counter the process of adverse selection and attract innovative members (Hendrikse, 2011). Cooperatives are thus able to attract high-quality supplies and diversify into high value-added products. For example, FrieslandCampina, a leading Dutch dairy cooperative, has been moving from 50:50 high versus low value-added products, to 80:20 now, and a plan of 90:10 in a few years (van de Horst, 2012).
In sum, when considering the restructuring of decision rights and income rights in cooperatives in past decades, it is reasonable to project a decreasing difference of product diversification levels between cooperatives and corporations over time. In other words, cooperatives and corporations shall be similar in terms of product diversification behavior. We conclude this section with the second hypothesis:

**Hypothesis 2:** The difference in the level of product diversification between cooperatives and corporations disappears over time.

4. **Method**

In this section, we explain the samples and data collection, the measures, and the analyses we use to test the proposition.

**Sample and Data Collection**

Both the samples and the data originate from the electronic database REACH, which is published by Bureau Van Dijk. The REACH database contains predominantly financial data of Dutch companies. These data are mainly based on the information that companies are legally required to deposit with the Chamber of Commerce. The REACH database was merged into Orbis Database in 2007, which covers the data of firms worldwide.

We first select all active Dutch cooperatives (national legal form: C) and public listed companies for the year 2012. The latter type of firms represents corporations. And then we look for these companies in the database in 2001. Consistent with the previous research on product diversification, we remove firms from the financial services industry (Standard Industrial Classification (SIC) 6000 to 6999) and regulated utilities industry (SIC 4000 to 4999) (Denis et al., 1997; Goranova et al., 2007). It results in 429 cooperatives and 48 public listed companies (Sample 1). For each company, we extracted its SIC code information from the database. The data for the year 2012 is downloaded from Orbis edition December 2012, and the data for the year 2001 are part of the REACH database historical edition in December 2001. With this measure, we identify the companies that are present in both 2001 and 2012, i.e., the companies that operate continuously during the time period of 2001~2012. The purpose is to adjust for the impact of the entry of new single-segment companies (Basu, 2009) and to differentiate the genuine changes from sampling errors. From 2001 to 2012, the number of cooperatives increases from 1,249 to 3,678, the entry of such large amount of new cooperatives in the database may bias the analysis. We therefore only investigate the same group of companies.

Cognizant of other factors that affect product diversification, such as firm size, leverage, and etc. (Denis et al., 1997), and in order to the remove the inactive cooperatives with no business activities (for example, the cooperatives founded by the owners of apartments jointly to exploit the common facilities, which is not aimed at creating business and thus not useful for comparison) from Sample 1, we further select the cooperatives that have available financial data (operating revenue) from Sample 1. Because reporting financial information is not mandatory for cooperatives, there are only a few cooperatives (31 out of 1,249) in REACH database with financial information in 2000 (a year before the sampling time). As a consequence,
there are only 11 cooperatives with financial data in both 2000 and 2011. This requirement seems to be too
strict and results in a too small sample of cooperatives. However, more cooperatives report financial data in
2011 (486 out of 3,678). We therefore select the cooperatives which have available operating revenue data
for 2011. By doing this, we secure that the cooperatives in our sample are active in business activities. It
results in Sample 2, which consists of 114 companies (66 cooperatives and 48 public listed companies).

Measures

We use a dummy variable for the governance structure. The variable has value zero for cooperatives and
value one for corporations.

To measure product diversification, we use unweighted product-count measures. Unweighted product-
count measures are reliable, are easy to compute, and have low information requirements (Montgomery,
1982; Lubatkin, Merchant and Srinivasin, 1993). Weighted measures are more refined, but the breakdown
of sales that is necessary to calculate the weights is not available for most of the companies in our sample
(Khanna and Palepu, 2000). Besides, the correspondence between unweighted product-count measures
and Rumelt’s measures (Rumelt, 1974) is strong, and perhaps even stronger than the correspondence
between weighted product-count measures and Rumelt’s measures that was found in earlier studies
(Lubatkin et al., 1993). This supports the validity of unweighted product-count measures. Therefore, we
took the number of four-digit industry codes to measure each company’s absolute degree of overall product
diversification (Kim, Hoskisson and Wan, 2004).

