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Farmers' perceived transaction costs in relation to slaughterhouses
-The case of the Swedish slaughter business

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Bönders upplevda transaktionskostnad i relation till slakterier
- En studie av den svenska slaktinindustrin

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Acknowledgements

Abstract

What are the key factors driving farmers' choices of whom to sell to? This study searches for an answer. Transaction costs are hypothesized as the determinant of pig producing farmers' choice of trading partner in this study. The farmers have a choice between two types of slaughterhouse. One of these is Scan, which used to be a farmer co-operative, but is now a so-called FCB (Farmer Controlled Business). This implies that it is fully owned by the farmers who supply their animals to the slaughterhouse. The other type of firm is IOFs (Investor-Owned Firms), which are profit maximising firms. There are many IOF slaughterhouses in the Swedish pig slaugher industry, such as Ugglarps, KLD, Dahlsjöfors, and Skövde.

As it is impossible to measure transaction costs objectively focus is directed towards the farmers' perceived transaction costs. Various socio-psychological concepts are used to interpret farmers' perception on their transaction costs. The combination of transaction cost theory and socio-psychological theory generates a number of economic and social variables which may determine farmers' perceived transaction cost. These variables are suggested in a series of the dependent or independent hypotheses. The hypotheses are tested by an empirical investigation which is based on a large number of quantitative data from the farmers. The data is processed by some particular statistical methods, such as chi-square test and t test.

According to the results of the statistical analysis, this study supports the initial assumption that transaction costs are essential to farmers' choices of trading partner. The socio-psychological attibutes such as attitudes are expressions of the farmers' perceived transaction costs. Other factors, like ownership structure, pricing strategies, and loyaly affect the farmers' choice of trading partners as well.

The findings of this study indicate that farmers' perceptions of their transaction costs are various. Farmers delivering to Scan perceive higher transaction costs than the farmers who are suppliers to the investor-owned slaughterhouses. Based on the findings, it concludes that Scan would have to perform more efficient to reduce farmers' perceived transaction costs.

Key terms: Sweden, slaughterhouse, pig farmer, transaction costs, socio-phychology.

Sammanfattning

Vad avgör när lantbrukare bestämmer vilka uppköpare de ska leverera till? I denna studie anses transaktionskostnadsteorin bestämma lantbrukarnas val av handelspartner. För att empiriskt undersöka detta används transaktionskostnadsteorin såsom bas för en empirisk undersökning av de transaktioner, som sker mellan svenska grisproducenter och två typer av slakterier. Dessa är Scan AB (som är bondestyrt genom genom den finska föreningen LSO samt Swedish Meats) samt övriga slakterier, vilka alla drivs utifrån en vinstmaximeringsmålsättning.

Olika socio-psykologiska begrepp används för att tolka lantbrukarnas uppfattning om sina transaktionskostnader. Genom att socio-psykologi kombineras med transaktionskostnadsteorin framkommer en rad variabler, som kan uppfattas mäta lantbrukarnas upplevda transaktionskostnader. Dessa variabler ingår i en rad hypoteser rörande lantbrukarnas val av slakterier.

För att testa dessa hypoteser genomförs en empirisk studie i form av en enkät bland samtliga grisproducenter i Skåne. Data insamlas således genom ett frågeformulär, vars frågor är kopplade till lantbrukarnas attityder till deras handelspartner. De insamlade data blir föremål för stattiska analyser såsom chi-square test och t'test. Statistikprogrammet SPSS användes för analyserna av data.

Resultaten av studien bekräftar att grisproducenternas val av slakteri kan förklaras med hjälp av transaktionskostnadsteorin. De socio-psychologiska variablerna (attityder mm) är uttryck för lantbrukarnas upplevda transaktionskostnader i relation till de två typerna av slakteriföretag. Ytterligare faktorer, såsom ägandeförhållanden, prisstrategier och lojalitet, påverkar lantbrukarnas val av handelspartner.

De lantbrukare, som levererar till Scan, upplever sig ha högre transaktionskostnader än de, som levererar till de övriga slakterierna. Resultaten tyder på att Scan skulle behöva vara mera effektivt för att lantbrukarna skulle uppleva sig ha lägre transaktionskostnader, när de leverar till Scan.

Nyckeltermer: slakterier, grisproducenter, transaktionskostnader, socio-psykologi

Abbreviatons

CEO –Chief Executive Officer

EC – European Community

EU – European Union

FCB – Farmer Controlled Business

IOF – Investor Owned Firms

TCE – Transaction Cost Economics

Table of Contents

Introduction

Recent changes related to the food production in Sweden have renewed the interest and the focus on the meat sector. Special attention has been paid to the development of Swedish slaughter industry since the Sweden's slaughtering giant – Scan was sold to a Finnish meat producer. This takeover indicates that Scan is no longer a traditional farmer cooperative any more, and hence it is interesting to know is there any changes about the farmers' attitude towards today's Scan after the takeover.

1.1 Problem background

There are two types of slaughterhouses in Swedish slaughter industry. One is represented by the largest slaughterhouse – Scan AB, which used to be a traditional farmer cooperative. Scan AB has three categories of owners. The largest owner is the Finnish farmer cooperative LSO Foods, who has also the majority of the seats in the board; the Swedish cooperative Swedish Meats owns a smaller part of the stock and finally, a large share of the stock is owned by a variety of owners, trading the stock at the Helsinki Stock Exchange. The latter shares have virtually no influence as these shares have very little voting power. The system of different classes of stock is quite common in some countries, among them Finland and Sweden. This unique ownership form reflects that Scan AB is partly controlled by the farmers (Scan's suppliers or the members of Swedish Meats). Based on this account, Scan AB should not be called a traditional cooperative but a farmer controlled business (FCB), which is "a commercial and legally registered business in which farmers or farmers' organizations hold a controlling stake (Internet, EFFP 1, 2007).

The other type of slaughterhouses is investor owned firms (IOFs). Two of them (KLS Foods and Ugglarps) are owned by the Danish farmer cooperative Danish Crown, but Danish Crown runs these two firms as if they are investor-owned firms. The Swedish suppliers to the two slaughterhouses owned by Danish Crown are not members of the Danish cooperative but solely suppliers. The other IOF slaughterhouses are fairly small and most often family-owned.

There is intense competition between these two types of slaughterhouse in Sweden, both concerning sales to retailers and other processing firms and their purchases of animals to be slaughtered. This study concerns only the latter market, i.e. how the slaughterhouses compete to attract farmers who are willing to sell their animals. It may be assumed that the farmers behave differently in relation to the slaughterhouses depending on ownership structure of the organizations. It seems reasonable to believe that the farmers who have some ownership (even though limited) in Scan AB should be more loyal to that firm, have more positive opinions and attitudes, etc.

1.2 Problem analysis

A study about farmers' choices of slaughterhouse could be based on different types of theories. One type is the neo-institutional theory, and here transaction cost theory seems to be a well-suited analytical tool. Transaction cost theory focuses on the transactions between business actors. The costs occurred in making economic exchanges are viewed as transaction costs (excluding administrative costs), which may affect individual producers' choice of a

trading partner from the various kinds of downstream processors. Swedish pig farmers are facing a similar problem as the rest of the agriculture producers, which is the choices of buyers between FCB and IOF

Another type of theory that can be used in order to explain the farmers' slaughterhouse decisions is socio-psychological theory. A large number of studies have been conducted with the aim of exploring different psychological determinants in relation to farmers' decisions. These concepts are attitudes, loyalty, involvement, knowledge and trust, etc.

To which extent farmers prefer an IOF or a FCB slaughterhouse is, however, depending on the market characteristics, notably the degree of competition that the farmers experience. If a large number of buyers are fighting each others in order to get supplies from the farmers, there is no market failure. Then it might be less attractive to deliver to a FCB. Hence, a FCB may not necessarily be considered to be the best partner.

A conclusion drawn from the discussion above is that two types of theories are suitable for this study. Transaction cost theory is used, to some extent, to prove that this theory offers a way whereby the behavior of the different categories of farmers (the Scan suppliers, and the IOF suppliers) can be estimated in a comparable way. The transaction cost theory is, however, based on a number of behavioral assumptions, which may be debatable, like the assumption that the actors are utility maximizing and they may act opportunistically. For this sake, it is advisable to include behavioral theory in the form of socio-psychology. The composition of the individually perceived transaction costs may be elucidated with the help of socio-psychological theory. In case the farmers have bad attitudes toward a slaughterhouse, they consider themselves to have high transaction costs in relation to that firm, for example.

1.3 Aim

Hence the aim of this study can be stated as to explore how Swedish pig farmers consider their transaction costs when choosing a slaughterhouse to sell their animals to. The word "how" implies that different types of socio-psychological concepts may serve as explanatory variables when the transaction costs are to be assessed.

In order to accomplish this aim, an empirical study is to be conducted. The data must originate from the pig farmers themselves.

The study would be of special interest for all pig slaughterhouses in Sweden and perhaps also abroad. Especially Scan AB will use the findings as this firm is the only one that is labeled as a FCB in Sweden, and the study emphasizes a comparison between farmers selling to FCBs and to IOFs. It should, though, be recognized that the study has a value also from a theoretical perspective. It may be the first study ever made where farmers' behavior is investigated with the use of a combination of transaction cost theory and socio-psychological theory.

It should be noted that this study concerns only one single stage in the value chain for meat. How the meat is processed and sold is outside the scope of the study. The study is focused on pig farmers' behavior. No other types of animals are included. The pig farmers to be included in the study are those who produce pigs for slaughter. Other categories are excluded, i.e. those who produce piglets to be sold to other farmers.

1.4 Outline

A brief introduction about the pig slaughtering industry in Sweden is available in the following chapter. The subsequent Chapter 3 comprises an account of the two theoretical bases of the study. In the end of Chapter 3 a number of hypotheses are suggested. Chapter 4 presents the methodology of the study with both data collection and methodological issues. The findings of empirical study are valid in Chapter 5. The analyses in Chapter 6 are linked to prior studies about farmers' choice of trading partners. The follows Chapter 7 where the findings are discussed and finally some conclusions are drawn in Chapter 8.

2 The pig slaughter industry in Sweden

Sweden became a member of the EC (European Community) in 1995. Since then the Swedish pig slaughter business has experienced a long period of depression. This can be perceived from a series of dramatic changes (such as the population of pig farmers, the production volumes of pigs, the mergers and acquisitions of the slaughterhouses). It seems that these changes have speeded up the structural adjustment in Swedish pig slaughter industry, hence these should be thoroughly introduced and analyzed in this chapter.

2.1 The production and slaughtering of pigs

Since 1995 the number of holdings with fattening pigs has decreased by 76 per cent or 6,300 holdings and the breeders of piglets have decreased by 82 per cent or 5,600 holdings (Internet, SJV 1, 2008). At present, roughly 6,000 farmers are running the pig production business. Most of them have herds of less than 100 animals. Despite this small number of slaughter pigs that are raised by these producers, there is a trend towards large scale pig producers. This shift implies that large holdings with more than 500 pigs are dominating the sector of pig production in Sweden.

In June 2008, about 1.61 million pigs were raised in Sweden, including 974,000 breeding and fattening pigs and 465,000 piglets (See Appendix 1). The pig production in Sweden is geographically concentrated to the south with almost one-third of the pigs in Scania (Skåne), the most southern county (Anon., 2008).

Moreover, the reduction of pig production in Sweden can be observed by the comparisons of pig numbers in recent years (Fig. 1).
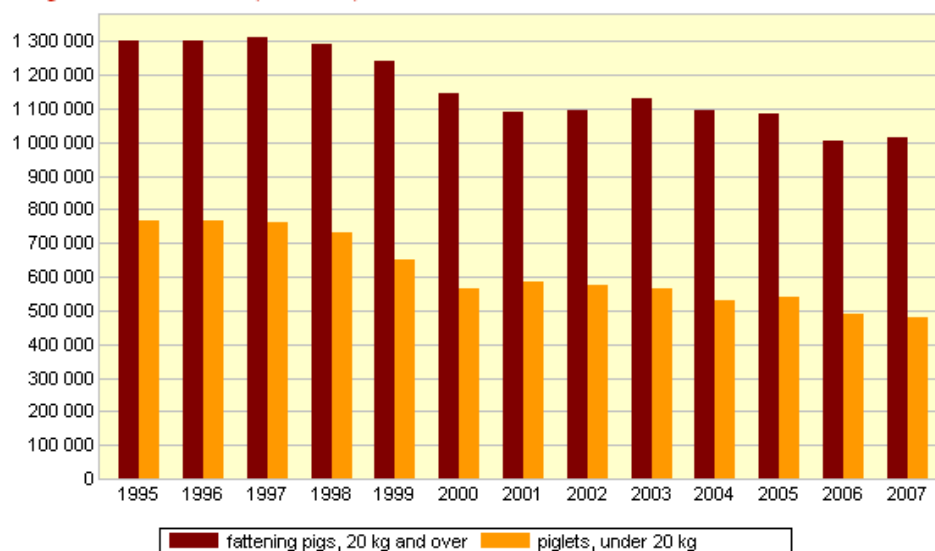
Figure 1. The numbers of fattening pigs and piglets in Sweden (1995-2007)
Source: SCB (Statistics Sweden), 2008

As Figure 1 illustrates, the number of fattening pigs has decreased by 285,000 (or 22 %) and the number of piglets fall more than 30% in Sweden during the 12 years.

The number of pigs has decreased as well since 2007. Fattening pigs decreased by 41,000 animals between 2007 and 2008, corresponding to 4 percent (Internet, SJV 2, 2008). This indicates that the reduction of fattening pigs during that period is even more rapid than before. Furthermore, since 2007 sows and boars decreased by close to 18,000 or 10 per cent (ibid). Hence it is reasonable to conclude that the downward trend in the production of fattening pigs continues.

It is notable that the decrease of the number of pigs is less significant than the reduction of pig farmers. Hoffmann and Andersson (1997) point out that this difference is partly attributable to a rapid structural adjustment in the sector of Swedish pig production; one category of pig farmers choose to expand the herd size in order to obtain an economically rational production unit, the other category of pig farmers, on the other hand, choose to decrease the herd size, or abandon their businesses, while to a larger extent relying on off-farm income.

