Social Capital and Incentives in the Provision of Product Quality by Cooperatives

Wendong Deng[1], George Hendrikse[2]

[1] Rotterdam School of Management, Erasmus University, Telephone: +31-10-4089570, Email: wdeng@rsm.nl

[2] Rotterdam School of Management, Erasmus University, Telephone: +31-10-4088660, Email: ghendrikse@rsm.nl

Paper prepared for presentation at the EAAE 2014 Congress
'Agri-Food and Rural Innovations for Healthier Societies'

August 26 to 29, 2014
Ljubljana, Slovenia

Social Capital and Incentives in the Provision of Product Quality by Cooperatives

Wendong Deng and George Hendrikse

Abstract

This article highlights the interaction between social capital, pooling and quality premiums and their influence on cooperative members' decisions regarding their product quality. A necessary condition for cooperative equitable principles such as complete pooling is that there exists a high level of social capital in the cooperative. When the level of social capital is high, the social motivation in the cooperative can guarantee high product quality while economic incentives are weak. When the level of social capital declines, an income rights structure with stronger quality incentives must be adopted by the cooperative to maintain the product quality. The cooperative is uniquely efficient when the farmers are risk averse and product quality is uncertain. When the level of social capital in cooperatives is higher than a threshold, which is decreasing in members' subjective risk toward production uncertainty, cooperatives are able to achieve higher product quality than investor owned firms (IOFs).

Keywords: Quality, Social Capital, Cooperatives, Income Rights Structure

"Cooperation is jointly determined by social factor and incentive alignment."

(Williamson, 1985. p6)

1. Introduction

Cooperatives are often associated with low quality products due to the defense-oriented characteristics of traditional cooperatives (e.g. Frick, 2004; Theodorakopoulou and Iliopoulos, 2012; Pennerstorfer and Weiss, 2012). Various traditional cooperative business practices seem not to be conductive to meeting consumers' need for quality (Merél, Saitone and Sexton, 2009; Fulton and Sanderson, 2002). Specifically, the practice of pooling in cooperatives is commonly believed to place cooperatives at a competitive disadvantage in quality differentiated markets (Liang, 2013). Low product quality of cooperatives is thus essentially a problem of collective motivation. Under the assumption of self-interest or opportunism, collectively beneficial quality outcomes fail to arise due to the actions motivated by the private benefits and efforts to individual members. Cooperatives therefore need to adopt an income rights structure with a well-designed pooling policy and quality premiums to promote the quality provision of members (Deng and Hendrikse, 2013), and attract high-quality farmers (Hendrikse, 2011). There is evidence showing that the cooperatives delivering high quality products are characterized by paying quality premiums to members (Balbach, 1998).

However, there is also considerable evidence showing that the informal aspects of cooperative organizations such as social norms and processes among members are no less important than the formal institutional settings of cooperatives for the provision of product quality. It is shown that social mechanisms have been effective in influencing the product quality by eliminating the free-riding problem (e.g. Chloupkova, Svendsen and Svendsen, 2003). In addition, cooperatives nowadays are also able to achieve higher product quality than IOFs under similar quality incentive structures. Cechin et al. (2012) point out that some important differences regarding relationship characteristics between the farmers and processors could account for the higher quality performance of Brazilian broiler cooperatives. Ruben and Heras

(2012) also find that the productive and economic performance of Ethiopian coffee cooperatives is enhanced by intra-community bonding social capital. It is therefore desirable to include the role of social capital in the study of the provision of product quality by cooperatives.

Previous research on cooperative's social capital has referred to the different facets of internal social capital, including ideology, culture, value, trust, identity, norms, and etc. (e.g. Valentinov, 2004; Feng, Nilsson, Ollila and Karantininis, 2011; Nilsson, Svendsen and Svendsen, 2012). These facets can be clustered into three dimensions: structural, cognitive, and relational (Nahapiet and Ghoshal, 1998). In this paper, our analysis of social capital in cooperatives will focus on the function of its relational dimension in mitigating free-riding problem in the organization. As such, the concept of social capital in this paper is conceptualized as in Putnam (1993): the ability of a group of agents linked by horizontal social relations to discipline individual behavior. Moreover, prior studies on cooperatives' income rights structure generally do not consider the interplay between economic incentives and social capital. This paper fills the gap by presenting a model regarding the interaction between cooperative's social capital and economic incentives and its influence on product quality.