Companies in different industries may have different opportunities for diversification. With all samples, we
control the industrial effect based on the classification of the main 2-digit SIC code of a firm. We introduce
an industry dummy to reflect the 8 different industrial divisions (see the appendix). With Sample 2, based
on the availability of financial data, we incorporated two additional common types of controls (Geringer et
al., 2000; Mayer and Whittington, 2003). The first one is company size. Control for size effects is very
common in the diversification literature (Chatterjee and Wernerfelt, 1991) since size may correlate with
product diversification. We used the natural log of average company asset and operating revenue for 2009,
2010 and 2011 to measure firm size. Secondly, the solvency ratio is introduced into the model as a control
of leverage. Similarly, the three-year average value for 2009, 2010 and 2011 is taken to smooth the
fluctuation.

Analysis

Because of the potential inconsistency in the coding system due to revisions of SIC (Martin and Sayrak,
2003), conducting a panel analysis by using the product diversification data for the year 2001 and 2012 in
Sample 1 and 2 is problematic. This is similar to the problem in historical analysis of financial data, which
suffers from changes of accounting policies and systems over time (Hind, 1997). We therefore focus our
study on the basis of a multiple cross-sectional data analysis and aim at investigating the change of the
difference of product diversification levels between cooperatives and corporations from 2001 to 2012. The
difference of product diversification levels in each single year is not affected by the inconsistency of the
coding system because both types of companies report their product portfolio under a same standard of the year under observation.

Thus, for both Sample 1 and 2 we first compare the product diversification level of cooperatives and corporations in different years, and then investigate whether the difference of product diversification level between these two types of companies changes between the year 2001 and 2012. After that, we adopt a Poisson Regression Model to investigate the relationship between company’s governance structure (independent variable) and product diversification level (dependent variable). For Sample 2, we incorporate additional control variables in the Poisson Regression Model. Because the dependent variable (number of 4-digit code a firm has) is discrete in nature and dispersedly distributed, we decide to choose a Poisson Regression Model for count data, instead of the linear regression model (Verbeek, 2012).

5. Results

Descriptive Statistics

Table 1 and 2 present the number and parentage of the diversified firms, and the distribution of firms in different industries. In both samples, the number of cooperatives is higher than that of corporations. The distribution of companies among industries is consistent between two samples. The companies in division A, which consists of agriculture, forestry and fishing, are all cooperatives. This is in line with the fact that cooperatives are playing a major role in Dutch agricultural and food industry (Bijman and Hendrikse, 2003). However, the cooperatives in agricultural division accounts for only about 6% of the cooperatives in each sample. Cooperatives are also more active in division F (wholesale trade) compared with public listed companies. In contrast, corporations are more dominant in division B (mining) and division D (manufacturing). No company changed the governance structure between 2001 and 2012. However, some companies changed their major business activities. In Sample 1, 9 cooperatives and 5 corporations have changed their major business activities in the period. And in Sample 2, 2 cooperatives have changed their major business activities. The general trend is that the number of companies in division B (mining), C (construction), and G (retail) decreases but the number of firms in division I (services) increases.

Some trends of product diversification can be identified by comparing the data across 2001 and 2012. First, we find a decrease of the percentage of the diversified public listed companies. The samples show that in 2001 around 69% of the public listed companies have more than one product or activity, i.e. they are diversified. This percentage drops to around 56% in 2012. This result fits in line with empirical findings of the downward trend of corporate diversification (Martin and Sayrak, 2003). Second, the percentage of diversified cooperatives decreases from 60% to 54% in Sample 1 but increases from 55% to 62% in Sample 2. Since the direction of the trends in two samples is mixed, we are not able to tell whether more cooperatives chose to diversify or not. However, the cooperatives in Sample 2, which report operating revenue data, are usually large cooperatives. Among this group of cooperatives, 5 chose to diversify in the past 10 years. It may entail that large cooperatives tend to diversify their product portfolios in the past 10 years.
Table 3 presents the descriptive statistics of the product diversification level, measured by the number of 4-digit SIC codes, of all the companies in the samples. We find that the mean and distribution of the number of 4-digit SIC codes are similar for different samples in the same year but different between 2001 and 2012 for a same sample. In 2001, the mean diversification levels of all companies are 2.37 and 2.57 for Sample 1 and 2. In 2012, both means drop by about 0.45 to 1.94 and 2.12. The second change across 2001 and 2012 is the increase of the percentage of firms that has only one 4-digit SIC code. This corresponds with the decrease of the percentage of diversified firms. The distribution of product diversification level is not normally distributed, with more than 60% of companies having only 1 or 2 SIC codes. However, the distribution is more concentrated in the range of 1 to 7 in 2012, whereas in 2001 is it much more dispersed.