The rapid fall of the number of pig farmers results in a drop of the volumes of slaughtered pigs, although the drop is not that obvious as comparing with the fall of pig farmer population. However, the pig slaughtering volumes in recent year is quit stable, which can be observed by comparing the volumes of slaughtered pigs (around three million pigs each year) from 2006 to 2008 (See Appendix 2). The constant volumes of slaughtered pigs in recent years are also exhibited in Figure 2: the volumes of slaughtered pigs are almost in the same scale from 2005 to 2008(between 20,000 tons and 24,000 tons monthly).
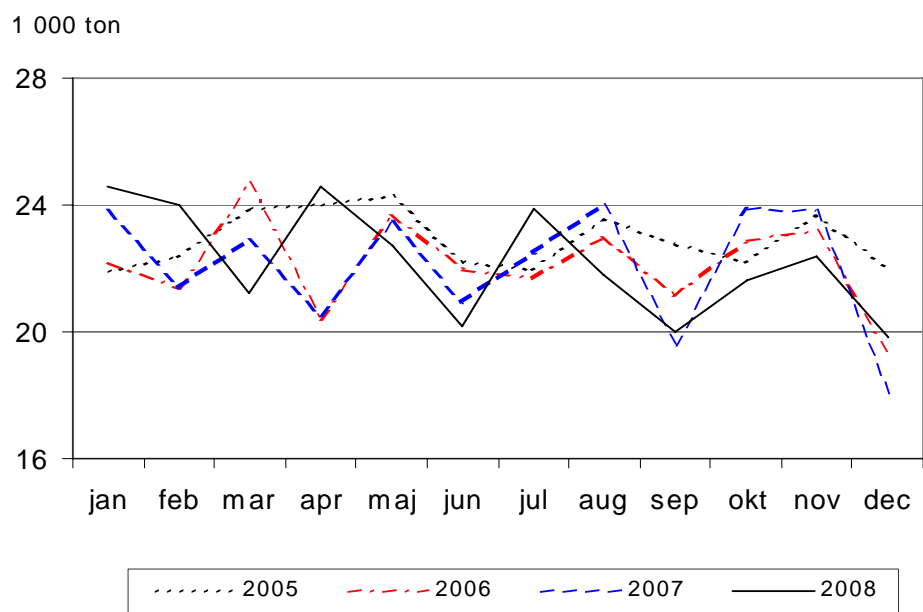
Figure 2. The volumes of pig slaughtering monthly in Sweden (2005-2008)
Source: SJV (the Swedish Board of Agriculture), 2008

To conclude; the market structure of the Swedish pig production can be characterized as a typical concentration model with the strategy of cost reduction. There are several reasons for the trend towards large scale production of pigs for slaguthering. The EU (European Union) membership brought a halt to the protective agricultural policy. The protectionism policy

towards Swedish meat industry did not exist any more. The changed government policy and the EU membership have contributed to opening the Swedish meat market. The following import competition resulted in a lower price for the pigs for slaughtering, and it enhanced the competitive pressure to reduce costs for Swedish pig farmers, especially for the small scale of pig farmers. This could be used to explain why so many pig farmers quitted pig raising since 1995. The tradition of cooperatives also contributed to the concentration within the Swedish pig production industry. The competition pressure forced those cooperative slaughter firms to reduce their costs, and their general strategies are that of closing smaller production units and increasing the capacity in the larger plants. This strategy has led to a more concentrated distribution of the pig for slaugtering. Moreover, the application of this strategy resulted in a change in the Swedish slaughter industry.

2.2 The pig slaughter business and various slaughterhouses

As it has been mentioned above, the structural adjustment of pig production in Sweden generates a highly concentrated market for Swedish pig slaughter business. No doubt, this business is dominated by Scan AB. It comprises four major plants (Kristianstad, Skara, Visby and Uppsala) with the shares 37.5%, 21.4%, 3.1% and 1.1% of slaughtered pigs during the first six months of 2008. This means that Scan AB has slaughtered around 63 % of the pigs of the whole Sweden during that period. The residual volume is handled by IOF slaughterhouses with various shares (See Appendix 3).

Originally, Scan AB was a traditional farmer cooperative, Swedish Meats, which was established in 1999 as a merger between slaughter co-operative apex organization Slakteriförbundet, the slaughtering parts of dairy cooperative Norrmejerier and the industrial parts of Skanek, Scan Farmet, Scan Norrland (Nilsson cited in Karlsson *et al.*, 2008). After this merger, Swedish Meats became the dominant cooperative firm with 17,400 farmer members in the Swedish slaughter industry.

Although Swedish Meats dominated the Swedish slaughter business, its unsuccessful operations resulted in large financial deficits of the cooperative. Due to the demand for new capital, Swedish Meats sold itself to a Finnish corporation LSO Foods in the beginning of 2007. HK Ruokatalo changed its name into HK Scan Group and formed a new company called Scan AB incorporating the business of Swedish Meats, to run the slaughterhouses and the marketing activities in Sweden. The contracts that pig farmers had with the former cooperative Swedish Meats were transferred to Scan AB. (ibid)

Swedish Meats, however, does not disappear from the Swedish slaughter industry. It now acts as an intermediary between Swedish farmers and Scan AB. This means that many former members of Swedish Meats until the last of June 2009 have an "obligation" to deliver their animals to Scan AB. (ibid)

Another task of Swedish Meats is to manage its 12.3% of the shares in HK Scan. This implies that the members of Swedish Meats still have a collective ownership of the HK Scan. The remainder of the equity capital of HK Scan is owned by a Finnish cooperative LSO Foods and the Helsinki Stock Exchange. As there are two categories of stocks of HK Scan, one stands for the majority of equity shares and the other represent the majority of the votes. LSO Foods has a minority of the equity shares (33% of the shares in HK Scan) and a majority of votes

(73% of the votes), whereas the Helsinki Stock Exchange has a majority of equity shares but a minority of the votes.

Swedish Meats also appoints one regular member and one call-in member of the board in HK Scan (of five totally) and three regular members (of nine totally) of the board in Scan AB. The board member distributions reflect that the farmers' interests and rights can be still represented by these board members from Swedish Meats, even if they are not the majority.

Except for Scan AB, two of the largest IOF slaughter firms (Ugglarps Slakteri and KLS Livsmedel) had slaughtered 7% and 5.4% of pigs in the first half year of 2008 (See Appendix 2). Both of them are located in the South of Sweden and owned by the largest Danish slaughter cooperative Danish Crown, which is the largest exporter in global meat market with a turnover of DKK 47 billion in the finical year 2007/08 (Stampe & Aunbol , 2008).

Danish Crown has already offered the Swedish market a strong product range, and the takeover of Ugglarps Slakteri and KLS add to this strength. Furthermore, the takeovers also strengthen the competition among the various slaughterhouses in the Swedish slaughter market. Especially in Southern Sweden, the acquisition of the Ugglarps creates a strong regional network of pig producers, and it enables the slaughtering of the Swedish pigs in the local slaughterhouse. Since the location of the Ugglarps is also the primary market of Scan's biggest plant – Scan Kristianstad – the competition between the two types of slaughterhouses (IOF and FCB) becomes even harder in Scania.

While Scan AB is the largest player on the Swedish pig slaughter market and Danish Crown (Ugglarps and KLS) is clearly number two. There are also a large number of other slaughter firms. Some of them are located in the most intense pig producing regions such as Västergötland, i.e. Skövde slakteri and Dalsjöfors. In Hallandia, also a region with a large production of pigs, Ginsten is a local slaughterhouse.

Obviously, Scania is the largest producing region in Sweden, and this region is dominated by Scan AB (a FCB) and Ugglarps (a subsidiary of the Danish cooperative Danish Crown, run as a profit-maximizing firm, i.e. as an IOF). This implies that Scania should be chosen as the region, where the empirical study is to be conducted.

3 Theoretical framework

FCBs are likely to share ideologies and characteristics with agricultural cooperatives since the agricultural cooperatives are one of the common types of FCB. As the only FCB in Sweden, Scan AB has been transformed from an agricultural cooperative. Hence it can be assumed that the theories or concepts which are used to assess the suitability of the agricultural cooperative have the same function to explain the existence of FCBs, at least in the case of the Swedish slaughter industry. This assumption is presented here and most of the theoretical arguments in this chapter are based on the research on agriculture cooperatives. For this sake, one should keep in mind the basic notions or conceptions between FCBs and cooperatives are no differences, even though Scan has a unique ownership form.

3.1 Transaction cost theory

Most of the prior studies concerning Swedish pig farmers' choice of buyers have a focus on comparing the differences between the cooperatives and IOFs (e.g. Jonsson, 1995; Falhlbeck, 1996; Lind & Åkesson, 2005). The main argument of these studies is that pig farmers are likely to consider trading with a cooperative slaughterhouse to reduce their transaction costs and thereby increase their total revenues. Pig farmers tend to regard cooperative slaughterhouses as trustworthy and less risky trading partners compared to IOFs. It also assumes that the low transaction costs of trading with cooperative slaughterhouses are the main explanation to why so many pig farmers have delivered their animals to their cooperative slaughterhouses. However, the structure of the Swedish slaughter industry has changed due to the transformation of Scan. Based on the contextual relationship of Swedish Meats and Scan AB, as well as the theoretical arguments of different transaction costs between delivering to cooperative slaughterhouse and IOF slaughterhouse, it is likely that farmers' transaction costs in relation to the slaughterhouses pose a reasonable explanation of pig farmers' choice of trading partner.

3.1.1 A historical approach of transaction cost theory

As one of the most important concepts of New Institutional Economics, transaction cost theory has begun to take shape in recent decades. A famous article written by Coase (1937) can be seen as the starting point of transaction costs concept. He questions "why firms exist", which is argued to depend on transaction costs. The question is why some transactions occur in the context of a hierarchy, instead of taking part in an open market. Transaction cost economics (TCE) tries to explain the specific structure of a business organization, most importantly to explore why vertical integration exists.

However, the term "transaction costs" can not be found in Coase (1937, p. 390), instead, he uses "the cost of using the price mechanism" as follows:

> *The main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism. The most obvious cost of "organising" production through the price mechanism is that of discovering what the relevant prices are. This cost may be reduced but it will not be eliminated by the emergence of specialists who will sell this information. The costs of negotiating and concluding a separate contract for each exchange transaction which takes place on a market must also be taken into account.*

Transaction costs are the costs of collecting information, negotiation and concluding contracts. The costs not only include the capital used, but also the time and effort. Because of the wide range of transaction activities when doing business, it is difficult to measure the transaction costs. Another difficulty is to delineate the boundary of various kinds of transaction costs because each kind of transaction has its specific cost. Many researchers attempt to solve the boundary problem by establishing a fundamental definition of transaction costs. Ollila (1989, p. 153) considers that "the transaction costs are the costs of all activities of gathering and processing information, negotiating contracts, administering, monitoring the exchange and solving possible deputes". His definition is even broader than that of Coase. Cheung (1983) perceives that information is one of the most important causes of transaction costs. In the field of TCE, the contributions of Williamson must be emphasized. Although his contributions are based on Coase's concepts, they are distinctive when comparing with other scholars' researches.

3.1.2 Williamson's assumptions of TCE

TCE is associated with Williamson's work. His concept is regarded as the most systematical tool to analyze the costs which exists in the transaction activities between sellers and buyers. Williamson's perspective is based on three behavioral assumptions. He assumes that humans are boundedly rational, opportunistic and risk neutral.

According to Williamson (1985, p. 45), "*bounded rationality* is the cognitive assumption on which transaction cost analysis relies". Bounded rationality mainly refers to the fact that people have both cognitive constraints and limited knowledge to process information. Normally, not all applicable information is available for the decision-makers due to the limited cognition and knowledge. It is also difficult for decision-makers to accurately work out all consequences depending on the information that they have. Another factor regarding bounded rationality is that people cannot foresee the alternative actions and reactions. For example, no matter how knowledgeable a manger might be, she or he cannot figure out all the possible consequences of her or his action. This is partly because the competitors' behavior is not a controllable variable for the manger.

Bounded rationality is the comparative assumption for another theoretical assumption, namely utility maximization; firms attempt to maximize profits, for example. Since Williamson stresses both production costs and transaction costs, he envisions production costs as the costs of building and running an "ideal" machine, while transaction costs are costs to ensure the machine works well, such as maintenance costs. In economics, the ideal machine would be a perfectly efficient market. The rationality of sellers and buyers within the market can directly influence the cost level through transactions. How people behave in a certain circumstance can be used to estimate whether their actions are rational. Simon (1957) argues that the term of "satisfying behavior" is more appropriate than maximization to explain human actions and replacing maximization with satisfying behavior is an essential step in the application of the principle of bounded rationality. Williamson (1996, p. 351), however, points out that "even granting that 'satisfying' is more descriptively accurate that maximization, satisfying is also a cumbersome concept and is difficult to model". Notably the bounded rationality assumption is widely associated with psychology as well as two other assumptions – opportunism and risk neutrality.

The assumption of *opportunism* is defined by Williamson (1985, p. 47) as "self-interest seeking with guile". It refers to the possibility that human beings will behave in a self-interested way with guile, because people are not "perfectly rational" due to the conclusion of the first assumption (bounded rationality). The opportunism assumption is also connected to people's behavior. Human being may not be entirely honest and reliable about their intension. Sometimes one might put pressure on another party relying on her or his comparatively advantageous position. Williamson concludes that not all people will act opportunistically all of the time. He merely assumes that someone does and has a room to act opportunistically some of the time, and it is difficult to find out who is opportunist and who is not in advance.

Williamson's last behavioral assumption is *risk neutrality*, which is between risk aversion and risk seeking. According to Aoki (1984), risk neutrality indicates that decision makers are indifferent between certain and uncertain, returns as long as the expected value of the uncertain returns is equal to that of the certain returns over the longer term. A number of critics have challenged the risk neutrality assumption but it has been well established that people have varying risk preferences. Even Williamson (1985, p. 389) acknowledges that people's risk preferences "for some purposes can be of utmost importance", nevertheless he accepts risk neutrality as an assumption.

These behavioral assumptions create the theoretical basis of TCE, but in themselves they are not the explanation of why firms will integrate vertically, because they are the natural characteristics of human being. The most influential explanation of transaction cost theory is the three dimensions that are formulated by Williamson.

3.1.3 Three dimensions of transactions

Williamson's dimensions or variables can be used to characterize any transaction in the economic life. Transactions may involve specific or non-specific assets; have high or low uncertainty and can be frequent or rare. These three dimensions also determine the transaction costs level in a market or a hierarchy. When the decision makers attempt to make the decision about whether to integrate vertically, these variables should be taken into account.

Asset specificity is particularly important in order to understand vertical integration. Williamson (1985, p. 55) says that:

> *Asset specificity refers to durable investments that are undertaken in support of particular transactions, the opportunity cost of which investments is much lower in best alternative uses or by alternative users should the original transaction be prematurely terminated, and the specific identify of the parties to a transaction plainly matters in these circumstances, which is to say that continuity of the relationship is valued, whence structural and organizational safeguards arise in support of transactions of this kind, which safeguards are unneeded (would be the source of avoidable costs) for transactions of the more familiar neo-classical (nonspecific) variety.*

This means that the assets ought to be valuable in the context of a specific transaction. Thus, transaction costs would be reduced by vertical integration. In another word, the transaction costs are likely to be lower with vertical integration if the transactions involve highly specific assets. In addition, the specific assets are widely associated with various investments. Four types of asset specificity are summarized by Joskow (1988, p. 106) as follows.

1) Site specificity: the buyer and seller are in a "cheek-by-jowl" relationship with one another, reflecting ex-ante decisions to minimize inventory and transportation costs. Once sited, the assets in place are highly immobile.

2) Physical asset specificity: when one or both parties to the transaction make investments in equipment and machinery that involve design characteristics specific to the transaction and which have lower values in alternative uses.