Our results show that when the level of social capital is high, the social motivation in the cooperative can guarantee a high product quality under an income rights structure with a low quality incentive intensity, and complete pooling is only efficient where the social capital level is very high; as social capital declines, the social motivation alone is incapable of supporting the cooperative's quality performance, and the income rights structure must be changed by replacing the weak quality incentive structure with strong economic incentives. Additionally, the value of social capital in a cooperative is highlighted by comparing the cooperative with an IOF in terms of their product quality and payoff. Social capital makes the cooperative uniquely efficient when the farmers are risk averse and the product quality is uncertain. We show that when the social capital level in the cooperative is higher than a threshold, which is decreasing in members' subjective risk toward production uncertainty, the product quality of the cooperative will be higher than that of the IOF.

The paper proceeds as follows. In Section 2 we specify the game between the processor and farmers. Section 3 determines the equilibrium. Section 4 compares the product quality and payoff of processors in different governance structures. The last section presents conclusions and suggestions for future research.

2. Model

This section presents a non-cooperative game regarding product quality. The decision making parties, the choices, the payoffs, the information structure and the sequence of the decisions will be specified.

There are two parties: a group of n upstream farmers and a downstream processor. The farmers are identical and produce a raw commodity that needs to be processed before reaching the functioning market. Each farmer produces one unit and supplies it to the processor. Each farmer decides individually regarding the quality of their produce. The product quality decision of farmer i is q_i, where $i = 1,2, \dots, n$, and the cost associated with the quality provision is

$$C(q_i) = \frac{1}{2} c q_i^2.$$

The quality provision cost coefficient c is identical for all farmers and is treated as a constant. Without loss of generality, the production costs of the raw produce are sunk and will not enter into the analysis (Saitone and Sexton, 2009). We assume that one unit of the raw produce will be processed into one unit of the final product.

We model the transactions between the processor and the farmers in a principal-agent framework (Holmström, 1979). The processor acts as a risk-neutral principal, and the farmers are risk-averse agents who are rewarded by the outcome of their efforts invested in the product quality. The efforts per se are not observable, but the quality of the delivered raw produce from the farmers to the processor is observable and verifiable. The processor offers the farmers a linear contract

$$P = \alpha + \beta q.$$

P is the unit price of the raw produce that the processor will pay for. α (≥ 0) is the base (guarantee) price and β (≥ 0) is the quality premium. An important function of the linear contract between the principal and agent is to balance the costs of risk bearing against the incentive gains (Holmström, 1979). This form of contract is commonly used in agribusiness, whether the processor is an IOF or a cooperative (Gow et al., 2000; Levy and Vukina, 2002; Dubois and Vukina, 2004; USDA, 2004; Cechin et al, 2012). The farmers are risk-averse, and their von Neumann-Morgenstern utility function of an uncertain payoff π_i ($i = 1,2, \dots, n$) is

$$U_i = -\exp(-r\pi_i).$$

Parameter r , which is assumed to be identical for all farmers, is the farmers' coefficient of absolute risk aversion, i.e., the higher r is, the more risk averse the farmers are. The payoff uncertainty results from the risks in agribusiness. Agricultural production and marketing are subject to different types of risks, including biological risk, price risk and institutional risk (Bogetoft and Olesen 2004). We focus on the risk of quality uncertainty in agricultural production. The realized product quality after harvest is $q_i + \epsilon_i$, where ϵ_i is a normally distributed random noise term, with mean zero and variance ρ_i^2, representing the uncertainty in the production. We assume that the uncertainty regarding product quality is identical for all farmers, i.e., $\epsilon_i = \epsilon$, $\rho_i^2 = \rho^2$. The variance ρ^2 represents the objective risk of production.

The processor further processes the raw produce supplied by the famers and sells the final products in the market, which is assumed to be competitive. The market differentiates product quality and the processor receives a unit price P_m from the market based on the average product quality Q (Pennerstorfer and Weiss, 2012)

$$P_m = P_0 Q; \quad Q = \frac{1}{n}\sum_{i}^{n}(q_i + \epsilon).$$

$P_0 (> 0)$ measures the market's marginal preference for quality and can be understood as the aggregated "taste parameter" of the market (Mussa and Rosen, 1978). We refer to the difference in the quality as in the realm of vertical product differentiation (Mérel et al., 2009). The quality of the raw produce determines the quality of the final product, and the processing itself cannot change the product quality. The processor's aggregate product quality Q is thus the average quality of the raw produce of all farmers.

We compare two governance structures: a marketing cooperative and an investor owned firm (IOF). The difference between these governance structures is threefold. First, the cooperative,

which is collectively owned by a society of farmers, is assumed to possess a certain amount of social capital within the organization. By contrast, the social capital, either between the farmers and the IOF processor or among the farmers, is assumed to be low and ignorable as compared with that in the cooperative. In other words, the farmers delivering raw produce to the IOF are unsocialized and the relationship between the farmers and the IOF is seen as solely seller-buyer like. Second, the cooperative may apply a pooling policy in its income rights structure while the IOF pays each farmer an individualized price for the supply of the raw produce. Third, a cooperative is characterized by the zero-profit feature, i.e. revenues of the processor are returned to members. By contrast, the IOF maximizes the processor's profit. In the following, the farmers' certainty equivalent payoff will be determined for each governance structure.