Comparison of Diversification Level

Table 4 compares the mean product diversification levels of cooperatives and corporations in different years. In addition to t-test statistic, we report the Wilcoxon nonparametric statistic because the data are not normally distributed. The Wilcoxon test enables us to distinguish between the two types of companies in terms of their product diversification levels. We find significant difference in the means product diversification levels between two types of companies in 2001, and more importantly, this difference fades away in 2012. In both Sample 1 and 2, the mean product diversification level of cooperatives is significantly lower than that of public listed companies in 2001. This result suggests that cooperatives in the samples are less diversified than public listed companies in 2001. Hypothesis 1 is thus supported. However, the difference in mean product diversification levels becomes smaller in 2012, and in both samples, the mean product diversification levels of cooperatives and corporations are no longer significantly different in 2012. In other words, the levels of product diversification of cooperatives and public listed companies are statistically comparable in 2012. The comparison result of 2012 data indicates that cooperatives are now similar to corporations in terms of product diversification level. The difference between cooperatives and public listed companies in terms of product diversification level is much smaller than before. The second hypothesis is thus supported by the data of 2012.

Regression Analysis

Our preliminary results based upon the Wilcoxon nonparametric test (Table 4) are reinforced by using regression analysis. We run individual Poisson regression on the cross-sectional data for each year to determine the relationship between firms’ governance structure and product diversification level. The results are presented in Table 5. The results for Sample 1 suggest that, while controlling for industry, the coefficient for governance structure (0 for cooperative and 1 for corporation) is positive and statistically significant at 5% level in 2001 but negative and insignificant in 2012. We obtain the similar results from the regression on Sample 2. It entails that, ceteris paribus, in 2001 public listed firms have about 0.22 (0.28) product or activity more than cooperatives in Sample 1 (2). However, in 2012 public listed companies seem to have fewer products or activities than cooperatives but this coefficient is not statistically significant. In the regression on the 2012 data of Sample 2, we also try to add two additional variables – asset and solvency ratio, to control for firm size and leverage. The results show that, while controlling for industry, firm size and leverage, the coefficient for governance structure is negative, with the significance level of 10%. Firm asset
and solvency ratio both have positive impacts on product diversification but these impacts are not statistically significant.

In summary, the analysis of the data for Dutch cooperatives and public listed companies reveals that cooperatives were less diversified than corporations in 2001. However, when comparing these two types of different firms again in 2012, we find that the relation between the governance structure and product diversification level is not statistically significant. This supports our argument that the governance structure characteristics that discriminate cooperatives from corporations and reduce the product diversification of cooperatives may be disappearing. We can no longer assert that cooperatives are still less diversified than corporations.

6. Discussion and Conclusion

Findings of research into production diversification based on public listed corporations may not automatically apply to cooperatives since they have a different governance structure. However, does the governance structure really matter in product diversification? This paper investigates the difference in product diversification between cooperatives and corporations. The results show that the product diversification level of Dutch cooperatives is lower than Dutch public listed companies in 2001. However, the difference in product diversification levels between these two types of companies is statistically insignificant in 2012.

