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Preface:

This Ph.D. thesis is a research project supported by the Danish Research centre for Organic Farming (DARCOF II), entitled “Future supply and marketing strategies in the Danish organic food sector”.

Part of the Ph.D. education in making the thesis has taken place on Cornell University, N.Y State, USA, following one semester at the Department of Rural Sociology/International development studies spring 2003. Likewise other Ph.D. courses and summer school have been carried out at the Research School for Organic Agriculture and Food Systems (SOAR), Faculty of Life Science, Copenhagen University.

The thesis marks the end of a long journey where I first of all would like to express my sincerest gratitude to my supervisor Professor Kostas Karantininis for his thoughtful guidance and critical reviews to help me find a path when I got lost. Also I am profoundly grateful for my co-supervisor Research director Mogens Lund for all his constructive comments on the FOI reports written on behalf of the empirical results for the thesis.

To my colleagues Lartey Lawson, Kim Martin Lind and Henrik Hansen I would like to say thank you for your time, help and support in the world of statistics.

In my heart I am also grateful for the opportunity I have had to present my work at conferences and workshops sharing thoughts and ideas along the way with good people who indirectly have contributed to the completion of this thesis.

Paul Rye Kledal
Copenhagen, July 2007

Summary

The main objective of this thesis is to investigate the factors which historically have shaped the evolution of the Danish organic food and farm sector, and to determine what its near future could be in terms of new supplier motivations for converting to organic, eventual changes in the farm structure and new modes of organizing the governance structure between farmers and retailers.

From a slow introduction during the 1980s the development of the organic farms sector itself takes on speed during the 90's getting broad societal recognition and political support. However, by the turning point of the millennium organic farming in Denmark had reached maturity and even started to decline in 2004 in terms of number of farms and land converting to organic production. Twenty five years of development seemed to follow the shape of a typical Product Life Cycle, starting with the phase of introduction, then growth, reaching maturity and later decline.

To investigate the past and future development of the Danish organic sector the theoretical model of the Product Life Cycle has been applied and combined with Adoption/diffusion theory. Equally the models have been extended using a supply chain approach where the focus of interest has been on bargaining power along the chain.

Two organic industries were chosen as case studies using both qualitative and quantitative methods for data collection and analysis.

The results on supplier motivations for converting to organic production indicated that the new comers would be both professional and market oriented, and have on average larger farms than the producers who entered previously during the period of market maturity and decline. The supplier profile found was therefore similar to the early majority during the 90's when the organic market experienced a significant growth.

The results on the supplier profiles supports also the findings made on the development on farm structure showing a growing bifurcation and concentration of production. Likewise the analysis made between organic and conventional consumer prices illustrates a clear convergence, which over time will support dynamic professional full time farmers.

The results on the modes of governance structure in the two industries showed a development of closer partnership between retailers and suppliers concerning product innovation and sales promotion. Especially in the organic pork industry where one slaughter house has monopoly on the production and controls the entry of new supplies the cooperation between retailer and suppliers are close and with long term contracts. However, in the organic vegetable industry, where competition between packagers and retailers are fierce, the strategies for countervailing bargaining power are

more diverse and prices are negotiated on a weekly basis. In the organic vegetable industry the analysis showed that retail bargaining power increased towards the suppliers during 2003 and 2005 using various control mechanisms like slotting fees, period of credit payment as well as marketing fees.

1. Introduction

1.1 Background

The beginnings of modern organic agriculture is generally attributed to the writings in the 1940's of Sir Albert Howard and Lady Eve Balfour, which espoused that the health of plants, soil, livestock, and the people are interrelated. It followed that farming practices should work in harmony with nature using inputs produced on farm. Organic agriculture was popularized in the United States by J.I. Rodale through the magazine *Organic Farming and Gardening*. Rodale advocated an approach to farming based on understanding and working with natural systems rather than attempting to control them. In the late 1940's and into the 1950s, chemical intensive agriculture successfully boosted agricultural productivity at relatively low cost, thus diverting attention away from the organic movement (Klonsky & Tourte, 1998, Kristensen, 2006).

However, during the 1960's and 70's a series of international events laid the foundation of a broad counterculture in the First world focusing on food, environment and modern farm production methods. Several of these events had their roots in growing social conflicts in the USA in relation to the war in Vietnam, civil rights movements striving for new constitutional minority rights as well as a growing concern for various environmental problems.

Among the latter were Rachel Carsons' book *Silent Spring* from 1962 describing the lethal consequences of using insecticides like DDT in agriculture killing all insects and thereby the conditions of life for many birds. With the focus of DDT found in breast milk questions grew on women and children's health in relation to how food was produced. In this regard a more radical consumerism developed saying that the greater the human control and design, the more artificial or 'plastic' it was, but the freer from rational involvement, the more natural. A basic rule became to eat lower down the food chain. The closer to the original source of food, the better, for it was likely to have been fouled by human intervention. This approach of self control and search for natural foods started a quest for other food items and to know how food was prepared. 'Brown food' became an icon of anti modernity like brown rice, brown bread, brown sugar as opposed to white flour, white bread and white sugar. Within the American counterculture of food choice for brown and Asian would also be interpreted as an air of racial, as well as progressive uproar against the white collar, white suburbia or the White House' war in Vietnam (Belasco, 1989).

Other important books and issues that symbolised the counterculture movement were *Diet for a small planet* by Frances Moore Lappé from 1971, which became the vegetarian text of the ecology movement addressing the conflict of feeding vegetable protein to animals while much of the world went hungry. Similar *Limits to growth* by Meadows et al. (1972) brought the message that the world was heading for disaster because of unfettered population growth and industrial expansion, exhaustion of stocks of natural resources, environmental destruction and food shortages (Jacobsen, 2005).

‘Back to Nature’ away from the cities out in the country living a more slow life, slow food and scaling down technology and technocracy to restore inner as well as outer balance became the new ideology and a way to act here and now.

“Ecology offered immediate personal steps. In electoral politics, you had to wait four years to make changes at the top; in dialectic Marxism you had to wait generations for changes from below. In ecology you could act right away, in your own household.....Metaphorically, living ecologically meant adopting simpler, more ‘natural’ styles, patterned on models that were nostalgic, often non-western, non-Anglo-American, or at least non-urban (Belasco, 1989 pp. 26-27)

The various currents in the American counterculture had also reached Denmark during the late 1960’s and 70’s with its mix of women-, collective-, antiwar and environmental issues. As Jacobsen (2005 p.59) points out: “It is not possible to understand the [Danish] organic movement, if one can not perceive the visions of a different, more sincere, poison free and more hole life, which was the fundament of the movement as well as others at the time. Especially between environment, women and the organic movement there existed a kind of denominator of ideology and [social] indignation”.

Three counter culture currents or groups in relation to Danish agriculture during the 1970’s can be detected for the development of The Association of Organic Farming in March 1981 (Jacobsen, 2005):

- 1) The collective living.
- 2) The political left
- 3) Environmentalism

The collective living

In 1976 the amount of collectives was 586 where 309 were on Zealand. Jacobsen (2005 p. 61) raises the hypothesis that these collectives “with no doubt played a significant role in the development of the organic farming/alternative agriculture” due to their demand for such products.

Their binding focus was mainly on new living arrangements to alter the old pattern of sex and work roles and thereby removing the hierarchies of the patriarchate in the nuclear family.

Hansmann (1996, pp. 31-32) explains the outcomes of these “non-capitalist” or so called alternative market organizations as counter reactions to *alienation* or *exploitation* said to characterize capitalist firms. Alienation is a common term in Marxian theory used to describe the way modern people are separated from the broader goals of a manufacturing process in which they participate. In the domain of work it has a fourfold aspect: Man is alienated from the object he produces, from the process of production, from himself, and from the community or society of his fellows. In relation to the

creation of organic food production, alternative market organizations emphasizing an altruistic transaction process could therefore be seen as a counter move trying to overcome the alienation or exploitive nature inherent with a competitive market economy.

Similar Kledal et al (2006) argues that the rules and regulations of organic farming has to be understood as a social counter response to the environmental conflicts derived from agriculture, but imposed by the competitive market forces in a capitalist society. The competition creates an economic pressure for constantly implementing new technologies, new ways of organizing production that increases productivity in time and scale leaving agriculture in a potential antagonistic and sometimes alienating relationship with society

The political left

This group was mainly focusing on the economic problems inherent in agriculture at the time in relation to debts, high prices for buying a farm and concentration and specialization of production and property. They were inspired by the Marxian philosophy stating that economic and cyclical crisis were inherent in a capitalistic market economy driven by profitability and could only be solved by abolishing private property relations. Inspirations from the women's movement also stated that the liberation of women was related to the question of being a property (to men) in the capitalist work hierarchy, and therefore alternative family- and work structures needed to be established as well.

Solutions to these questions lied in alternative ownership in agriculture inspired by socialist cooperatives. The first two in this regard were established in 1977, 'Dyrvig' and 'Søgård', with respectively 85 and 90 ha.

Environmentalism

This group focused more on the environmental problems in relation to modern agriculture, and they were similar to their like-minded in the USA getting disillusioned with just the political talking and no action. Their achievement as a first action was the establishment of the production collective 'Svanholm' with 375 ha. in 1978.

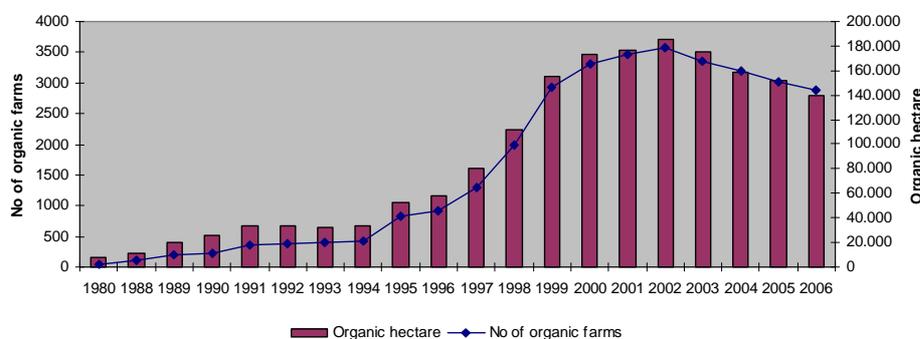
All three currents have interrelations concerning ideas and the ideologies of the time. In all three, food "became politicized like anything else in relation to the organization of society, and turning to new paths was a symbol of changing social relations as well as lifestyles. The important thing was what the food was, where it came from and how was it prepared. Like the people living in a collective, the food should be authentic, non-industrialized and alternative. The results, was a flirtation with new age food cultures like macro-biotic, acid-base or ying-yang diets" (Jacobsen, 2005 p. 60).

Out of the environmentalist group surrounding the 'Svanholm' collective the Association of Organic Farmers is born in March 1981. The development of the organic farm sector itself takes on speed later on with societal recognition and law approval combined with economic support in 1987.

In the beginning of the 90's supermarkets start to impose discount prices on organic products creating excessive demand and strong growth in farms and land converting to organic production during the rest of the decade.

However, by the turning point of the Millennium organic farming in Denmark had reached maturity and even started to decline in terms of number of farms and land converting to organic production. As illustrated in figure 1.1 twenty five years of organic farm development seemed to follow the shape of a typical product life cycle (PLC), starting with a phase of introduction, then growth, reaching maturity and later decline.

Figure 1.1. The development of organic agriculture in terms of number of farms and hectare (1980 – 2006)



Source: Plant Directorate, 1996-2007

Going into depth though with the development of organic production the main driver behind the fast growth from the mid-nineties was mainly large full-time dairy producers (> 70 dairy cows/farm), whereas a study by Kledal (2000) showed, that the future organic farmer converting to organic production would predominantly consist of part-time plant producers (20-50 hectare) and to some extent part time pork producers. This prediction has later been confirmed by Jacobsen et al. (2006). In other words, the development of the organic sector as a whole could to a large extent be depending on the type of product class or industry in motion.

Despite of the decline in farms and land converting to organic, the market share of organic foods, compared to total sales of food and beverages, has from 2000 to 2005 kept a status quo of five percent (GFK, 2007). The period of market maturity seemed to have resulted in a concentration of the organic production.

However, from mid 2005 there has been a steady rise in market sales, and organic foods have in the first quarter of 2007 now reached a market share of more than 7 percent of all food sales (GFK, 2007). In the same time the rise of organic sales has been supported by a 30 per cent increase of or-

ganic imports (Denmark Statistics, 2006), indicating perhaps a beginning international division of labour and production in the global organic sector. This leaves it an open question where the near future of the Danish organic sector will head at in terms of number of farms and land converting, as well as type of industries in motion.

1.2 Objectives of the research

The main objective of this research is to investigate the factors which historically have shaped the evolution of the Danish organic food and farm sector, and to determine what its near future could be in terms of new supplier motivations for converting to organic, eventual changes in the farm structure and new modes of organizing the governance structure between farmers and retailers.

To investigate the past and future development of the Danish organic sector the theoretical model of the Product Life Cycle has been applied and combined with Adoption/diffusion theory. Equally the models have been extended using a supply chain approach where the focus of interest has been on bargaining power along the chain. By combining the PLC model with Adoption theory and focusing on bargaining power the idea has been to analyze the dynamics, counter actions and strategies of the actors along the supply chain, and thereby be able to predict some future outcomes of the Danish Organic Food and farming sector.

1.3 Structure of the thesis

The research is composed of three parts. Part one consists of Chapters 1, 2 and 3. These Chapters will provide the general introduction about the study and discuss theoretical underpinnings of the research as well as methodological approach.

The conceptual framework is developed in Chapter 2. In this chapter the theories underlying the research are discussed. First the concepts behind the Product Life Cycle and Adoption/diffusion theory will be presented. Secondly the various approaches to analyze bargaining power along a supply chain will be discussed.

Chapter 3 elaborates on the methodological approach used by the study. The implementation of the theory in the research design will be presented together with eight hypotheses. The choice of two organic industries, pork and vegetables used as case studies will be explained. The selection of data using both qualitative and quantitative data will be reviewed emphasizing the purpose of both describing the two organic industries as well as test the theory employed.

Part two of the research is composed of Chapters 4, 5 and 6. These chapters show survey results and economic analysis based on the pillars of the research, specifically, the evolution of the organic sector and changing supplier motivations for converting to organic.

In Chapter 4 and 5, the development of the organic pork and vegetable chain respectively as case I and II will be presented by “travelling” through the different nodes of the chain. Analysis of the governance structure, where and how the bargaining power takes place will be explained. Economic regression analysis on price developments in respectively consumer- and farm gate prices will be presented and used also to document qualitative statements.

In Chapter 6 the results of the qualitative interviews of suppliers converting to organic during various market periods of the evolution of the organic market will be presented.

The last part of the research is Chapter 7. This chapter summarises important results of previous chapters and presents an overall picture of the two organic industries used as case studies. Conclusions drawn from the research results are discussed and limitations as well as further research possibilities are elaborated.

2. Theoretical and Conceptual Framework

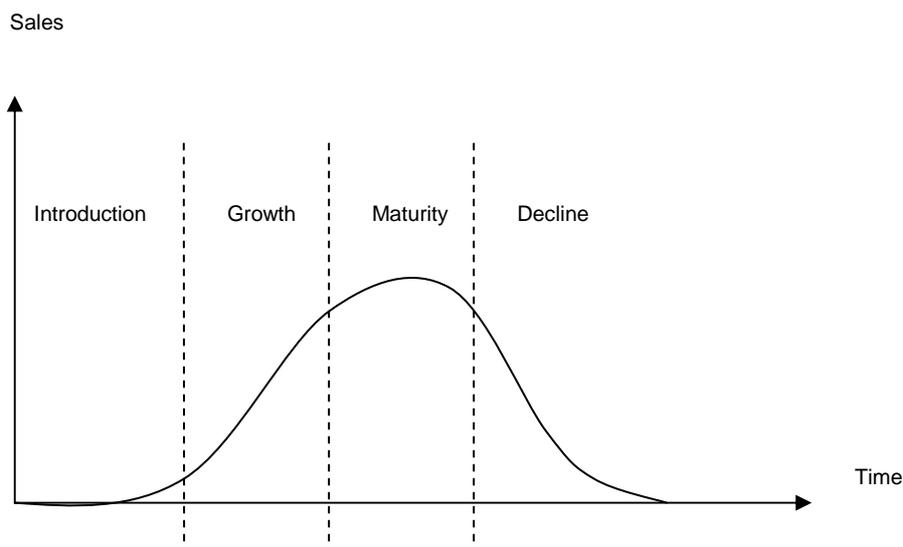
2.1 Introduction

In this chapter, the theoretical framework that will be followed and applied to the succeeding chapters of the thesis is developed. In developing the framework, two analytic approaches are combined into one structure in order to obtain a deeper insight into the evolution of the Danish organic sector. The first one is the theory of the Product Life Cycle and the second is the Adoption/diffusion model. Since farmers are not solitary islands all with equal access to an anonymous food market, but are bound in a social and economic network often tied to a specific supply chain, the question of bargaining power along a chain will be analyzed. Specifically how the node of retailers employ their strength to derive various types of marketing services will be presented using the theory on monopoly in Agro-food marketing.

2.2 The Product Life Cycle and Adoption/Diffusion theory

The concept behind the Product Life Cycle Theory (PLC) *combines demand and supply factors* to explain the cycle of a product's life from invention to growth to maturity. As illustrated in figure 2.2.1 the growth of demand tends to be slow in the innovation phase of a product then to accelerate and, finally to slow down again. The concept was used for the first time by Theodore Levitt (1965). Since then the PLC theory has been applied and extended to handle not only the development of a product, but also a market and/or an industry (Day, 1981).

Figure 2.2.1. The Product Life Cycle (PLC)



In reality few products follow such a prescriptive cycle. The length of each stage varies enormously. The decisions of marketers can change the stage, for example from maturity to decline by price-cutting. Not all products go through each stage. Some go from introduction to decline, and it is not always easy to tell which stage the product is in. Let alone the traditional PLC framework has little to say about the competitive processes that accompany the evolution of a market.

In building a framework for better understanding market evolution Lambkin and Day (1989) propose two basic requirements:

- 1) The unit of analysis
- 2) Factors influencing the pattern of market evolution

The unit of analysis

Like Porter (1987) Lambkin & Day suggest that the product class or industry seems the most appropriate unit of analysis: “This level reflects the aggregate effects of inter-brand rivalry and of extensions brought about through the emergence of new or improved product forms. The product class also corresponds most closely to the business unit level where competition between firms occurs most directly (Lambkin and Day, 1989 p. 4)”.

Mullor-Sebastián (1983) reached similar conclusions by making empirical testing of the product life cycle on U.S. trade data. The results showed that industrial product groups behaved in the manner predicted by the PLC theory on world markets. However, in the case of individual products, the results provided less support for the theory.

Factors influencing market evolution

The second requirement for understanding market evolution is to incorporate the factors that influence the pattern of product classes/groups sales over the life cycle. Here they follow the framework of Porter’s (1980) five forces, but organizes these forces into three categories:

- A) The demand system
- B) The supply system
- C) The supporting resource environment

The demand system is basically the size of the pool of prospective buyers also named the market potential. The factor is dynamic to the extent that it may be altered by various socio-economic trends and changes.

The supply system is strongly influenced by the number and types of suppliers that enter the market and by their particular business strategies.

The third category in Lambkin & Days proposal for understanding market evolution is the surrounding resource environment, which include:

- The presence or absence of an industry infrastructure
- A favourable regulatory environment to legitimize the new industry
- The developments in product and process technology that enable the product to be commercialized and to be refined and improved thereafter
- The availability and cost of input materials and systems which determine the cost and market attractiveness of the finished product

In mapping the PLC stages in relation to supplier strategies further insight can be drawn from what sociologists call Diffusion or Adoption theory, which translates closely to the PLC theory. The Adoption model is mainly *a supply driven theory* and the concept behind the diffusion theory is based on the understanding of how agricultural innovations diffused through rural communities dating back to the 1940's (Rogers, 2003). The adoption/diffusion theory operates with five adopter categories:

- 1) innovators, 2) early adopters, 3) early majority, 4) late majority, 5) laggards

The innovators and early adopters are part of the visionaries, a minority who will experiment and take up an innovation or idea. Usually they are highly entrepreneurial, want large scale change and are prepared to take risks and work with small, flexible business units. The early majority, are more risk averse and may be constrained within large scale complex systems. They are open for new ways of doing things to improve their business, but in the same time pragmatic. The late majority are the sceptical mass who wait and see what other big players have done before taking something on. Finally the laggards adopt.

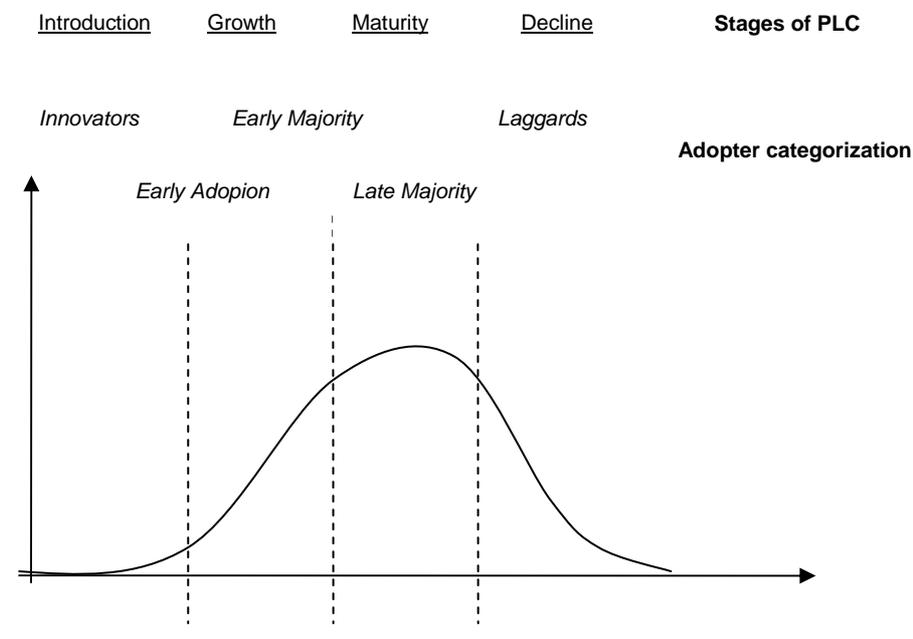
However, as Rogers (2003 p. 285) points out "laggard is a bad name because most non-laggards have a strong pro-innovation bias. Diffusion scholars who use adopter categories in their research do not mean any particular disrespect in the term 'laggard'. ...It is a mistake to imply that laggards are somehow at fault for being relatively late to adopt. System-blame may more accurately describe the reality of the laggards' situation". Rogers also reflects over the laggards in relation to organic farmers. He writes: "Today, looking back five decades to my Iowa diffusion study, the organic farmer I interviewed in the Collins study has had the last laugh over agricultural experts. My 1954 research classified him as a laggard. By present-day standards he was a super-innovator of the then radical idea of organic farming (2003 p. 194)".

Roger's reflections upon his own Adoption/diffusion theory could therefore be interpreted for viewing laggards as potential innovators replacing a period of decline in a PLC cycle with of a new growth cycle.

Padel (2001) and Vestergaard et al (2004) has used the Adoption/diffusion model to illustrate and explain the development of the organic sector. Padel concludes among others that "The conversion decision of the individual farmer can not be explained on the basis of traditional personal characteristics of the adopter alone; other factors need to be considered, such as policy support and the development of markets as well as the attitude towards organic farming in the agricultural community and the institutional development" (Padel, 2001 p 56).

In Figure 2.2.2 the model of diffusion/adoption is 'build in' with the concepts of the PLC theory. By joining the PLC theory with the Adoption/diffusion model the purpose is to explain supplier motivation in relation to the general market evolution. During the Introduction stage of the PLC 'take up' is invariably slow, but in the same time the innovators and early adopters act quickly although they only form a small part of the industry. If the product or idea starts to gain more support among the Early Majority the number of converts starts to rise exponentially and Growth occurs as it sweeps through the Late Majority until saturation or Maturity reaches the market. Then 'take up' slows down or even declines with the adoption of laggards.