Cooperative

Pooling is a general practice used by traditional cooperatives (LeVay, 1983; Staatz, 1987). It has a beneficial insurance function for risk-adverse farmers. The cooperative can decide on a pooling policy by choosing the pooling ratio σ, where $0 \leq \sigma \leq 1$ (Saitone and Sexton, 2009). σ denotes the portion of each member's produce that is assigned to a common pool. It determines the pooled payment received by a farmer and is contingent on the pooled quality Q_c. $1-\sigma$ denotes the portion of produce that determines a member-specific payment based on q_i. When $\sigma = 1$, the cooperative applies the complete pooling policy, whereas when $\sigma = 0$, the cooperative applies no pooling policy. Partial pooling is characterized by $0 < \sigma < 1$. The cooperative processor retains no profit and maximizes the joint economic certainty equivalent payoff of the processor and members by choosing the base price α_c, quality premium β_c, and the pooling ratio σ. A cooperative member therefore receives

$$P_c = \alpha_c + \beta_c[\sigma Q_c + (1-\sigma)(q_i + \epsilon)].$$

$$Q_c = \frac{1}{n}\sum_{i}^{n}(q_i + \epsilon).$$

We suppose that social capital generates a social mechanism making a cooperative member internalize the ethical standard in the organization and will lose utility if his action deviates from this standard (Casadesus-Masanell, 2004). Although this is indeed an extreme simplification of the concept and functionality of social capital, we show that the model is suitable for highlighting the basic function of social capital in terms of affecting members' behavior. In our model, the cooperative's ethical standard is set as a product quality standard Q_s, which is the product quality desired by the cooperative. The cooperative's social capital level, denoted as $\Delta\ (\geq 0)$, measures the pressure felt by the members to abide by the quality standard. Intuitively, social capital in the cooperative results in intrinsic motivation because the further away the product quality is from the standard, the larger the social loss the member will suffer. This loss in members' utility can be guilt or the loss of reputation from other members, as a kind of social penalty

$$U_{Loss} = -\frac{1}{2}\Delta(q_i - Q_s)^2.$$

A member's overall payoff therefore consists of not only an economic but also a social part

$$\pi_i(q_i) = \alpha_c + \beta_c[\sigma Q_c + (1-\sigma)(q_i + \epsilon)] - \frac{1}{2}cq_i^2 - \frac{1}{2}\Delta(q_i - Q_s)^2.$$

The member's certainty equivalent payoff is

$$CE_i = \alpha_c + \beta_c \left[\frac{\sigma}{n}\sum_i^n q_i + (1-\sigma)q_i\right] - \frac{1}{2}cq_i^2 - \frac{1}{2}k\beta_c^2\left(\frac{\sigma^2}{n} + (1-\sigma)^2\right) - \frac{1}{2}\Delta(q_i - Q_s)^2.$$

$k \equiv r\rho^2$ denotes the member's subjective risk toward the product quality uncertainty. The subjective risk is the corresponding objective risk scaled by the farmer's degree of risk aversion (see Bolton and Dewatripont, 2005, Chap. 4). The term $\frac{1}{2}k\beta_c^2\left(\frac{\sigma^2}{n} + (1-\sigma)^2\right)$ is the risk premium, which is the disutility of risk.

IOF

When the processor is an IOF, it pays for individual product quality of each farmer. The IOF will maximize its total profit subject to the farmers' participation constraint by deciding on the linear contract

$$P_f = \alpha_f + \beta_f q_i.$$

It is assumed that social capital plays no role in the transactions between the farmers and the IOF, i.e. the social (dis)utility does not enter into the farmers' certainty equivalent payoff. The payoff of a farmer i is

$$\pi_i = \alpha_f + \beta_f(q_i + \epsilon) - \frac{1}{2}cq_i^2.$$

Both the quality premium and risk premium in farmer i's certainty equivalent payoff are individualized. The certainty equivalent payoff of a farmer trading with the IOF processor is therefore

$$CE_i = \alpha_f + \beta_f q_i - \frac{1}{2}cq_i^2 - \frac{1}{2}k\beta_f^2.$$

We assume that the members' coefficient of absolute risk aversion, quality provision cost coefficient, quality uncertainty in production, and the market's preference for quality are common knowledge. The product quality can be perfectly measured. The cooperative's social capital level is also known and treated as exogenous. The game consists of three stages. The efficient governance structure (cooperative or IOF) is determined in the first stage. The linear contract (and pooling ratio of the cooperative) is decided by the processor in the second stage. In the third stage, the farmers decide their product quality. The game will be solved by backward deduction.