The analysis and explanation of the (in)difference in product diversification level between cooperatives and public listed companies is based on the impacts of a company’s governance structure on its product diversification decision. In this paper, we focus on the allocations of decision rights and income rights, which may discriminate between cooperatives and corporations. For several years, Dutch agricultural cooperatives have been undertaking substantial structural changes (Bärnheim, 1996; Van Dijk, 1997; Zwanenberg, 1997). Like other types of companies, cooperatives must continually adapt to the changing marketplace. As substantial restructuring has taken place in the cooperative business sphere in recent years in many countries, Fulton (1995) questions whether cooperatives can adapt to a rapidly changing environment. The flexibility of cooperative’s governance structure makes this adaptation possible. Through the adaptation in decision rights and income rights allocation, cooperatives are able to deal with the new circumstances efficiently and continue to coexist and compete with IOFs. The adaptation of cooperatives' decision rights structure is based on the internal degrees of freedom regarding the allocation of authority in cooperatives. Delegating more decision rights by members to management entails giving real authority away while keeping the formal control staying at the top. The separation of formal and real authority gives management more freedom to operate. The principal-agent relationship in cooperatives is thus modified into a class of incomplete contracts between the members and management, which restructure the cooperative in order to make traditional cooperatives more responsive to market demand. As such, the governance structure of a cooperative may not matter at all in its investment behavior (Hendrikse, 2007). Cooperatives may behave similarly to corporations in terms of product diversification. Another adaptation of cooperatives' governance structure is with the allocation of income rights. Cooperatives can replace the collective capital structure by a more “individualized” capital structure (Nilsson, 1998). Through this
adaptation, although cooperatives’ ownership rights still reside with members, cooperatives become more capable of raising sufficient equity and may ease the financial constraint for product diversification. In sum, as many observations have signaled that cooperatives behave like ordinary enterprises, in this study we show that the product diversification levels of Dutch cooperatives and public listed companies are statistically comparable in 2012. It is intriguing that Fakhfakh et al. (2010) establish a similar result regarding the productivity of worker cooperatives and capitalist firms in four manufacturing industries in France.

This study is subject to some limitations. First, since we focus on the cooperatives and corporations in the Netherlands, it thus has the limitation of external validity. The reason is that the characteristics of the various governance structures may vary from country to country, depending on the different institutional environments. For example, a cooperative in the Netherlands may differ somewhat from a cooperative in the U.S. (Hendrikse and Veerman, 2001). Product diversification may also have a more positive influence on the performance of cooperatives in counties with a less developed institutional environment than in the Netherlands. Therefore, it is valuable to conduct more longitudinal studies based on the samples from other countries, in order to validate the change of cooperatives’ diversification strategies in past decades. An additional limitation of our study is the measures we used. For product diversification we used unweighted measures, which are less refined than weighted measures such as the entropy measure (Palepu, 1985), and fairly unsophisticated compared with measures inspired by the resource-based view (Robins and Wiersema, 1995; Farjoun, 1998; Silverman, 1999; Miller, 2006).
Table 1: Distribution of Firms in Industries in Sample 1

<table>
<thead>
<tr>
<th></th>
<th>Type of Firm</th>
<th>Sample Size</th>
<th>Diversified Firms</th>
<th>Distribution of Firms in Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A     B   C   D   F   G   I   J</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>Cooperative</td>
<td>429</td>
<td>259    60%</td>
<td>27    0   13   27  170  29  162 1</td>
</tr>
<tr>
<td></td>
<td>Public Listed</td>
<td>48</td>
<td>33     69%</td>
<td>2      4   17   5   7   13  0</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>447</td>
<td>292    61%</td>
<td>27    2   17   44  175  36  175 1</td>
</tr>
<tr>
<td>2012</td>
<td>Cooperative</td>
<td>429</td>
<td>233    54%</td>
<td>26    0   9    33  170  26  165 0</td>
</tr>
<tr>
<td></td>
<td>Corporation</td>
<td>48</td>
<td>27     56%</td>
<td>1      4   18   4   4   17  0</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>447</td>
<td>260    55%</td>
<td>26    1   13   51  174  30  182 0</td>
</tr>
</tbody>
</table>

Percentages are in italic.