3) Human asset specificity: Investments in relationship-specific human capital that often arise through a learning-by-doing process.

4) Dedicated assets: General investments by a supplier that would not otherwise be made but for the prospect of selling a significant amount of product to a particular customer. If the contract were terminated prematurely it would leave the supplier with significant excess capacity.

Similarly, Shelanski and Klein (1995) describe the specific assets as a variety of relationship-specific investment, which including both specialized physical and human capital, alone with intangibles such as R&D and the specific knowledge or "capabilities" of the firms.

The dimension of *uncertainty* is closely related with a traditional "risk-uncertainty" perspective, as Williamson puts it. The uncertainty is also about the difficulty of foreseeing the consequences that might occur during the process of transactions. If a transaction needs more time to be complete, the uncertainty might increase. Another reason for uncertainty is information asymmetry. For instance, the buyers do have more information or knowledge of the market than the suppliers. This might lead to opportunistic behavior on the part of buyers. How do the suppliers trust the information which the buyers provide to them? How do the suppliers know that, having come to an agreement, the buyers won't try to renegotiate the contract at some future time?

Uncertainty is associated with bounded rationality. Because of people's cognitive constraints and the complicated world, they are facing the danger which comes from the uncertainty. For example, lack of information about the alternative buyers in the market may lead to profit loss for the suppliers.

The last dimension is *transaction frequency*. According to Williamson's concept, if someone invests in transaction specific assets in her or his own firm and the transaction with another firm is much frequent, there is a high risk of opportunistic behavior from another firm. In the same way, Anderson and Schmittlein (1984, p. 388) point out that "for rarely occurring transactions, loss from opportunism and inflexibility are likely to be lower than the integrated firm's incremental overhead. As a transaction recurs more frequently, however, integration becomes more desirable since potential losses from not integrating outweigh the overhead costs of integration."

Transaction cost theory is often applied to understand the arrangement of horizontal and vertical integration in the agricultural sector. According to Fahlbeck (1996), cooperatives can be seen as a form of vertical co-ordination between two stages in the agricultural production chain. For this sake, Scan AB can be viewed as a vertical co-ordination between pig production and meat processing in the Swedish slaughter industry. Notably, no matter how the Swedish slaughter industry changes, the main focus of the slaughter business is always on the vertically integrated slaughterhouses (such like Scan). Hence more attention is paid to explore the relationship between transactions cost theory and vertically integrated slaughterhouse in next section.

3.2 A prior study of Swedish slaughter business

Most often, the arguments concerning vertically integrated organizations are closely related with transaction cost theory, especially in the case of the Swedish slaughter business. As it has been mentioned in the beginning of last section, the differences regarding farmers' transaction costs have been examined by a number of empirical studies. Among them, Fahlbeck (1996) can be seen as a strong support for this study due to the similar research objective (the determinants of Swedish pig farmers' choice of trading partner) and the same theoretical basis (transaction cost theory).

In Fahlbeck's study, two hypotheses concerning farmers' different transaction costs are formulated and finally tested by a survey. This survey is to compare the transaction costs between the farmers' delivering to a cooperative slaughterhouse and the farmers trading with an IOF slaughterhouse, namely "co-op farmers" and "IOF farmers".

3.2.1 The assumption about farmers' asset specificity

Fahlbeck's first hypothesis focuses on the "asset specificity" dimension of transaction costs. In the agricultural sector, specific assets can be characterized as the initial investments that farmers have made for specific farming purpose, and the costs of these specific investments are regarded as sunk costs. Once the investment decision is made, some assets might be immobile or fixed for certain farming purpose and the costs for these assets are sunk. Even though not all specific investments are sunk, the salvage value of these assets can be very low for some other reason.

According to the first hypothesis in Fahlbeck' study, farmers trading with cooperatives ought to have more specific asset, i.e. more investments of a sunk cost character, than farmer trading with IOFs. The idea of this hypothesis comes from Williamson's analysis of asset specificity principle, that is, a high share of specific investments within the total assets are more likely result in vertical integration. Specific assets can be various for pig farmers. To test the differences between the two groups of pig farmers ("IOF farmers" and "co-op farmers"), three dimensions of specific assets have been investigated by Fahlbeck.

The *site specificity* dimension is tested by the questions of possibilities to trade with more than one slaughterhouse and distances to the slaughterhouses. In general, the data support the first hypothesis. Co-op farmers' choices are far less than IOF farmers, and they also have a long distance to alternative slaughterhouses. Besides the location constraint, the co-op farmers' ideology makes it impossible for them to trade with an IOF slaughterhouse. However, the results cannot represent the situation in whole Sweden due to the large density of slaughterhouses in the sample region.

Human asset specificity concerns the parameters of pig farmers' education and working experience. A higher degree of investments in human capital of co-op farms gives weak support for the first hypothesis, because the difference between the two groups of big farmers is not significant.

Physical asset specificity is to test pig farmers' opinions about their fixed assets. The result from the investigation shows that modern livestock buildings are more popular among co-op farmers, which means that more capital has been invested in the buildings and equipments by

co-op farmers. The investigation also identifies that co-op farmers have fewer possibilities to write off their assets. This might result in the situation where co-op farmers are more "locked in" on their farms. The most important finding in association with the first hypothesis is that most co-op farmers do not think they will get the full value when selling assets. This finding strongly supports the theoretical arguments, "farmers have a high degree of sunk costs ought to have higher incentives to safeguard such resources by becoming members of a jointly-owned farmers' cooperative" (Fahlbeck, 1996. p. 16).

Fahlbeck acknowledges that even the support of the theoretical validity (i.e. transaction cost determinants to vertical integration of farmers in processing cooperatives) is not that strong, at least no empirical finding is available for challenging his first hypothesis.

3.2.2 The assumption about the cooperatives can lower transaction costs

Fahlbeck's second hypothesis is closely related to the first one. It assumed that if co-op farmers are more sensitive to their specific assets compared to IOF farmers, farmer co-operatives should be regarded as a mean to lower transaction costs. The first investigation concerns the pig farmers' conceptions about the safety and transaction costs to trading with co-operative slaughterhouses and IOF slaughterhouses. No surprise, most co-op farmers believe that trading with cooperative slaughterhouses is safer than trading with IOF slaughterhouses. An interesting finding is that the majority of IOF farmers also see co-operative slaughterhouses as safer trading partners. This strongly supports the theoretical argument about transaction costs (e.g. the co-operative membership can work as a safeguard against possible opportunism behavior). As a consequence, co-op farmers' safeguard attitude ought to reduce the transaction costs of trading with their own cooperative slaughterhouses, such as contact costs, contract costs and enforcement costs. In relation to the safeguard issue, a risk premium arises among the co-op pig farmers. To balance the risk premium costs, IOF slaughterhouses will pay more for the animals to pig farmers compared to co-operative slaughterhouses.

3.2.3 The limitations and further research possibilities of the prior study

Fahlbeck's study can be described as a "bridge", which builds up a connection between the two types of theory in this study. The contributions of Fahlbeck's study are important for this study but some limitations should not be ignored before it comes to the other type of theory. One may doubt if his findings are applicable to explain the current situation in relation to pig farmers' transaction costs. Furthermore, it seems interesting to question that is there any other variable likely to determine farmers' transaction costs except the transaction dimensions. These limitations, on the other hand, provide a good opportunity for this study to perform a further research. Hence the intention of this study is partly based on these further research possibilities.

a) *The appearance of the "new" suppliers – "FCB farmers"*
To test farmers' transaction costs, "co-op farmers" and "IOF farmers" have been chosen as two groups of research samples by Fahlbeck. Since only cooperative slaughterhouses and IOF slaughterhouses were available to the pig farmers in that time, the suitability of the sample choice should not be questioned. The pig farmers' current choices, however, are different than before, because the cooperative slaughterhouse has been replace by a FCB (Scan AB). In

other words, Swedish pig farmers' current alternatives of slaughterhouses are in between the FCB and the IOF slaughterhouses.

It supposes that the "FCB farmers" trading with Scan AB are the former members of Swedish Meats. Due to the ownership change of Scan, the perceived transaction costs of "FCB farmers" may be different as compared to trading with the former cooperative. Hence how "FCB farmers" consider their transaction costs ought to be investigated, in comparison with the transaction cost of the "IOF farmers" who are trading with IOF slaughterhouses.

b) *The weak supports from transaction cost theory*

Based on Williamson's arguments, the three transaction dimensions (asset specificity, uncertainty and transaction frequency) can be seen as the variables which may determine farmers' transaction costs. Nevertheless, only the asset specificity variable has been examined and the other two variables (uncertainty and transaction frequency) have not been taken into account in Fahlbeck's study. This means that asset specificity is the only criterion to assess farmers' transaction costs.

It seems that Fahlbeck's choice in relation to the transaction dimensions is reasonable since the theoretical argument implies that the dimensions of uncertainty and transaction frequency are controlled by the asset specificity. But whether or not this argument fits to the case of Swedish slaughter business is unknown. Due to the weak empirical supports from the variables of uncertainty and frequency, Fahlbeck's conclusion (i.e., transaction costs is determinant when pig farmers choice their trading partners) seems not that reliable. Therefore, uncertainty and frequency ought to be involved in the investigation of pig farmers' transaction costs.

c) *The absence of behavioral theory*

The structural adjustment of Swedish slaughter industry creates a lot of challenges and choices for all IOF slaughterhouses and the former cooperative (Scan). For the IOF slaughterhouses, what kinds of strategies they should apply to compete with Scan? On the other hand, as the only FCB, how will Scan react and maintain its dominating poison in the Swedish slaughter industry? These questions may have a linkage with Fahlbeck's discussion, that is, cooperatives are more likely to link with "ideology" or "reputation" since they are the specific characteristics of the cooperatives. He also points out that ideology and reputation will be formed during the process of mutual adaptation on both sides of the transaction. As a former cooperative, Scan AB may inherit some cooperative ideology and reputation, but no evidence shows that the former members' attitudes and behavior toward Scan AB will remain the same.

It should be remembered that Williamson's transaction cost theory is based on behavioral assumptions, such as bounded rationality and opportunism. How slaughterhouses' behave may influence pig farmers' attitudes towards them. If the pig farmers are dissatisfied with the slaughterhouses, they may behave negatively. This might result in high transaction costs on behalf of the farmers in the process of transitions. Based on this account, a behavioral theory in the form of socio-psychology is necessary to be introduced to assess transaction costs in relation to pig farmers' attitudes toward the alternative slaughterhouses.

3.3 Socio-psychological concepts

This section aims at using a socio-psychological approach to interpret farmers' behavior. Socio-psychology concerns how social phenomena affect people and how people interact with others. In economics, socio-psychological theory can be seen as a tool to analyze how business actors' attitudes and behavior affect their decisions and actions. In this study, the main concern is how socio-psychological factors influence farmers' decisions of choosing trading partners.

3.3.1 Socio-psychological factors in relation to farmers' perceptions

A number of researchers have perceived that satisfaction is an essential issue when producers evaluate their trading partners. Producers' satisfaction degrees can be expressed by their different attitudes toward their trading partners. In the case of agricultural transaction, satisfaction is also assumed as a crucial factor which is likely to determine with whom farmers prefer to do business. However, the condition of farmers' satisfaction is not just about the economic benefits that they have obtained from the trading partners (i.e., a good price of their products), especially for the members of the agricultural cooperatives. The finding of Österberg and Nilsson (2009) shows that the single most important explanation to members' satisfaction with their cooperatives is the members' perception of their participation in the governance, and this factor is even stronger than the product prices. Despite the members' perception of their participation in the governance, other cooperative values in relation to the membership issue must be considered by farmer members as well, such as trust, involvement and a spirit of solidarity and equity(e.g. Hakelius, 1996). These values or attitudes can also be viewed as the particular socio-psychological factors or variables which exist in the relationship between the members and the cooperatives.

Golovina and Nilsson (2009) conclude that such socio-psychological factors are vital especially in traditional organized cooperatives as the unallocated equity capital implies vaguely defined property rights. They also view these socio-psychological factors as informal institutions, for example trust, readiness to be involved in collective action and cooperative governance, positive attitude to solidarity, equity, democracy and liberty, are instrumental for the solution of common property problems. Without them, free-riding behavior, low involvement, and distrust in the management are likely, all of which are detrimental for cooperatives' development.

3.3.2 Farmers' trust towards their trading partners

In business, trust is the fundamental precondition for success. Nothing can destroy a relationship more completely than distrust. There are a number of ways to define trust. In general, trust is both about emotional and logical actions. Trust is also important in our social network. A definition of trust based on socio-psychological foundations is that "trust is a psychological state comprising the intentions to accept vulnerability based upon positive expectations of the intentions or behavior of another" (Rousseau *et al.*, 1998, p. 395). Moreover, Hansen *et al.* (2002) view trust as having cognitive and affective dimensions. According to them, cognitive trust is more objective in nature and is based on a rational and methodical process that results in a judgment that individual, group or organization is trustworthy, and affective trust is subjective in nature because it is based the moods, feelings

or emotions that one have concerning the perceived that one has concerning the perceived trustworthiness of an individual, group or organization.

Farmers' trust toward their alternative trading partners (cooperatives and IOFs) has been examined in many studies. The main arguments are based on the different objectives between cooperatives and IOFs, i.e., cooperatives provide benefits to their members (producers), while IOFs focus on the profit returns to investors (non-producers). Sykuta and Cook (2001) suggest this difference may create greater trust in the relation between producers and producer-owned agribusinesses than between producers and IOFs.

The prior studies confirm that trust is more important for cooperative firms than IOFs. Shaffer (1987) asserts that trust makes or breaks a cooperative, in part because the contract between producer and the organization is more relational in cooperatives than in IOFs and because cooperative are generally more reluctant than IOFs to impose sanctions on their members. Similarly, Fulton and Giannakas (2001) claim how member commitment within a cooperative – which could be a manifestation of organizational trust – is affected by cooperative characteristics and affects cooperative performance. Moreover, James and Sykuta provide a linkage between trust and cooperative characteristics, and they argue that trust is related to typical cooperative norms such as equal treatment as well as to relative homogeneity within the membership (James & Sykuta, 2005).

Nevertheless, members' organizational trust is not only related with their membership, but also the trust within the leadership of cooperatives. Nilsson, Kihlén and Norell (2009) present how distrust within the leadership will create difficulties of operating and governing the cooperatives. As the cooperative business firm has to work on market condition, the management takes control (Bager, 1996). With passive and poorly informed members, management works autonomously from the members (Hogeland, 2006). The board of directors, being highly dependent on the CEO (Chief Executive Officer), loss in legitimacy in the eyes of the members (Nilsson, Kihlén and Norell, 2009).