Figure 2.2.2. The model of Diffusion incorporated with the Product Life Cycle



However, farms are not solitary islands with equal access to a food market, but are bound in a social and economic network often tied to a specific supply chain. At most times the supply chain can be

compared to an hour glass with markets changing from many suppliers to a few processors, followed by many consumers. In other words the markets in a food supply chain can be a succession of full competition horizontally among farmers, followed by an oligopoly vertically in processing towards retailing in full competition horizontally among many consumers (Kledal, 2003).

The question of (bargaining) power along a food supply chain is therefore of importance when the analytic focus is on evolutionary changes.

2.3 Supply chain bargaining power.

Within the framework of Political Economy and critical agro-food research *food filières*, *food networks*, *systems of provision* and *commodity chains*, are well established concepts and approaches unveiling the different forces of power acting upon the commodity flows from producer to consumer (Atkins & Bowler, 2000).

The *commodity chain* approach within Political Economy is first of all a tradition that derives its inspiration from the *World Systems theory* of writers such as Wallerstein (1974). The agenda here is the tracing of commodity flows at a global scale in order to uncover the usually biased and exploitative relationship between the raw material provider and the site of consumption. The approach from the World Systems writers has in general been Marxian emphasizing social conflicts and historical changes and using food studies as an evolutionary marker.

This form of analysis, taking one food product at a time (fx tomatoes, lettuce, oranges) traces production from the first agro-inputs, through farm production to food processors, wholesalers, retailers and consumers, and includes the labour process, technology and state policies. William Friedland (1984,1994), Burch & Pritchard (1996) have contributed with illustrative research in this mode of analysis.

From the early 1990's the *Global Commodity Chain* (GCC) approach had attracted significant attention, and its focal distinction introduced by Gerrefi (1994), between *producer-driven* and *consumer-driven* GCC's generated a number of case studies. Gibbon (2001) has proposed a third type of governance structure which he claims, is found in many 'traditional' primary commodity chains: the international *trader-driven* chain. The governance structure has so far been very important for the analytic focus in GCC since the type of *driver* in the chain is determined by the location of market power and ability to keep up barriers to entry.

At the centre of GCC analysis lays the contractual linkage of formally independent firms, and a strong point of the GCC approach is its inclusion of power in economic relations and transactions in international production and trading relations. One important aspect is that power is seen not simply

as the effect of barriers to entry, but also of organizational changes and of more effective ‘supply-chain management’ implemented by key agents (Raikes, Jensen & Ponte, 2000).

The *supply chain* as a concept is a common term used in the business school literature and in general focuses more on economic behaviour and efficiency problems along the chain.

However, within this tradition Cox et al (2002, p.4) looks upon “the supply chain as a series of *exchange relationships* between buyers and suppliers”, where they analyze “how variations in the power balance of these relationships affect the flow of value through the chain”.

Supply chain power is defined “as owning or controlling a supply chain resource that combines high degrees of utility and scarcity for a buyer or a supplier in the context of a particular transaction. It is *always* the combination of the two variables that provides the basis for supply chain power” (Cox et al, 2002 p. 22).

The primary concern for Cox et al. is with the distribution of revenues from the ultimate consumer at each of the nodes in the supply chain, and therefore the nature of competition for the revenues at each node.

When discussing the concept of power and food chains the main difference in research tradition between the commodity chain and supply chain approach seems firstly to be the level of social analysis, and secondly whether one is emphasizing social structure or firms or markets in the analysis. Williamson (2000) depicted four levels of social analysis. On the highest level (level 1) is where social embeddedness is located - in which change occurs at a rate of centuries to millennia – referring to customs, traditions and societal norms. At a lower level (level 2) is the institutional environment referring to the formal and informal social rules, changing at a rate of 10 years to a century. At level 3 is the governance structure where change occurs more frequently at a rate of one year up to a decade. The lowest level (level 4) refers to the resource allocation where change is continuous. Resource allocation refers to among others prices and production quantities. Typically the GCC approach will start from level 2 focusing on structure and how it influences firms and actor behaviour and continue downwards to level 4, whereas the supply chain approach will start from level 3 and include number 4.

In this thesis the supply chain approach from Cox et al and their definition on power will be applied using level 3 and 4 from Williamsons’ social analysis. The approach will therefore be micro analytic focusing on governance structure and resource allocation along the nodes of the supply chain.

According to Boehlje & Schrader (1995:15-16) there are two fundamental points of control and one fundamental source of power in a negotiation based coordinated food supply chain system. The first point of control is the end user (retailers) and those firms that have intimate contact and knowledge

about the consumer. The second is the raw material supplier, depending on the sustainability of their contribution to the production/distribution process. Here they point out specifically the owners of genetics. The one fundamental source of power, at the two ends of the supply chain they argue, is knowledge.

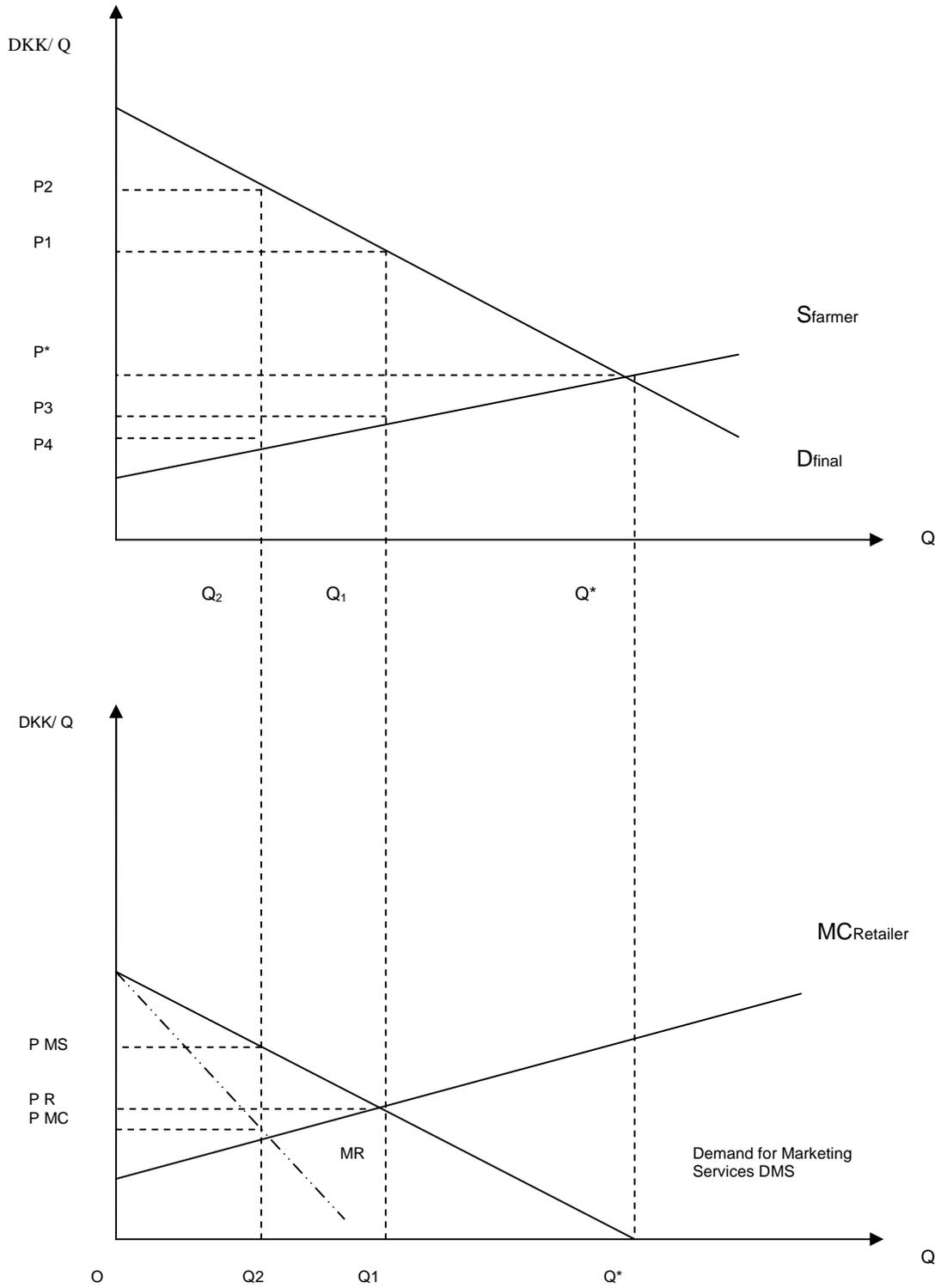
However, the retailers owe their position of strength to more than just knowledge. According to (Duffy & Fearn, 2004) it is a combination of two primary factors. The first is their site specificity, or store location, which again is linked to a certain population size and transportation network that ties it to the population. The second factor is their scale in store size and spread of stores. Their size allows them to advertise heavily to bring customers into their stores. The scale of their business allows them to negotiate aggressively to get the best possible deals from their suppliers.

The theory on monopoly in Agro-food marketing illustrates how retailers can use their scale and exert bargaining power upon suppliers' up-stream extracting various types of marketing services (Padberg et al, 1997).

The upper panel of figure 2.3.1, illustrates the marginal cost, or otherwise the farmer's willingness to supply a certain amount of commodities at rising prices (S_{Farmer}), and the consumers willingness to pay (consumer demand) (D_{Final}). The ideal market finds its equilibrium at P^* and Q^* . However, in a modern food system there are involved costs of distributing, processing, packaging and displaying various types of products. This is illustrated in the bottom panel of figure 2.3.2. It is assumed here that these activities (marketing services) are all handled by the retailer at the end of the chain, and illustrated as the retailers' rising marginal costs (MC_{Retailer}). The demand for marketing services (DMS) is derived by subtracting vertically the farmers' supply from the consumer demand ($DMS = D_{\text{Final}} - S_{\text{Farmer}}$). Where MC_{Retailer} crosses the Demand for Marketing Services (DMS) the retailer has a marginal cost at P_R for handling Q_1 , which it will claim as Marginal Service cost of displaying the products to its consumers. The 'real' market price will therefore be $P_1 = P_3 + P_R$.

If the retailer market is a monopoly the individual retailer will produce along the Marginal Revenue curve MR. Where MR crosses MC_{Retailer} at (Q_2, P_{MC}) the retailer will have maximum profit due to a market price at P_2 (the monopoly-point) where the price for Marketing Services is P_{MS} . Where $OP_{MS} = OP_2 - OP_4$ by construction. If the retailer market is an oligopoly the individual retailer will set its marketing service fee between P_{MS} and P_R .

Figure 3.2.1. Deriving Marketing Services under retailer monopoly/oligopoly



According to Dobson et al (2002) & Clarke et al (2002) other ways retailer bargaining power can manifest itself is through the contractual obligations (as vertical restraints), which retailers can place on suppliers. These could take a number of forms such as listing charges (where buyers require payment of a fee before goods are purchased from the listed supplier), slotting allowances (where fees are charged for store shelf-space allocation), or retroactive discounts on goods already sold.

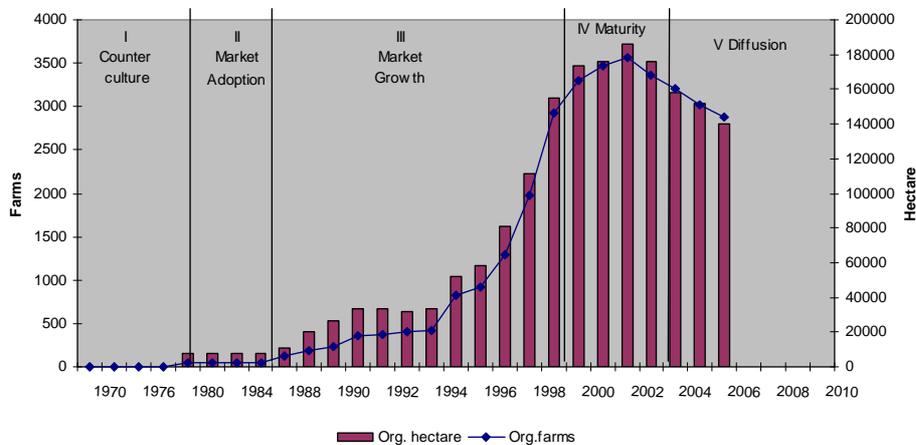
This will be illustrated and explained further in Section 5.5.

2.4 Development of framework for analyzing the evolution of the Danish organic sector

Following the theoretical framework of the PLC and its market stages the development of the organic sector has been categorized into five organic market periods as illustrated in figure 2.4.1 The various market periods are at the same time linked together with the categorization used in the ‘adoption/diffusion’ model, classifying the organic farmers in relation to their business strategies and motivations towards the demand for organic products along the supply chain.

To each market period various research questions/hypothesis are put forward.

Figure 2.4.1. Market periods of the organic PLC linked to adopter categorization of primary producer



I Counter culture

In Figure 2.4.1 the ‘innovators’ are related to market period I named the *counter culture* where alternative farm products are sold or consumed in small mostly closed markets (e.g. self-sufficient eco-villages, collective homes) started mainly by people with urban background moving to the rural. This market period is set from the 1970’s to 1980.

The following hypothesis in market period I will be put forward:

Hypothesis H₁: The innovators among organic suppliers in market period I are driven by alienation in relation to various societal and environmental problems caused by the industrial farm methods in conventional production.

II Market adoption

The 'early adopters' are related to market period II named *Market adoption*, where organic products are starting to be sold on more open and mainstream markets. The period is set from 1981 to 1986, and the intersection 1981 is chosen due to the establishment of the Association of Organic Producers the same year, where also organic products were starting to be sold through mainstream supermarkets like FDB (now Coop Denmark) (Ingemann, 2006; Jacobsen, 2005).

The Association of Organic Producers (AOP) became from its start an intermediary between FDB and the organic producers organizing supplies, marketing and contracting. Organic vegetables were the first organic product to be sold and sales rose from 30 tonnes in 1981 to a 1.000 tonnes in 1987 (The committee and trade association for coordination between Organic and Biodynamic farming, 1991).

The expansion of organic sales illustrates the growing number of consumers demanding organic products as well as suppliers responding to it. Small groups of professional conventional farmers converting to organic are starting to become part of the pool of suppliers.

The supporting resource environment plays an important role for the successful take off of organic farming in this period. Not only had the organic farmers become accepted by the largest retailer from its start, but also the Association of conventional Small Holder Producers in Denmark had begun to make joint cooperation with AOP on Advisory service in 1983. Together with a growing political concern [from the Center-left] for the environmental damages caused by the conventional farming, organic farming were seen as a serious alternative and solution to conventional farming methods having positive appeals among professional conventional farmers as well (Jacobsen, 2005 pp.109-110).

The following hypothesis in market period II will be put forward:

H₂: The early adopters among organic suppliers in market period II are mainly driven by environmental concerns related to their profession as farmers

III Market growth

Then follows period III running from 1987 to 1999 where the organic market starts to experience a significant growth and the ‘early majority’ begins to enter. The market period has been named *Market growth*. The intersection 1987 has been chosen because organic production gets officially recognized by state law on the 14th of May 1987. With this law Denmark becomes the first country in Europe that gives state support to convert to organic farming, and so a favourable resource environment are established legitimizing the new organic industry supporting its demand and supply system. Further political and economic support of significance are later followed by a national Action plan I and II for organic farming respectively in 1995 and 1999.

The *Market growth* period could be divided into two parts with the first one running from 1987-1993, and the second half running from 1994 to 1999. Especially from 1994 the organic market experienced a very steep growth, in sales, number of farms and land converting to organic after FDB introduced a strategic promotion of organic products in the late 1993. However, to be in line with the adaptation/diffusion model the growth period is kept as one period stretching from 1987 to 1999.

Hamm and Michelsen (1996) characterises the development of the Danish organic food market by identifying three distinct periods from 1981 to 1996. Up until 1987 the market developed only in response to initiatives taken by organic farmers themselves and hence organic sector growth is characterised as mainly *driven by supply*. The national regulation in support of organic farming from 1987, and its immediate positive effect on organic farming, leads Hamm and Michelsen to characterise the development as *policy driven*. After August 1993 where consumer demand increases sharply they characterize the period as *demand driven*.

However, the evolution of a market is according to Lambkin and Day (1989) depending on the interactions between the demand and supply system in response to a supporting resource system, where a favourable regulatory environment legitimizes a new industry, is of importance. Reading Jacobsen (2005), and cited in the two previous market periods, the significance of a favourable resource environment becomes evident, and shows that the characteristics of the development of the Danish organic food market used by Hamm and Michelsen would be too simple.

Due to the fast growth in the organic sector in combination with undersupplies several studies on farmer motives converting to organic are being pursued during this period. Michelsen & Jæger (2003) and Michelsen & Rasmussen (2003) found in two surveys, one in 1995 and the second in 1998, that the concern for the environment was an important factor for converting, but that professional challenges was of increasing importance as well as expectations to improve the farm economy.

On a European level Padel (2001) found similar changes in motivations among farmers converting to organic, and Guthman (2004, p. 57) detects in her research on organic farming in California the same diffusion among farmers moving away from ideological concerns towards a “conventionalization” in terms of market- and production approaches.

The following hypothesis in market period III will be put forward:

H₃: The early majority among organic suppliers in market period III are mainly driven by economic and professional work challenges

IV Market maturity

From 2000 to 2003 the organic market matures and the ‘late majority’ enters market period IV named *Market maturity*. Governmental support schemes to promote growth in supplies are reduced or taken away from sectors with oversupply like milk, and economic support to organic farming are now following a discourse based on a ‘market driven growth’ (Ministry of Food, Agriculture and Fisheries, 1999 p. 10).

According to standard theory of perfect competition, a contested market will emerge where there are opportunities for firms to make profits. Profits are defined as earnings in excess of a firm’s costs of production and they are available when the price commanded by a unit of output is higher than its marginal costs. The theory also argues that the entry of more and more firms into a profitable market will normally, in the long run, drive the market price down until it reaches equilibrium at the minimum average cost of production. At this point supply and demand is in balance, and the opportunity to make profits has been dissipated by market competition. Only those firms that are able to at least break even at this long-run equilibrium price will remain in the market. To accomplish this, firms will generally try to gain economies of scale by specializing production leading to a concentration of production. The fundamental insight of this theory is that, over the long run, profits will tend to zero, because their existence stimulates increasing levels of competition from new market entrants. The standard theory implies that the organic market would encounter a larger entry of professional farmers during the period of growth driving down the market price.

However, this theoretical insight ignores the fact that food procurement in general is done through supply chains with the shape of an hour glass: Many raw material suppliers, few processors, few retailer chains, and many consumers. The nature of the power structure in such a supply chain has a direct impact on the process of exchange and, therefore, on a firm’s capacity to appropriate rents. In a market period where maturity sets in, bargaining power would be exerted more dominantly.

In the context of retailer bargaining power it should accordingly to the theory on monopoly manifest itself on marketing services depending on the market structure itself (Padberg, Ritson and Al-

bisu, 1997). Secondly according to Dobson et al (2002) & Clarke et al (2002) retail bargaining power would manifest itself in the contractual obligations (as vertical restraints) which retailers can place on suppliers. These could take a number of forms such as listing charges (where buyers require payment of a fee before goods are purchased from the listed supplier), slotting allowances (where fees are charged for store shelf-space allocation), or retroactive discounts on goods already sold

The following hypothesis on market period IV will be put forward:

H₄: The late majority among organic suppliers in market period IV, are mainly driven by economic and market requirements

H₅: Organic farm gate and consumer prices will in a saturated market converge with the conventional farm gate and consumer prices

H₆: Bargaining power is exercised from both the input factor node as well as the retailer node of the supply chain

V Market diffusion

Market period V in the organic PLC cycle is set from 2004. The period is named *Market diffusion* and the farmers entering the organic market in this period are called 'laggards'. The intersection of 2004 is chosen because a significant decline in the number of farms and arable land starts to take place for the first time in the organic PLC as illustrated in figure 3.2.1.

The possible future scenarios within market period V could either be a further decline, a status quo, or a new growth in the number of farms and hectare converting to organic.

On the demand side Larsen (2006) claims in his Ph.D. thesis that the present discourse in the organic food sector is influenced by aesthetical values. Evidence of this could be found in the fast growth of new processing industries like organic microbreweries and various types of pure organic consumer outlets concerning 'eating out' selling products among others organic coffee, tea, ice cream etc.

On the supply side Kledal (2001) found a bifurcation and segregation among high tech and low tech organic farms, when the organic market started to mature in 2000. A continuation of this could be expected in this market period whether the organic market is experiencing growth, status quo or further decline.

However, during decline the pressure for new innovations could be expected to increase and various types of partnerships between retailers and suppliers could shape laying the ground for a new wave of growth. According to Vestergaard & Linneberg, (2004) the cost reductions reached through effective and efficient logistics, processing, distribution and marketing combined with the high price elasticity of organic products creates a self-enforcing development towards increased organic markets probably obtained after a certain threshold level of market size. Likewise, the Danish case with oligopolies in the processing and distribution of organic products, clearly demonstrates the need to include their policies and power play when interpreting the functioning of the organic markets.

The laggards in this period could therefore in accordance with Rogers (2003) be regarded either as actors who are late comers in a PLC, or actors being part of a new second wave of innovative entrepreneurs promoting growth to a new organic PLC.

The following hypothesis in relation to market period V will be put forward:

H₇: The laggards among the organic suppliers in market period V are mainly driven by aesthetical values and market requirements

H₈: Bifurcation among organic high tech and low tech suppliers will increase

To organize the hypothesis put forward in relation to the evolving market periods of the Danish organic sector, the following table has been made. Likewise the most important factors from the demand and supply system as well as the resource environment have been placed in each of the five market periods.

Figure 2.4.1. Key factors influencing the various market periods in the Danish Organic PLC

	I Counter culture 1970 - 80	II Market Adoption 1981 - 86	III Market Growth 1987 – 1999	IV Market Maturity 2000 - 03	V Market Diffusion 2004 -
Demand system	Self-sufficiency	Small sales on 'open' market, Under 0,1 per cent of total food sales	Fast growth through retail market, Demand exceeds supply	Stable market share of 5 per cent of total food sales	Market share rising to 7 per cent in 2007
Supply system	Collectives, Bio dynamic farms	150 - 200 organic suppliers	Fast growth in organic farms reaching 3.100,	Concentration in organic in the organic sector, Decline of farms and hectare	Continued concentration and decline as well as bifurcation in the organic sector
Resource environment	Grassroots movements (women, collective, environment)	Establishment of Association of Organic Producers, Cooperation with conventional smallholder farmers and political Center-left	National legislation of Organic Farming, National Action plans for Organic farming, Economic support for both demand and supply system	Continued economic support but aiming more direct promoting a market driven development	Same
Hypothesis put forward	H ₁ : The innovators are driven by alienation in relation to various societal and environmental problems caused by the industrial farm methods in conventional farming	H ₂ The early adopters are mainly driven by environmental concerns related to their profession as farmers	H ₃ The early majority are mainly driven by economic and professional work challenges	H ₄ The late majority are mainly driven by economic and market requirements H ₅ Organic farm gate and consumer prices will converge in a saturated market H ₆ Bargaining power is exercised from both the input factor node as well as the retailer node of the supply chain	H ₇ The laggards are mainly driven by aesthetic values and market requirements H ₈ Bifurcation among high tech and low tech organic farmers will increase

2.5 Conclusion

In this chapter, a framework for analyzing the evolution of the Danish organic sector has been presented. To investigate the past and future development the theoretical model of the Product Life Cycle has been applied and combined with the Adoption/diffusion model. Equally the models has been extended using a supply chain approach where the focus of interest has been on bargaining power and governance structures along the chain.