3. Equilibrium Quality Incentive

In this section, we present the equilibrium linear contract (and the equilibrium pooling ratio of the cooperative) in the two governance structures[1].

Cooperative

The average product quality of the cooperative is

[1] Due to the limitation of space, the detailed derivation is omitted but is available with the authors.

$$Q_c^* = \frac{\beta_c\left(\frac{\sigma}{n} + 1 - \sigma\right) + \Delta Q_s}{c + \Delta} + \frac{1}{n}\sum_i^n \epsilon.$$

The cooperative's product quality standard is assumed to be the product quality that generates the first-best cooperative economic payoff, i.e. $Q_s = \frac{P_0}{c}$.

The cooperative maximizes the joint certainty equivalent payoff of the processor and members by choosing σ $(0 \le \sigma \le 1)$ and β_c $(0 \le \beta_c \le P_0)$[2]

$$0 \le \sigma^* \le \frac{ck\left(1 + \frac{\Delta}{c}\right)^2}{1 + ck\left(1 + \frac{\Delta}{c}\right)^2} \text{ and } \frac{1}{1 + ck(1 + \frac{\Delta}{c})^2} \le \frac{\beta_c^*}{P_0} \le 1.$$

Combining the solution of σ^* and β_c^*, we denote the optimal income rights structure of the cooperative as

$$S^* \equiv \frac{\beta_c^*}{P_0}(1 - \sigma^*) = \frac{1}{1 + ck(1 + \frac{\Delta}{c})^2}.$$

Because the cooperative operates with a zero-profit constraint, the base price can be obtained by

$$\alpha_c^* = q_i^*(P_0 - \beta_c^*).$$

The relationship between S^* and Δ is stated in Proposition 1 and depicted in Figure 1.

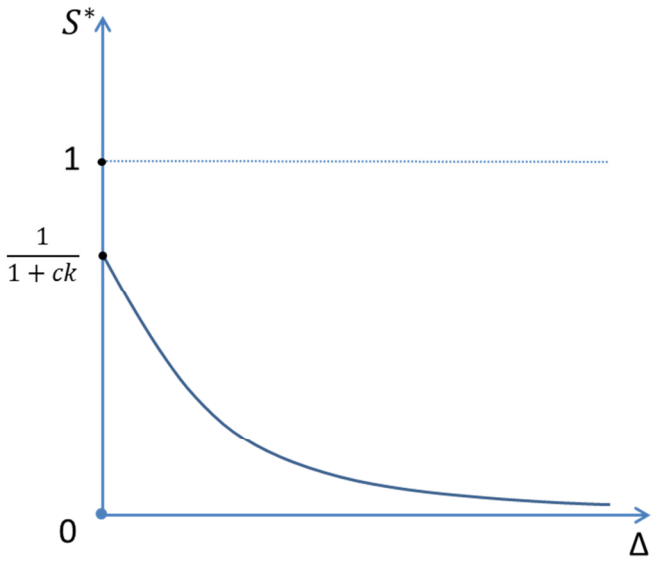

Figure 1: The relationship between social capital and the quality incentive intensity

[2] The quality premium will be not larger than the market's marginal preference for quality because the cooperative has a zero-profit feature.

Proposition 1: When the cooperative's social capital level declines, the quality incentive by the cooperative will be stronger.

Proposition 2 formulates the comparative statics result regarding the members' subjective risk toward quality uncertainty. Given any level of social capital, a higher level of subjective risk k requires the cooperative to adopt the income rights structures with lower quality incentive intensity. This is so because a strong quality incentive results in substantial risk bearing of the members and generates large disutility. The cooperative thus should choose a high pooling ratio, which shares more risks among members, or a large base payment, which makes the processor bear more risk. This is in line with the results of the classic principal-agent framework (Holmström, 1979).

Proposition 2: When members' subjective risk toward quality uncertainty increases, the cooperative chooses a lower quality incentive intensity, given the level of social capital.

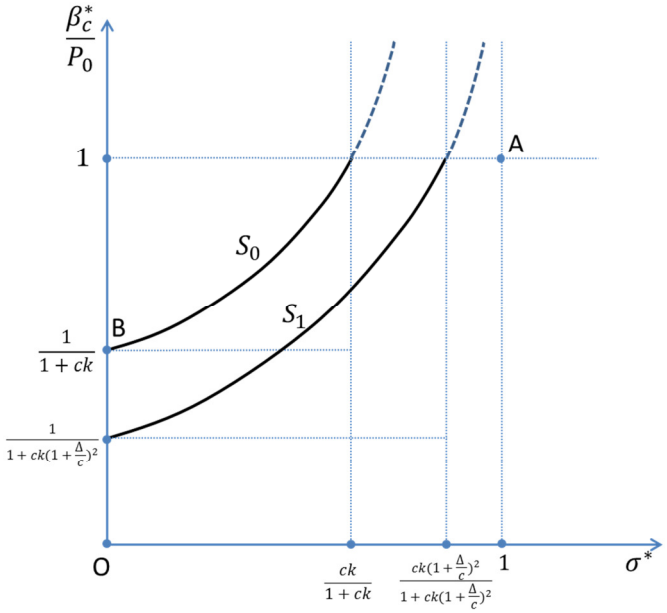

Figure 2: Tradeoff between pooling ratio and quality premium in the quality incentive intensity