3.3.3 Member involvement in the cooperatives

Another socio-psychological factor of cooperative members' satisfaction is the level of members' involvement of the membership. Involvement is a concept expressing individuals' psychological attachment to a phenomenon. It is also a concept of sharing activities in a group or a community. Cooperative can be seen as the member-based community, farmer members should be involved into the daily activities of the cooperative, such as doing business with the cooperative, attending meetings, serving on committees as elected representatives, and recruiting other farmer to become members. Member involvement can be viewed as a specific characteristic or a basic ideology of the cooperative. This is also an essential difference comparing with IOFs, i.e., the possibilities of being involved in the capitalism firms is fairly small for the producers (farmers).

The involvement issue, on the other hand, may generate a risk for cooperatives, that is, members' dissatisfaction towards their cooperatives. The dissatisfaction might lead to the fail of cooperatives. The linkage between involvement and ethical attitude has been discovered. Zusman (1993) claims that if members' ethical attitudes are too weak to support the cooperative enterprise, it is bound to fail sooner or later. Moreover, if members are excluded from the membership or their involvement in the cooperative is too low, they will feel like

outsiders. Therefore, they may not want to invest in the cooperative; they try to be free-riders; they do not control the management adequately, and so on (Cook, 1995; Holmström, 1999).

A cooperative itself may result in a low involvement situation as well, especially when the cooperative becomes large and complex, the members have difficulties in keeping informed of the business and assessing what is happening in the firm (Nilsson, Kihlén and Norell, 2009). Therefore, the cooperative members can not be a part of the cooperative. While there is a tendency that members consider their influnces in the cooperative are important to them. Hence, the conflicts between the reality and the expectation are likely to increase members' dissatisfactions toward their cooperatives.

3.3.4 Members' participation in cooperative governance

Members' perception of their participation in the governance of cooperatives is the last socio-psychological factor of members' satisfaction. That is also the particular concept of cooperatives' ideology. Members' participation in cooperative governance is also related to the involvement issue of the cooperatives, but it is more focus on the members' involvement within the leadership than the membership.

For a cooperative to supply its members with the services that they demand, a well-functioning member democratic governance system is important (Gray and Kraenzle, 1998; Bhuyan, 2007). According to the cooperatives' ownerships (i.e., members are the owners of the cooperatives), the members should take control of the cooperatives through their selected representatives. It is important for the cooperatives to get interests from the farmers.

However, the mechanism of member control may cause many problems for the cooperatives. Firstly, agency theory indicates that information asymmetry might result in the members have difficulties to make ex-post assessments of the boards' and the managements' performance (Österberg and Nilsson, 2009). Secondly, property rights theory explains that the control problems are aggravated when the principal is collective and the property rights are vaguely defined. Collective principal and vaguely defined property rights may lead to the free-rider behavior, which will reduce members' desire of taking control and weaker members' incentive of being involved in the governance of the co-operatives. Finally, the constraints of members' ability and knowledge may be disastrous for the cooperative. The large size and different location of members might result in conflicting interests within the cooperatives' membership. Because the management thus obtain few, unclear and conflicting signals from the membership there is a risk that neither the board of director nor the CEO can interpret what the members want them to do (Cook and Iliopoulos, 2000; Hendrikse, 2007).

Based on the accounts above, member control is increasingly problematic, especially in large cooperatives with diversified business activities and with large and heterogeneous membership (Fulton and Giannakas, 2001; Borgen, 2001). Hence, one may expect member control to be weak in many cooperatives (Hogeland, 2006). Rather management will take control. However, members have strong wishes to participate in the governance of the cooperative, because their profitability relies on the cooperatives' success. This is the human natural that people don't want others to decide their fates. Thus, if the management takes control and the business is unsuccessful, members' commitment in the governance will become weaker, and the dissatisfaction toward the cooperatives tends to increase among the membership.

3.4 Theoritical conclusion and hypotheses

The theoretical framework of this study is based on a larger number of previous studies. In these studies, farmers' choice of trading partner have been examined by using either transaction cost theory or socio-psychology theory. Fahlback's findings can be seen as somewhere in between transaction cost theory and socio-psychological concept, and therefore his findings are presented in the middle of the theoretical introduction as a connection between the two types of theories.

In Fahlback's study, Swedish pig farmers have been categorized into two groups "co-op farmers" and "IOF farmers" because the two groups of farmers have chosen to trade with two types of slaughterhouses which differ in ownership forms. However, is transaction costs still the determinant of farmers' choice of trading partner after the farmer has experienced Scan's ownership? Or to say; is there any other variable or factor that may influence farmers' choices?

Based on Williamson's transaction costs concepts, if the three dimensions of transaction costs, on the one hand, can be used to interpret the transaction costs on behalf of farmers, these dimensions can be regarded as the variables that may determine farmers' choice of trading partner. If the socio-psychological factors, on the other hand, have some effects on farmers' perceived transaction costs, these factors are also assumed as the variables of farmers' choices. To conclude; the combination of transaction cost theory and socio-psychological concepts may generate six latent variables which may determine farmers' transaction costs. They are: (1) farmers' asset arrangements, (2) farmers' transaction frequencies, (3) farmers' perceived uncertainty of the transactions, (4) farmers' trust or distrust towards their trading partners, (5) farmers' degree of involvement, and (6) farmers' influence on their trading partners.

It seems that the relationship between the six latent variables and farmers' transaction costs can be exhibited by Figure 3, where the plus signifies a negative impact on farmers' transaction costs, the minus express a positive effect on the transaction costs.
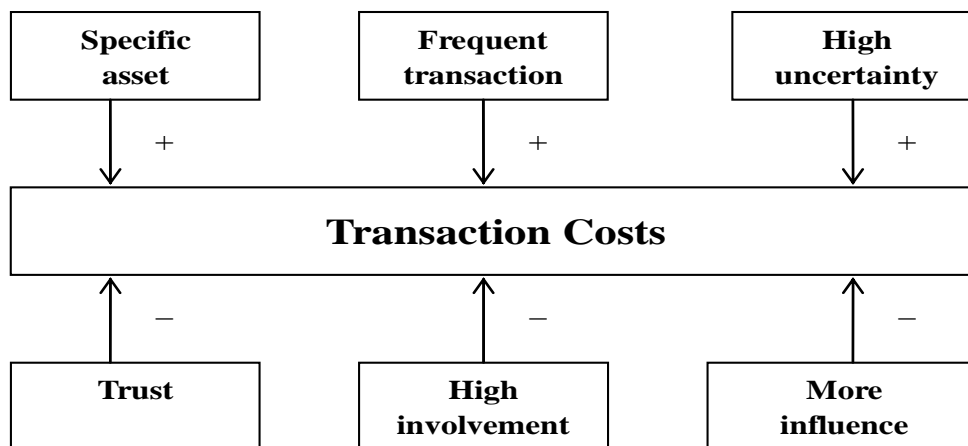
Figure 3. The hypothesized relationship between the latent variables and transaction costs

In the figure above, the end point of the arrows (the middle rectangle) represents the assumed determinant of farmers' choice of trading partner – transaction costs. The upper three rectangles in the figure express the three latent variables which are based on transaction cost

dimensions. The lower rectangles, on the other side of the figure stand for another three latent variables in relation to socio-psychological concepts.

According to Figure 3, a set of hypotheses with the aim of examining these latent variables in association with the two types of theories are suggested. Whether or not these latent variables have direct effects on farmers' choices will be tested by comparing the differences between two groups of farmers ("FCB farmers" and "IOF farmers").

3.4.1 Hypotheses regarding transaction cost theory

As the first latent variable of farmers' transaction costs, asset specificity dimension refers to the investments that are undertaken in support of particular transactions. Many kinds of farmers' investments can be characterized as specific assets, such as the investments of buildings and facilities for farming. These investments can also be viewed as sunk costs that cannot be recovered once they have been incurred. The different asset arrangements between "co-op farmers" and "IOF farmers" have been examined by Fahlbeck in his study. His findings have provided empirical support to the theoretical argument that "co-op farmers" have more specific assets than "IOF farmers". Then, which group of farmers has more specific assets between "FCB farmers" and "IOF farmers"? This question can be answered by comparing the different asset arrangements between the two groups of farmers, and therefore the first hypothesis suggests:

H 1. "FCB farmers" have more transaction specific assets in their farming operations than "IOF farmers".

Traditional transaction cost theory claims that two other transaction cost dimensions (transaction frequency and uncertainty) are influenced by the dimension of asset specificity. If the farmers' assets are set up for trading with a particular slaughterhouse, the transactions between the farmers and this slaughterhouse should be more frequent. Furthermore, the farmers' specific assets arrangement and the frequent transactions with the slaughterhouse are like to create opportunistic behavior on the part of the slaughterhouse. Consequently, the opportunistic behavior may increase farmers' perceived uncertainty of trading with the slaughterhouses. Based on these theoretical arguments, two following hypotheses are used to test if there are any differences in farmers' transaction frequencies and farmers' perceived uncertainty of trading with the slaughterhouses between the two groups.

H 2. "FCB farmers" delivery larger volumes to the slaughterhouses than "IOF farmers".

H 3. "FCB farmers" experience more uncertainty in their relationship to the slaughterhouses than "IOF farmers".

Farmers' transaction frequencies are likely to be reflected by the times that they deliver their animals to the slaughterhouses, but the number of deliveries are not suitable to be used to measure farmers transaction frequencies in this case. Instead, farmers' delivery volumes are introduced in the second hypothesis. This is because the delivery volumes may represent farmers' actual delivery frequencies in a more logical way. Suppose that a farmer has delivered more times to the slaughterhouse than the other farmer during a certain period, but the total delivery volume of this farmer is less than the other farmer in the same period, and

therefore it is plausible to conclude that this farmer has more transaction frequency than the other farmer.

According to Figure 3, if "FCB farmers" are more sensitive to these three latent variables than "IOF farmers" (i.e., they have more specific assets, sell larger volumes and perceive more uncertainty on the part of trading partner, they may have more transaction costs than "IOF farmers". Hence, the last hypothesis in this section can be expressed as:

H 4. "FCB farmers" do have more transaction costs than "IOF farmers".

To conclude; there is a causality among the four hypothesis in relation to transaction cost theory, which is that the three transaction cost dimensions will determine farmers' transaction costs.

3.4.2 Hypotheses regarding socio-psychological concepts

As H 4 suggests, if "FCB farmers" perceive that they have more transaction costs than "IOF farmers", they must try their best to reduce their transaction costs and increase their profitability. Farmers suppose that Scan as a former cooperative, which still has a function of lowering their transaction costs. It also seems that Scan inherited cooperative ideology and characteristics which is very attractive for the farmers. "FCB farmers", in consequence, have decided to deliver their animals to Scan. For this sake, farmers should take different attitude towards the slaughterhouses that they are delivering to. Then, socio-psychological concepts should be introduced to test the differences in farmers' attitude towards the slaughterhouses between the two groups of farmers.

The first latent variable associated with socio-psychological concepts is trust, since trust is essential for any kind of business relationship. It supposes that trust can lower farmers' transaction costs in relation to the slaughterhouses, such as contact costs (the costs for maintaining the relationship between farmers and slaughterhouses), contract costs (the resources spent on contracting), and enforcement costs (the costs of executing contracts). The ownership difference between Scan and IOFs may create greater trust in the relation between "FCB farmers" and Scan than between "IOF farmers" and IOFs. If this is correct, "FCB farmers" should perceive more trust to Scan than IOF slaughterhouses. Hence, the first hypothesis in relation to farmers' trust or distrust towards their trading partners is:

H 5. "FCB farmers" perceive more trust to their trading partners, as compared with "IOF farmers".

Two other latent variables related to socio-psychological concepts are both about farmers' participantion in the slaughterhouses. One related to farmers' general involvement in the slaughterhouses. The other is more concern about farmers' participantion in slaughterhouses' governances. Both variables are particularly important for "FCB farmers" since these are the specific characteristics or basic ideologies of the former cooperative Scan. Moreover, the two concepts are also the essential differences between Scan and IOFs because the possibility of being involved in IOF slaughterhouse or participate in IOFs' governances seems very difficult for IOF suppliers. If "FCB farmers" consider that they are excluded from Scan or their influences on Scan's governance is too small, they are likely to behave negatively, such like try to be "free-riders". This may generate more transaction costs on the part of farmers, such as investing more resources to contact with their suppliers, or devoting more energy to reach

agreements in contracts and enforce the contracts. Thus, Scan would have to create more opportunities for its suppliers to make them participate in the organization and as well the governance of the organization.

Based on above analysis, the latent variable regarding the involvement issue is hypothesized as following.

H 6. "FCB farmers" have higher involvement in their trading partners, as compared with "IOF farmers".

Since farmers' participantion in slaughterhouses' governance can be understood as if farmers have enough power to influence the slaughterhouses, the hypothesis associated with the last socio-physiological concept can be formulated as:

H 7. "FCB farmers" have more influence on their trading partners, as compared with "IOF farmers"

According to Figure 3, the three latent variables related to socio-physiological concepts have positive influences on farmers' transaction costs. Then, it seems reasonable to conclude that Scan ought to lower farmers' transaction costs; otherwise there is no point in the choices of "FCB farmers". Therefore, the final hypothesis is available as:

H 8. FCBs create lower transaction costs for the farmers than IOFs do.

As can been seen in this section, all of the latent variables have been hypothesized as the determinants that may influence farmers' transaction costs. Therefore, the two major aims of this study can be precisely stated as: (1) it is to empirically test if transaction cost theory are valid to assess the degree of farmers' transaction cost and (2) if socio-psychological concepts can be used to explain the perceived difference in transaction costs between delivering to Scan and IOF slaughterhouses. To fulfill the two study aims, an empirical study should be conducted by comparing the data from both "FCB farmers" and "IOF farmers". If the hypotheses are supported by the empirical study, significant differences between the two groups ought to be found.

4 Methodology

The methodology of the study is introduced as an independent chapter since it covers too much information which ought to be presented in details.

4.1 Data collection

An empirical research has been conducted in order to test the hypotheses. Relevant data has been collected from the pig farmers who are raising fattening pigs in Scania. These research samples have been chosen because both population and density of pigs in this region are relatively high (See Appendix 1), and this is also the region where actual competition between Scan and IOFs is most frequent[1].

Totally 36 questions with the aim of testing the hypotheses have been formulated into a questionnaire (See Appendix 4). On the basis of various kinds of objectives and functions of these questions, the questionnaire is divided into four parts. The question in the first part is used to define farmers' identities, i.e., which slaughter business the farmers are trading with. The following two parts in the questionnaire are both formed by 12 questions which intend to investigate farmers' general attitudes and experienced difference towards alternative slaughter businesses, but the questions in the third part more focused on gathering numerical data. Farmers' background is investigated through the rest of the questions, which are formulated in the last part of the questionnaire, but not all of them are used to test the hypotheses, such as farmers' age and gender.