By combining the PLC model with adoption theory and focusing on bargaining power the idea has been to analyze the dynamics, counter actions and strategies of the actors along an organic supply chain. The purpose for this is to be able to predict some future outcomes in terms of new supplier motivations for converting to organic, eventual changes in the farm structure and new modes of organizing the governance structure between farmers and retailers.

3. Methodology

3.1 Introduction

As described in the primary introduction the evolution of the organic sector has previously been dependent on different industries in motion. To draw on this historical fact and in the same time present possible development prospects for the Danish organic sector, two industries were found in 1999/2000 to have potentials for being in motion although a general maturity of the organic sector were commencing.

The two industries were organic pork and organic vegetables, and they have therefore been chosen as in-depth case studies for this research study.

The case studies have used a combination of qualitative and quantitative data. Concerning the qualitative data the chapter will describe how these have been collected, and in relation to the quantitative data the chapter will elaborate on which have been possible to obtain and others which have not been, and therefore made some of the economic analysis intended impossible to conduct.

3.2 Case studies and data collection

To analyze the market evolution and future growth potentials of the Danish organic sector two industries were chosen as case studies:

- Organic vegetables
- Organic pork

The choice of these two industries was based on results from previous studies Kledal (2000, 2001) who concluded from his research studies back in 1999 that organic dairy production would cease to grow, whereas new areas of potential growth were within pork and plant/vegetable production.

Organic vegetable and pork production were at the same time relatively unexamined concerning various socio-economic aspects like farm types, production costs, market potentials and supply chain description.

Yin (1981) has defined the case study as a research strategy which focuses on understanding the dynamics present within single settings. According to Eisenhardt (1989) case studies typically combine data collection methods such as archives, interviews, questionnaires and observations. The evidence may be qualitative (e.g., words), quantitative (e.g., numbers), or both, which can be used to provide description, test theory or generate theory. In relation to qualitative interviews and the amount one should conduct, Miles & Huberman (1994) recommends a sample size guided by the answers the researcher gets. Once the answers from new respondents become repetitive there is no need for conducting further interviews.

In this thesis the purpose of the case studies is to provide *description* of the two unexamined chains and *test* the theory applied. The evidence put forward will be a combination of qualitative interviews and quantitative data.

The research methodology applied can be characterized as a micro analytic approach delimited to Williamson's (2000) levels 3 and 4 of social analysis. The focus is on the actors along the nodes of the supply chains analyzing how transactions and bargaining power is carried out (governance structure) in relation to developments and changes in prices and quantities (resource allocation).

Data collection was first done by reviewing relevant literature, publications and studies to outline the two chains although there are few studies on these specific sectors. During this process key players along the chains were found. Key players include producers, agricultural consultants, market operators and procurement officers among the retailers. Specific organic consumer or household studies have been delimited from this research.

The key players chosen along the supply chain were from the beginning surveyed through a combination of telephone interviews and face-to-face discussions. During this process a more open-ended qualitative interview form were used to let the key players themselves point out how the network of the organic vegetable chain was functioning guided by questions in terms of production flows, contracting and power structures along the chain. Likewise they were asked to point out suppliers whom they thought could represent a new potential change and second wave of growth in organic farm production.

Then a second round of interviews were made with a more narrow group of key players going into depth with the questions on how contracts are negotiated, how bargaining power is exercised, which node is it exercised from, what type of counter actions they could foresee or employ, and what prospects they saw for themselves in the future concerning the development and growth of organic production. During this process a more specific questionnaire was used, and 24 persons have been involved in these in-depth interviews. The questionnaire is placed in Annex I and the interview list is placed in Annex II.

However, in both the first and second round of interviews all farmers stated that bargaining power came solely from the retailer node. None had any experience of bargaining power being exercised from the input factor node like machinery, seeds or pig breeding. Only one innovative organic vegetable producer felt a kind of disproportion in power when he was requesting seeds for specialty crops. He felt they were reluctant to do this service, because his request and purchase was very small in comparison with others and therefore uninteresting.

The clear statement from farmers that bargaining power was exercised solely from the retailer node made the research focus how on governance structures between retailers and suppliers along the chains were organized.

The qualitative interview period has taken place from spring 2004 to the summer 2006.

To evaluate and support the various claims from the qualitative interviews in the two chains the following approach has been taken collecting quantitative data.

3.3 Organic pork

Organic meat is the fourth largest product group in organic retail sales in value terms, and pork occupies 1/3 of it covering a sale of 61 Mio. DKK (Kledal, 2007). However, organic pork has been slow to reach a broader consumer market through retailing and often only in certain shops in specific retailer chains.

The GFK data from 1997 – 2004, in the possession of FOI, also contains information on consumer prices on respectively conventional and organic pork cuttings. However, due to the very small and uneven distribution of organic pork meat sold through retailers in most of the period from 1997-2004, makes information on organic pork scattered and unable to be used in a price analysis comparing with the conventional. Instead data from Denmark Statistics have been chosen since they from 2001 have regularly collected an average monthly consumer price on chopped organic pork respectively conventional. Consumer prices from Denmark Statistics from 2001 to 2005 were therefore chosen for further price analysis. Prices from post-slaughtering or post-processing have not been able to obtain neither from official sources nor through the qualitative interviews. Farm gate prices on organic and conventional pigs were collected from the Danish Agricultural Advisory Service (DAAS) dating from 1999 to mid 2006.

To test the hypothesis (H_5) of convergence between organic and conventional prices in a saturated market the aim was first to make a co-integration analysis. However, since the organic prices collected are *non-stationary* a co-integration analysis is not possible and so a regression model has been formulated instead.

To document the development of the farm structure in organic pork production a special survey was obtained from the Plant Directorate back in October 2005 and repeated in spring 2007. Together with organic pork specialist, Tove Serup from DAAS, a classification was made to group the organic pork producers into hobby farms (1-39 sows), part-time producers (40-69 sows), full-time producers I (70-199 sows), full-time producers II (200-499 sows) and full-time producers III (500-799 sows).

Likewise DAAS accounts representing organic pork producers were collected and ordered according to the classification made above. Economic data were therefore average numbers representing each classification group, and dating from 2001 to 2005 (both years inclusive). DAAS were in possession of 23 to 33 accounts during these five years. The accounts have been used to analyze investments and thereby document future development paths of the organic pork industry.

The willingness to respond to interviews and to provide quantitative data differed significantly between the contacted persons, firms and product classes. The reason for this is first and foremost due to the fact that the organic pork chain is fairly small with very few players in the nodes dealing with the retailers. In slaughtering only one firm is a dominant part, and in organic meat processing competition is very high among a few firms. Relevant interview information has where ever possible been crosschecked with quantitative data.

3.4 Organic vegetables

Organic vegetables are the second largest product group in organic retail sales in value terms, and carrots are by far the largest single vegetable sold covering a sale of 88 Mio. DKK – 37 per cent of all organic vegetables sold (Denmark Statistics, 2006). Organic carrots are the only vegetable where systematic and successive data on prices and quantities are being collected. Organic carrots will therefore represent the organic vegetable chain concerning quantitative data. However, organic salads have been included whenever possible to compare if the specificity of a vegetable (e.g. short and long durability) would influence the governance structure (contracting) in relation to protect against ‘hold ups’.

Consumer prices on respectively organic and conventional carrots were obtained through GFK data in the possession of FOI. The data contains weekly or monthly information on prices paid by the consumers in various types of retailer chains (discount, supermarkets and hypermarkets) from 1998 – 2004. The GFK data are based on a statistical consumer sample representing the whole population of Denmark, and where the consumers write down the prices on their purchases.

Farm gate prices on organic carrots were possible to obtain from respectively 1997 to 2004 collected by FOI (Agricultural accounts, series A 1998-04), but they are a yearly average price. FOI gets these data from Denmark Statistics, which again gets them from the Association of Market Gardeners (GASA) in Aarhus. GASA sends a weekly market price, which is calculated into an average yearly farm gate price by Denmark Statistics. A written request through Denmark Statistics (by Ole Olsen at the department of farm statistics) was made asking for permission to get the weekly prices so a comparison of price developments in respectively farm gate and consumer prices could be made analyzing if potential bargaining power were taking place. Unfortunately GASA never replied to this request so an analysis of convergence between organic and conventional farm gate prices could not be made.

Several vegetable producers and all the packagers have been asked if they would reveal their farm gate- as well 'ab packaging' prices from the period of 1997-2004 to analyze if eventual bargaining power were taking place, but they were all very reluctant to do so.

Farm accounts on organic vegetable production can not be collected since most vegetables produced are often part of larger plant production on the farm. One would therefore have to collect the names of all organic vegetable producers, classify their farm production and get permission to get access to specific producer accounts. The time and resource limit of the thesis did not allow for such a detailed data collection and request.

3.5 Summary

In this chapter the methodology employed was discussed on how information for the study and how economic data analysis was carried out. The research was designed to collect relevant information respectively from primary and secondary sources through field interviews and literature review respectively. Two organic industries, pork and vegetables were chosen as in-depth case studies due to findings of their prospects of growth despite a general maturity in the organic sector as a whole.

Primary data sources for the research were personal interviews structured in two rounds. The first round consisting of drawing up the network of the two chains, finding the major nodes where transactions take place and encircle key actors along the chains. Then a second round of interviews were made with a more narrow group consisting of 24 persons, where in-depth questions were asked on how contracts are negotiated, how bargaining power is exercised, where it comes from and what prospects they saw for themselves in the future concerning the development of the organic food market.

The willingness to respond to interviews and to provide quantitative data differed significantly between the contacted persons, firms and product classes. The reason for this is first and foremost due to the fact that both chains are a fairly small with few players in the nodes dealing with the retailers. In slaughtering only one firm plays a dominant part, and in organic meat processing competition is very high among a few firms. In vegetables only four packagers deal with the retailers and are in heavy competition among each other. Relevant interview information has where ever possible been crosschecked with quantitative data.

4.0 The organic pork chain

4.1 Introduction

In this chapter the results of field interviews and economic data analysis are used in order to:

- describe the evolution of the organic pork market
- draw up the network of the chain presently with its key nodes of transactions
- describe the organization of the governance structure and nodes of bargaining power
- test hypothesis and theory

The chapter will start describing the historical development of organic pork production in Denmark in accordance with the market phases conceptualized in the theoretical framework of the PLC. Then the present network of the organic pork chain is drawn up illustrating the key nodes of transactions and where bargaining power takes place. Then each node is analyzed, using Williamsons' analytic level approach 3 and 4, focusing on resource allocation and governance structure. Each node will be reviewed in terms of firm structure, size and output economically as well as production in tonnes. Then the organization of the governance structure between slaughtering, processing and retailers is described.

Economic analyses are then made comparing organic and conventional consumer pork prices from the period of 2001 to 2005. A statistical price trend analysis testing hypothesis H_5 stating that organic prices will converge with conventional during the market period of maturity and diffusion will be employed.

4.2 Historical background

1987 - 1993

Organic production in Denmark has its legal and formal start with the establishment of the Association of Organic Farmers (LØJ) [Danish: LØJ (Landsorganisationen af Økologiske Jordbrugere)] March 1981. Vegetables were primarily the main crop sold as organic, but in 1987 a review of the organic pork production was made. The Danish Bacon and Meat Council, The Association of Organic Farmers, Coop Denmark (FDB at that time) and The Consumer Council established a project (later known as the FDB-project) with the purpose of

- setting up guidelines for organic pork production
- stating the number of farms and level of organic pork production
- estimating the economic performance
- estimating meat and taste quality

- estimating the potential sales of organic pork

In total 13 farms was part of the project having a variation of 2 to 21 sows. The project lasted from January 1989 to February 1990 and 1.650 finishing pigs were produced. During the project period two set of rules concerning organic pork production were prevailing: 1) the rules made by The Association of Organic Farmers and 2) the rules of the Danish State implemented through the “Law on organic production” from 10th of June 1987. The two set of rules were at that time differing on matters like housing conditions, feeding, use of medicine, transportation and slaughtering. Therefore specific rules, connected and compromised in relation to the project, were formulated (The National Committee for Pig Production [Danish: Landsudvalget for Svin], 1989).

Before the start of the project there was among the organic pork producers great ideological disagreement on the matter of housing and outdoor production concerning which type of pig production should be outside (farrowing, piglets or finishing pigs), for how long they should stay outside or even the necessity of being outdoor. After the FDB-project ended these discussions continued and had great impact later on concerning the development of producer organizations and processing industry (Banke, Hansen & Viemose, 1995).

Along with the FDB-project a trade association called SØBA (Pork Association of Organic and Biodynamic producers) [Danish: Svinebranchen af Økologiske og Biodynamiske Avlere] was established in June 1989 organizing the farmers selling to FDB. It had 30 members with 17 under conversion. The low number of farmers organized in SØBA was due to several causes. Firstly, organic pork production was characterized by a small production size insignificant to the individual farm economy. Secondly, most of the organic pork was sold directly from the farm to the consumers, and therefore a large majority of organic pork producers had no interest in being part of a trade association. Thirdly, as mentioned above, the production rules were of great controversy among the organic pig producers themselves.

After the FDB-project had stopped the ideological disagreements in SØBA concerning marketing strategies and productions rules resulted in the formation of two new trade associations: ØKOKØD [Danish: organic-meat] and Naturens Venner [Danish: Friends of Nature]. The first one, ØKOKØD founded in April 1990, was organized around producers who thought that organic pigs should be kept outdoors. The second, Naturens Venner was founded in November 1990 and organized by the producers who believed that organic pigs could also be fed in a housing system with a delimited access to open air.

The general rules from The National Organic Association of 1991 clarified some of the differences on housing and outdoor production by making it clear that pigs should be kept on free range for at least 150 days during the summer.

This was later modified in 1993 stating that finishing pigs could be kept in a housing system, but with access to open air (Organic Farming, March 1993 [Danish: Økologisk Jordbrug, 1993]).

However, sales through supermarket outlets during the FDB-project period were not very successful, and with unstable production flows as well as large disparities in meat quality it was difficult to deliver a homogeneous product to the consumers. Supermarket chains were therefore very reluctant to market organic pork after the FDB-project. ØKOKØD succeeded for a couple of month during 1991 to continue sales through supermarkets. Naturens Venner had a customer base of 20 FDB outlets in East- and Mid Jutland, but overall it was difficult to get access to the retail market.

In February 1992 the sales association Friland Food [Free range food] was founded as an alliance between The Association of Animal Protection, conventional producers of outdoor pigs and ØKOKØD. One of the suppliers to Naturens Venner, Ulrich Kern-Hansen (who a year later established the organic slaughtering and processing company Hanegal (cockcrow)), accused the word 'Friland' [free range] for being heavily misleading since it was only a short period that the pigs (both organic and conventional) had been fostered free range, and he threatened to go to the Danish Consumer Ombudsman for false marketing (Organic Farming [Danish: Økologisk Jordbrug], January 1992).

A case was made in 1998 in relation to a control campaign made by the former Directorate on Food concerning misleading food marketing, but was dismissed. Again in 2002 the Kern family tried to make a case of misleading marketing of the free range concept contra the advertising problems of promoting animal welfare in organic pig production. The case was again dismissed by the Directorate on Food in May 2002, but the verdict received a complaint by the consumer council with an appeal to reconsider the decision (www.forbrugerradet/markedsforing/breve/fodevarer/24_juni_2002; www.hanegal/publikationer/ovrige_artikler/redegorelse_vedr._sagen_om_frilandsgrisen 5th. of July 2002).

Fifteen years after the first attempt to institutionalize the concept of what an organic pig should be, ideological disagreements was still prevailing, but now within public organizations regulating the overall national market.

The same year as Friland Food was formed Naturens Venner went bankrupt in August 1992 (Organic Farming [Danish: Økologisk Jordbrug] October 1992).

The costs of production and distribution of organic pigs were high at that time due to a production that was small and scattered around the country, making it very difficult for both producers and retailers to make a profit (Michelsen, 1992).

However, even sold with a price premium of only ten percent above the conventional pork meat, through 106 butcher shops (via the butcher chain 'Mesterslagteren'), the consumers failed to respond to the animal welfare concept and total sales reached all together 120 to 150 pigs per week (both conventional and organic under the label of Friland Food). The butcher chain had expected the double (Organic Farming [Danish: Økologisk Jordbrug] November 1992).

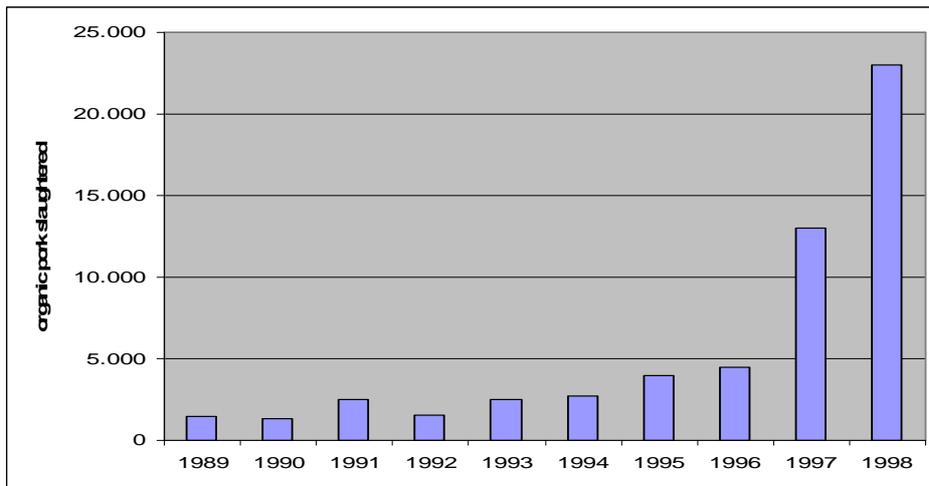
In February 1993 Friland Food applied for an administration order due to an excessive debt. The cause for this was related to three major obstacles: 1) an uneven supply, 2) large disparities in meat quality and 3) no sustainable arrangements were able to be obtained with the existing slaughtering houses. Concerning the organic pig producers organized in Friland Food through ØKOKØD only a few were left, due to over production, small demand and farm prices under break even. Twenty five organic pigs were being delivered per week (1.300 pigs per year), and sale and marketing of organic pork were in reality left to the producers themselves (Organic Farming [Danish: Økologisk Jordbrug] February and March 1993).

In late 1993 Ulrich Kern-Hansen, who was a supplier of the former Naturens Venner, starts together with his wife Fie Graugaard, the organic sales vendor Hanegal (cockcrow) from the their farm at Silkeborg in Jutland. Their strategy was different from the others by first and foremost selling their products as frozen. When sales have a certain flow they are then sold as fresh products saving costs in retailing and lowering consumer prices (Banke, Hansen & Viemose, 1995). Hanegal becomes the first pure organic slaughtering house, also producing slicing and spread contrary to Friland food which mainly sells fresh cut meat parts.

1994 - 1999

From 1994 to 1999 there is a large increase in the production of organic pork, number of organic pork farms as well as a demand for organic pork meat. Due to the conversion period to be labelled as an organic pig the growth within production has a time lag before slaughtering. Therefore, the growth in pigs slaughtered as organic sets in later than 1994-95, but accelerates from 1997 and forward as illustrated in figure 4.2.1

Figure 4.2.1 Number of pork slaughtered and sold as organic from 1989 to 1998



Source: Ecoguide, [Danish: Økoguide] 1999.

The new organic pork sales vendor Hanegal is in 1994 asked by FDB to market its product in 300 FDB outlets, and in 1995 slaughtering is in-sourced at the farm in Silkeborg. The slaughterhouse is build up around low cost containers; an idea inspired from a trip to the former Soviet Union on how large cooperatives managed slaughtering pigs at low costs (personal interview with Fie Graugaard I₁₇, January 2006 founder of Hanegal together with her husband Ulrich Kern-Hansen).

In May 1995 Friland Food starts up its own processing company Salling Kød ApS, but the expectations are not fulfilled and most of the company is sold in 1996.

In 1998 Hanegal starts new production facilities in the town of Haderslev (Jutland) due to higher demand from FDB and processing constraints in relation to the containers used at Silkeborg (Organic Farming [Danish: Økologisk Jordbrug] August 1998).

In 1999 the slaughtering house Vestjyske Slagterier, where Friland Food have their animals slaughtered, merge with Danish Crown. Since Danish Crown already has its own small organic line, and being almost a single player within the slaughtering market, it would have been impossible for Friland Food to both compete with Danish Crown as well as find an alternative slaughtering house that could meet their demands. Friland Food therefore decides to become a kind of a 'new generation cooperative' within the Danish Crown company. Danish Crown starts off with a 60 per cent ownership and takes over the last 40 per cent five years later in 2004 (Organic Farming [Danish: Økologisk Jordbrug] August 1999 + personal interview with Karsten Deibjerg Kristensen I₁₈, Director in Friland, January 2006).

1999 was also the year where other organic firms were bought up, so all three organic animal related productions: egg, milk and meat, as well as cereals were now dominated by conventional corporations (Organic Farming [Danish: Økologisk Jordbrug] August 1999).

2000 - 2006

In June 2000 Friland Food succeeded in getting an export deal with an English supermarket chain (name not revealed) selling 100 organic pigs per week (Organic Farming [Danish: Økologisk Jordbrug] June 2000).

This breakthrough on the export market was important, because the large increase in organic pig production in 2000 had created an oversupply with a lower quotation as a result.

However, from 2000 to 2003 the home market for organic pig had in general stagnated or even started to decline. On the export markets other European countries like Germany and Holland had increased their organic pig production, and despite Friland Food expanded its sales on the export markets prices were in this period low. National differences on production rules, like the acceptance of using conventional piglets and selling them as organic finishing pigs in countries outside Denmark, gave higher production costs to Danish organic pig producers and made competition more difficult. Several of the suppliers to Friland Food had to stop production in this period.

In 2001 the family owned meat processing company Farre Ltd. starts production of organic slices, sausages, pâtés, bacon etc. selling in the beginning to the supermarkets of ISO (outlet only in Copenhagen), Dagrofa, which is the wholesaler for the independent supermarkets, various catering companies and the discount chain of FDB: Fakta. Friland Food supplies the raw materials (Organic Farming [Danish: Økologisk Jordbrug] March 2001).

In 2002 Friland food changes its name to just Friland [Free range].

In 2003 Hanegal was near bankruptcy due to the large investments in new production facilities in Haderslev back in 1998 followed shortly after with stagnation in the organic meat market. Focus in Hanegal turned more towards sales of slices and fast food like organic pizzas, rather than selling simple cuttings from slaughtered pigs.

In December 2003 FDB declared, after launching a four month campaign promoting organic meat with a price reduction of ten per cent, that if sales of organic meat would not increase, only a few shops around Copenhagen, Århus and Silkeborg would be marketing it in the future. Already after two months sales of organic meat increased with 40 per cent and the ten per cent in price reduction became permanent (Press notes: Politiken 05.12.03 and www.okologi.dk/presserum/09.02.04).

Friland also decided to put more effort on the home market in recognition of the necessity of a strong home market for further expansion on the export markets.

During 2004 and 2005 demand for organic meat increases both at home as well as on the export markets, and by the end of 2005 the market prices for organic pig have never been higher with 11.50 DKK above the conventional price.

In 2004 Farre Ltd. receives the Børsen food price for its 'finnochio' salami, and the company has an export to the supermarket chain Tesco in England as well as to Germany through the organic wholesaler company Öko-land. Farre ltd. has approximately 50 per cent of the meat slice market in Denmark (Børsen Fødevarer Sundhed, 09.08.04).

The growing demand internationally as well as on the home market with access to most discount stores, has secured a critical mass in the supply so all of the organic pork can be sold as organic. Friland decides in 2005 to give market access for ten new suppliers expecting that in March 2007 the company will have 55 suppliers and a production of 1,300 to 1,400 finishing pigs per week. This will give a production of 7.800 finishing pigs per year in contrast to the production of 38,000 in 2005 (Organic Farming [Danish: Økologisk Jordbrug] April 2006).