Table 2: Distribution of Firms in Industries in Sample 2

<table>
<thead>
<tr>
<th></th>
<th>Type of Firm</th>
<th>Sample Size</th>
<th>Diversified Firms</th>
<th>Distribution of Firms in Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A     B   C   D   F   G   I   J</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>Cooperative</td>
<td>66</td>
<td>36     55%</td>
<td>3     0   0    10  21   4  27  1</td>
</tr>
<tr>
<td></td>
<td>Corporation</td>
<td>48</td>
<td>33     69%</td>
<td>2     4   17   5   7   13  0</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>114</td>
<td>69     61%</td>
<td>3     2   4    27  26   11 40  1</td>
</tr>
<tr>
<td>2012</td>
<td>Cooperative</td>
<td>66</td>
<td>41     62%</td>
<td>3     0   0    11  20   5  27  0</td>
</tr>
<tr>
<td></td>
<td>Corporation</td>
<td>48</td>
<td>27     56%</td>
<td>2     1   4    18  4    4  17  0</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>114</td>
<td>68     60%</td>
<td>3     1   4    29  24   9  44  0</td>
</tr>
</tbody>
</table>

Percentages are in italic.
Table 3: Descriptive Statistics for Product Diversification Level

<table>
<thead>
<tr>
<th>Sample</th>
<th>Year</th>
<th>No. of 4-digit SIC Codes</th>
<th>Distribution of No. of 4-digit SIC Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Min</td>
</tr>
<tr>
<td>Sample 1</td>
<td>2001</td>
<td>2.3690</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.04727)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>1.9350</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.11048)</td>
<td></td>
</tr>
<tr>
<td>Sample 2</td>
<td>2001</td>
<td>2.5702</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.50652)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>2.1228</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.24190)</td>
<td></td>
</tr>
</tbody>
</table>

Percentages are in italic; Standard deviations are in parentheses.

Table 4: Comparison of Means of Product Diversification Level

<table>
<thead>
<tr>
<th>Sample</th>
<th>Year</th>
<th>Cooperatives</th>
<th>Corporations</th>
<th>Difference in Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of 4-digit SIC Codes</td>
<td>No. of 4-digit SIC Codes</td>
<td>Student t</td>
</tr>
<tr>
<td>Sample 1</td>
<td>2001</td>
<td>Sample Size 429 Mean 2.2867 (1.8480)</td>
<td>Sample Size 48 Mean 3.1042 (3.2762)</td>
<td>t statistic -2.640**</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>429 Mean 1.9231 (1.0878)</td>
<td>48 Mean 2.0417 (1.3040)</td>
<td>-0.701</td>
</tr>
<tr>
<td>Sample 2</td>
<td>2001</td>
<td>66 Mean 2.1818 (1.6715)</td>
<td>48 Mean 3.1042 (3.2762)</td>
<td>-1.964*</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>66 Mean 2.1818 (1.2014)</td>
<td>48 Mean 2.0417 (1.3040)</td>
<td>0.593</td>
</tr>
</tbody>
</table>

Standard deviations are in parentheses.
**denotes significance at the 1% level.
*denotes significance at the 5% level.
Table 5: Regression Results of Product Diversification Level