According to the information provided by Swedish Statistics, there are totally 664 pig farmers in Scania. Due to the demand of a large volume of data, the questionnaires have been sent to all of them. After the deadline of returning the questionnaires (two weeks later), 160 responses have been received. But 42 farmers didn't answer any question in the questionnaire because they stated that they had quitted raising pigs. After removing these inapplicable responses, the percentage of applicable responses is 17.8% (118 answers are applicable). But it is unconvincing to conclude that this fairly small sample size may represent the whole population of pig farmers in this region. To enlarge the volume of sample size, same questionnaires were sent to the 501 remainders[2] who didn't return the questionnaires before the first deadline. One week later, totally 101 questionnaires had been returned (82 of them were from the 501 remainders and the rests came from the farmers who didn't return the questionnaires before the deadline), but 44 responses were still inapplicable. Hence, the final number of the useful answers is 175, which means that 175 research samples of this investigation can be used for further analysis.

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[1] Scan's two biggest slaughterhouses (Scan Kristianstad and Scan Skara) and its major competitors (IOF slaughterhouses) Ugglarp Slakteri AB and KLS Livsmedel are all located in or nearby this region.
[2] The number of remainders who didn't return their questionnaires before the deadline is 504, three of them called and said they have stopped to produce pigs, and therefore their names are removed from the remainders' list. This is why the remainders are 501, but not 504.

4.2 Statistical techniques

Since the data of this investigation is based on large volume of quantitative information, the quantitative approach is employed for investigating the relationships between the data and the hypotheses. The process of measurement is the key to the quantitative research because it provides the fundamental evidence whether there is any conflict between the data and the hypotheses. The data is mostly collected, analyzed, explained and presented by various kinds of statistical methods, and therefore statistical tests are chosen as the measure to make statistical decisions using the data in this study.

According to the theory of scale types (Stevens, 1946), all measurements in science can be classified into four different types of scales, they were "nominal", "ordinal", "interval" and "ratio". Based on the scale of measurement, the data which gathered from the investigation can be categorized into two groups – categorical data (nominal and ordinal scales) and continuous data (interval and ratio scales). *Categorical data* having unordered or ordered scales are called *nominal or ordinal scales*, while *continuous data* having interval scales or both equal intervals and an absolute zero point are called interval or ratio scales (Internet, SRM 1,1997). Among the data of this investigation, a good example of nominal scale is farmers' gender which the order of the categories is arbitrary. The Likert scale where there is a logical ordering to the categories can be seen as ordered scale. But no data can be characterized as interval scale or ratio scale.

The reason of distinguishing data is that the statistical method is different in terms of the scale of measurement. Due to the characteristics of the two groups of experimental data in this investigation, *chi-square test statistics* is used to deal with the categorical data, and *t-test statistics* is suitable to compare the means of two groups of data, such as the distances to the slaughterhouses that farmers are trading with.

4.2.1 Chi-square test

"The chi-square test (X^2) is the most commonly used method for comparing frequencies or proportions. It is a statistical test used to determine if observed data deviate from those expected under a particular hypothesis (Internet, SE 1, 2009). In this investigation, *Person's chi-square test* is used to determine whether an association (or relationship) between the two groups ("FCB farmers" and "IOF farmers") in the 175 observed samples is likely to reflect a real association between the two group in the whole population of pig farmers. In the case of the two groups being compared by categorical data, the chi-square test can also be interpreted as determining if there is a significant difference between the two groups.

To answer the question "is there any difference of a particular issue between the two groups", the particular null hypothesis (H_0) and alternative hypothesis (H_1) that are based on the chi-square test ought to be set.

$H_0 : \pi_{i,j} = \pi_i \pi_j$ (the distribution of frequency data between the two groups is associated with each other, no difference is observed)

$H_1 : \pi_{i,j} \neq \pi_i \pi_j$ (the distribution of frequency data between the two groups is not associated with each other, a significant difference is observed)

To test if the null hypothesis is true, the value of test statistic(X^2) can be calculated by following formulas.

$$X^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{\left(O_{i,j} - E_{i,j}\right)^2}{E_{i,j}}$$

In this investigation, where
X^2 = the test statistic that asymptotically approaches an X^2 distribution;
r = the number of possible outcomes of "FCB farmers";
c = the number of possible outcomes of "IOF farmers";
$O_{i,j}$ = an observed frequency of "FCB farmers" and "IOF farmers";
An expected (theoretical) frequency $E_{i,j}$ of "FCB farmers" and "IOF farmers" is

$$E_{i,j} = \frac{\sum_{k=1}^{c} O_{i,k} \sum_{k=1}^{r} O_{k,j}}{N}$$

Note: $\sum_{k=1}^{c} O_{i,k}$ is the total number of observed samples within the group of "FCB farmers", $\sum_{k=1}^{r} O_{k,j}$ is the total number of observed samples within the group of "IOF farmers" and N is the total sample size. The number of degrees of freedom is equal to $(r-1)(c-1)$.

However, the value of X^2 does not mean much on its own. It must be looked up in the chi-square critical values in a table - *chi-square table* (See Appendix 5), the table shows the extent to which the association or relationship between the two groups might be caused by chance (i.e., the sample error). Hence, after the chi-squared test-statistic is computed by the expected and the observed frequencies, the probability of obtaining the observed difference (p-value) should be examined to test if the null hypothesis is true.

The p-value (level of signification) that produced by chi-square test is equal to the probability of obtaining the observed difference between the two groups of samples. "Consequently, if the p-value is small the data support the alternative hypothesis. If the p-value is large the data support the null hypothesis. Conventionally (and arbitrarily) a p-value of 0.05 (5%) is generally regarded as sufficiently small to reject the null hypothesis (Internet, UWE 1, 2006). In other words, if the p-value associated with chi-square test is smaller than 0.05 (< 0.05), there is evidence to reject the null hypothesis in favor of the alternative, i.e., there is evidence that the observed and expected frequencies between the two groups are significantly different at the significance level reported by the p-value. By contrary, if the p-value is larger than 0.05 (> 0.05), there is not enough evidence to reject the null hypothesis, and it should be concluded that there is evidence that the observed and expected frequencies between the two groups are not different.

4.2.2 T-test

Contrary to chi-square test, t-test (or student's t-test) is commonly used to analysis continuous data. "The t-test assesses whether the means of two groups are statistically different from each other" (Internet, SRM 2, 2006). Since the research samples in this investigation have been categorized into two groups ("FCB farmers" and "IOF farmers"), *independent two-sample t-test* is appropriate to be employed to compare the means of the continuous data of the two groups.

Similar with chi-square test, t-test is also used to test a null hypothesis. But the null hypotheses associated with t-test and chi-square test are based on different assumptions. The null hypothesis of t-test assumes the mean values of the two groups of samples are equal. In this investigation, a suitable t-test null hypothesis with its alternative might be formulated as following.

$H_0 : \pi_1 = \pi_2$ (the means of continuous data between the two groups are equal, no difference is discovered)

$H_1 : \pi_1 \neq \pi_2$ (the means of continuous data between the two groups is not equal, significant difference is discovered)

To examine the null hypothesis of t-test, the test statistic value of t-test can be calculated as by following formulas.

$$t = \frac{\overline{X}_1 - \overline{X}_2}{S_{X_1 X_2} \cdot \sqrt{\dfrac{1}{n_1} + \dfrac{1}{n_2}}}$$

Note: $\quad S_{X_1 X_2} = \sqrt{\dfrac{(n_1 - 1)S_{X_1}^2 + (n_2 - 1)S_{X_2}^2}{n_1 + n_2 - 1}}$

In this investigation, where $S_{X_1 X_2}$ is estimator of the common standard deviation of the two groups of samples, it is defined in this way so that its square is an unbiased estimator of the common variance whether or not the population means are the same. In these formulas, $n =$ number of samples, $1 =$ "FCB farmers", $2 =$ "IOF farmers". '$n - 1$' is the number of degrees of freedom for either group, and the total sample size minus two (that is, $n_1 + n_2 - 2$) is the total number of degrees of freedom, which is used in significance testing.

The method and process of testing the null hypothesis of t-test is almost the same with chi-square null hypothesis test, i.e., calculating the t-value and examining the p-value. What might be different is that t-test has its own critical table – "t table", which contains the critical t-values under different degrees of freedom and levels of significant (p-values).

P-value associated with t-test or chi-square test can be calculated by many ways when the values of test statistics and freedom degrees are identified. But the calculation of p-values is very complicated; a computer package will be the most efficient way to do the appropriate calculations. Therefore, the professional software package for statistical analysis - Statistical Package for the Social Sciences (SPSS) is chosen to conduct the calculations of p-values and statistics tests in t-test and chi-square test.

It should be noted that the t-test is used when sample sizes are small (ex., < 30), but with larger samples the Z-test is used. Basically, the principle of these two tests is no different. When larger sample sizes are identified (such as this case) the t-test procedure gives almost identical p-values as the Z-test procedure. For this reason, there is no (direct) Z-test in SPSS, instead, t-test is available for comparing the means between the two groups of fairly large samples.

5 The empirical findings

Before the data is processed by the computer software- SPSS, the sample sizes of the two groups of farmers ("FCB farmers" and "IOF farmers") ought to be identified, i.e., whom the 175 farmers that provided useful answers are trading with? Based on this consideration, the question regarding farmers' current delivery percentages to each slaughterhouse has been asked in the beginning of the questionnaire. Besides the 70 and 81 farmers who deliver all their animals to Scan and IOFs, the rest (24 farmers) choose to send their animals to both Scan and IOFs at the same time. Since the aim of this study is to investigate the differences between "FCB farmers" and "IOF farmers", the data which provided by the farmers trading with both Scan and IOFs should not be taken into account, even if their answers might inflect the differences between Scan and IOFs in a more direct way. Hence, the sizes of the two groups of samples ("FCB farmers" and "IOF farmers") are finally verified as 70 and 81.

5.1 Statistical results of farmers' asset specificity

5.1.1 Human asset specificy

Human asset specificity has been tested by the questions concerning farmers' education and farmers' devoted efforts on their farms.

In the question regarding farmers' education, farmers have been asked to report their highest completed education. According to the Swedish education system, farmers' completed education is categorized into six levels.

Table 1. Parameters of farmers' education

	"FCB farmers"		"IOF farmers"		chi-square	p-value
	Yes	No	Yes	No		
Primary/secondary school	70	0	78	0	No difference*	
Agricultural high school	15	55	15	63	0.11	0.74
High school	1	69	12	66	8.968	0.003
After high school short education	17	53	12	66	1.855	0.173
Agricultural collage/university	18	52	12	66	2.436	0.119
Collage/university	5	65	6	72	0.016	0.899

* The statistical results related to *Primary/secondary school* are not given, since the frequencies of the answer "No" in both groups are "0" which is meaningless in statistics.

Chi-square test has been used to examine if farmers' education between the two groups have any different in each education level. As can be seen in Table 1, only farmers' answers concerning the education of high school differ significantly between the two groups, because the probability of obtaining the observed difference (p-value) is just 0.3% (0.003) which is far more less than the critical p-value 0.05. This means that there is enough confident to reject the null hypothesis which assumes that the two groups farmers have no difference in the education of high school. When comparing the frequencies between the two groups in such education, "IOF farmers" have a higher degree than "FCB farmers". However, this difference cannot be viewed as a support that "IOF farmers" have a higher degree of investments in human capital.

Besides the education issue, farmers have also been asked about their time arrangement on farming and pig production respectively (i.e., how many percents of the working hours they spent on farming and pig raising).

Table 2. Parameters of farmers' time arrangement on farming and pig production

	"FCB farmers"			"IOF farmers"			t-value	p-value
	N*	Mean	Std. Dev.	N*	Mean	Std. Dev.		
Farming (%)	66	86.76	25.796	71	81.93	30.106	1.010	0.314
Pig raising (%)	61	39.41	27.468	69	43.71	29.091	-0.863	0.390

* "N" stands for the number of farmers who provided useful answers in each group; it can be also interpreted as the sample size of each group.

On average, which group of farmers has consumed more time on farming and pig production is examined by t-test statistics. No important difference between the two groups is found because the two outcomes of p-values in Table 2 are larger than 0.05 (0.314>0.05, 0.39>0.05).

Since no important statistical difference is observed in both cases, it seems reasonable to conclude that there is no significant difference about farmers' specific human asset between the two groups.

5.1.2. Site specificity

The site specificity dimension has been tested by asking farmers about the distance to the slaughterhouses that they are delivering to in the questionnaire.

Table 3. Parameters of the distances between farms and slaughterhouses

	"FCB farmers"			"IOF farmers"			t-value	p-value
	N	Mean	Std. Dev.	N	Mean	Std. Dev.		
Distance(Km)	69	77.62	35.946	70	115.56	102.657	-2.916	0.005

The useful answers related to this question have been reported by 69 "FCB farmers" and 70 "IOF farmers". According to t-test statistics, these answers are available to test the null hypothesis, which assumes that the average distance to the slaughterhouses between the two groups of farmers have no difference. As Table 3 shows, the probability of obtaining the observed difference (p-value) between the two groups is 0.005, which means that the possibility to accept the null hypothesis is extremely small (equal to 0.5%). Thus, there is enough confident to reject the null hypothesis and accept that the distances to slaughterhouses between the two groups of farmers is significant difference at a 99.5% (1-0.005) level. The mean difference between the two groups is 37.94Km (115.56-77.62), which indicates that "FCB farmers" have shorter distances to the slaughterhouses that they are delivering to than "IOF farmers". Consequently, "FCB farmers" have more specific site assets than "IOF farmers".

5.1.3 Physical asset specificity

When it comes to physical asset specificity, two questions have been asked to the farmers. One considers the current conditions of farmers' product facilities; the other concern is that whether or not farmers believe their investments would be paid back with a full value, in a situation where they sell their assets.

Table 4. Parameters of farmers' physical assets

	"FCB farmers"			"IOF farmers"			chi-square	p-value
Product facilities	New	Good	Worn	New	Good	Worn	1.140	0.566
	12	44	12	17	42	16		
Investment payback	Yes	No	Don't know	Yes	No	Don't know	5.409	0.067
	40	16	13	44	9	25		

In the questionnaire, farmers' product facilities have been categorized into three degrees ("New", "Good condition" and "Worn out"), while the answers about if farmers perceive that they can get the full value when selling assets are divided into three groups ("Yes", "No" and "Don't know"). To compare the frequencies of these categorical data between the two groups, chi-square test has been employed.

Table 4 illustrates that the actual probability of obtaining the observed differences (p-values) in both cases is fairly large, as compared with the significant level of 0.05 (i.e., 0.566>0.05 and 0.067>0.05). These outcomes of chi-square test inflect that there are no significant difference associated with farmers' physical asset arrangement between "FCB farmers" and "IOF farmers".

5.2 Transaction frequency

Farmers' delivery volumes are the key criterion for evaluating their transaction frequency in the questionnaire. It assumes that farmers delivering larger volumes have more frequent transactions with the slaughterhouse, and therefore a question concerning farmers' total delivery volumes in 2008 was asked to the farmers.