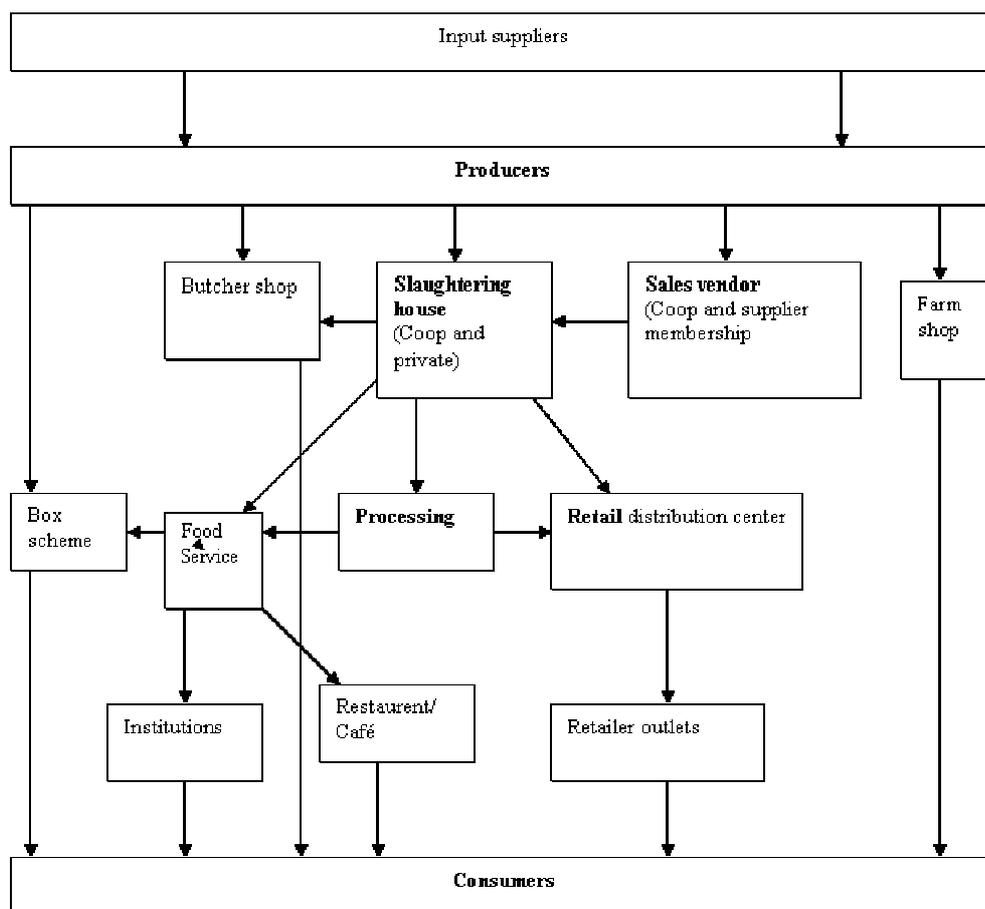
January 1, 2006 Friland buys a sales vendor in Kiel in Germany to expand its sales through retailers on a growing organic market in Germany (Friland, 2005/2006). Hereby Friland follows the international trend of processing industries going abroad to align themselves with foreign sales companies that has good contacts and access to their national retailer chains.

The 8th of June 2006 Friland receives King Frederik IX price of honour for its growing export of organic pork meat. Within three years the export had risen from 24 Mio. DKK to 42 Mio. DKK and accounts for 60 per cent of the company's sale of organic pork (www.Friland.dk).

4.3 The network and nodes of transactions

The network of the Danish organic pork chain is a fairly short and simple chain consisting of five major nodes: the primary producers, sales vendors and slaughtering houses, the process industry, the retailers and the consumers. This is illustrated in figure 4.3.1 and the major nodes are marked with thicker letters.

Figure 4.3.1 The network and nodes of the Danish organic pork chain



Source: Own illustration.

The key agents among the producers are those that have organized themselves around a cooperative in relation to production and slaughtering. The major slaughtering house for organic pig is Danish Crown which slaughtered 38.000 organic finishing pigs in 2005, covering 81 per cent of all organic pork produced. However, it is the sales vendor company Friland that organizes the organic pork producers as well as the trading of all the cuttings done by Danish Crown.

Friland do not process the slaughtered organic pork further into sausages, pâté etc., but sells fresh cut meat, liver etc. to the node of processing or directly to food service and retail distribution centers.

The second player in the node of slaughtering is Hanegal a private slaughtering house slaughtering around 3.000 organic pigs per year. Hanegal does, in contrast to Friland, process the pork meat into various cuttings, slices and frozen fast food products.

Key companies in the node of processing are 'Hanegal' and the 'Farre - Aalbæk' butcher shop.

In Food service 'Frydenholm' is important and has links to Farre – Aalbæk, and they both have distribution to the Box –scheme company 'Aarstiderne'. The venture capital company 'Øko-invest', which operates under various pension funds and with the organic food sector as its main investment target, has capital invested in both Frydenholm and Farre - Aalbæk. The capital invested is respectively 50 and 27 per cent of the companies' share capital (www.ecoinvest.dk).

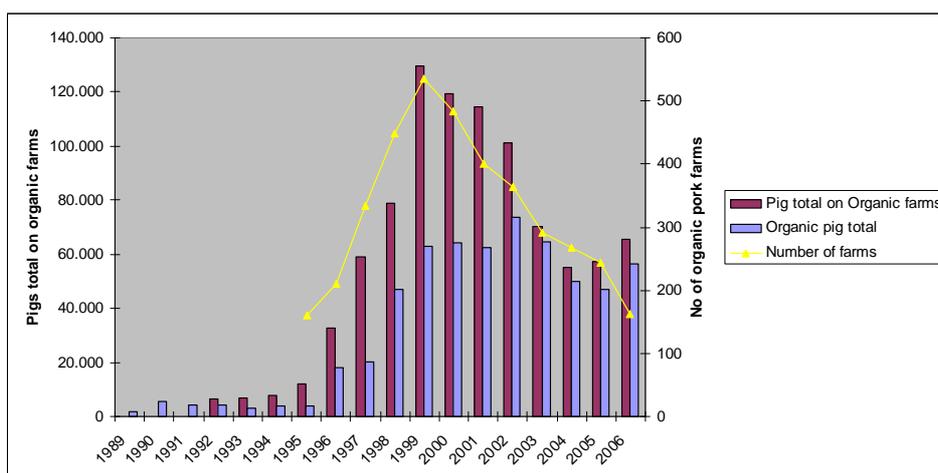
Other minor private slaughters or butcher shops slaughters and process the last 19 per cent of the organic pork selling it directly to consumers or farm shops and restaurants.

Key nodes, where bargain power is prevailing are according to the actors between slaughtering and retailing and processing and retailing. This will be discussed further in chapter 4.8.

4.4 The primary production base

The development of the organic pork production has in terms of number of farms and production of finishing pigs followed the traditional PLC curve in organic farming: slow growth during the 1980's and early 90's; then a steep rise from the mid-nineties, maturation around 2000 and then decline. This development is illustrated in figure 4.4.1 starting in 1989 with 1.900 organic pigs reaching a maximum of 64.219 in year 2000 declining to 46.783 in 2005, and then rising again to 56.537 in 2006. In 1995 the number of organic pork farms was 161 reaching a maximum of 535 in 1999, and has since then declined to 163 in 2006 (Plant directorate, 1995 to 2007).

Figure 4.4.1 The development of organic pig farms, and the number of organic pigs produced from 1989 to 2006



Source: Plant Directorate, 1995 to 2007.

The number of pigs on the organic pork farms is illustrated by a red and a blue bar. The red bar symbolizes all pigs on the organic pork farms (Organic and non-organic under conversion). The

blue bar symbolizes the pigs classified and slaughtered as organic. As one can see the red bar increases very fast during the mid nineties illustrating the positive expectations that farmers had to the organic pork market. However, when maturity sets in from 2000, the production of pigs declines dramatically.

From 2003 pigs under conversion and organic pigs produced has reached a balance. From 2005 there is again a rise of pigs under conversion illustrating farmers responding to a growing demand as well as higher and stable market prices. The year 2006 and 2007 should therefore see an increase in the number of pigs classified as organic. The decline in farms and the parallel growth in organic pigs indicate an increasing concentration of production.

Farm classification and production size

In the Danish organic pig production three production systems prevail:

1. Sows kept outdoor with finishing pigs kept indoor
2. Both sows and finishing pigs kept outdoor
3. One unit pen where the pigs are kept in climate tents with access to outdoor area

A questionnaire made back in 2000 by the Swine commission under the national association of organic meat producers showed that after weaning four out of ten organic pigs were kept outside (Hundahl, 2000). In 2006 this is expected to have changed in favour of production system number one, where the finishing pigs are kept under some form of indoor housing. Producers who still keep the pigs outside would typically be those who have a small production (personal interview with Tove Serup organic pig consultant at the Danish Agricultural Advisory Service (DAAS) [Danish: Dansk Landbrugsrådgivning]). However, there are no analyses documenting the number of producers in relation to their type of production system.

To describe more in detail the classification of the organic pork farms a special survey was obtained from the Danish Plant directorate in 2005 and again in June 2007 giving data on location as well as number of sows and/or finishing pigs produced. The Plant Directorate do not save the data on the organic farms, so getting data from earlier years has not been possible. In the light of the information from the Plant directorate a classification on hobby producers, part time and full time pig producers was made together with Tove Serup (DAAS).

Producers, who are specialized with finishing pigs only, have been transformed into farm holdings with 'year sows'¹. 18 finishing pigs per year sow has been used as a transformation factor. 69 year sows has been chosen as the maximum amount of year sows a producer could have to be categorized as a part time producer. 70 year sows and above, and the producer has been categorized into

¹ A sow kept for 365 feed days (Christiansen, 2005).

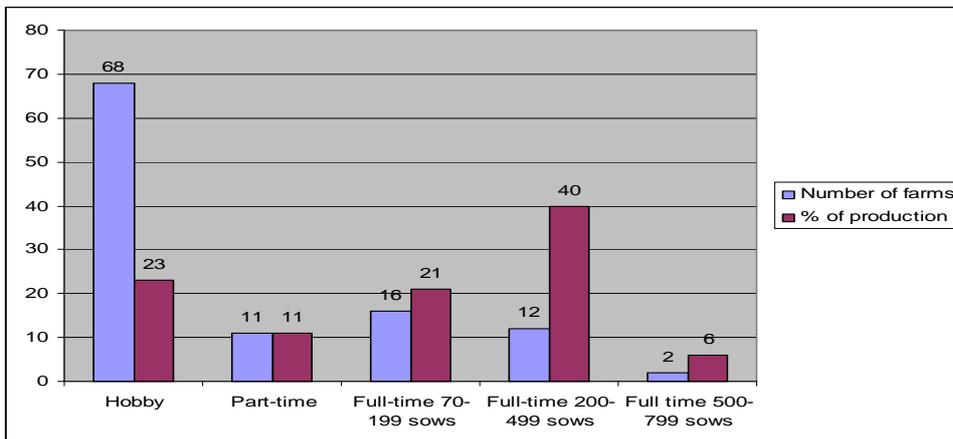
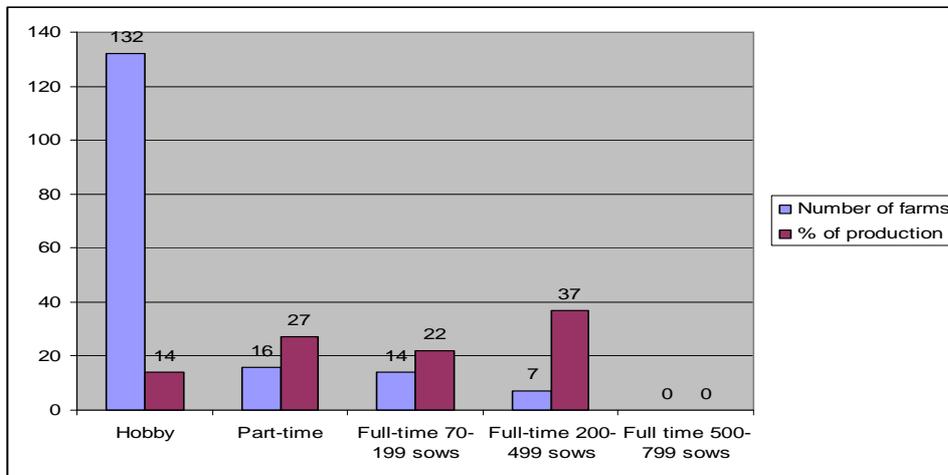
various groupings of a full time organic pig producer. The transformation factor has been 18 man-hours of work per year sow making a full time producer starting with a minimum of 1,260 hours per year.

Hobby pork producer:	1 – 39	sows
Part time:	40 – 69	“
Full time I:	70 – 199	“
Full time II:	200 – 499	“
Full time III:	500 – 799	“

In figure 4.4.2 the classification of the special data from the Plant Directorate is illustrated. The decline in the number of organic pork farms is taking place only among hobby- and part time farmers, where the hobby farmers have declined with more than 50 per cent from 132 farms to 68. The part time farmers have decreased from 16 to 11 farms. In 2005 the 16 Part-time farms had 27 per cent of the production, and the hobby producers, which constituted 78 per cent of all organic pork farms, occupied only 14 per cent of the pork production. In 2007 the part time producers occupied only 11 per cent of the organic pork production, whereas the hobby producers had increased their share from 14 to 23 per cent.

However, the classification made shows a high degree of concentration as well as bifurcation within the organic pork production. In 2005 21 full time farms occupied almost 60 per cent of the organic pork production and in 2007 the full time producers had increased to 30 farms and occupied 67 per cent of the organic pork production.

Figure 4.4.2 Development in type and number of organic pig farms and their share of production in per cent in 2005 and 2007



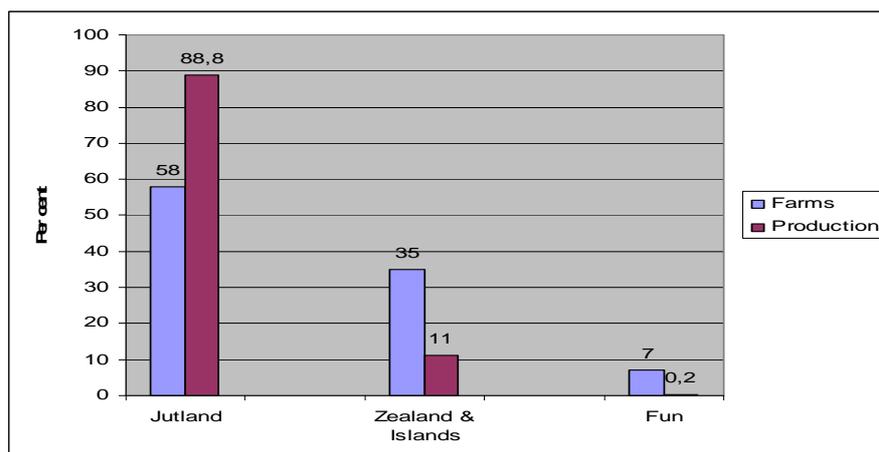
Source: Own calculation based on a special survey from the Plant Directorate 2005 (top) & 2007 (bottom).

According to Director Karsten Deibjerg Kristensen (I₁₈) Friland had in 2005 forty five pig producers as suppliers and members and suppliers and slaughtered 38.000 finishing pigs in 2005. This was 81 per cent of the all organic pigs produced being 46.783 (Danish Plant directorate, 2006). The supplier group in Friland would therefore be very similar to all 37 organic pork farmers classified as part time and full time producers in 2005.

An important factor concerning cost of handling pork and again related to consumer price is collecting the animals from the individual farms to a slaughterhouse. Many small farms spread out and far away from the slaughterhouse(s) increases costs. The geographical spread of the organic pork production should therefore be concentrated in Jutland where the slaughterhouses for organic pigs are located.

In figure 4.4.3 the geographical spread is illustrated showing that almost 89 per cent of the organic pig production is located in Jutland, and eleven per cent in Zealand. Only 0,2 per cent is located on Fyn. Since slaughtering of the organic pigs at Danish Crown and Hanegal takes place at their plants in Jutland, there seems to be a close correlation between development of primary production and the location of slaughtering plants.

Figure 4.4.3 The geographical spread and concentration of the organic pig production 2005



Source: Own figure based on the special survey obtained from the Plant Directorate 2005.

What Figure 4.4.3 also shows is that the organic pig production is much more concentrated in Jutland than on Zealand and Fyn. 58 per cent of the organic pig farms in Jutland produce 89 per cent of all organic pigs, whereas Zealand and Fyn has 42 per cent of all organic pig farms, but produces only 11 per cent of the organic pigs. The majority of the full-time farmers are therefore concentrated in Jutland and the hobby producers on Zealand and Fyn.

4.5 Slaughtering and Processing

Slaughtering

In the node of slaughtering two major key players exist: Friland/Danish Crown and Hanegal. Their basic production data are shown in table 4.5.1

However, Friland is having a monopoly position slaughtering 38.000 pigs (in 2005) or 81 per cent of all organic pigs in Denmark. Hanegal slaughtered around 3.000 pigs or 6 per cent of all organic pigs. The last 14 per cent were slaughtered by smaller butcher shops.

Table 4.5.1 Major firms slaughtering organic pigs in Denmark and their key production data (2005)

Firm	Friland/Danish Crown		Hanegal
Starting organic production	1992		1994
Organic pigs slaughtered	38,000		3,000
Market share (per cent)	81		6
	Home market	Export	
Tonnes produced (own estimation)	2,850	1,700	225
	4,550		
	Home market	Export	
Turn over from organic pork (mio. DKK)	28	42	2.2
	70		(own estimation)
Suppliers	45		25
Major meat products	Fresh meats for supermarkets, small processing of ham, bacon and sausages	Frozen meats for supermarkets, fresh for butchers, raw material for own further processing (70 per cent of company turnover)	

Source. Own table based on interviews and official data from newspapers, homepages and annual reports from firms above.

Friland is estimated to produce around 4.550 tonnes of organic pork meat with 1.700 going to export and 2.850 tonnes sold at the home market. The money value is respectively 42 Mio. DKK derived from export and 28 Mio. DKK derived from sales at the home market. Altogether 70 Mio. DKK in turnover (2005).

Forty five organic pig producers are at the moment organized in Friland, and ten more are under way to supply the increased demand. This is expected to increase production up to 60- 70.000 finishing pigs and a weekly slaughtering of approximately 1,400 pigs by March 2007 (Organic Farming [Økologisk Jordbrug] April 2006).

Main market for Friland products is fresh meat for retailers. A small part of Friland meat is processed into ham, bacon and sausages. Sixty per cent of the organic pork production from Friland is exported with UK as the dominant market. Friland is the biggest supplier of organic meat in Europe, and Danish Crown is the biggest slaughtering company in Europe.

Friland as a firm organization is best described as a sales vendor for the organic meat producers, operating as a *new generation cooperative (NGC)* (Stefanson, Fulton & Harris, 1995) within the conventional slaughtering cooperative Danish Crown. New generation cooperatives have many of

the same elements as the traditional cooperatives, but differ on certain main characteristics. The main focal point of NGC's is value-added processing. Previous cooperatives centered on commodity marketing, basically acting as a clearinghouse for the member's products.

Another difference is on delivery rights where in traditional cooperatives the members have the possibility or right to deliver everything they produce, and often there are no quantity limits to the members' production. Since NGC's are often market driven, the members will typically be obligated to deliver a specific quantity (and quality – as in the Friland case 'organic' or 'animal welfare'), which are tied to the level of equity invested. These obligations ensure a consistent flow of raw material in the NGC (Waner, 2000).

NGC's differ also markedly from traditional cooperatives on membership. Typically, in the latter case membership is open and in NGC's it is closed. The closed membership is necessary because a) it would jeopardize the viability of the business if everyone could become members, and b) to secure that the NGC members come from a group that are willing and able to produce a given quantity and quality of the raw product in question.

The second key player within slaughtering is Hanegal. Hanegal has gone through several economic reconstructions after a suspension of payments in 2003, which have meant a decline in the pork delivered as well as the slaughtering of organic pigs at Hanegal. Up to 2003 Hanegal had around 50 suppliers who were members of a delivery association and had a stock in Hanegal (7 per cent). Today Hanegal has 25 suppliers delivering around 3.000 pigs (personal interview with Fie Graugaard). The reconstruction has made Hanegal focus more on processing and innovation concerning introducing new products every year to the retail sector, and expanding also into organic fish and chicken.

Processing

Within processing two pioneers and key players dominate as well. One is Hanegal and the other is the butcher shop/processor Farre-Aalbæk as illustrated in table 4.5 2.

Farre-Aalbæk claims that they are the largest producer of organic cuttings, slices and sausages in Denmark (Børsen, January 17th 2005). They purchase around a 1,000 tonnes of pork meat from Friland and imports 200 tonnes from Sweden in relation to export demands from the Swedish organic rules under 'KRAV'. Farre-Aalbæk has for several years had an export to England, but now also Germany and Sweden are countries they export to. How much in money value and tonnes have not been able to obtain through the interviews. Products are sold under different brands to different discount chains as well as supermarkets. The type of products is different pâtés, frankfurters, wieners, meat sausage for slicing, bacon and cooked ham.

Hanegal processes its own raw materials from the pig slaughtering that are not sold either as fresh meat cuttings to the butchers or frozen to the supermarkets. The production from slaughtering has

been estimated to be approximately 225 tonnes. How much of this that goes to processing and how much being sold as fresh or frozen to retailing and butchers have not been able to obtain through the interviews. Neither has the value from the organic pork in processing been revealed. The type of product line within organic pork resembles the ones Farre-Aalbæk produces, but differs in its content: Danish specialty leverpostej, smoked and non-smoked sausages, bacon etc.

Table.4.5.2 Dominating firms processing the organic pork meat

	Hanegal	Farre-Aalbæk	
Starting organic production	1994	2000	
Organic pork utilised (tonnes)	225 (estimated)	Import	Export
		200	1.000
		1,200(verified)	
Turn over from organic pork (Mio. DKK)	?	?	
Major Product lines (org. pork)	Danish specialty leverpostej, smoked and non-smoked sausages, bacon, wieners	Sausages, bacon, pâtés, frankfurters, wieners, cooked ham	

Source. Own table based on interviews and official data from newspapers, homepages and annual reports from firms above.

In the beginning of 2007 two conventional firms have with the growing demand for organic meat chosen to move into the organic market offering organic fillings and spread. One is Defco Ltd. (Delicious Food Company) which so far will deliver around 100 tonnes of fillings ('rullepølse', 'hamburgerryg' and ham) per year to the Danish Supermarket Group. The other firm is Stryhn, which produces more than half of all 'leverpostej' in Denmark. They have started in 2007 to produce organic leverpostej sold only to Superbest and Irma stores on Zealand. Friland will deliver the organic liver to Stryhn (Organic Farming [Danish: Økologisk Jordbrug], January 12th and 26th 2007).

4.6 Sales and the retail market

In Denmark, three major retailer groups account for approximately 95 per cent of the food and non-food market. They are respectively 'Coop Denmark', 'The Danish Supermarket group' and the 'Grocers' dominated by 'Dagrofa/Supergros'. The last five per cent of the food and non-food market are occupied by two German discount chains, Aldi and Lidl, and the Norwegian Rema 1000 (Stockmann, 2006).

In table 4.6.1 the four groups dominating the Danish retail market are illustrated together with their major outlets, total turnover and their market share of both organic and conventional. Most of the outlets have organic products, but differ significantly in their sales as well as the type of commodities sold. The Coop group has the highest market share of organic foods being 55 per cent, and the

Irma chain within the Coop group is a high quality segment store, dominating with up to 30 per cent of the products being organic. Irma stores have the highest sale of organic in relation to the turnover of the chain.