The choice of β_c^* and σ^* in S^* is pairwise because the cooperative is faced with a tradeoff between providing a quality premium and sharing production risk. Figure 2 illustrates the values of β_c^* and σ^* in the optimal income rights structure of the cooperative. S_0 represents the value β_c^* and σ^* when there is no social capital in the cooperative, while S_1 represents the case when the level of social capital Δ is positive. S_0 serves as a benchmark in highlighting the effect of social capital. In both cases, we assume that the members' subjective risk is equal to k.

Proposition 3: The frontier of efficient income rights structure expands when the level of social capital increases, i.e. $\sigma^* \in \left[0, \frac{ck(1+\frac{\Delta}{c})^2}{1+ck(1+\frac{\Delta}{c})^2}\right]$ *and* $\frac{\beta_c^*}{P_0} \in \left[\frac{1}{1+ck(1+\frac{\Delta}{c})^2}, 1\right]$.

When the social capital level is very high, i.e. $\Delta \to \infty$, curve S^*will further expand and its end points will approach Point A and Point O in Figure 2. On Point A, the income rights structure consists of $\alpha_c = 0, \beta_c = P_0, \sigma = 1$. It entails that the cooperative is able to adopt the equitable principle of complete pooling when a very high level of social capital exists in the organization. Complete pooling distributes the net revenue to members completely based on

delivered volume, regardless the quality of the product. The members share the revenue equally and there is no need to pay a base payment. Or, the cooperative can simply adopt another type of equitable principle by paying each member a fixed price for their deliveries and the pooling is not necessary, i.e. $\alpha_c = P_0 Q_s, \beta_c = 0, \sigma = 0$ (Point O). In both situations, the high level of social capital in the cooperative prevents the members from free-riding. Their decisions of product quality will be consistent or very close to the quality standard Q_s set by the cooperative.

Corollary: A necessary condition for cooperative equitable principles of complete pooling is that there exists a very high level of social capital in the cooperative.

IOF

Given the linear contract offered by the IOF processor, farmer i makes the decision of product quality by maximizing his certainty equivalent payoff

$$q_i^* = \frac{\beta_f}{c}.$$

Subject to the farmers' participation constraint, the IOF maximizes its profit by choosing β_f $(0 \leq \beta_f \leq b)$

$$S^* = \frac{\beta_f^*}{P_0} = \frac{1}{1+ck}.$$

The optimal linear contract the IOF shall offer can be represented by Point B in Figure 2.

4. Governance Structure Choice

We now compare the cooperative with the IOF in terms of the equilibrium product quality and certainty equivalent payoff. We choose the efficient governance structure that maximizes the joint certainty equivalent payoff of the processor and farmers. Table 1 summarizes the product quality, the farmer's certainty equivalent payoff, the processor's payoff and the joint payoff per unit of product in each governance structure.

Table 1: Product quality and certainty equivalent (CE) payoff per unit of product

Processor	Cooperative	IOF
Product Quality	$Q_s\left[1-\frac{ck(1+\frac{\Delta}{c})}{1+ck(1+\frac{\Delta}{c})^2}\right]$	$Q_s\left[1-\frac{ck}{1+ck}\right]$
Farmers' CE Payoff	$\frac{P_0^2}{2c}\left[1-\frac{ck}{1+ck(1+\frac{\Delta}{c})^2}\right]$	R
Processor's Payoff	0	$\frac{P_0^2}{2c}\left[1-\frac{ck}{1+ck}\right]-R$
Joint Payoff	$\frac{P_0^2}{2c}\left[1-\frac{ck}{1+ck(1+\frac{\Delta}{c})^2}\right]$	$\frac{P_0^2}{2c}\left[1-\frac{ck}{1+ck}\right]$