Table 5. Parameters of farmers' total delivery volumes in 2008

	"FCB farmers"				"IOF farmers"				chi-square	p-value
Delivery volumes	1	2	3	4	1	2	3	4	3.370	0.338
	27	24	12	5	39	17	16	6		

Farmers' total volumes of delivered pigs in 2008 are weighed by four scales with the values of 1: <500 pigs, 2: 500-3000 pigs, 3: 3000-6000 pigs, and 4: >6000 pigs. The p-value in Table 5 is 0.338, which is larger than 0.05. Thus, farmers' delivery volumes are not significantly different between the two groups in 2008. This means that there is no significant difference in farmers' transaction frequencies between "FCB farmers" and "IOF farmers", at least in last year.

5.3 Uncertainty

According to transaction cost theory, when information between producers and processors is asymmetric, opportunistic behavior on the part of processors occurs. Processors' opportunistic behavior will increase producers' perceived uncertainty to them. For the sake of examining if the phenomenon of information asymmetry also exists in the relationship between farmers and slaughterhouses, three questions have been asked in the questionnaire.

In the first question, farmers are asked to report if they receive market and financial information from the slaughterhouses that they are delivering to. In the subsequent question, the farmers who perceive that they have gotten information from the slaughterhouses are requested to evaluate the received information, here a five-point Likert scale is used to categorize the answers related to information reliability, i.e., 1= very reliable, 2=reliable, 3=neutral, 4=unreliable, and 5= very unreliable. In the last question, farmers are asked to compare the reliability of received information from Scan and IOFs directly.

Table 6. Parameters of information access and information reliability

	"FCB farmers"			"IOF farmers"			chi-square	p-value
Receiving information	N	Yes	No	N	Yes	No	8.729	0.003
	69	54	15	78	43	35		
More Reliable	Scan	IOFs	Don't know	Scan	IOFs	Don't know	35.425	0.000*
	23	16	30	4	53	19		

* The p-value is printed as 0.000 in SPSS. This should be interpreted as p< 0.001, and not be taken as exactly 0.

According to Table 6, significant differences between the two groups are found in both questions. One is associated with the answers about if farmers receive information from the slaughterhouses that they are delivering to have a significant difference between the two groups (i.e., 0.003<0.05). There are more "FCB farmers" receive information from the slaughterhouse (78% "FCB farmers" receive information from Scan, while the percent of "IOF farmers" who receive information from IOFs is 55%). The other significant difference regarding information reliability is generated by farmers' direct comparison between Scan and IOFs. It seems that IOF farmers' answers create this difference, since the responders who perceive that Scan provides the most reliable information is very rare (5.3% in the whole group) but 23% of "FCB farmers" think IOFs provide the most reliable information to their suppliers.

Table 7. Parameters of information reliability with scales

	"FCB farmers"					"IOF farmers"					chi-square	p-value
Information Reliability	1	2	3	4	5	1	2	3	4	5	2.466	0.65
	3	40	19	3	2	4	39	31	2	3		

Table 7 indicates that when farmers are requested to evaluate the received information from the slaughterhouses that they are delivering to, the answers give no significant difference between the two groups. However, if the neutral answers (scale 3) are not considered in this case, the differences with both groups will become more obvious. That is, majority of "FCB farmers" and "IOF farmers" perceive that the slaughterhouses that they are trading with provide much reliable information to them.

5.4 Farmers' trust or distrust towards the slaughterhouses

As a crucial factor of socio-psychological concepts, farmers' trust towards the slaughterhouse has been examined by comparing which type of slaughterhouse is more trustworthy between Scan and IOFs in the questionnaire.

Table 8. Parameters of farmers' trust toward the slaughterhouses

More trustworthy	"FCB farmers"			"IOF farmers"			chi-square	p-value
	Scan	IOFs	Don't know	Scan	IOFs	Don't know		
	18	23	28	1	69	10	46.176	0.000

As can be seen in Table 8, the p-value associated with chi-square test should be interpreted as less than 0.001. This fairly small p-value denotes that the difference between the two groups is very significant. There are totally 80 "IOF farmers" who have answered this question, but only one of them considers that Scan is more trustworthy than IOFs. This finding, is of course, not surprising because these responders have actually chosen to trade with IOFs slaughterhouses. What may be more interesting is that there are also 23 "FCB farmers" believe IOFs is more trustworthy than Scan, but the number of "FCB farmers" who held the opposite opinions is just 18. Consequently, there is a dominating opinion that IOFs is more trustworthy than Scan in both groups of "FCB farmers" and "IOF farmers".

5.5 Farmers' involvement in the slaughterhouses

Whether or not farmers perceive that they have been involved in the slaughterhouses is not tested directly in the questionnaire. Instead, two questions concerning the importance and desirability for farmers to be involved in the slaughterhouses have been asked. If farmers perceive that the slaughterhouses' survivals are important to their businesses, they may consider that it is necessary to be involved in the slaughterhouses. However, if farmers perceive that they have gotten bad treatment from the slaughterhouses, they may loss their interests to participate in the slaughterhouses' activities.

Based on the above consideration and assumptions, farmers have been asked which slaughterhouse's survival is much important for their future production and which slaughterhouse treats them better than the other one.

Table 9. Parameters of the involvement issue for the farmers

	"FCB farmers"			"IOF farmers"			chi-square	p-value
	Scan	IOFs	Don't know	Scan	IOFs	Don't know		
Slaughterhouses' survival	27	19	23	4	60	16	39.000	0.000
Better treatment	15	20	34	2	70	7	55.075	0.000

The answers in both questions point out that the differences between "FCB farmers" and "IOF farmers" are statically significant due to the extremely small p-values in Table 9.

The frequency distributions in the first question indicate that the majority of farmers in both groups have perceived that the survivals of the slaughterhouse(s) which they are trading with is more important than the other(s).There are totally 79 farmers who believe that IOF

slaughterhouses' survivals are much important for their suppliers, but only 31 farmers perceive that Scan's survival is much important for its suppliers. Due to obvious difference, it has enough confident to conclude that the involvement in the slaughterhouses is more important for "IOF farmers", as compared with "FCB farmers".

In the second question, the frequency distributions express that farmers in both groups take the same attitude, that is, "IOF farmers" can get a better treatment from IOF slaughterhouses than what "FCB farmers" get from Scan. Therefore, it should be conclude that "IOF farmers" have more desirability to be involved in the slaughterhouses than "FCB farmers".

5.6 Farmers' influence on slaughterhouses

Whether farmers perceive that they have enough power to influence the slaughterhouses' decisions have been tested by two questions. They are used to investigate farmers' complaint times to their trading partners and the response times of these complaints, respectively. The aim of this investigation is to test which type of slaughterhouse has more concerns about farmers' proposals (suggestions, questions and complaints). It assumes that the slaughterhouse that has more concerns about farmers' proposals, farmers may perceive that they have power to influence this slaughterhouse's decisions.

Table 10. Parameters of complaint times and response times

	"FCB farmers"			"IOF farmers"			t-value	p-value
	N	Mean	Std. Dev.	N	Mean	Std. Dev.		
Complaint times	34	4.12	4.326	31	2.71	2.383	1.603	0.114
Response times	34	0.85	1.374	31	2.03	1.958	-2.831	0.006

The p-value (0.114) related to farmers' compliant times in Table 10 indicates that there is no statistical difference between the two groups, even if "FCB farmers" complained more times than "IOF farmers" averagely (4.12>2.71). However, a significant difference in the response times between Scan and IOFs is observed due to the actual p-value is smaller than the critical p-value (0.006<0.05)

The average response rates related to farmers' complaints can be computed by the means of complaint times and response times which have been given in Table 10. The average responses rate in the group of "IOF farmers" is 82.17 %(1.958/2.383), while only 31.8 %(1.374/4.326) of farmers' complaints have been replied by Scan.

5.7 Farmers' transaction costs

The data related with transaction costs is quite difficult to be gathered and measured by the questionnaire because farmers may be sensitive to relevant questions (i.e., farmers may think that this kind of questions are their business secrets). For this reason, only farmers' general opinions related to three kinds of transaction costs (contact costs, contract costs and enforcement costs) have been asked in the questionnaire. It supposes that if the slaughterhouses are easier to be contacted, agree to a contract, and better at the contract enforcements, farmers' costs will be in a low level.

Table 11. Parameters of farmers' general attitudes toward transaction costs

	"FCB farmers"			"IOF farmers"			chi-square	p-value
	Scan	IOFs	Don't know	Scan	IOFs	Don't know		
Contact	19	17	33	1	67	11	56.544	0.000
Contract	18	16	35	1	61	16	48.217	0.000
Contract enforcement	18	16	35	4	45	29	22.793	0.000

As Table 11 shows, all the answers associated with the three kinds of transaction costs give significant differences between the two groups due to the fairly small p-values (less than 0.001). Both groups of farmers perceive that the slaughterhouse(s) which they are trading with is easier to be contacted and agree to a contract, and better at contract enforcement than other slaughterhouse(s). This perception, however, is accepted by more "IOF farmers" than "FCB farmers" due to the frequency distributions in all answers.

This finding corresponds to the result of another question very well. That is, when farmers are requested to recommend a slaughterhouse to their friends, no "IOF farmers" recommended Scan since they have perceived the transaction costs is too high to trade with Scan. A more interesting observation in this question is that 63% of "FCB farmers" also recommend IOF slaughterhouses to their friends.

5.8 Control variables

Two control variables have been used to control the outcomes of this empirical study. They are farmers' production capacities and farmers' risk attitudes. These two control variables are chosen since they are likely to influence the empirical outcomes. If the two groups of farmers differ significantly on production capacities, one may suspect that some reported distinctions in farmers' influences on the slaughterhouses are created by the size of operation rather than the response rate of farmers' complaints. On the other hand, if farmers' risk attitudes between the two groups are significantly different, the two groups of farmers should have important differences in their asset arrangements. Therefore, these two control variable should hold constant so as not to influence the empirical outcomes.

To measure the production capacities, farmers have been requested to report how many slaughtering pigs and sows that they have at the same time in their farms.

Table 12. Parameters of farmers' production capacities

	"FCB farmers"			"IOF farmers"			chi-square	p-value
Slaughter pigs	<200	200 - 1000	>1000	<200	200 - 1000	>1000	2.254	0.324
	26	24	16	34	17	16		
Sows	<150	150 - 500	>500	<150	150 - 500	>500	0.041	0.980
	41	13	3	47	14	3		

As Table 12 illustrates, two large p-values give no statistical differences in the numbers of slaughtering pigs and sows between the two groups. Hence, "FCB farmers" and "IOF farmers" do not differ significantly on production capacities.

Another question on farmers' preferred payments for their animals have been asked in the questionnaire to test farmers' risk attitudes. It assumes that alternative contracts are available to the farmers, one is the offer with a fixed price of 14 SEK/kg, and the other alternative with a fluctuating price which could vary between 12 and 16 SEK/kg (the probabilities between receiving a higher price and a lower are equal), farmers are asked which offer they are prefer.

Table 13. Parameters of farmers' risk attitudes

	"FCB farmers"		"IOF farmers"		chi-square	p-value
	Alt. 1	Alt. 2	Alt. 1	Alt. 2	0.036	0.849
Risk attitudes	20	42	21	41		

The fairly large p-value (0.0849) in Table 12 also gives no significant difference in farmers' choices between the two groups. Hence, "FCB farmers" and "IOF farmers" do not differ significantly on risk attitudes as well.

Since all statistical tests of the two control variables give no significant differences between the two groups, it is confident to conclude that these two control variables have no affects on the obtained differences between the two groups. The other explanation of this finding is the reported results associated with statistics tests are reliable unless these two control variables are not appropriate to be introduced in this investigation.

6 Analysis

The latent variables related to the transaction cost dimensions and the socio-psychological concepts have been tested statistically in the last chapter. The hypothesized determinant of the farmers' choice of trading partner – transaction costs are, however, not yet confirmed by the empirical tests. Hence the analysis in this chapter is to explore if transaction costs determine farmers' choices of trading partner. To analyze this, the hypotheses which are used to compare the different transaction costs between "FCB farmers" and "IOF farmers" ought to be tested.

6.1 The hypotheses related to transaction cost dimensions

Among the empirical findings in relation to farmers' asset specificity, the two group farmers only differ in site specificity, i.e., "IOF farmers" have a longer distance from their firms to the slaughterhouses. On other words, the proper location of "FCB farmers" may lower their transaction costs since site specificity economize on inventory and transportation expenses (Williamson, 1996). However, no significant difference in human asset specificity and physical asset specificity are observed between the two groups of farmers. Hence, the site specificity difference can be seen as a rather week support for the first hypothesis **(H1)**: *"FCB farmers" have more transaction specific assets in their farming operations than "IOF farmers"*.

However, there is no statistical difference between the delivery volumes of the two farmer groups. This means that the empirical test doesn't support the hypothesis related to the transaction frequency variable **(H2)**, which says that *"FCB farmers" sell larger volumes than "IOF farmers"*. Hence, this hypothesis ought to be rejected confidently.

According to the significant difference in information access between the two groups of farmers, it may be supposed that Scan provides more information to its suppliers. Nevertheless, the "FCB farmers" don't believe that the information that they get is more reliable than what "IOF farmers" get from IOF slaughterhouses since no significant difference regarding information reliability is observed in both groups. Therefore, there is not enough empirical evidence to support that the difference in information access may create more asymmetric information in the relation between IOFs and "IOF farmers" than between Scan and "FCB farmers", or to conclude "IOF farmers" experience more uncertainty than "FCB farmers". Due to this, the hypothesis about *"FCB farmers" experience more uncertainty in their relationship to the slaughterhouses than "IOF farmers"* **(H3)** should not be accepted, but there is neither reason to reject it.

To conclude; the three transaction cost dimensions do not indicate any major differences between the two groups of farmers as to their perceived transaction costs. As the transaction cost dimensions are compared, no asset specificity parameters were found to differ between the two groups of farmers. Due to the similar asset arrangements, neither the parameters of farmers' transaction frequencies and their perceived uncertainties show any significant differences between the two groups. These findings correspond to transaction cost arguments which indicate that uncertainty and transaction frequency are often generated by asset specificity (Farazmand, 2002). For this reason, the hypothesis which states that *"FCB farmers" have higher transaction costs than "IOF farmers"* **(H4)** cannot be accepted.

However, the answers related to farmers' general attitudes towards transacting with two types of trading partners provide explanations to the differences between the farmer groups. The parameters of transaction costs indicate that the two groups of farmers differ significantly in their perception of contact costs, contract cost and contract enforcement costs in relation to the two types of trading partners. Especially the "IOF farmers" have a solid belief that IOF slaughterhouses are easier to contact, to agree to a contract with and better at the contract enforcement than Scan. This belief of "IOF farmers" implies that "IOF farmers" invest fewer resources in collecting information, contracting and controlling the contracts than "FCB farmers". Therefore the transaction cost level of "IOF farmers" is lower than "FCB farmers".

6.2 The hypotheses related to socio-psychological concepts

The lower transaction costs of "IOF farmers" may be interpreted in terms of socio-psychology, which include various kinds of farmer attitudes toward their trading partners. The two groups of farmers have significantly different attitudes towards their trading partners.