Table 4.6.1 The four groups dominating the Danish retail market, their major outlets and their total market share as well as organic market share (2006)

	Total Turn over (Billion DKK)	Organic share of Total turn over (Mio. DKK)	Total market share (%)	Organic market share (%)
COOP Denmark			36,3	55
Irma	2,26	277		12,5
Fakta	7,9	215		3
Kvickly Xtra & Kvickly	12,5	380		3
Superbrugsen	15,34	360		2,5
Dagli' Brugsen	2,9			
Lokal Brugsen	?			
Danish Supermarket Group			29,9	35
Føtex	14,1	158		1,1
Netto	16,1	548		3,5
Bilka	11,8	89		
Grocers (Dagrofa/Supergros)			29,3	6
Superbest	10,1	135		1,3
Superspar	1,8			
ISO	1,6			
Aktiv Super	1,3			
100 % Foreign			4,5	4
Aldi	4,56	50		1
Lidl	0,3			
Rema 1000		63		

Source: Own table based on material from Stockmann, 2006 and Organic Farming [Danish: Økologisk Jordbrug] January 26, 2007.

In the Danish Supermarket Group the discount chain Netto has the highest sale of organic reaching more than half a billion DKK. Netto started in 2005 to use organic as a serious profile distinguishing themselves as a 'soft' quality discount chain in contrast to the 'hard' discounts like Aldi and Lidl, where price is main driver for attracting consumers. The examples of Irma and Netto illustrate

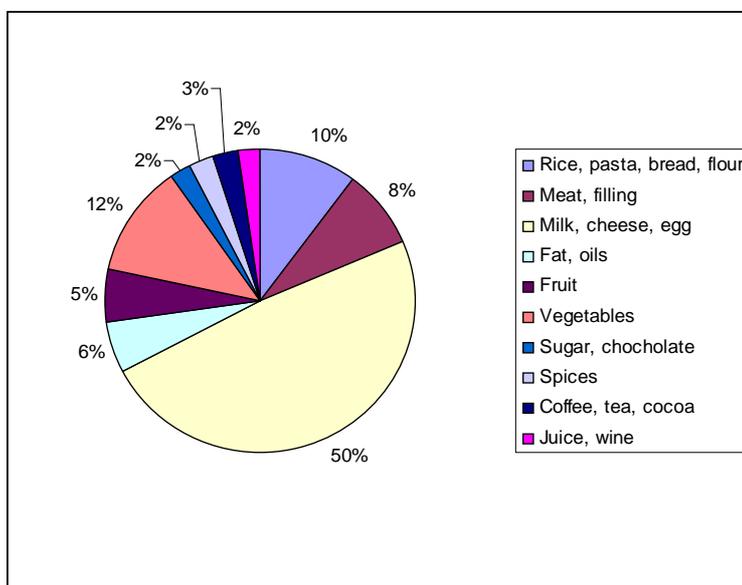
the general bifurcation of the consumer market, and how organic products have started to differentiate and thereby finding new competitive 'space' among the retailer shelves (Kledal, 2006).

Among the independent grocers the ISO outlets are a mix between the high quality outlet Irma and the medium supermarket outlet Føtex of the Danish Supermarket Group. ISO has a number of organic products from especially smaller organic producers. ISO stores are from April 2007 to become a part of the Superbest chain under Dagrofa, and the future concept of the ISO stores and their strategies launching organic are not yet known.

The total sales of organic food and beverages in retailing amounted in 2005 to approximately 2,3 Billion DKK (Euro 308 Mio.). This amounts to approximately four per cent of the total sales of food and beverages in retailing. If the alternative sales channels, which cover 20 per cent of all organic sales, are included, the organic market share in 2005 would be approximately five per cent (Kledal, 2006).

In figure 4.6.1 the composition of the organic retail sale is illustrated. As figure 4.6.1 shows, 50 per cent came from the product group milk, cheese and eggs amounting to 1,1 Billion DKK. Organic meat and fillings occupied 8 per cent of the total sales in retailing, and was the fourth largest product group in terms of turnover.

Figure 4.6.1 Product composition of organic sales in retailing 2005



Source: Statistics Denmark, May 2006.

In table 4.6.2 the changes in turnover in retailing since 2003 has been listed. Both meat and vegetables are the product groups with the most significant changes in terms of growth. Organic meat has each year had a growth rate of around 30 percent rising from 116 to 194 Mio. DKK (26 Mio. Euro).

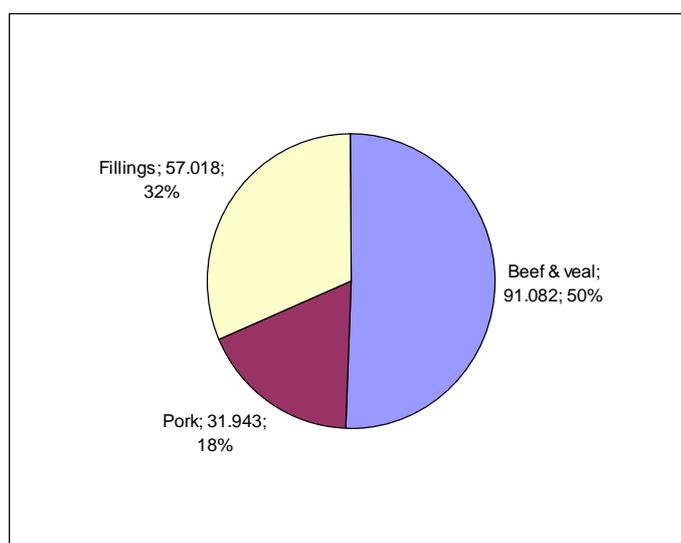
Table 4.6.2 Turnover in organic retailing from 2003 to 2005 (DKK)

	2003	2004	2005
Rice, pasta, bread, flour	231.715	222.079	232.198
Meat, filling	115.866	148.226	193.908
Milk, cheese, egg	1.072.307	1.037.102	1.112.201
Fat, oils	89.410	94.704	127.163
Fruit	82.384	98.108	123.524
Vegetables	230.641	236.623	271.411
Sugar, chocolate	50.129	49.536	51.978
Spices	32.246	40.794	55.534
Coffee, tea, cocoa	58.619	58.086	63.330
Juice, wine	53.806	55.061	53.925
Total turnover	2,017,123	2,040,319	2,285,173

Source: Statistics Denmark, May 2006.

However, organic meat and fillings consists also of veal and chicken. In figure 4.6.2 the composition of the meat sales is illustrated. As the figure shows, organic pork accounted for 32 Mio. DKK or 18 per cent of all organic meat sales. Fillings accounted for 57 Mio. DKK. If one estimates organic pork meat to make up 50 per cent of the fillings, then the turnover value in fillings would be approximately 29 Mio. DKK (3,8 Euro) ($57 \text{ Mio. DKK} / 2 = 28.5$). Organic pork meat would then have a total value in retailing of 61 Mio DKK (8,2 Euro) ($32 \text{ Mio} + 29 \text{ Mio. DKK} = 61 \text{ Mio. DKK}$) amounting to almost one third of the total turnover value in organic meat sales in retailing ($61/194 \times 100 = 31 \%$).

Figure 4.6.2 The composition of organic meat sales in retailing



Source: Statistics Denmark, May 2006.

In table 4.6.3 the three meat categories are described in terms of the amount of tonnes sold in 2005 and compared with sales two years before. As one can see sales of pure pork meat has more than doubled from 202 to 422 tonnes from the 2003 to 2005. Fillings have increased with 50 per cent from 389 to 589 tonnes. If one again estimates the pork meat to constitute 50 per cent of the fillings then pork meat would amount to 295 tonnes in fillings ($589/100 \times 50$). Total sales of organic pork in tonnes would then amount to 717 tonnes ($422 + 295$) or 28 per cent of the total tonnes of organic meat sold in retailing ($717/2.549 \times 100 = 28\%$).

Table 4.6.3 Composition of organic meat sales in retailing from 2003 to 2005 (tonnes)

	2003	2004	2005
Beef & veal	1,029	1,106	1,379
Pork	202	333	422
Fillings (meat & chicken)	389	442	581
Total	1,768	2,002	2,549

Source: Statistics Denmark, May 2006.

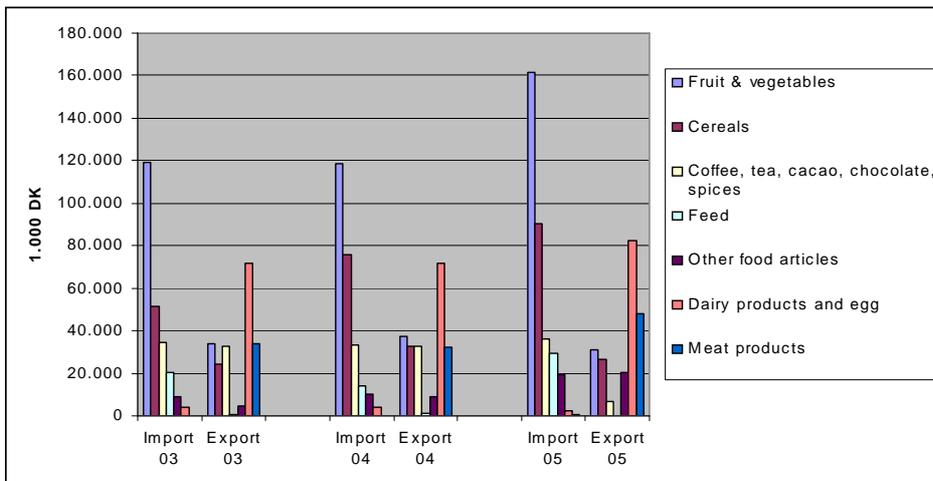
4.7 Danish import and export of organic pork

In 2005 the Danish foreign exchange with organic food commodities amounted to a total of 665 Mio. DKK (Euro 89 Mio.). The import amounted to 413 Mio. DKK (Euro 55 Mio) and the export was 252 Mio. DKK (Euro 34 Mio.) (Denmark Statistics, November 2005).

In relation to the total gross output of 2,124 Mio. DKK (Euro 286 Mio.) from the Danish organic primary production, the organic export value accounted for approximately 12 per cent (own calculations based on FOI (2004)).

In figure 4.7.1: *Foreign trade with organic food (2005)* the most important organic products, respectively being imported and exported to Denmark, are illustrated. The largest import share came from 'fruit and vegetables' which amounted to 39 per cent of the total import value; 161 Mio. DKK (Euro 22 Mio.). Half of it came from vegetables, the other half was fruit. Second largest import share was cereals, followed by the group of coffee, tea and chocolate with respectively 22 and 9 per cent of the total Danish organic import. The import of organic meat products is small amounting to 760,000 DKK (Euro 102.000) in 2005.

Figure 4.7.1 Foreign trade with organic food from 2003 to 2005



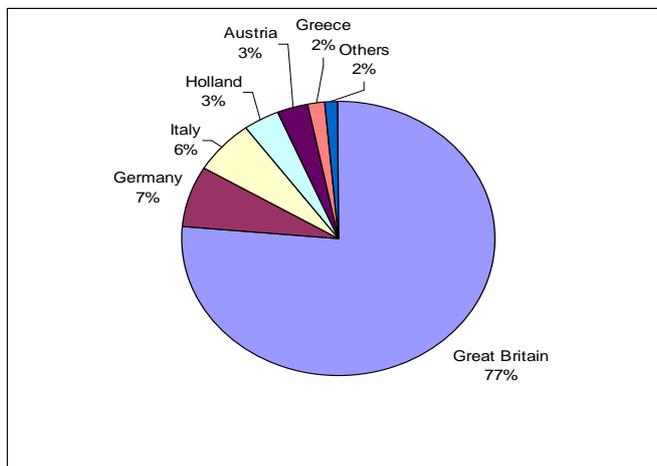
Source: Statistics Denmark, November 2006.

When it comes to organic exports dairy products including eggs are the primary export products and meat products number two. Meat products were mainly products from pork like bacon, the middle parts as well as the front parts of the pig. The export value from organic meat was in 2005 almost 48 Mio. DKK (Euro 6 Mio.) – being 19 per cent of the total export value of 252 Mio. DKK.

The sales vendor Friland is the main exporter of organic meat (especially pork). Their exports of organic pork in 2005 amounted to 42,4 Mio DKK. (Euro 5.7 Mio.) (www.friland.dk 20.06.06).

In figure 4.7.2 the countries where Denmark exports its organic pork to are illustrated. Great Britain is the main market for organic pork accounting for more than 3/4 of the export sales. Then Germany and Italy comes second and third accounting for respectively 7 and 6 per cent followed by a smaller share to Holland, Austria, Greece and others. Because of the very few firms actually exporting organic pork meat, and with Friland as the main exporter, official data is not possible to be obtained. The calculations on the export value and countries buying organic pork is therefore based on own estimations from various sources such as Denmark Statistics - 2005, Friland Annual report 2004/2005 and Børsen/Fødevarer Sundhed Monday 17th of January 2005 newspaper article on Farre Ltd on its export value to Germany.

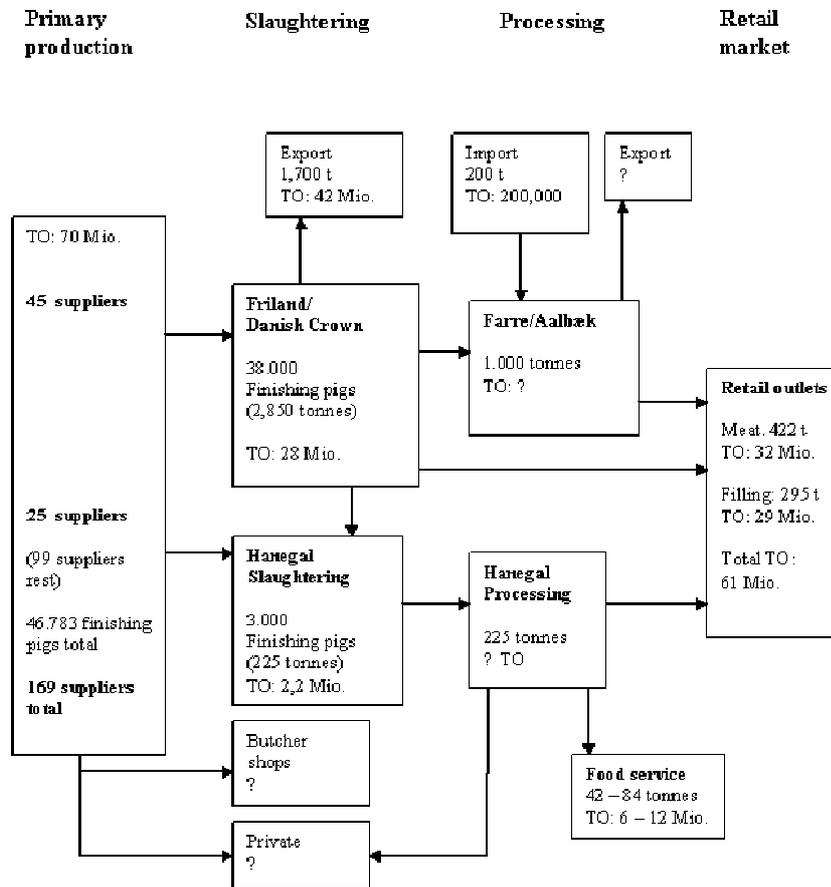
Figure 4.7.2 Major countries where Denmark exports organic pork (2005)



Source: Friland Annual Report 2004/2005, Statistics Denmark, 2005.
Børsen/Fødevarer Sundhed 17th of August 2005.

To sum up the most important data from the previous parts of chapter 4 the following diagram, Figure 4.7.3 have been made illustrating the flow of organic pork in tonnes as well as in money value from producer to consumer. TO stands for Total Turnover.

Figure 4.7.3 Flow diagram of the organic pork in tonnes and value terms (DKK) in 2004/05 (own illustration)



In the node of primary production 169 organic pork suppliers produce 46,783 finishing pigs. 45 suppliers deliver 38,000 finishing pigs to the sales vendor Friland. Danish Crown slaughters the pigs for Friland, and with an estimated slaughtering weight of 75 kg Friland would then produce 2,850 tonnes of pork meat. The turnover value (TO) for Friland in organic pork is estimated to be 70 Mio. DKK, based on own calculations from various sources such as Organic Farming [Økologisk Jordbrug], February 1996 and indirectly from Friland Annual Report, 2005. Friland does not officially publicize its turnover.

25 suppliers deliver 3,000 finishing pigs to the slaughtering and processing company Hanegal with an estimated production of 225 tonnes. Turnover value from the organic pork has been estimated to be 2,2 Mio. DKK. Approximately 5,800 pigs (or 434 tonnes of pig meat) are then produced by the rest of the 99 organic pig suppliers, which partly consume and partly sell this amount to private consumers as well as to various butcher outlets.

60 per cent of Friland pork meat is exported with a turnover value of 42,4 Mio DKK (www.friland.dk 20.06.06). The export in tonnes is estimated to be 1.700.

In the node of processing Farre Ltd. buys according to interview with sales manager Henry Franzen approximately a 1,000 tonnes of pig meat from Friland per year and imports 200 tonnes from Sweden (2005). It exports its processed commodities to Sweden as well as Germany and Great Britain. How much the turnover value is as well as tonnes exported have not been possible to obtain.

In the node of retailing 422 tonnes of pork meat were sold at a turnover value of 32 Mio. DKK (Euro 4,3 Mio). In fillings pork was estimated to account for 50 per cent of the sales. Turnover value in fillings was therefore estimated to 29 Mio. DKK (Euro 3,9 Mio) and constitute for 295 tonnes. Total turnover of organic pork among organic meat sales in retailing was therefore 61 Mio. DKK (32 + 29 Mio. DKK) and in Euro 8,2 Mio.

Organic food commodities are estimated to have a share between 10 to 20 per cent of the Food service market leaving a turnover value between 200 and 400 Mio. DKK (Sall & Sall, 2004; Kledal 2006). The turnover value of organic pork meat in retailing was above calculated to be 61 Mio. DKK. accounting for approximately 3 per cent of all organic sales in retailing (61 Mio. DKK/2.300 Mio. DKK). Estimating the same percentage of organic pork in the organic food service market the turnover value would be between 6-12 Mio. DKK (200-400 Mio. DKK/ 61 Mio. DKK). The flow in tonnes of organic pork in the node of Food service is then estimated to be between 42 to 84 tonnes (derived from 422 tonnes of organic pork in retailing sold at 61 Mio. DKK = 6,9 tonnes per Mio. DKK x 6-12 Mio. DKK).

4.8 Governance structure in supplier – retailer relations

From the interviews carried out along the various nodes of the Danish organic pork chain bargaining power was revealed by the suppliers as taking place between:

- The node of slaughtering and retailers
- The node of processing and retailers

However, getting detailed qualitative information on bargaining power, possible control mechanisms and type of governance structures between retailers and the two nodes up-stream have been difficult to obtain. The reason for this has to do with two specific conditions along the chain. The first is due to the fact that the amount of players in each node is very small. Secondly, in the node of slaughtering Friland has a monopoly position, and in the node of processing only two major firms dominate. Detailed information could therefore easily reveal where the information source came from.

What the interviews did reveal though were that the monopoly position held by Friland, organizing the node of production and slaughtering and its closed membership, secures the producers of organic pork a very strong control on entry as well as supply. This leaves Friland, as a sales vendor, with a relatively higher influence on the price setting towards the retailers when demand is greater than supplies. Qualitative interviews revealed that Friland has been able to negotiate longer term partnership deals with the retailers with a length of 1 to 2 years.

In the node of processing the interviews revealed that bargaining power prevails very strongly between processors and retailers in favour of the latter. The two processors interviewed both expressed that they had good relationships with the retailers, but that they were tough to negotiate and trade with. They also stressed that their marketing strategies have changed the last couple of years. They are putting much more effort and resources towards in-store sales at the retailer outlets. This change among suppliers/processors to increase their sales work within the supermarkets follows the 'Wall Mart' trend, where retailers outsource their (shelf)space. The commodities that have a high turnover and/or low costs from selling will therefore have a greater opportunity of getting access to retailer (shelf)space.

In table 4.8.1 the governance structure imposed on processors by retailers has been listed.

Table 4.8.1 Types of governance structures between retailer and supplier in the node of slaughtering and processing (2005)

	Slaughtering	Processing
Length of contracts	1 - 2 years	Several months – 1 year
Supplier acceptance of price reductions during campaigns	Yes	Yes
Increasing in-door sales	No	Yes
Bargaining Power from retailer	Low/medium	Medium/high

Source: Own table based on interviews of key actors in the node of retailing, processing and slaughtering during 2005/06.

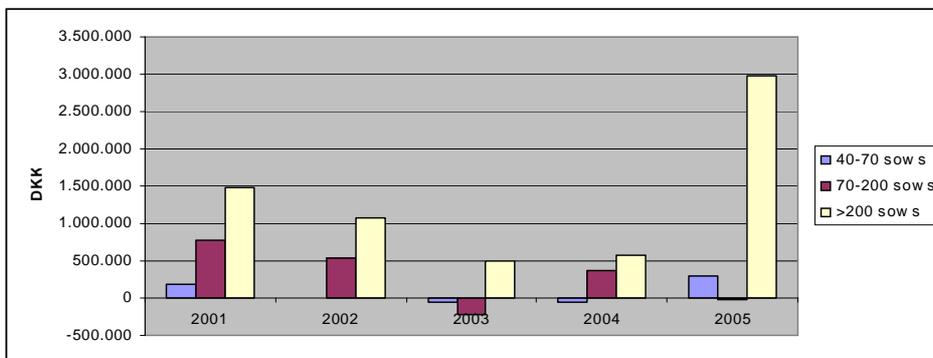
4.9 Economic investment and price analysis

In figure 4.4.1 there were indications that organic pork producers in 2005 were responding to the growing demand for organic meat by increasing the production of pigs. This increase was also confirmed through the interviews of key persons in the node of slaughtering. A further measurement of positive producer expectations to a growing market demand would be an increase on the farm investments over time.

In figure 4.9.1 the producer categories made in chapter 4.4 (hobby, part time and full time) are illustrated in relation to their 'net farm investments'² from 2001 to 2005. The hobby farmers are not included due to their very extensive production of pork and mainly combined with beef production. Equally, it is not possible from the accounts from DAAS to see which farm investments are related to the pork and which are related to the beef.

As illustrated in figure 4.9.1 there is a general decline in investments for all categories of organic pork producers. However, in 2004 the full time producers increases their investment relatively high, and in 2005 full time producers II are the backbone of all net farm investments in organic pork production.

Figure.4.9.1. Net farm investments in organic pork production (part-time, full-time I and II) from 2001 to 2005

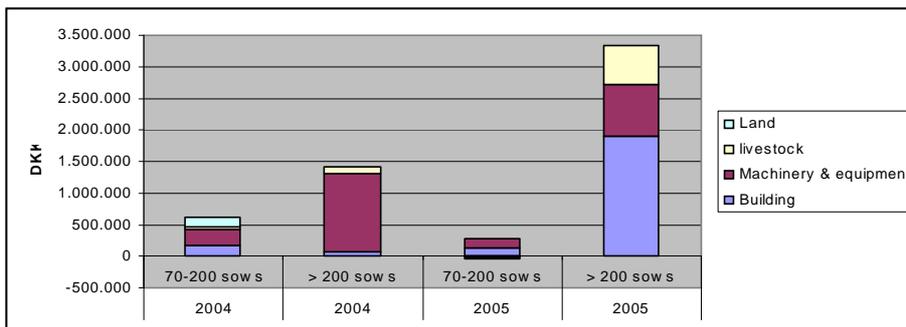


Source: Own illustration based on 33 DAAS accounts from 2001-2005.

In figure 4.9.2 the type of farm investments made in relation to being a full-time or large full-time organic pork producer is illustrated. A total of nine DAAS accounts are included out of a total population of 21 farms within the chosen categories. There could be some bias in the numbers since it is not known if the accounts are from the same farms both years.