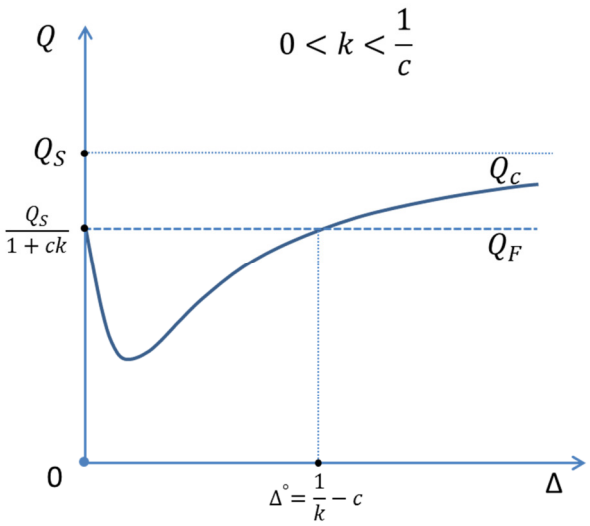

Figure 3a: Quality comparison when $0 < k < \frac{1}{c}$

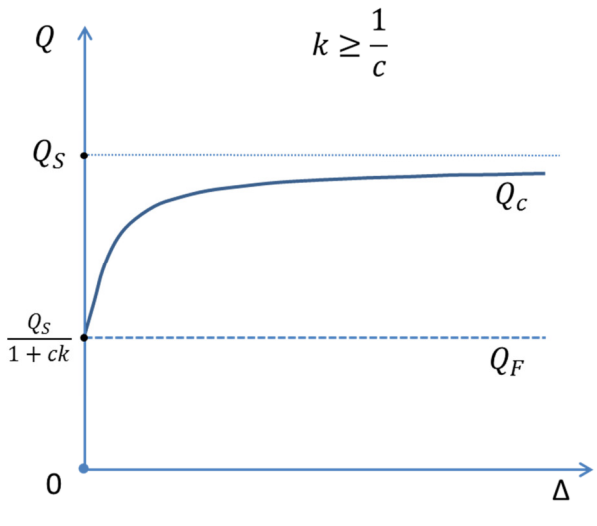

Figure 3b: Quality comparison when $k \geq \frac{1}{c}$

Proposition 4: The cooperative and IOF will have the same product quality when $\Delta = 0$ *or* $\Delta = \frac{1}{k} - c$. *The cooperative will supply lower quality than the IOF if and only if* $\Delta \in \left(0, \frac{1}{k} - c\right)$.

The comparison of product quality yields the following insights. First, the cooperative maximizes the members' certainty equivalent payoff by reaching an optimal tradeoff between incentivizing the product quality and reducing the disutility of risk. Second, when $\Delta > 0$, the cooperative is able to choose weaker quality incentives than the IOF does because the social capital in the cooperative serves as a social motivation substituting the economic incentive for the members' quality provision. Third, the threshold social capital level $\Delta^\circ = \frac{1}{k} - c$ is determined by the members' subjective risk toward quality uncertainty. In essence, it reflects the relative effectiveness of economic incentive and social motivation in different contexts. The solid curve in Figure 4 provides a graphical illustration of Δ°. The area above curve Δ° and the horizontal axis represents the range of social capital, with which the cooperative will have higher product quality. The area surrounded by curve Δ°, the horizontal and the vertical axis represents the situations where the IOF will have higher product quality. This result is formulated in Proposition 5:

Proposition 5: In the agribusiness with high (low) quality uncertainty in production, high-quality products are mainly produced by cooperatives (IOFs).

Straightforward comparison of the joint certainty equivalent payoff shows that when an optimal income rights structure is chosen by the cooperative, the joint certainty equivalent payoff of the cooperative will always be higher than that of the IOF if the cooperative's social capital level is higher than zero. The existence of social capital in the cooperative replaces economic incentives and helps reduce disutility from the risk of production uncertainty when the farmers are risk averse. Therefore, with social capital, the cooperative is always more efficient than the IOF. Proposition 6 states the result:

Proposition 6: The cooperative is uniquely efficient when $\Delta > 0$.