When the farmers declare which type of slaughterhouse is the most trustworthy a dominating attitude is that IOF slaughterhouses are more trustworthy. This finding is contrary to the theoretical arguments, namely that investor-owned firms are "low-trust and coercive", while vertically integrated firms (such as Scan) are "high-trust and democratic" (Shapira, 1999). Because of this, the hypothesis which is based on the theoretical argument that *"FCB farmers" perceive more trust to their trading partners, as compared with "IOF farmers"* (**H5**) should be rejected.

Furthermore, when farmers were asked about involvement and influence issues both groups of farmers answered similarly. They perceive themselves to have more involvement in and stronger influence in IOF slaughterhouses. Since farmer participation in the governance of FCBs may be expected due to the FCBs' cooperative roots, farmers should have more positive attitudes to Scan than to IOF slaughterhouses. Such positive attitudes may reduce the transaction costs in relation between Scan and "FCB farmers". Nevertheless, the theoretical arguments do not hold true in this case. The empirical findings do not support that farmers have more positive attitudes toward Scan. Therefore, it seems reasonable to conclude that farmers' beliefs in the FCBs' cooperative roots are not existent any more, at least not in the case of Scan.

Since "IOF farmers" have perceived that their trading partners' survival is much important for them and they are also willing to be involved in their trading partners, it is reasonable to conclude that "IOF farmers" have higher involvement in the slaughterhouses than "FCB farmers". For this reason, the hypothesis which assumes *"FCB farmers" have higher involvement in their trading partners, as compared with "IOF farmers"* (**H6**) should be rejected confidently.

The empirical finding also shows that "IOF farmers" are likely to perceive more influences on their trading partners than "FCB farmers" due to the different behavior towards farmers' complaints between the two types of trading partners. Therefore, the hypothesis expresses that *"FCB farmers" have more influence on their trading partners, as compared with "IOF farmers"* (**H7**) is not accepted.

Based on the above analysis, when the two groups of farmers' perceived transaction costs are combined with the socio-psychological concepts' influence on transaction costs, it seems reasonable to conclude that Scan cannot be seen as a means to lower transaction costs. On the contrary, it seems that Scan has increased the transaction costs from the farmers' points of views due to farmers' negative attitudes to Scan. Hence, the final hypothesis **(H8)** which assumes that *FCBs create lower transaction costs for the farmers than IOFs do* may be confidently refused.

6.3 A comparison with a prior study

Since a similar study was conducted by Fahlbeck (1996), it is interesting to compare the observations in that study with those of this study. The most important difference between these two studies is the final outcomes. In Fahlbeck's study, cooperatives were concluded as a means of lowering the farmers' transaction costs, while the findings in this study indicate that IOFs create lower transaction cost for farmers. A plausible explanation is that the cooperative organizational form, studied by Fahlbeck, and the FCB model of this study are fundamentally different albeit today's Scan is still farmer-owned and has cooperative roots. Through the transformation from a cooperative to a farmer-controlled business Scan lost its cooperative ideology and its good reputation among the farmer population. It is now considered to be one firm among others, operating as a profit-driven slaughterhouse, though only less efficiently.

This explanation gets support from the empirical findings related to the socio-psychological concepts in this study, that is, when FCBs become large and complex, they may face difficulties in relation to their suppliers. Especially when some external co-owners participate in the governance, "the external co-owners bring with them another way of doing business, which is often not appreciated by the farmers" (Nilsson, Kihlén and Norell, 2009). As the FCBs can no longer lower the farmers' transaction costs, it is reasonable that farmers have a negative attitude to them.

7 Discussion

Besides transaction costs, some other factors may have an effect on farmers' choice of trading partner. Three of them are highlighted and discussed in this chapter. They are observed in the empirical study, but they are not investigated in depth because they are extraneous to the two types of theories. Nevertheless they are important and they are related to the farmers' choice.

First, *the ownership structure* is an evident difference between Scan and the IOFs. Because of this difference, Swedish pig farmers are categorized into two groups; one is selling to Scan and the other is selling to IOF slaughterhouses. The takeover of Scan by HK Roukatalo is, however, likely to influence the farmers' attitudes to Scan. The eventual direct impact that the slaughterhouses' ownership form may have on the farmers' attitudes to the slaughterhouses was examined in the empirical study. The question concerned whether the farmers would change their choice of slaughterhouse if Scan and IOFs altered their ownership structures. The answers indicate that there are no important differences between the two groups of farmers. Most farmers in both groups believe that they probably change their initial choice. This finding indicates that the ownership difference between Scan and IOF slaughterhouses has an effect on farmers' attitude to their trading partner, and therefore farmers' choice of trading partner is determined by the ownership structures of the slaughterhouses.

The second extraneous factor is the *slaughterhouses' pricing strategies*. It is not a secret that IOF slaughterhouses tend to offer a better price to their suppliers than Scan. This phenomenon can be observed in some farmers' comments within the questionnaires. Several farmers stated that they are much concerned about the price of their animals and a couple of the Scan suppliers acknowledged that they would get a higher payment if they were to deliver to IOFs. This is of course no surprising. The complaints of low payment were more intensive in the group of "FCB farmers". Hence, it may be assumed that to the extent that price is an important variable in the farmers' decision to switch partners the "FCB farmers" are more likely to switch. This assumption is supported by the answers to the questionnaire's question about whether the farmers have changed slaughterhouse. Among the 77 "IOF farmers" who answers this question, only three denied that they had changed slaughterhouses before, whereas 81% of "FCB farmers" reported that they never changed partners. Although no empirical findings are available to verify that the 74 "IOF farmers" who have changed their trading partners are former suppliers to Scan, at least there is a linkage between the different switching frequencies and the different payment between the two kinds of slaughterhouses. Therefore, it seems reasonable to conclude that price is an important determinant of farmers' choice of trading partners.

The third latent factor should be the *farmers' loyalty to their trading partner*, which may also link to the question of changing slaughterhouses in the questionnaire. The significantly different answers between the two groups to this question, on the other hand, may be interpreted as "FCB farmers" show more their loyalties to Scan than "IOF farmers" do. Farmers' loyalty is closely related with farmers' attitude toward their trading partner. If farmers show a bad attitude toward their trading partners, it is impossible that farmers have high level loyalty to their trading partners. Since all empirical tests have the same direction that "FCB farmers" take a negative attitude to Scan, the finding of "FCB farmers" have more loyal thinking than "IOF farmers" would not be accepts. Then, if farmers' attitude can not explain why just few "FCB farmers" have changed slaughterhouses, some other factors may be valid to explain it. The most reasonable explanation is that "FCB farmers" have a variety of barriers that may hinder them to change slaughterhouse, such as lack of information about

other slaughterhouses, a locked-in contract with Scan and risk aversion. Therefore, farmers' loyal thinking can not be regarded as the determinant that can influence their choices of slaughterhouses.

The last factor that may influence farmers' choice is about *other persons' opinions.* This factor is important for farmers since decisions cannot be made in a vacuum. It assumes that farmers have close connections with each others and they also share information within a particularly social society (such as the agricultural cooperative society). This factor is examined in the empirical tests. Farmers have been asked whether their choice of trading partner is affected by the people whom they are familiar with. .The answers to this question show statistical differences between the two groups of farmers. Most "IOF farmers" perceive that they have the same trading partner as the people that they socialize with. This means "IOF farmers" are more sensitive to other persons' opinions than "FCB farmers". Hence, their choice of trading partner is more likely to be influenced by other persons' opinion. Due to this observation, the factor related to other persons' opinions should be regarded as a determinant of farmers' choice of trading partner.

8 Conclusions

This study shows that transaction costs are significant in affecting farmers' choice of trading partner. It also demonstrates that the degree of farmers' perceived transaction costs are determined by which type of slaughterhouses they choose to deliver to. The farmers delivering to Scan feel that they have higher transaction costs than the farmers who send their pigs to IOF slaughterhouses. This finding implies that the theoretical argument (traditional cooperative are organized to lower farmers' transaction costs) may not apply to Scan. This is because the takeover of Scan in 2007 changes Scan' ownership structure and today's Scan cannot be characterized as a cooperative. The change of Scan's ownership structure may result in farmers' negative opinions of Scan, and thereby increasing farmers' perceived costs of transacting with Scan.

According to the findings related to farmers' attitude towards Scan, Scan seems to have a big problem with the farmers.This problem can be regarded as a crisis of confidence between Scan and the farmers since majority of farmers consider Scan's competitors (IOF slaughterhouses) are trustworthier than Scan. The findings also show that the farmers are no longer able to control Scan due to the takeover of Scan by the external investor. Because of this, the farmers become dissatisfied with Scan and they loose their interests to be involved in Scan. The consequence of farmers' negative opinions to Scan may be that the farmers with a high degree of specific assets and transaction frequency would not consider Scan as a safeguard to reduce the uncertainty by transacting with the slaughterhouses, thereby lowering the transaction costs. This has been proved by the empirical study because there are no important relationships between the economic variables (the three transaction cost dimensions) and farmers' perceived transaction costs. This observation also implies that the farmers to a large extent assess their trading partners in social terms (the three socio-psychological concepts) rather than economic ones. Hence the application of socio-psychological theory turns out to be valuable in this study.

The above-mentioned problem between Scan and the farmers can be seen as a warning to Scan. If Scan does not take some measures to change the relationship with the farmers, Scan may lose a large numbers of suppliers when the suppliers' contracts expire. In order to keep the current suppliers and recruit the new suppliers, Scan must perform more efficiently to reduce the farmers' perceived transaction costs. Then, what is Scan supposed to do to realize this? The answers to this question are available in the findings of this study. One suggestion from the findings is that Scan would have to re-design its communication strategy in relation to the farmers. If the farmers get more reliable information from Scan, the contact costs in relation to Scan would be reduced. Another suggestion is that Scan should pay more attention to farmers' voices (farmers'complaints, questions and suggestions). If the farmers perceive that their voice gets good attention, the costs of agreeing a contract and enforcing the contract with Scan may be lower. However, these suggestions are based on a precondition, which is that Scan must offer a competitive price to the farmers. Without this, the farmers probably would not change their attitude towards Scan.

It should be noted that the findings of this study are based on the farmers' perception of transaction costs. The transaction costs of the slaughterhouses are not examined. For this sake, it seems that the transaction costs from the slaughterhouses' perspective are necessary to investigate in a future study. Probably, this future study can be implemented by comparing the accounting figures between Scan and the IOF slaughterhouses.

Hopefully, these empirical findings in this study may have some specific contribution to future researches. But it must be emphasized that this study only concerns one FCB in one industry of one country, and therefore these finding are not generally valid.

One should keep in mind that once there exist FCBs in a market, the FCBs' competitors (IOFs) may have to adjust their strategies, just as FCBs have to adjust to the IOFs. The competition between FCBs and IOFs will never stop unless one of them disappears from the market. Therefore, every single change of FCBs or IOFs is worth to be explored by researchers. Comparisons between FCBs and IOFs will always be of interest for scholars.

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Appendix 1. Number of piglets and total number of pigs in June 2008

Average incorrectnesses are market as italics after the data.

Standard errors in per cent.

Område	Smågrisar, under 20 kg		Summa svin	
Län				
Stockholms	2 891	*7,3*	15 372	*5,3*
Uppsala	11 667	*2,6*	32 901	*2,3*
Södermanlands	17 376	*2,6*	58 663	*2,9*
Östergötlands	33 473	*1,8*	114 883	*1,4*
Jönköpings	4 761	*1,0*	14 012	*0,6*
Kronobergs	3 485	*0,5*	14 852	*0,2*
Kalmar	25 365	*1,7*	81 806	*1,2*
Gotlands	17 137	*0,2*	59 871	*1,2*
Blekinge	6 599	*3,6*	32 531	*2,7*
Skåne	143 298	*0,5*	475 206	*0,4*
Hallands	53 751	*2,1*	199 234	*3,5*
Västra Götalands	83 787	*0,7*	291 808	*0,4*
Värmlands	16 753	*1,6*	56 765	*2,1*
Örebro	11 943	*2,6*	47 477	*2,2*
Västmanlands	20 256	*2,8*	60 178	*2,2*
Dalarnas	2 676	*0,4*	7 031	*0,8*
Gävleborgs	1 729	*3,6*	7 580	*3,4*
Västernorrlands	1 901	*0,7*	8 593	*0,6*
Jämtlands	193	*15,2*	635	*5,5*
Västerbottens	4 769	*2,6*	18 731	*1,1*
Norrbottens	1 535	*0,7*	11 161	*0,3*
Produktionsområde				
Götalands södra slättbygder	101 368	*1,2*	366 850	*1,9*
Götalands mellanbygder	105 562	*0,6*	351 373	*0,5*
Götalands norra slättbygder	96 565	*0,8*	349 402	*0,6*
Svealands slättbygder	75 917	*1,1*	251 688	*0,9*
Götalands skogsbygder	64 752	*0,9*	210 315	*0,8*
Mellersta Sveriges skogsb.	10 704	*2,0*	31 079	*3,2*
Nedre Norrland	4 155	*1,7*	18 646	*1,6*
Övre Norrland	6 321	*1,9*	29 936	*0,7*

Stödområde

1	84	*34,4*	508	*12,1*
2a	6 452	*1,9*	31 354	*0,7*
2b	2 548	*0,5*	11 920	*0,4*
3	3 681	*1,7*	9 170	*2,8*
4a+4b	19 482	*1,5*	64 493	*1,9*
5a	10 124	*1,2*	32 345	*1,0*
5b	48 242	*1,2*	148 932	*0,8*
5c	18 204	*2,4*	56 859	*2,5*
5m	14 567	*2,0*	54 432	*1,7*
Övriga riket	341 961	*0,5*	1 199 277	*0,6*
Hela riket				
2008	465 345	*0,4*	1 609 289	*0,5*
2007	479 518	-	1 676 327	-
2006	491 644	*0,6*	1 680 535	*0,5*
2005	537 800	-	1 811 216	-

Source: The Swedish Board of Agriculture, 2008

Appendix 2. Slaughtering of livestock at slaughterhouses

	2006	2007	2008	Jan - dec *Jan - Dec* 2006	2007	2008	Dec *Dec* 2006	Dec *Dec* 2007	Dec *Dec* 2008
Slaktsvin *Fattening pigs*									
Antal (1 000-tal) *1000 heads*	2 918,61	2 889,54	2 922,35	2 918,61	2 889,54	2 922,35	201,66	197,91	222,77
Kvantitet (1 000 ton) *Quantity*	251,56	250,91	253,56	251,56	250,91	253,56	17,20	17,20	18,83
Suggor *Sows*									
Antal (1 000-tal) *1000 heads*	56,36	59,68	56,45	56,36	59,68	56,45	3,83	3,69	3,79
Kvantitet (1 000 ton) *Quantity*	9,24	9,70	9,00	9,24	9,70	9,00	0,64	0,60	0,62
Galtar *Boars*									
Antal (1 000-tal) *1000 heads*	1,65	1,77	1,68	1,65	1,77	1,68	0,12	0,10	0,10
Kvantitet (1 000 ton) *Quantity*	0,26	0,28	0,27	0,26	0,28	0,27	0,02	0,02	0,02
Unggris *Young pigs*									
Antal (1 000-tal) *1000 heads*	8,58	11,93	12,10	8,58	11,93	12,10	0,92	1,08	1,42
Kvantitet (1 000 ton) *Quantity*	0,33	0,47	0,47	0,33	0,47	0,47	0,04	0,04	0,06
Unggalt *Young boars*									
Antal (1 000-tal) *1000 heads*	36,51	40,70	41,20	36,51	40,70	41,20	2,78	3,03	3,21
Kvantitet (1 000 ton) *Quantity*	3,06	3,43	3,46	3,06	3,43	3,46	0,23	0,25	0,26
S:a Svin *Total Pigs*									
Antal (1 000-tal) *1000 heads*	3 022,26	3 004,11	3 033,80	3 022,26	3 004,11	3 033,80	209,31	205,81	231,29
Kvantitet (1 000 ton) *Quantity*	264,45	264,87	266,76	264,45	264,87	266,76	18,13	18,11	19,78

Note: The totals may include minor groups which are not presented separately in this table.