² All farm investment minus production depreciations

Figure.4.9.2 Type of farm investments in relation to full-time or large full-time organic pork producer in 2004 and 2005



Source: Own table based on nine DAAS accounts from 2004-2005.

From figure 4.9.2 it is shown that in 2004 full-time producers invested in machinery & equipment, buildings and land approximately with 1/3 to each, whereas large full-time producers invested mostly in machinery & equipment. In 2005 the large full-time producers dominated in the investments with 4/6 in buildings and 1/6 to machinery and livestock respectively.

The DAAS came to similar results in a survey based on 15 organic pork farms, but did not distinguish between various farms categories based on full-time and large full-time farms. Furthermore DAAS concluded that investments in 2004 were mostly directed towards land and property (Statistik Nyt fra Dansk Landbrug, 2006). However, this does not specifically come out from the analysis in this report.

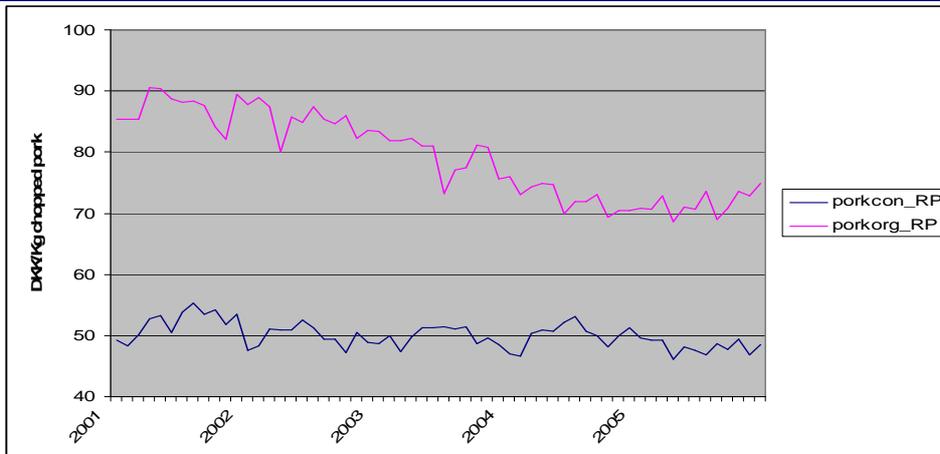
The investment analyses made above indicate strongly that the concentration in the Danish organic pork production is likely to continue and grow relatively faster among the large full-time producers having between 200-500 sows.

Development in consumer and farm gate prices

The possibility for the organic suppliers to have above normal profits on their price premiums over time due to ownership of a critical resource with high utility and relatively scarcity, would accordingly to mainstream economic theory only be temporary, and therefore a contraction between organic and conventional prices should be expected.

To test this hypothesis monthly average consumer prices on chopped organic pork as well as conventional, were collected from Denmark Statistics representing the period of 2001 to 2005. The data have been converted into *real* prices (year 2000), and analyzed to evaluate the price difference between organic and conventional pork.

Figure 4.9.3. The development between organic and conventional consumer prices on 1 kg of chopped pork 2001-2006.



Source: Own calculation based on Statistics Denmark monthly statistics on agriculture 2001-2005

In Figure 4.9.3 the development between organic and conventional prices are illustrated showing a large decrease in organic consumer prices for chopped pork over the five year period, and a very small decrease for conventional chopped pork.

For a statistical price trend analysis a regression model was formulated to test if the organic and conventional consumer prices on chopped pork were converging as indicated by in Figure 4.9.3. In order to quantify the slope of the lines and if they are statistically significant the following regression model was formulated as

$$\text{Difference between organic pork price and conventional price} = f(\text{intercept, time}) + \varepsilon$$

Where:

Price is a monthly price from 2001 – 2005,

Time is a monthly time 1,260 months,

the error term is represented by ε , $\sim N(0, \sigma^2)$

The estimated results are illustrated in table 4.9.1

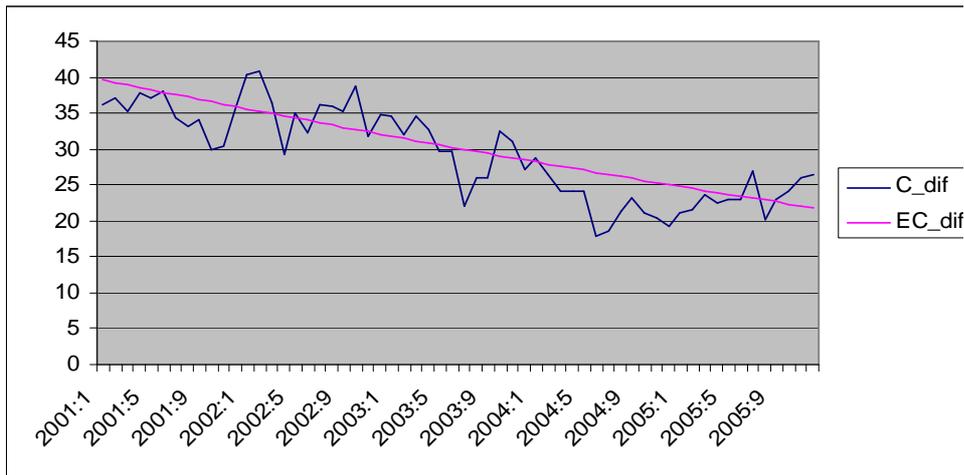
Table 4.9.1. Difference between organic and conventional pork price (2001-2005)

Variable	Estimate	SE	T-value
Intercept	39.97	1.92	20.80
Time	-0.34	0.09	-3.80
Time squared / 100	0.07	0.15	0.47

Source: own calculation

The fitted price difference between organic chopped pork meat and conventional is in January 2001 40.00 DKK, but declines and converge towards conventional chopped pork reaching a fitted price difference of 22 DKK December 2005. The decline is calculated to be 0.34 DKK per month. This significant decline in the price difference is illustrated in Figure 4.9.4

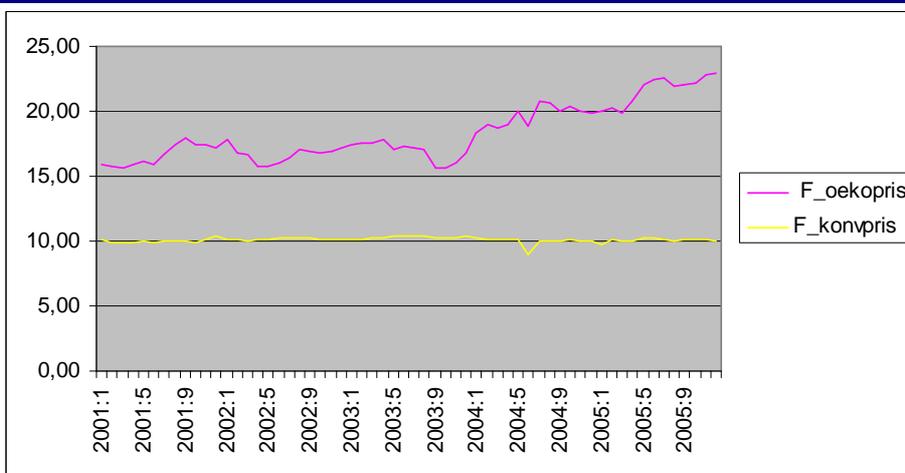
Figure 4.9.4. The development in consumer price difference between organic chopped pork and conventional 2001 -2005



Source: Own calculation

However, since late 2003 the organic pork market has experienced a situation where the farm gate price has been rising steadily. From a quotation price of 15.68 DKK it has reached a level of almost 23.00 DKK in 2006 as illustrated in Figure 4.9.5.

Figure 4.9.5. The development in organic and conventional farm gate prices 2001 - 2005



Source: DAAS

The key players along the pork chain have been questioned about this development of declining consumer prices and in the same time experiencing rising farm gate prices. According to the interviews the reason is due to the fact that sales in organic pork meat has reached a level of 'critical mass' through retailing, where

- i) all parts of the organic pig is now sold as organic to organic prices leaving the producers with a better market price
- ii) the cost of distribution and sales of organic pork have declined significantly due to growing demand through retailing
- iii) The monopoly position of Friland/Danish Crown towards retailers enables them to benefit from a higher efficiency in distribution, and thereby counterbalance the bargain power of the retailers to some degree. The organization of Friland as a new generation cooperative, with control over entry, is important in securing the monopoly position over supply.

4.10 Summary and conclusions

This chapter made use of the PLC framework as well as Williamson's approach to analyse the development and present day structure of the Danish organic pork chain.

With regards to the historical development organic pork production has been characterized by many difficulties from both the supply and demand system. Especially the ideological conflicts from the late 80s to the mid 90s concerning definition of what an organic pork is seems to have delayed building up an efficient supply and kept a positive resource environment in a waiting position. However, from 1999 when Friland enters the conventional pork chain as a new generation coop a process of greater efficiency and new markets nationally and internationally starts to emerge.

In 2005/2006 60 per cent of the Danish organic pork production is exported and 2/3 of it goes to one single market: the UK market. The economic export value is approximately 43 Mio. DKK.

The production structure in number of pork farms have followed the same trend as the over all organic market. First a slow introduction followed by a fast growth from the mid 90s which reaches a maximum of 535 farms in 2000. Then follows a decline, where the number of farms is now 1/4 the maximum being only 109 in mid 2007. However production is approximately at the same level illustrating a clear concentration of production. As illustrated by the classification of the organic pork farms only 30 full time farms occupy 67 per cent of the organic pork production with a clear tendency of bifurcation splitting up between hobby farmers and full time producers.

Getting valuable information on the governance structure and type of bargaining power in the organic pork chain has been difficult to obtain. However, the monopoly position of the organic farm-

ers in Friland organized as a new generation coop gives them strong control on supplies and farm gate price towards retailers in times of growing demand. The few companies within processing claims that competition and bargaining power is strong concerning getting access to the retailer shelves, and they have to use more resources now than previously on in-door sales, acceptance of price reductions during retailer campaigns for organic products.

With regards to price convergence between organic and conventional chopped pork there was a clear decline of the organic consumer price of 22 DKK over five years from 2001 to 2005. The price decrease is almost 50 per cent.

Since the end of 2003 the farm gate prices of organic pork has increased with approximately 50 per cent compared to a status quo in conventional farm gate prices. The reason for this opposite trend of declining consumer prices and rising farm gate prices in organic pork was firstly due to increasing sales through retailers so all part of the organic pork is now sold as organic. Secondly the increasing sales through retailers have lowered distribution costs, because the production of organic pork has reached a level beyond the 'critical mass' in retail distribution.

Conclusion concerning test of hypothesis

H₅: Organic farm gate and consumer prices will in a saturated market converge with the conventional farm gate and consumer prices

could only be confirmed in relation to consumer prices. With regards to farm gate prices the opposite trend has emerged since 2003, which has to do with the structure and organization of the organic pork market (e.g. monopoly and control over supply in the node of slaughtering)

H₆: Bargaining power is exercised from both the input factor node as well as the retailer node of the supply chain

could only be confirmed as taking place from the retailer node. However, it has not been able to document if the 'tools' used in transactions between processors and retailers are actually a source of bargaining power being exercised and/or if it is increasing.

H₈: Bifurcation among organic high tech and low tech suppliers will increase

could only be confirmed from the period of 2005 to 2007. The classification of the organic pork farm structure and development of it has not been done before.

5. The Danish Organic Vegetable chain

5.1 Introduction

In this chapter the results of field interviews and economic data analysis are used

- to describe the evolution of the organic vegetable market
- to draw up the network of the chain presently with its key nodes of transactions
- to describe the organization of the governance structure and nodes of bargaining power
- to test hypothesis and theory

The chapter will start with a description of the historical development of organic vegetable production in Denmark in accordance with the market phases conceptualized in the theoretical framework of the PLC. Then the present network of the organic vegetable chain is drawn up illustrating the key nodes of transactions and where bargaining power takes place. Then each node is analyzed, using Williamson's analytic level approach 3 and 4, focusing on resource allocation and governance structure. Each node will be reviewed in terms of firm structure, size and output economically as well as production in tonnes. Then the organization of the governance structure between packagers and retailers is described since bargaining power takes place here according to the suppliers.

However, since most statistical data on organic vegetables are related to organic carrots a special attention has been given to this crop. When comparing transaction conditions in the governance structure iceberg salad has been included to see if differences in the specificity of the vegetables (e.g. durability) would affect the way contracting between retailers and suppliers is made.

Economic analyses are then made comparing organic and conventional consumer prices on carrots from the period of 1997 to 2004. A statistical price trend analysis testing hypothesis H_5 stating that organic prices will converge with conventional during the market period of maturity and diffusion has been employed. Farm gate prices for organic carrot have not been able to be obtained, so a comparison with sufficient data to make trend analysis in the development of organic and conventional farm gate prices has not been possible.

5.2 Historical background

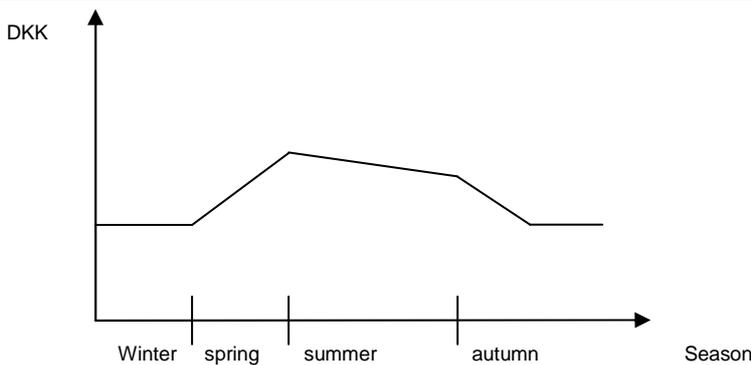
1979 - 1986

The development of the organic vegetable industry in Denmark is very closely connected to the establishment of the Danish organic farm movement, and related to the people starting up the production collective 'Svanholm estate' on the main island Zealand in 1979. In 1980 the 'farm group' at 'Svanholm estate' started a study circle with people representing the various alternative farming systems prevailing at that time, trying to form common rules for what alternative farming could be.

After many debates within the study group, as well as with a large group among the alternative farm movement, who felt that Biodynamic farming was too ‘religious’³, the Association of Organic Farmers (LØJ) was founded in March 1981. Parallel with the foundation of LØJ, the former FDB (now Coop Denmark) invites the various alternative farm groups to an open meeting, trying to find out what the production possibilities are, after FDB have had many enquiries about sales of alternative products. FDB chooses to concentrate on farmers following the rules of LØJ, and Poul Henrik Hedeboe from Svanholm becomes the coordinator/contact person between FDB and the farmers producing under the regulatory regime of LØJ.

FDB buys what existing organic and biodynamic farmers can produce, and Svanholm gets a niche producing what FDB would like to promote. Production volume is arranged for a whole season with a fixed price following the price profile of the season (see figure 5.2.1). Potatoes, onions and carrots are the main crops. This ‘planned economy’ of the organic vegetable production and sales continues till the beginning of the 90’s.

Figure 5.2.1 Season profile of vegetable prices



Source: Own illustration

From 1984 to 1986 sales doubled and FDB decides to promote more heavily on organic products from 1986 (See also table 5.2.1). Svanholm decides the same year to build a packing department.

Table 5.2.1 Actual sales from FDB on organic vegetables from 1981/82 – 1988/89

Year	1981/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89
Tonnes	30	100	150	150	300	1.000	3.000	4.000

Source: The Co-committee and trade association for coordination between Organic and Biodynamic farming, 1991 (Danish: Fællesudvalget og Branchekoordineringsudvalget for Økologisk og Biodynamisk Jordbrug, 1991).

³ Using the words of Poul Henrik Hedeboe (I₄) during one of the qualitative interviews, and head of the farm group at Svanholm from the very beginning

1987 - 1999

In 1987 governmental initiatives like the first nationally controlled organic brand – the red Ø - as well as various economic support schemes for organic farmers is instituted. This political acknowledgement of organic farming helped to spur new optimism within the organic movement.

In 1988 the independent supermarket chain ‘Irma’ starts to sell organic products. The organic vegetable producer’s establishes the sales organization ‘Fælles Grønt’, but it closes down two years later in 1990 becoming ‘Fælles Grønt Vest’, a sales organization for the organic vegetable producers in Jutland. ‘Fælles Grønt Vest’ is later merged in 2000 becoming the present cooperative and sales vendor ‘Dan Organic’. Sales of organic products move in general from stagnation to decline in the period of 1988 to 1993.

In 1992 FDB buys the supermarket chain Irma and closes down a year later 52 of its shops out of 114. The same year the organic producers starts negotiating with FDB about promoting organic products close to traditional food prices on the condition that FDB will involve themselves in a heavy marketing effort – later known as the discount promotion on organic products in 1993 which helps to boost sales on all categories of organic products.

In 1993 the organic producers on Zealand and Fyn organize themselves in ‘Biodania’ – a sales and coordination organization. Production and sales on vegetables are now organized and negotiated with FDB as a contract stating a specific supply, a specific start price and any deviation in price is determined by demand and supply during the season.

In 1997 ‘Netto’- the discount chain of ‘Dansk Supermarked’ - starts to sell organic vegetables, and overall demand increases from 1997 to 2000. The organic vegetable producer/packager I₂ named this period during the interview as “the golden period” due to the strong cartel position the producers had through ‘Biodania’ when negotiating sales with the retailers.

The rising demand combined with rising farm gate prices and steady market sales for organic vegetables attracts professional conventional producers to convert to organic production. However, these new comers belonging to the ‘early majority’ are not organized in ‘Biodania’, so to break the barriers of entry they start to offer the retailers lower prices on organic vegetables.

FDB reacts to the previously ‘hold up’ situation and *ex-post opportunism* from the sales organization ‘Biodania’, and stops buying organic vegetables through them. The producer cartel ‘Biodania’ breaks down and instead the retailers negotiate with each individual organic producer. Expected production and expected sales are still discussed in the late autumn before season starts, but prices are settled every week in relation to demand and supply where producer and supermarket are ‘free’ to sell or buy.

Some strong players in 'Biodania' like 'Søris I/S' choose not to sell its products to FDB, but instead through the discount chain 'Netto'.

2000 - 2005

Between 2000 and 2005 the pressure on farm gate price and deliverable conditions has according to the producers raised and a general mistrust to FDB is common among the producers during interviews. From 2003 FDB is split up so FDB only takes care of the political part of the coop. The retailing itself is organized through 'Coop Denmark', which again is organized on a Nordic level within 'Coop Nordic'. The mixture of being dependent on coop Denmark's large market share on organic products, knowing their code of conduct and commitment to promote organic products, and at the same time experiencing a supermarket chain operating more and more on the same premises as the 'pure capitalistic' supermarket chains, are a general concern and type of argument coming from some of the organic vegetable producers. The discount chain 'Netto' has so far kept a good reputation among the organic vegetable producers using a policy of the 'principal-agent' in terms of paying a little more to the producers, and in the same time securing themselves dedicated suppliers.

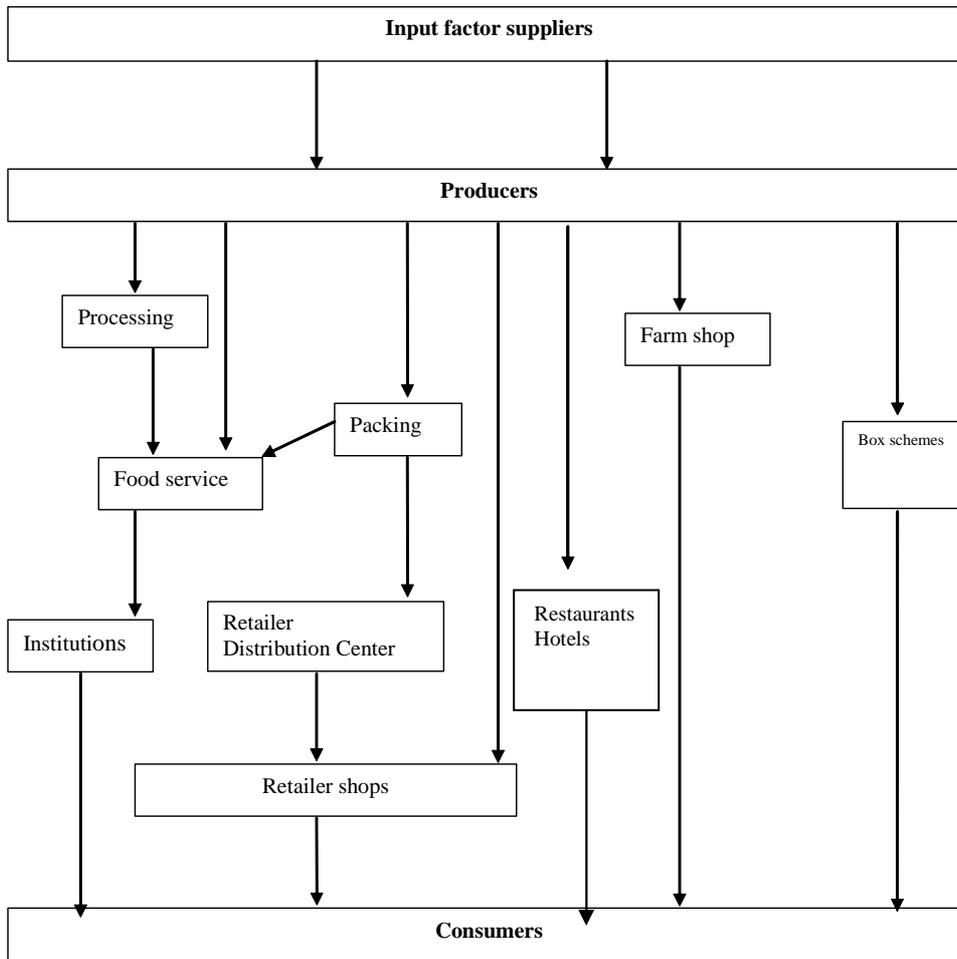
How the retailer bargain power appears and is carried out in practise will be discussed in chapter 5.7.

5.3 The network and nodes of transactions

Taking a 'still-picture' of the 2005 supply chain of organic vegetables one finds a fairly short and simple chain that can be conceived as consisting of four major nodes: the primary producers, the packagers, the retailers and the consumers. The links where complexity starts to rise are between the nodes of producers and consumers, indicating the variety of ways organic vegetables are consumed. Through the studies of the two chosen vegetables a general network of the Danish organic vegetable chain has been drawn and illustrated in figure 5.3.1

Looking at the network, between producers and consumers, the key agents on producer side are a few producers who individually or as a cooperative, control the packing node. Farmers who pack and sell to retailers have the cost and duty of delivering to a retail distribution center. Retailers want to keep transaction costs low, so they are interested in only trading with as few producers as possible, but enough to secure themselves against 'hold up' situations.

Figure 5.3.1 The organic vegetable supply chain



Source: own illustration

Since retailing purchases around 80 per cent of the organic vegetables (Kledal, 2006) the links between the packing node and the retail distribution center is of importance concerning contracting, logistic arrangements and bargain power.

From the retail distribution center the retailers have their own distribution and logistic programme reaching their various types of outlets (hypermarkets, supermarkets, discount etc.).

Other producers have found an 'alternative distribution channels' for their products creating a farm shop and/or a box scheme where vegetable boxes are delivered directly to the consumers. This can be either once, twice or every third week. Alternative distribution channels within organic food like box schemes are economically important in Denmark. The E-trading box-scheme company 'Aarstiderne.com' (Season.com) had alone around 30 per cent of the market turnover on organic vegetables in 2004 (Kledal, 2006).

Some producers can have an arrangement with a local retailer delivering directly some small amount or a special vegetable, but this is becoming more rare since independent retailers are declining rapidly and instead they belong to various kinds of chains or buyer groups with restrictions on where and what to buy. Other producers can have special customers like restaurants, or a food-service company again supplying to various kinds of public institutions like day-care centers, schools etc., or private markets like restaurants and hotels.