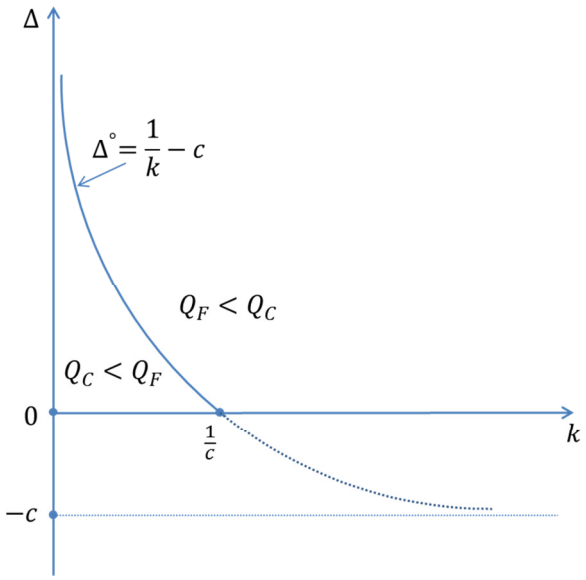

Figure 4: Product quality, social capital and subjective risk

5. Conclusion and Further Research

A model is formulated to study the value of social capital in cooperatives and the importance of the balance between social capital and the income rights structure for cooperatives. It highlights the value of social capital in the provision of product quality by cooperatives. Social capital in the cooperative generates the social motivation for the members to abide by the product quality standard. With social capital, the cooperative is able to adopt less intensive economic quality incentives, which expose the members to less quality uncertainty. The existence of a very high level of social capital supports the equitable principle of complete pooling in traditional cooperatives. With social capital, cooperatives can generate a larger joint certainty equivalent payoff and thus are more efficient than IOFs. However, social capital will change with the development of cooperatives. The increasing prevalence of a market-oriented perspective has led marketing cooperatives to assign increasing importance to the techno-structure (executives) over the socio-structures (Bataillie-Chedotel and Huntzinger, 2004). Cooperatives tend to lose social capital when they expand horizontally and vertically. We argue that when social capital in cooperatives is incapable of supporting the product quality by providing social motivation, the change of cooperatives' income rights structure becomes necessary. When the cooperative's social capital level declines, stronger quality incentive will be introduced by the cooperative.

Social capital provides social motivation for cooperative members in the quality provision, however, it will not always lead cooperatives to have higher product quality than IOFs. Whether cooperatives have higher product quality depends on the social capital level and the subjective risk aversion level of farmers. When farmers have a high subjective risk toward quality uncertainty, the economic quality incentive becomes less effective in eliciting their quality efforts. The social motivation geared by the social capital becomes more advantageous. As an IOF is less able to elicit high quality supply from the farmers, a low level of social capital in the cooperative is already sufficient, by the mechanism of social motivation, to make the cooperative supply a higher product quality than the IOF. To the contrary, when the farmers have a low subjective risk toward quality uncertainty, the economic quality incentive becomes more effective, and a high level of social capital will be needed to supplement the weaker economic incentive in the cooperative. Therefore, social capital will make

cooperatives more competitive in the agribusinesses with high quality uncertainty in production.

There are various possibilities for further research. First, the members' social motivation to act according to the cooperative's standard is treated as exogenous and is decided by the social capital level of the cooperative in the model. There is the possibility that pooling policies may influence the social capital as well, i.e. the two-way interaction between the economic and social incentive. Partial pooling represents a higher intensity of individualized quality incentive for members than complete pooling. It may positively or negatively affect the members' social preference of contributing to the well-being of the cooperative. In other words, the decrease of the pooling ratio can have the "crowding-in" or "crowding-out" effect on the cooperative's social capital which provides intrinsic motivation for members to perform (Bowles and Polania-Reyes, 2012). The next step is therefore to model the interaction between the cooperative income rights structure and social capital as an endogenous attribute of the cooperative. Second, the members' cost parameter of product quality and their risk aversion level are assumed to be identical. We do not investigate the adverse selection problem caused by the decreasing social capital in this paper. Further modeling is called for to address heterogeneous members' decisions. Third, a longitudinal study of the evolution of social capital in a single large cooperative along its lifecycle is lacking. Such studies are helpful to provide cooperative practitioners and researchers with a better understanding of the balance of the cooperative social and economic attributes.

Reference:

Balbach, J.K., (1998), "The Effect of Ownership on Contract Structure, Costs, and Quality: The Case of the U.S. Beet Sugar Industry", in Royer, J.S. and R.T. Rogers, the Industrialization of Agriculture: Vertical Coordination in the U.S. Food System, Ashgate Publishing Ltd., Aldershot (United Kingdom), 1998, pp. 155-184.

Bataille-Chedotel, F. and Huntzinge, F. (2004). Faces of Governance of Production Cooperatives: An Exploratory Study of Ten French Cooperatives. Annals of Public and Cooperative Economics 75:1, pp. 89–111.

Bogetoft, P., and Olesen, H.B. (2004), "Design of Production Contract: Lessons from Theory and Agriculture", Copenhagen Business School Press, Copenhagen, Demark.

Bolton, P., and Dewatripont, M. (2005), "Contract Theory", MIT Press, Cambridge, MA.

Bowles, S. and Polanía-Reyes, S. (2012). Economic Incentives and Social Preferences: Substitutes or Complements? Journal of Economic Literature 2012, 50:2, 368–425.

Casadesus-Masanell, R. (2004). Trust in Agency. Journal of Economics & Management Strategy. Volume 13, Number 3, 375–404.