Source: Regina-slaughter (Slaughter Database of Swedish Board of Agriculture), 2008

Appendix 3. Pig slaughterhouses in Sweden

Companies, locations, and shares (%) of slaughtered pigs during the first six monthes of 2008 (total slaughtered pigs 1,525,523 st)

Brålanda
AJ Dahlbergs
Slakteri AB
3,6 %

Skara
Scan AB
21,4 %

Skövde
Skövde Slakteri
AB
8,9 %

Dalsjöfors
Dalsjöfors Slakteri
AB
5,9 %

Harplinge
Ginsten Slakteri
AB
2,0 %

Luleå
Alviksgården
AB
2,0 %

Skellefteå
Nyhléns &
Hugosons AB
0,4 %

Delsbo
Delsbo Slakteri
AB
0,0 %

Rättvik
Siljans Chark AB
0,8 %

Uppsala
Scan AB
1,4 %

Visby
Scan AB
3,1 %

Kalmar
KLS Livsmedel
7,0 %

(Danish Crown)

Trelleborg
Ugglarp Slakteri AB
5,4 %

(Danish Crown)

Kristianstad
Scan AB
37,5 %

Source: KCF (Swedish Meat Industry Assocaition), 2008

Appendix 4. Questionnaire

Questionnaire: Perceived differences between Scan AB and other slaughterhouses
The aim of this study is to clarify the perceived differences between Scan and the other slaughterhouses. That is why we wonder which slaughterhouse you are delivering to:

1.1 Which slaughterhouse or which slaughterhouses do you deliver to and how large percentage of your animals do you send to each slaughterhouse?

Scan	_____ %
Ugglarps Slakteri	_____ %
KLS Livsmedel	_____ %
Ginsten Slakteri	_____ %
Dalsjöfors Slakteri	_____ %
SLP	_____ %
Sell at the spot market	_____ %
Other slaughterhouse…………………..	_____ %
TOTAL	**100 %**

Imagine that you are advising a friend who is considering starting raising pigs. Your friend is not sure whether to deliver to Scan or to another slaughterhouse. Your friend has studied the slaughter prices and found that there are no large differences between the alternatives. The service does not seem to differ either. Your task is to clarify to your friend which alternative that is the best considering the aspects listed below.

2.1 This slaughterhouse will consider your suggestions, questions and complaints to larger extent than the other:

       Scan
       Another slaughterhouse
       It doesn't matter/I have no opinion.

2.2 The survival of this slaughterhouse is the most important for your future production:

       Scan
       Another slaughterhouse
       It doesn't matter/I have no opinion.

2.3 You can trust this slaughterhouse more than the other:

       Scan
       Another slaughterhouse
       It doesn't matter/I have no opinion.

2.4 It is easier to get in contact with this slaughterhouse:

       Scan
       Another slaughterhouse
       It doesn't matter/I have no opinion.

2.5 It is easier to agree to a contract with this slaughterhouse:

       Scan
       Another slaughterhouse
       It doesn't matter/I have no opinion.

2.6 This slaughterhouse is the best at following the contracted terms:
> Scan
> Another slaughterhouse
> It doesn't matter/I have no opinion.

2.7 This slaughterhouse provides the most reliable market information:
> Scan
> Another slaughterhouse
> It doesn't matter/I have no opinion.

2.8 This slaughterhouse will treat you better than the other will:
> Scan
> Another slaughterhouse
> It doesn't matter/I have no opinion.

2.9 Generally, which slaughterhouse would you recommend to your friend?
> Scan
> Another slaughterhouse
> It doesn't matter/I have no opinion.

2.10 Assume that Swedish Meats and LSO withdraw as owners to Scan or that any of the other slaughterhouses would get pig farmers as owners – would you then change your advice?

Probably		Probably not
1	2	3

2.11 Assume that you are considering to advice your friend to deliver to Scan – how much more must another slaughterhouse pay compared to Scan in order for you to change your advice? Assume that both alternatives are paying approximately 13/SEK/kg (incl. dividend, bonuses etc.)
- ☐ 0:00 < 0:05 kr more per kg
- ☐ 0:05 < 0:15 kr more per kg
- ☐ 0:15 < 0:50 kr more per kg
- ☐ 0:50 < 1:00 kr more per kg
- ☐ 1:00 < 2:00 kr more per kg
- ☐ 2:00 < kr more per kg

2.12 Assume that you are considering to advice your friend to deliver to some other slaughterhouse than Scan – how much more must Scan pay compared to the other slaughterhouse in order for you to change your advice? Assume that both alternatives are paying approximately 13/SEK/kg (incl. dividend, bonuses etc.)
- ☐ 0:00 < 0:05 kr more per kg
- ☐ 0:05 < 0:15 kr more per kg
- ☐ 0:15 < 0:50 kr more per kg
- ☐ 0:50 < 1:00 kr more per kg
- ☐ 1:00 < 2:00 kr more per kg
- ☐ 2:00 < kr more per kg

This section discusses your experiences of the slaughterhouse(s) that you deliver to.

3.1 How fare is it to the slaughterhouse(s) that you are delivering to?   _____ kilometer
                                                                              _____ kilometer

3.2 Do you receive market and financial information (information regarding supply and demand of pigs and pork) from the slaughterhouse(s) that you are delivering to today?
   ☐ Yes   ☐ No

3.3 How reliable is the information you receive from the slaughterhouses?

Very reliable	Reliable	Neither	Not reliable	Very unreliable
☐	☐	☐	☐	☐

3.4 How many times during the previous year have you complained about anything or suggested something to the slaughterhouse(s) that you deliver to?

Scan :_____times
Other slaughterhouses:_____ times

3.5 How many times have your complaint or suggestion resulted in a change?

Scan :_____times
Other slaughterhouses:_____ times

3.6 What do you think about the following slaughterhouses (give a mark for all slaughterhouses even if you do not deliver to them):

	Like very much				Do not like at all	
	1	2	3	4	5	Don't know
Scan	☐	☐	☐	☐	☐	☐
Ugglarps Slakteri	☐	☐	☐	☐	☐	☐
KLS Livsmedel	☐	☐	☐	☐	☐	☐
Ginsten Slakteri	☐	☐	☐	☐	☐	☐
Dalsjöfors Slakteri	☐	☐	☐	☐	☐	☐
SLP	☐	☐	☐	☐	☐	☐
Other:_____	☐	☐	☐	☐	☐	☐

3.7 How reliable do you think the following slaughterhouses are (give a mark for all slaughterhouses even if you do not deliver to them):

	Very reliable				Very unreliable	
	1	2	3	4	5	Don't know
Scan	☐	☐	☐	☐	☐	☐
Ugglarps Slakteri	☐	☐	☐	☐	☐	☐
KLS Livsmedel	☐	☐	☐	☐	☐	☐
Ginsten Slakteri	☐	☐	☐	☐	☐	☐
Dalsjöfors Slakteri	☐	☐	☐	☐	☐	☐
SLP	☐	☐	☐	☐	☐	☐
Other:_____	☐	☐	☐	☐	☐	☐

3.8 How good treatment do you get/think you would get from the following slaughterhouses (give a mark for all slaughterhouses even if you do not deliver to them):

	Very good				Very bad	
	1	2	3	4	5	Don't know
Scan	☐	☐	☐	☐	☐	☐
Ugglarps Slakteri	☐	☐	☐	☐	☐	☐
KLS Livsmedel	☐	☐	☐	☐	☐	☐
Ginsten Slakteri	☐	☐	☐	☐	☐	☐
Dalsjöfors Slakteri	☐	☐	☐	☐	☐	☐
SLP	☐	☐	☐	☐	☐	☐
Other:_____	☐	☐	☐	☐	☐	☐

3.9 Have you ever changed slaughterhouse? If so, how many times have you changed?
   ☐ Yes   ☐ No   _____ times

3.10 How many pigs in total did you deliver to slaughter during 2008?
   ☐ < 500 pigs   ☐ 500-3000 pigs   ☐ 3000-6000 pigs
                       ☐ > 6000 pigs

3.11 Assume that the slaughterhouse that you are delivering to offers you two kinds of contracts. The contract will be valid for your total production during one year. The first alternative offers you a fixed price during the period. The other alternative offers you a fluctuating price, which implies that you can both loose and earn money in relation to alternative one:
   1) You get 14 SEK/kg or
   2) You will get paid between 12 and 16 SEK/kg. The probability for receiving a price higher than 14 SEK is equal to receiving a lower price.
Which alternative do you prefer?
       ☐ I prefer alt. 1   ☐ I prefer alt. 2

3.12 If you had no contract today, which slaughterhouse(s) would you choose to deliver to?

Scan	_____ %
Ugglarps Slakteri	_____ %
KLS Livsmedel	_____ %
Ginsten Slakteri	_____ %
Dalsjöfors Slakteri	_____ %
SLP	_____ %
Sell at the spot market	_____ %
Other slaughterhouse……………………_____ %
TOTAL	**100 %**

This section will provide background information about you and your company.

4.1 How old are you?
☐ <30 ☐ 30-50 ☐ 50-65 ☐ >65

4.2 Gender:
☐ Male ☐ Female

4.3 Highest completed education:
☐ Primary/secondary school
☐ Agricultural high school
☐ High school
☐ After-high school short education (e.g. management courses, BYS, Gårdsmästare etc.)
☐ Agricultural Collage/University, namely: _____
☐ Collage/University

4.4 How many percent of your working hours do you spend at the farm?
……. % (of which ……. % spent on pig raising)

4.5 Do you have experience from working outside the farm?
☐ Yes ☐ No

4.6 What kind of pig production do you have?
☐ Slaughter pigs ☐ Piglets ☐ Integrated production, totally or partly

4.7 How many slaughter pigs do you have at the same time at the farm?
☐ < 200 ☐ 200-1000 ☐ > 1000

4.8 How many sows do you have at the same time at the farm?
☐ < 150 ☐ 150-300 ☐ > 500

4.9 If you were to sell your farm today (incl. the animals) would you then get the money you have invested back?
☐ Yes ☐ No ☐ Don't know

4.10 Generally, what in what conditions are your equipment and houses at the farm (stables with equipment, machinery etc.)?
☐ New (during last three years) ☐ Good condition ☐ Worn out ☐ Don't know

4.11 To what slaughterhouse do the most people you know deliver (neighbors, friends, acquaintances, relatives)?
☐ Same as me
☐ Other than me

Appendix 5. Chi-square table

area	.995	.990	.975	.950	.900	.750	.500	.250	.100
1	0.00004	0.00016	0.00098	0.00393	0.01579	0.10153	0.45494	1.32330	2.70554
2	0.01003	0.02010	0.05064	0.10259	0.21072	0.57536	1.38629	2.77259	4.60517
3	0.07172	0.11483	0.21580	0.35185	0.58437	1.21253	2.36597	4.10834	6.25139
4	0.20699	0.29711	0.48442	0.71072	1.06362	1.92256	3.35669	5.38527	7.77944
5	0.41174	0.55430	0.83121	1.14548	1.61031	2.67460	4.35146	6.62568	9.23636
6	0.67573	0.87209	1.23734	1.63538	2.20413	3.45460	5.34812	7.84080	10.64464
7	0.98926	1.23904	1.68987	2.16735	2.83311	4.25485	6.34581	9.03715	12.01704
8	1.34441	1.64650	2.17973	2.73264	3.48954	5.07064	7.34412	10.21885	13.36157
9	1.73493	2.08790	2.70039	3.32511	4.16816	5.89883	8.34283	11.38875	14.68366
10	2.15586	2.55821	3.24697	3.94030	4.86518	6.73720	9.34182	12.54886	15.98718
11	2.60322	3.05348	3.81575	4.57481	5.57778	7.58414	10.34100	13.70069	17.27501
12	3.07382	3.57057	4.40379	5.22603	6.30380	8.43842	11.34032	14.84540	18.54935
13	3.56503	4.10692	5.00875	5.89186	7.04150	9.29907	12.33976	15.98391	19.81193
14	4.07467	4.66043	5.62873	6.57063	7.78953	10.16531	13.33927	17.11693	21.06414
15	4.60092	5.22935	6.26214	7.26094	8.54676	11.03654	14.33886	18.24509	22.30713
16	5.14221	5.81221	6.90766	7.96165	9.31224	11.91222	15.33850	19.36886	23.54183
17	5.69722	6.40776	7.56419	8.67176	10.08519	12.79193	16.33818	20.48868	24.76904
18	6.26480	7.01491	8.23075	9.39046	10.86494	13.67529	17.33790	21.60489	25.98942
19	6.84397	7.63273	8.90652	10.11701	11.65091	14.56200	18.33765	22.71781	27.20357
20	7.43384	8.26040	9.59078	10.85081	12.44261	15.45177	19.33743	23.82769	28.41198
21	8.03365	8.89720	10.28290	11.59131	13.23960	16.34438	20.33723	24.93478	29.61509
22	8.64272	9.54249	10.98232	12.33801	14.04149	17.23962	21.33704	26.03927	30.81328
23	9.26042	10.19572	11.68855	13.09051	14.84796	18.13730	22.33688	27.14134	32.00690
24	9.88623	10.85636	12.40115	13.84843	15.65868	19.03725	23.33673	28.24115	33.19624
25	10.51965	11.52398	13.11972	14.61141	16.47341	19.93934	24.33659	29.33885	34.38159
26	11.16024	12.19815	13.84390	15.37916	17.29188	20.84343	25.33646	30.43457	35.56317
27	11.80759	12.87850	14.57338	16.15140	18.11390	21.74940	26.33634	31.52841	36.74122
28	12.46134	13.56471	15.30786	16.92788	18.93924	22.65716	27.33623	32.62049	37.91592
29	13.12115	14.25645	16.04707	17.70837	19.76774	23.56659	28.33613	33.71091	39.08747
30	13.78672	14.95346	16.79077	18.49266	20.59923	24.47761	29.33603	34.79974	40.25602

Source: StatSoft, Inc., 1984