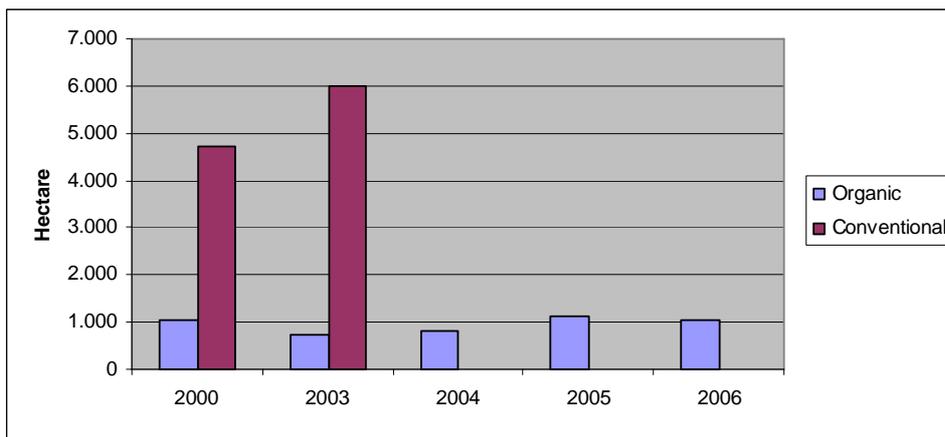
In the real world a vegetable producer will often consist of several nodes in the network. For example a producer can have a farm shop, have his own packing room delivering to a retail distribution center as well as an organic food service node.

5.4 The primary production base

In comparison with the overall picture of organic farming in Denmark, the organic vegetable production accounts for only a very small share in farms and arable land. As illustrated in figure 5.4.1 the arable land in 2003 were 729 ha, and dropped from 1,054 ha in 2000 following the general trend of decline in the organic sector. However, this decline has mainly been caused by a decrease in the organic carrot production area with approximately 300 ha. In 2006 the organic vegetable area is back to its 2000 level following the overall rising demand for organic products since 2005.

Out of the total land in Denmark used for vegetable production in 2003, the organic area with its 729 ha accounted for 11 per cent. The conventional vegetable production had in the same period risen to 1,265 ha. covering 6,000 ha.

Figure 5.4.1 Development in organic vegetable area 2000 - 2006

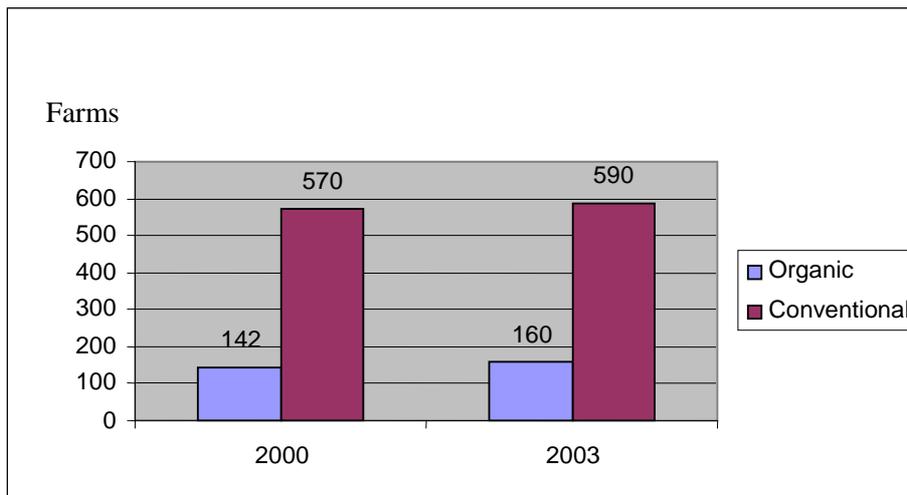


Source: Statistics Denmark, June 2004 and Plant Directorate 2004, 2005 and 2006.

Although the arable land for organic vegetable production declined in 2003, the number of farms had surprisingly gone up from 142 in 2000 to 160 in 2003, as shown in figure 5.4.2. The conventional farms have had a similar increase rising from 570 to 590. The 160 organic vegetable farms account for 21 per cent of all Danish vegetable farms.

There are no official statistics on the number of vegetable farms after 2003.

Figure 5.4.2 Development in number of organic vegetable farms 2000 - 2003



Source: Statistics Denmark, June 2004.

The regional location of the 160 organic vegetable farmers is illustrated in table 5.4.1. The organic vegetable farms are almost distributed fifty-fifty among the islands and Jutland. However, the vegetable farms in Jutland and their output in tonnes are at much larger sums. This is related to the type of crops grown. Heavier root crops suitable for the sandier soils of Jutland like carrots as well as leek and onions dominate in comparison with the lighter crops on the islands like salads, broccoli, sugar corn etc. Also the fact that organic consumption is related to greater urban areas could have an impact on the choice of production and placement of farmers who choose to produce organic vegetables, with the main capital Copenhagen being situated on the island of Zealand. Especially organic farmers, where the main income is from selling through the so called alternative market, are often placed close to a greater urban area.

Table 5.4.1 Organic vegetable farms and their location in Denmark (2003)

	The islands of Fyn, Zealand and Bornholm		Jutland		Total
No of org. farms	76	48 %	84	52 %	160
Hectare	252	35 %	477	65 %	729
Tonnes	4,621	29 %	11,327	71 %	15,948

Source: Denmark Statistics, June 2004.

The 15,948 tonnes of organic vegetables produced in 2003 amounted approximately to 9 per cent of the total Danish vegetable production at 179,759 tonnes.

In table 5.4.2 a 'Top ten list' of what organic vegetable farmers produce in terms of hectare used is described in comparison with conventional vegetable production.

As one can see carrots is the most produced organic vegetable in Denmark. Then onions, cabbage and various salads succeed the latter being number four.

Potatoes do not in the Danish statistics figure as a vegetable, but according to FOI special statistics organic potatoes in 2003 occupied 337 ha and the output was 5.600 tonnes. If one regards potatoes as a vegetable it would be number one in terms of organic hectare used and number two in terms of output.

Table 5.4.2 The organic and conventional vegetable 'Top ten list' 2003

No.	Organic			Conventional		
	Crop	Hectares	Tonnes	Crop	Hectares	Tonnes
1	Carrot	218.1	9,036	Onion	1,196	42,941
2	Onion	85.1	2,096	Carrot	1,165	52,950
3	Cabbage	66.6	1,223	Cauliflower	415	5,531
4	Salads	57.7	872	Peas	324	1,336
5	Beetroot	28.9	616	Cabbage	305	14,103
6	Leek	27.5	410	Leek	302	4,716
7	Parsley root	27.0	261	Onion (industry)	275	10,073
8	Celeriac	22.4	330	Other cultures	274	-
9	Parsnip	21.8	339	Broccoli	249	1,127
10	Broccoli	18.9	51	Herbs	248	-

Source: Statistics Denmark, June 2004.

Since organic carrots and salads are the most produced vegetables in terms of differences in durability the two commodities have been chosen for specific analyzes along the organic vegetable chain.

Table 5.4.3 illustrates the changes taken place specifically among organic carrot and iceberg salad producing farms from 2000 to 2003 in terms of number of farms, hectare utilized and output in tonnes.

Among organic carrots the arable land has been reduced with 320 ha – falling from 538 ha to 218 ha - and the production output has declined with 10.154 tonnes – from 19.190 to 9.036. The number of farms has declined from 73 to 64. Compared to conventional carrot production the number of farms has increased with 16 farms from 141 to 157 and the arable land has risen with 177 ha – from 770 ha to 947 ha. Production output has risen from 29.974 tonnes to 43.036 tonnes – an increase of 47 per cent.

Organic Iceberg salad seems to be very stable in terms of number of farms and output during the period 2000 to 2003. Conventional Iceberg producers have fallen from 28 to 24, but the arable land is the same.

Table 5.4.3 Development in organic and conventional carrot and iceberg production 2003

	No. of farms		No. of ha		Prod. output (tonnes)		Ha per farm	
	2000	2003	2000	2003	2000	2003	2000	2003
Org. carrot	73	64	538	218	19.190	9.036	35,7	41,5
Conv. Carrot	141	157	770	947	29.974	43.914	39	46,4
Org. Iceb. Salad	14	13	33	32	532	531	16,1	16,6
Conv. Iceb. Salad	28	24	177	177	4.651	4.246	26	24

Source: Statistics Denmark June 2004

However, the organic vegetable producers within carrots and iceberg salad were during the qualitative interviews of the opinion, that the official statistics on vegetable production in 2000 were not all correct. Denmark statistics have confirmed this, and in their statistics for 2003 (Statistics Denmark, 2004: 2) written that some producers with conventional production have been included as organic. The data on vegetable production for 2003 are according to the producers' representative. They also state that there has been a decline in farmers producing organic carrot, and that the sector is experiencing a concentration of production on fewer but larger farms.

In table 5.4.4 Statistics from the Plant Directorate has been gathered to investigate eventual changes taken place in the organic vegetable area as a whole as well as the size of the organic carrot area from 2003 to 2006.

As illustrated the total organic vegetable area increases after 2003 with approximately 300 hectare and is back to the year 2000 level. Carrots have increased with the same and therefore the crop behind the growth in the organic vegetable area. Carrots account for almost 50 per cent of organic vegetable area. Salads are pretty stable, but have increased with 8 hectare or 27 per cent in 2006.

Table 5.4.4. The development in the organic vegetable area 2003 - 2006

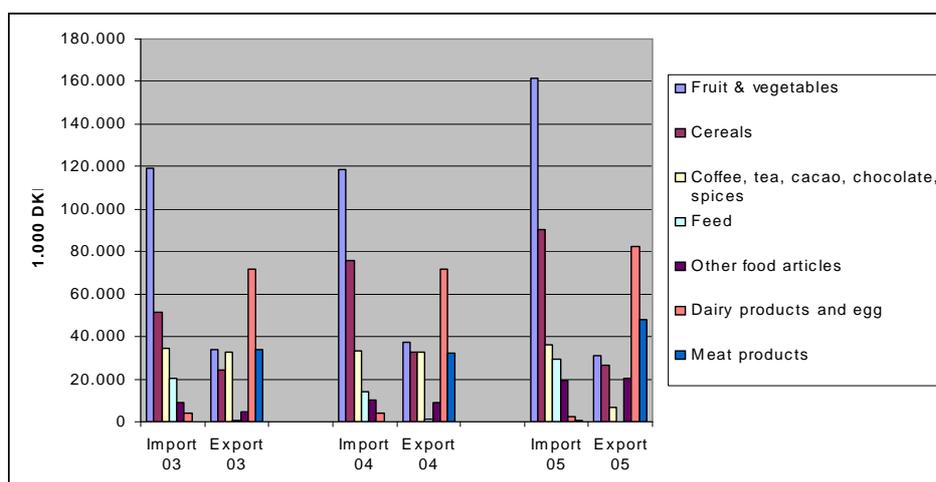
	2003	2004	2005	2006
Org veg. area total (ha)	729	826	1.122	1.060
Of this carrots (ha) / %	218/ 30	369/ 45	419/ 37	514/ 49
Of this salads (ha)	32	No data	30	38

Source: Plant Directorate 2003 – 2006

5.5 Danish import and export of organic vegetables

In figure 5.5.1: *Foreign trade with organic food (2005)* the most important organic products, respectively being imported and exported to Denmark, are illustrated. The largest import share came from 'fruit and vegetables' which amounted to 39 per cent of the total import value; 161 Mio. DKK (Euro 22 Mio.). Half of it came from vegetables, the other half was fruit. Second largest import share was cereals, followed by the group of coffee, tea and chocolate with respectively 22 and 9 per cent of the total Danish organic import.

Figure 5.5.1 Foreign trade with organic food from 2003 to 2005



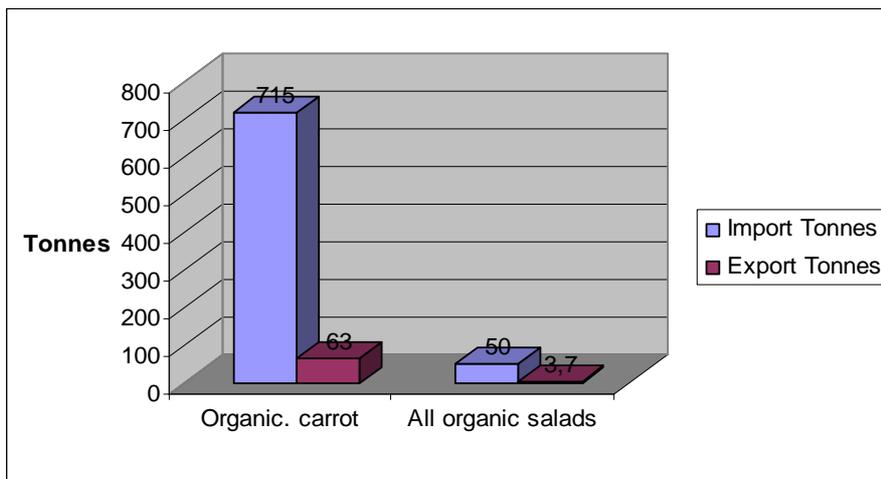
Source: Statistics Denmark, November 2006.

From Statistics Denmark a special survey on the import and export of organic carrots and iceberg salads has been made. However, Iceberg salad was too small a number to gather information on, but

all organic salads could be obtained, and are therefore shown to give a picture of the import/export size.

In figure 5.5.2 the import/export in tonnes are illustrated. The import of organic carrots was 715 tonnes. In relation to the total production of 9,036, the import share was 8 per cent. There was a small export of 63 tonne. Salads had an import share of 50 tonnes, and just 3,7 tonnes of export.

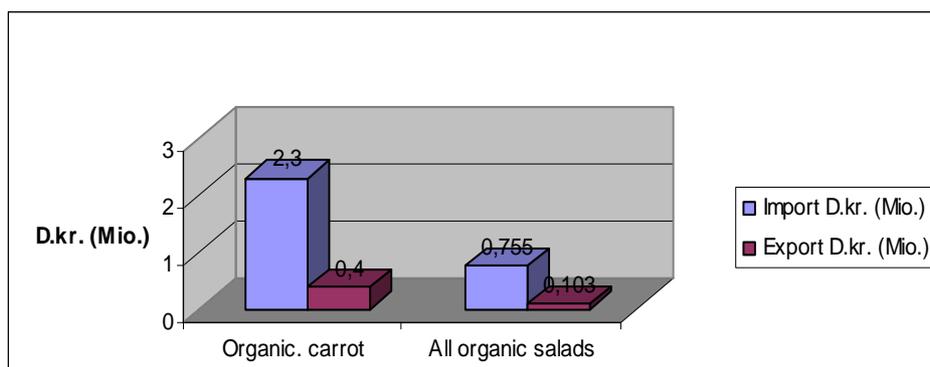
Figure 5.5.2 Import/ Export (ton) of organic carrots and salad 2003



Source: Denmark Statistics 2005 (special delivery).

In figure 5.5.3 the import/export share in DKK (Mio) is illustrated. The organic carrot import amounted to 2,3 Mio. DKK Compared to the total organic vegetable import of 28,127 Mio. DKK, the organic carrot import share accounted for 8 per cent.

However, these data from Denmark Statistics did not correspond with the qualitative information obtained from the producers. The producers stated an import of carrots which were twice as much and an export almost 13 times more than the official statistics claim. Pointing out these discrepancies to Denmark Statistics they have informed that the producers own statements should be followed, and that they will look into their future statistical data collection on organic import/export.

Figure 5.5.3 Import/Export values of organic carrot and salad 2003

Source: Statistics Denmark 2005 (special delivery).

5.6 Retail sales of organic vegetables

In table 5.6.1 the changes in turnover in retailing since 2003 has been listed. Both meat and vegetables are the product groups with the most significant changes in terms of growth. In 2005 vegetables accounted 271 Mio. DKK or 12 per cent of total turnover in organic retail sales.

Table 5.6.1 Turnover in organic retailing from 2003 to 2005 (1.000 DKK)

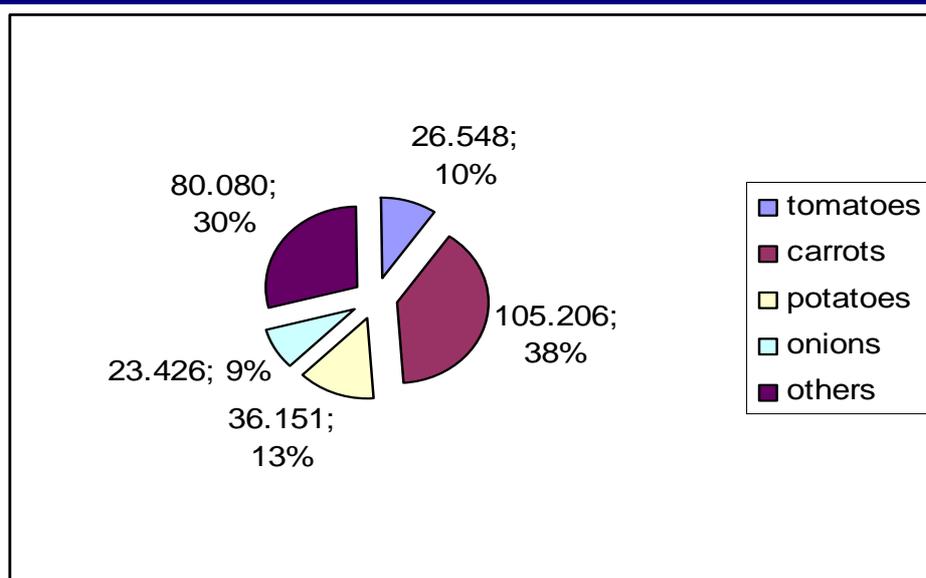
	2003	2004	2005
Rice, pasta, bread, flour	231.715	222.079	232.198
Meat, filling	115.866	148.226	193.908
Milk, cheese, egg	1.072.307	1.037.102	1.112.201
Fat, oils	89.410	94.704	127.163
Fruit	82.384	98.108	123.524
Vegetables	230.641	236.623	271.411
Sugar, chocolate	50.129	49.536	51.978
Spices	32.246	40.794	55.534
Coffee, tea, cocoa	58.619	58.086	63.330
Juice, wine	53.806	55.061	53.925
Total turnover	2,017,123	2,040,319	2,285,173

Source: Statistics Denmark, May 2006.

In figure 5.6.1 the composition of the vegetable sales is illustrated in more detail.

With a sale of 105 Mio DKK. (14 Mio. Euro) organic carrots were by far the largest single vegetable sold in Denmark covering 39 per cent of total organic vegetable sales. Potatoes covered 13% and onions and tomatoes covering respectively 9 and 10 per cent. The rest was made up by all kinds of other seasonal vegetables like cabbage, leeks, parsnip, salads etc. covering 29 per cent of the total organic vegetable sale.

Figure 5.6.1 Composition of organic vegetable sales in retailing 2005 (1.000 DKK)



Statistics Denmark, May 2006.

In table 5.6.2 the five categories of organic vegetables are described in terms of the amount in tonnes sold and compared with sales in 2003 and 2004 as well. As one can see organic carrots have increased with 3.049 tonnes since 2003. A general increase has occurred with the other vegetables as well.

Table 5.6.2 Organic vegetable sales in tonnes 2003, 2004 and 2005

	2003	2004	2005
Tomatoes	445	443	480
Carrots	8,394	9,365	11,443
Potatoes	3,833	4,143	4,692
Onions	1,528	1,544	1,826
Others	2,754	2,548	2,743
Total	16,954	18,043	21,184

Statistics Denmark May 2006

5.7 Packaging – the node of bargaining power

In terms of bargaining power key players among organic vegetable producers are not only related to their size of production, but also their ability to control the packaging and distribution of other vegetables in general. The owner(s) of the packaging node are often a major producer of one or a few vegetables with a supply of other vegetables from other producers to keep costs of labour and machinery in the packaging down. The node of packaging is trading directly with the retailers or other intermediaries selling directly to consumers.

The point of departure for power analysis therefore focused on the governance structure between the node of vegetable packaging and the buyers. Since retailers are the main buyers of organic vegetables, and the producers themselves claimed that power in transactions was exercised by the retailers using various control mechanisms to carry it out, analysis went into depth with the governance structure in producer-retailer relations.

In table 5.7.1 the major producers/distributors in organic carrots and iceberg salad are listed with their total production flow, including the size of import/export in terms of tonnes, and compared to the data from Statistics Denmark (June 2004 & May 2006). The numbers from the producers are based on their own statements for 2005.

Among organic carrots producers four major suppliers out of 64 (in 2003) control the node of packaging. They are Dan Organic Ltd., Sørís I/S, Marienlyst market garden Ltd. and Tange market garden Ltd. The four are also major packagers and distributors of other organic vegetables like onions, potatoes etc. purchased from other producers.

In iceberg salad three producers can be considered major distributors to the retailers, and thereby in control of contracting with the retailers. The three producers (out of 13 in 2003) are Marienlyst market garden, Lars Skytte and 'Øko-One' by Michael Balle.

The E-trading company Aarstiderne.com is supplied partly by the producers in the node of packaging and from some farms national and internationally.

Figure 5.7.1. Key packagers/producers among organic carrot and iceberg salad

Organic carrot Producer/distributor:	Organic iceberg salad Producer/distributor:
<p>Dan Organic Ltd.: A distributor of 60 suppliers (42 are members)</p> <p>Production flow/year: 3.500 t. consumer carrots 1.800 t. industry carrots</p> <p>Import: 350- 400 t. consumer carrots Export: 800 t. consumer carrots 1.800 t. industry carrots</p> <p>Søris I/S: Farm: 100 ha. (10 ha own carrot production)</p> <p>Production flow: 3.500 t. consumer carrots</p> <p>Import: 1.000 t. consumer carrots</p> <p>Tange market garden Ltd.: Farm: 375 ha mostly rented land. (95 ha carrots)</p> <p>Production flow/year: 3.500 t. consumer carrots</p> <p>Export: 300 t. consumer carrots</p> <p>Marienlyst market garden Ltd: Market garden: 30-40 ha + rents land 70 ha own carrot production</p> <p>Production flow/year: 2.5 00 t. consumer carrots</p> <p>Import: 150 t. consumer carrots</p> <p>Aarstiderne.com (E-trading company) Sales flow: 420 t. consumer carrots Import: 60 t. consumer carrots</p>	<p>Marienlyst market garden Ltd: Market garden: 30-40 ha + rents land 8 ha iceberg salad production</p> <p>Production flow/year: 150.000 heads</p> <p>Skytte, Lars Market garden: 17 ha (12 ha iceberg salad)</p> <p>Production flow/year: 200.000 heads</p> <p>Øko-One Aps Owner rents land: 22 ha (8 ha iceberg salad production)</p> <p>Production flow/year: 150.000 heads</p> <p>Aarstiderne.com Production/Sales flow: 600.000 heads Import: 300.000heads</p>
Total number of producers in 2003	
64	13

Source: Own illustration

In relation to consumer carrots the total production flow was according to the producers estimated to 13.000 tonnes. 1.200 tonnes were imported, making total production of consumer carrots in Denmark 11.800 tonnes. From the 11.800 1.100 were exported leaving 10.700 tonnes for sales in Denmark. Official sales on organic carrots through retailers in 2005 (leaving out alternative sales channels) were 9.769 tonnes. In this respect producer claims and official statistics corresponded fairly close.

However the official import/export data deviated a lot from the producers own claims. As illustrated in Table 5.7.2 the national production of organic carrots according to Denmark Statistics (June 2004) was 9.036 t. plus an import of 715 t. making the total official production flow 9.751 tonnes. The official import quota of 715 tonnes was only 65% of what the producers claimed, which

amounted to 1.200 t. The official data on exports of organic carrots was 63 tonnes, whereas the producers claimed they exported 1.100 tonnes. As mentioned before Denmark Statistics has been notified this deviation on the official data of organic carrot import/export and producer claims. One has to be aware though that the official data is from 2003, but the qualitative interviews have been made in 2004 and 2005. The import/export flow can in the same time vary a lot from one year to the other in small market such as the organic market.