Cechin, A., Bijman, J., Pascucci, S., Zylbersztajn D., Omta, O. (2012). Quality in cooperatives versus investor owned firms: evidence from broiler production in Paraná, Brazil. Manage Decis Econ: Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/mde.2586.

Chloupkova, J., Svendsen, G.L.H, and Svendsen, G.T. (2003). Building and Destroying Social Capital: The Case of Cooperative Movements in Denmark and Poland. Agriculture and Human Values 20: 241–252.

Deng, W., and Hendrikse, G.W.J. (2013). Uncertainties and Governance Structure in Incentives Provision for Product Quality. In T. Ehrmann, J. Windsperger, G. Cliquet & G.W.J. Hendrikse (Eds.), Network Governance: Alliances, Cooperatives, and Franchise Chains (pp. 179-203). Heidelberg: Physica-Verlag.

Dubois, P. and Vukina, T. (2009). Optimal incentives under moral hazard and heterogeneous agents: Evidence from production contracts data. International Journal of Industrial Organization 27, 489–500.

Feng, L., Nilsson, J., Ollila, P., and Karantininis, K. (2011). The Human Values behind Farmers' Loyalty to Their Cooperatives. Paper presented at the 5th international conference on Economics and Management of Networks, December 1 – 3, 2011, in Limassol, Cyprus.

Frick, B. (2004). Does ownership matter? Empirical evidence from the German wine industry. Kyklos. 57, 357-386.

Fulton, M. and Sanderson, K. (2002). Cooperatives and Farmers in the New Agriculture. Rep. Co-op. Secr. Agric. Agri-Food, Canada.

Gow, H.R., Streeter, D.H. and Swinnen, J.F.M. (2000). How private contract enforcement mechanisms can succeed where public institutions fail: the case of Juhocukor a.s. Agric Econ 23: 253 -265.

Hendrikse, G.W.J. (2011). Pooling, Access, and Countervailing Power in Channel Governance. Management Science, 57(9), pp. 1692-1702.

Holmström, B. (1979), "Moral Hazard and Observability", The Bell Journal of Economics, 10(1).

LeVay, C. (1983). Agricultural cooperative theory: A review. Journal of Agricultural Economics, 34:1-44.

Levy, A. and Vukina, T. (2002). Optimal Linear Contracts with Heterogeneous Agents. European Review of Agricultural Economics, Vol 29(2), pp. 204-217.

Liang, Q. (2013). Governance, CEO Identity, and Quality Provision of Farmer Cooperatives. ERIM PhD Series in Erasmus University Rotterdam, EPS-2013-281-ORG, ISBN 978-90-5892-325-7.

Mérel, P.R., Saitone, T.L. and Sexton, R.J., (2009), "Cooperatives And Quality-Differentiated Markets: Strengths, Weaknesses And Modelling Approaches", Journal of Rural Cooperation, 37(2): pp. 201-224.

Mussa, M. and S. Rosen, (1978), "Monopoly and Product Quality", Journal of Economic Theory, 18: pp. 301-317.

Nahapiet, J. and Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. The Academy of Management Review, Vol. 23, No. 2, pp. 242-266.

Nilsson, J., Svendsen, G.L.H., and Svendsen, G.T. (2012). Are Large and Complex Agricultural Cooperatives Losing Their Social Capital? Agribusiness, Vol. 28 (2) 187–204.

Pennerstorfer, D., Weiss. C.R. (2012). Product quality in the agri-food chain: Do cooperatives offer high-quality wine?. European Review of Agricultural Economics 1: 1-20.

Putnam, R.D. (1993). Making Democracy Work: Civic Traditions in Modern Italy, Princeton University Press, Princeton

Ruben, R. and Heras, J. (2012). Social Capital, Governance and Performance of Ethiopian Coffee Cooperatives. Annals Of Public And Cooperative Economics 83:4.

Saitone, T.L. and Sexton, R.J. (2009). Optimal Cooperative Pooling in a Quality-Differentiated Market. American Journal of Agricultural Economics, 91(5), pp. 1224-1232.

Staatz, J.M. (1987), "The Structural Characteristics of Farmer Cooperatives and Their Behavioral Consequences", ACS Service Report No. 18. U. S. Department of Agriculture.

Theodorakopoulou, I. and liopoulos. C. (2012). Support for farmers' cooperatives: Sector report wine. Wageningen: Wageningen UR.

USDA (2004). Contracts, Markets, and Prices: Organizing the Production and Use of Agricultural Commodities. Agricultural Economic Report Number 837.

Valentinov, V. (2004): Toward A Social Capital Theory of Cooperative Organisation, Journal of Cooperative Studies, Vol. 37 (3), pp. 5-20.

Williamson, O. (1985). The Economic Institutions of Capitalism. Free Press, New York.