Dependent Variable: Number of 4-digit SIC Codes

Method: ML/QML - Poisson Count (Quadratic hill climbing)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample 1 2001</th>
<th>Sample 1 2012</th>
<th>Sample 2 2001</th>
<th>Sample 2 2012</th>
<th>Sample 2 2012'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0</td>
<td>0.5515</td>
<td>0</td>
<td>0.5184</td>
<td>-0.0125</td>
</tr>
<tr>
<td>Industry A</td>
<td>1.8689</td>
<td>-0.0563</td>
<td>1.8971</td>
<td>0.3287</td>
<td>0.2717</td>
</tr>
<tr>
<td></td>
<td>(1.8636)*</td>
<td>(-0.4848)**</td>
<td>(1.8514)*</td>
<td>(0.8221)</td>
<td>(0.0677)</td>
</tr>
<tr>
<td>Industry B</td>
<td>1.2819</td>
<td>0.6044</td>
<td>1.2171</td>
<td>0.8114</td>
<td>0.7518</td>
</tr>
<tr>
<td></td>
<td>(1.2106)</td>
<td>(1.0250)</td>
<td>(1.1449)</td>
<td>(1.3564)</td>
<td>(1.2433)</td>
</tr>
<tr>
<td>Industry C</td>
<td>1.0989</td>
<td>0.7082</td>
<td>0.9657</td>
<td>0.8914</td>
<td>0.8981</td>
</tr>
<tr>
<td></td>
<td>(1.0884)</td>
<td>(4.3932)**</td>
<td>(0.9249)</td>
<td>(2.7991)**</td>
<td>(2.7163)**</td>
</tr>
<tr>
<td>Industry D</td>
<td>1.1803</td>
<td>0.2821</td>
<td>1.1292</td>
<td>0.6081</td>
<td>0.4906</td>
</tr>
<tr>
<td></td>
<td>(1.1754)</td>
<td>(2.5000)**</td>
<td>(1.1187)</td>
<td>(3.5889)**</td>
<td>(2.6517)**</td>
</tr>
<tr>
<td>Industry F</td>
<td>0.7170</td>
<td>0.0806</td>
<td>0.7053</td>
<td>0.2898</td>
<td>0.3657</td>
</tr>
<tr>
<td></td>
<td>(0.7160)</td>
<td>(0.2704)</td>
<td>(0.6987)</td>
<td>(1.5537)</td>
<td>(1.8857)*</td>
</tr>
<tr>
<td>Industry G</td>
<td>0.5436</td>
<td>0.1988</td>
<td>0.4547</td>
<td>0.4251</td>
<td>0.3651</td>
</tr>
<tr>
<td></td>
<td>(0.5393)</td>
<td>(1.4390)</td>
<td>(0.4423)</td>
<td>(1.7018)*</td>
<td>(1.4341)*</td>
</tr>
<tr>
<td>Industry I</td>
<td>0.5470</td>
<td>0.4712</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.5461)</td>
<td>(0.4673)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset (log)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0745</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1.2566)</td>
</tr>
<tr>
<td>Solvency (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0055</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1.6730)*</td>
</tr>
<tr>
<td>Structure</td>
<td>0.2222</td>
<td>-0.0563</td>
<td>0.2870</td>
<td>-0.2312</td>
<td>-0.3197</td>
</tr>
<tr>
<td></td>
<td>(2.2210)**</td>
<td>(-0.4848)</td>
<td>(2.0898)**</td>
<td>(-1.5580)</td>
<td>(-1.8267)*</td>
</tr>
<tr>
<td>Observations</td>
<td>447</td>
<td>447</td>
<td>114</td>
<td>114</td>
<td>114</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-802.57</td>
<td>-705.91</td>
<td>-211.26</td>
<td>-173.56</td>
<td>-171.95</td>
</tr>
<tr>
<td>R²</td>
<td>0.325</td>
<td>0.126</td>
<td>0.208</td>
<td>0.208</td>
<td>0.247</td>
</tr>
</tbody>
</table>

z-statistics are in parentheses.
*denotes significance at the 10% level.
**denotes significance at the 5% level.
Appendix: 2-Digit SIC Code Detail Level

<table>
<thead>
<tr>
<th>Division</th>
<th>Product or Activity</th>
<th>Range of 2-Digit Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Agriculture, forestry, &amp; fishing</td>
<td>01-09</td>
</tr>
<tr>
<td>B</td>
<td>Mining</td>
<td>10-14</td>
</tr>
<tr>
<td>C</td>
<td>Construction</td>
<td>15-17</td>
</tr>
<tr>
<td>D</td>
<td>Manufacturing</td>
<td>20-39</td>
</tr>
<tr>
<td>E</td>
<td>Transportation &amp; pub. utilities</td>
<td>40-49</td>
</tr>
<tr>
<td>F</td>
<td>Wholesale trade</td>
<td>50-51</td>
</tr>
<tr>
<td>G</td>
<td>Retail trade</td>
<td>52-59</td>
</tr>
<tr>
<td>H</td>
<td>Finance, insurance, &amp; real estate</td>
<td>60-67</td>
</tr>
<tr>
<td>I</td>
<td>Services</td>
<td>70-89</td>
</tr>
<tr>
<td>J</td>
<td>Public administration</td>
<td>91-97</td>
</tr>
<tr>
<td>K</td>
<td>Nonclassifiable establishments</td>
<td>99</td>
</tr>
</tbody>
</table>

Source: Occupational Safety and Health Administration, United States Department of Labor
Reference