Table 5.7.2 Producer claims and official statistics on production, imports and exports – organic carrots and iceberg salad

	Production (tonnes)		Import (t)	Export (t)
	Carrots	Iceberg salad	Carrots	Carrots
Denmark Statistics	9.036	531	715	63
Producer claims	10.700	500	1.200	1.100

Source: Own illustration based on the qualitative interviews with producers

In relation to iceberg salad the four major suppliers claimed they had a production of 1.1 Mio. salad heads. Two salad heads amount to approximately one kilogram, making the total production of iceberg salads 575 tonnes. Denmark Statistics had an official production output of 531 tonnes, which is also very close to producer claims.

When estimating the sales from the packagers it is important to be aware of that they have an extended supply network between each other helping out when one of them have an order they cannot fulfil sufficiently. The same carrots can therefore be sold two times from two different packagers. The first sale is from packager one to packager two and the second sale is from packager two to retailer.

5.8 Governance structure in Producer – Retailer transactions

Since year 2000 the way ‘producer – retailer’ transactions have been conducted has changed dramatically. The changes have been listed in table 5.8.1

Until 2000, when demand for organic products was increasing steadily, transactions were in general planned and coordinated between retailers and the producer cartel Biodania with mutual bindings concerning terms of production output, determination of price before season start.

After 2000, the organic vegetable market sees the entry of new large professional producers breaking the cartel and reshaping the governance structure between producer – retailer and their modes of transactions. From 2000 the retailer negotiates output terms and price with the four major packagers individually.

Table 5.8.1 Retailer-producer transactions before and after year 2000

	Before 2000	After 2000
Retailer obligations on production output	Yes	No
Producer start price negotiated before season start	Yes	No
Producer prices during season decided according to demand and supply	Yes	Yes
Various slotting fees for access to retailer space	No	Yes

Source: Own illustration based on the qualitative interviews with producers

The way transactions take place starts with the retailers, more specific a procurement officer in the buyer organization, who negotiates in the late autumn with producers individually before the start of the season about their expected production budget in combination with the retailer's sales budget. Some producers claim that they do not get any information about the retailers' expectations on sale. In general the producers claim that there are no written bindings or terms concerning retailer obligations buying the production output. Prices are determined during the season on a weekly basis based on demand and supply, and the retailers are free to buy from whom they want.

Since 2000 various slotting fees and other control mechanisms for selling through retailers have been institutionalized, and thereby moving the cost and risk-burden of selling organic vegetables more and more on to the producers themselves.

The qualitative interviews of the organic vegetable producers indicate an increasing bargaining power at the retailer node especially through the various and variable control mechanisms concerning marketing fees, obligation fees for renting specific retailer packaging systems, time of return payment from deliverance, opening fees for having access to new retail stores, all of which the producers have to pay. In table 5.8.2 the various slotting fees and control mechanisms according to the producers have been listed.

Table 5.8.2 Retailer control mechanisms on organic vegetable suppliers

	2003	Future retail proposals
Period of credit	21 days	45 - 90 days
Specific marketing fee per. sold unit (D.kr.)	0,10	No information
A general marketing fee	2-3 %	5 %
Deposit for renting retailer boxes	30 D.kr.	No information
Rent of using packing boxes	3,80 D.kr. per box	No information
Opening fee	No information	2.500 D.kr
Written contract	None	Yes
Producer covering losses	First 6 days	No information

Source: Own illustration based on the qualitative interviews of the producers

Concerning the *period of credit*, the interviews with the organic vegetable producers revealed that retailers have proposed to prolong the time of return on payments from originally 21 days to 45 days. One producer even claimed that they are pushing for 90 days. In other words, the retailers are reducing the cost of capital for themselves, but increasing it for the producers.

The consequences of extending the period of credit will first of all put a pressure on small farmers, who are often a major group in organic farming. Secondly, the turn over period of vegetables delivered and sold in supermarkets is usually under a week, so the discrepancy between sold at retailer and retailers paying their suppliers will grow immensely.

The '*specific marketing fee*' which the farmer pays per unit sold at the retailer is a replacement for a previous policy, where the producers had to accept a random reduction in price if the retailers had planned a certain campaign involving organic vegetables. In this way the producers have a kind of control over their contribution to sales campaigns, and what the retailers actually carry through.

The '*general marketing fee*' is a fee the producers have no control of what it goes for. Before it was a mutual agreement on helping marketing organic vegetables, but the producers pushed forward for getting a more specific marketing fee to control payments and retailer marketing efforts. In some ways it would be more correct to say that the marketing fee has become a 'space fee' the retailers collect for the producers to use space in the retailer stores. The retailers have proposed to raise the marketing fee from the previously 2-3 per cent to 5 per cent.

Deposit on packing boxes is a deposit the producers have to pay the retailers for renting their specific packing boxes. The deposit is paid back when boxes are returned to the retailers.

On top of that the producers also have to pay a *Renting fee* per packing box to cover depreciations of the boxes plus the obligation of the retailers to wash them.

Some of the large producers interviewed claim that in relation to sales agreements on organic exports the discount chain 'Netto' charges an *opening fee* from the producers for getting the advantages of access to more space in new stores the chain is opening abroad. Discount chains usually have between 1,200 and 1,400 commodities, so if this is a fee that is collected from each supplier of 1,400 commodities it amounts to 3,5 Mio DKK collected just to open a store. However, only very few of the producers have been presented for an opening fee.

A *Written contract* is being proposed more and more heavily from the retailers on the producers. They have so far rejected to sign it many of them claiming that the demands are outrages like paying a fine of 10.000 DKK if deliverables are not on time. However, the increasing push for written contracts in the governance structure between retailers and organic vegetable producers has to be seen in relation to the growing vertical integration and internationalization of the buyer organizations of the retailers. The nearness between national buyers and producers are diminishing, and so written contracts are becoming the norm to secure supplies.

Producers covering losses is for salad producers 6 days. That means if the salads start to rotten within 6 days the producer covers the loss. The producers are here left with a lot of asymmetric information concerning their products regarding handling at the retailer distribution center, distribution itself to display in the shops. If salads are not sold because the retailer claims they were starting to rot, the producers are left with only trust on this type of governance structure in transactions.

The qualitative interviews with the producers reveal that not only has the producer-retailer regime changed since 2000 from a market with certain obligations resting on the shoulders of the retailers concerning sales, to a pure market driven price setting. The retailers' have also created a 'tool box' for various ways to control and increase their bargaining power towards the suppliers, and according to the organic vegetable farmers, the pressure has been increasing up to 2005.

Parallel with the tool box, an increasing vertical integration in decision making among retailers is also taking place.

For example the buyer organizations among the three biggest players in Denmark, 'Coop Denmark', 'Dansk Supermarked' and 'SuperGros', have all become more vertically integrated. In relation to Coop Denmark the buyer organization within food has transformed into a buyer organization for 'Coop Nordic Food' organized along different food categories (i.e. fruit and vegetables). In this respect a common statement from the organic vegetable producers being interviewed were, that previously they could negotiate personally with the procurement officer responsible for purchasing their crop or group of crops. But now the producers claim that the procurement officers themselves

have little or no influence on the terms of transactions. It is “somebody higher up in the system where decisions have been made”, the producers are told.

‘Netto’, the discount chain under ‘Dansk Supermarked’, which is a major outlet for organic products, has previously negotiated sales and terms of contracting directly with the producers. From January 2005 contracts, terms of distribution, have to be negotiated with ‘Dansk Supermarked Indkøb’ (Dansk Supermarked buyer organization).

To combat this growing trans-national concentration of bargaining power and vertical restraints, some of the organic producers predicted that their countermoves would be to buy or ally themselves with other organic farmers in Germany as well as in the Nordic countries. In this way they would still be in control of the node of packaging and distributing in relation to the buyer organisations of the retailers operating on a Scandinavian market. In the same time they would also be able to handle large amounts as well as a greater product variety, offering retailers economies of scale and scope.

Other moves are the emergence of different modes of partnerships between retailers and producers cooperating on product innovation. One packager/producer had made contract on delivering special carrot varieties for snack and wok food. Others have joined the initiative made by the Association of organic farmers coordinating sales campaigns with the discount chain Netto with a range of organic commodities/producers promoting new among others new products.

5.9 Economic price analysis

The possibility for the organic farmers to obtain an above normal profit due to having ownership of a critical resource with high utility and relatively scarcity would according to theory only be temporary in open competitive markets, and therefore a convergence between organic and conventional prices should be expected.

This is stated in hypothesis number one.

For testing this hypothesis a price trend analysis regression model was formulated as follows:

Difference between organic carrot price and conventional price = f (intercept, time) + ε

Where:

Price is a monthly price from 1997 – 2004;

Time is monthly time is 1.2...96 months, put in as one trend from 97 January to 99 October and a second trend from 99 November to 2004 December

The error term is represented by ε , $\sim N(0, \sigma^2)$

The Food and Resource Economic Institute is in possession of monthly consumer prices in retailer outlets for carrots in the period from 1997 to 2004 inclusive. These data have been converted into *real* prices (year 2000), and analyzed to evaluate the price trend in organic and conventional carrot respectively for a discount- and a supermarket chain.

The results are illustrated by table 5.9.1

Tabel 5.9.1 Development on consumer prices respectively for organic and conventional carrots in competing supermarkets as well as discount stores

	DICOOUNT			SUPERMARKET		
	Estimate	SE	T-value	Estimate	SE	T-value
Intercept	3,48	0,28	12,37	3,06	0,42	7,26
Dummy 97 jan -99 october	2,00	0,30	6,67	- 0,09	0,36	- 0,24 *)
Trend I. 97 jan – 99 oct	- 0,03	0,01	- 2,59	0,06	0,01	4,42
Trend II. 99 nov -04 dec	- 0,02	0,01	- 2,92	0,01	- 0,01	- 1,23 *)

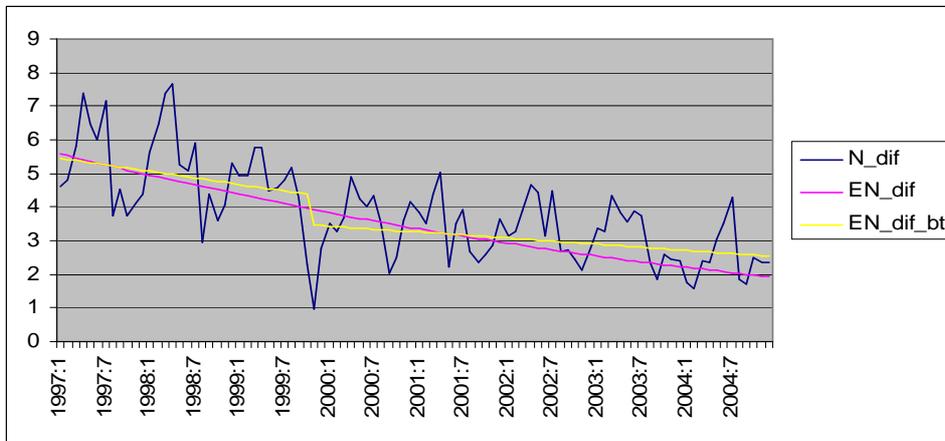
Source: Own calculation

All parameters are significant at the 5 per cent level except when marked with *)

In the discount chain there is significant convergence in the prices between organic and conventional carrots. In period I, from January 1997 to October 1999, the price difference drops on average by 0.03 DKK per month. In period II, from November 1999 to December 2004, the price difference decreases by 0.02 DKK per month. Altogether the organic carrot price has declined and converged towards the conventional carrot price with a fitted price difference from 5.40 to 2.70 DKK.

This is illustrated graphically in figure 5.9.1. The N dif represents the consumer price difference between organic and conventional carrots. The fluctuation in the price difference seen in the figure is the seasonal fluctuation starting with a lower price during winter, increasing in spring until the supply of fresh home-market produce reaches a peak typically from May to July. Then prices start to fall, reaching a price minimum in November/December. The EN dif represents the trend line and EN dif bt represents the broken trend line to illustrate the difference when taken into account the sharp price decline in October 1999 when the producer cartel is broken up.

Figure 5.9.1 Difference in consumer price between organic and conventional carrots in a discount chain from 1997 – 2004



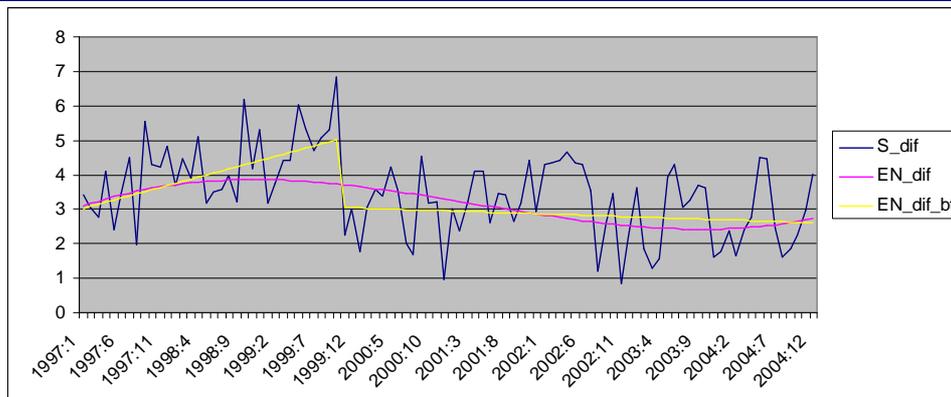
Source: GFK data consumer prices on organic and conventional carrots.

Concerning the development in the supermarket chain the price difference between organic and conventional carrots in the *increases* with 0.06 DKK in period I as illustrated in table 5.9.1. Then the price difference drops significantly in October 1999 followed by a slight decline of 0.01 DKK per month in period II. However, the trend decline in period II is not significant.

The difference in organic and conventional carrot prices in the supermarket chain is in December 2004 2.80 DKK (fitted price) – close to the difference in the discount chain.

Figure 5.9.2 illustrates graphically the decline and development of convergence in the price between organic and conventional carrots in the supermarket chain.

Figure 5.9.2. Difference in consumer price between organic and conventional carrots in a supermarket chain from 1997 - 2004



Source: GFK data on consumer prices on organic and conventional carrots.

The trend line in both the discount- and the supermarket chain confirms the information obtained from the qualitative interviews about the collapse of their cartel (and the Golden Period) by the end of 1999 due to the entry of professional newcomers. The collapse created a much more competitive environment between suppliers and retailers followed by lower farm gate and consumer prices.

The development in farm gate prices is illustrated in table 5.9.2 where organic farm gate prices declines in 1999 and 2000 despite increasing farm gate prices on conventional carrots.

Table 5.9.2 Average prices 'ab farm' on organic and conventional carrots from 1998 to 2004

Year	1998	1999	2000	2001	2002	2003	2004
Conventional	2,15	2,42	2,32	2,60	2,66	2,53	2,61
Organic	3,59	3,41	3,26	3,68	4,41	3,97	3,79
Organic premium in percentage	67	41	41	42	66	57	45

Source: FOI price statistics 1998 to 2004.

5.10 Summary and conclusions

This chapter made use of the PLC framework as well as Willamsons' approach to analyse the development and present day structure of the Danish organic vegetable chain.

The chapter begins with a historical presentation stating that the development of the organic vegetable industry is synonymous with the birth and early start of organic farming in Denmark. It is also the birth of an industry surrounded by a positive resource environment from the start involving

among others a large retail chain like coop Denmark, which supports and animates the Association of organic farmers to organize an efficient supply system from the start. After a period of relatively fast growth during the 80's a five year period of stagnation follows. From 1994 fast growth follows again with the general trend of growth in the overall organic market from the mid 90's up to 2000. This period is also mentioned as 'the golden period' for the vegetable producers due to their control of supply and farm gate prices through the producer cartel 'Biodania'. However, entries of new professional conventional producers/packagegers converting to organic in the late 90's breaks the cartel, and the mode of transactions changes from a 'planned economy' to one where retailers negotiate with the packagegers individually and prices are determined on a weekly basis in accordance with supply and demand.

The production of organic carrots is the most important of all organic vegetables occupying almost 50 per cent of the organic vegetable area. The total organic vegetable area has reached the same level of year 2000 at 1.000 hectare after a decline following the general decline of farms and hectare in the organic sector as a whole from 2000 to 2004. From 2000 to 2003 there has been a decline in organic carrot farms followed by a parallel concentration of production.

When it comes to import of organic foods to Denmark 'Fruit and vegetables' has the largest share in import value amounting to almost 40 per cent of total organic food import. Fruit and vegetables cover fifty per cent each.

Bargaining power takes place according to the producers/packagegers in the nodes between packaging and retailers. In Denmark four packagegers control the flow of packaging and distribution of organic vegetables to retailers or other intermediaries before the node of consumption.

During the market period of maturity and diffusion, bargaining power from the retailers have increased towards the packagegers/producers. The retailers have various and variable control mechanisms to employ their bargaining power concerning the period of credit, demanding certain marketing fees, obligation fees for renting specific retailer packaging systems or opening fees when a retailer opens up a new shop. The interviews documented a clear change an increase of these various control mechanisms towards the packagegers/producers.

The economic regression trend analysis investigating the hypothesis of convergence between organic and conventional consumer prices on carrots showed a clear convergence. The analysis was made for both a discount chain and a supermarket chain.

In the supermarket chain the price trend analysis confirmed what the qualitative interviews revealed namely that the period from 1997 to 2000 was 'the golden period' for the producers experiencing rising prices through their cartel of 0.06 DKK per month. Then a large drop in the price follows by the end of 1999 parallel with the entry of new large professional carrot producers becoming organic

and breaking the organic producer cartel Biodania. The late autumn is also the time for price negotiations for the next season between retailers and packagers/producers. The price difference between organic and conventional in the supermarket chain analyzed has since 2000 stayed at 2.80 DKK.

In the discount chain the organic consumer price difference had decreased from 5.40 to 2.70 DKK over the period of 1997 to 2004. There is a slight drop in the price at the end of 1999 parallel with the break up of the producer cartel Biodania, but not as severe as in the supermarket chain. The price trend analysis confirms the information from the qualitative interviews that the discount chain is using a more moderate bargaining power in terms of price policy employing the policy of the 'principal-agent'. The consumer price difference between organic and conventional carrots is almost the same in the discount chain as in the supermarket chain: around 2.70 to 2.80 DKK.

To combat the tendency increasing bargaining power and vertical restraints, some of the organic producers predicted that their countermoves would be to buy or ally themselves with other organic farmers in Germany as well as in the Nordic countries. In this way they would still be in control of the node of packaging and distributing in relation to the buyer organisations of the retailers operating on a Scandinavian market. In the same time they would also be able to handle large amounts as well as a greater product variety, offering retailers economies of scale and scope.

Other moves are the emergence of different modes of partnerships between retailers and producers cooperating on product innovation. One packager/producer had made contract on delivering special carrot varieties for snack and wok food. Others have joined the initiative made by the Association of organic farmers coordinating sales campaigns with the discount chain Netto with a range of organic commodities/producers promoting new among others new products.

Conclusion concerning test of hypothesis

H₅: Organic farm gate and consumer prices will in a saturated market converge with the conventional farm gate and consumer prices

could only be confirmed in relation to consumer prices. Sufficient data material on the organic farm gate prices were not able to be obtained

H₆: Bargaining power is exercised from both the input factor node as well as the retailer node of the supply chain

could only be confirmed as taking place from the retailer node. The tools used by the retailers to employ and increase their bargaining power were documented in the period of 2003 and 2005.

H₈: Bifurcation among organic high tech and low tech suppliers will increase

could not be confirmed. However, an increasing concentration of production among organic carrot producers between 2000 and 2003 were documented.

6. Supplier adoption in the organic vegetable & pork chain

6.1 Introduction

In this chapter the concepts of the adoption/diffusion model is applied. The farmers interviewed were asked about their main motivations for converting to organic production, and their answers have been ordered in main topics and related subjects. These topics and related subjects have then been categorized in accordance with the market period/adoption type of conversion as outlined in the theoretical framework. The five adopter type and the answers from farmers interviewed are then presented in detail.

6.2 Motivations for converting to organic production.

The motivations among key producers for converting or starting up organic production could from the qualitative interviews be categorized into five different topics each relating to certain subjects being repeated by the farmers interviewed.

In table 6.2.1 the subjects mentioned by the farmers have been organized in relation to the topic in question.

Table 6.2.1. Topic and subjects related to producer motivations converting to organic	
Topic	Subjects
A) Ideological concerns	Organic farming seen as a necessary transition in farming for creating a new society in harmony with Nature and Man. Feelings of alienation in terms of industrial farm processes and use of chemical input factors
B) Environmental or animal health concerns	More narrow focus on pesticides and nitrate leaching influenced by public debate. For pork producers animal welfare the heavy use of medicine, or personal health risk in relation to working in industrial stables, were subjects raised
C) Economic concerns	Possibilities of higher residuals Possibilities of higher freedom in production planning and sales
D) Personal – work concerns	Positive public opinions and interest related to being an organic farmer Greater work challenges – innovative field
E) Market concerns	Deliver what the consumer wants Possibilities for expansion on new markets

Source: Own table

As presented in table 6.2.1 the five topics were categorized as ranging from ideological concerns, the environmental damages and animal welfare problems caused by conventional farming methods, to more professional concerns related to economy, work challenges and future market prospects. Under these topics specific subjects were repeated by the farmers interviewed.

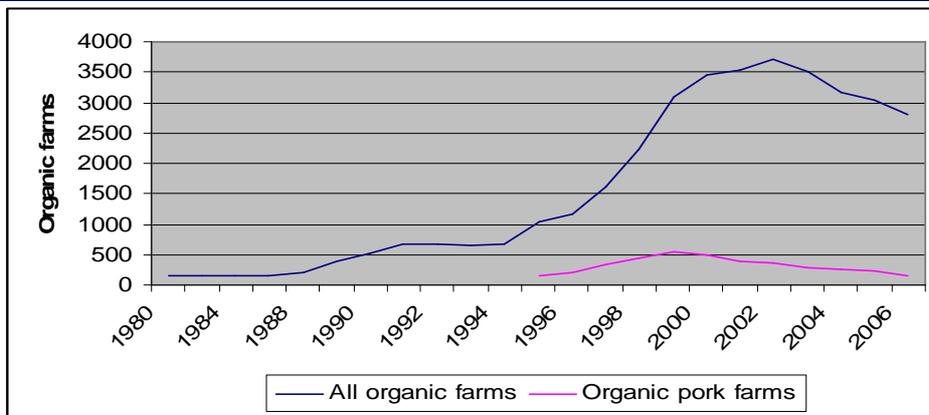
In table 6.2.2 the topics and their related subjects have been placed in relation to the five adopter categories the farmers interviewed belonged to. When organizing the farmers and their answers (topics and subjects) under the Adoption/diffusion model a clear transformation in the motives for becoming an organic farmer is evident. The *innovators* have a strong ideological motivation for starting up organic production whereas a professional approach moves in the forefront with the succeeding adopter categories. For the *early adopters* it is the question of the environment and animal welfare problems caused by conventional farm methods. With the organic market growth new groups of conventional farmers belonging to the *early* and *late majority* converts for reason emphasising economy, personal work challenges and market opportunities. Only one *laggard* was found belonging to the pork industry, and here personal work challenges and market opportunities were in the forefront.

Table 6.2.2. Categorisation of producer motivations for going organic

Product class	1970 – 80 (I) Innovators	1981 – 86 (II) Early adopters	1987 – 99 (III) Early majority	2000 – 03 (IV) Late majority	2004 – (V) Laggards
Vegetable	A: Ideological B: Environmental	B: Environmental C: Economic	C: Economic D: Personal/work E: Market	C: Economic E: Market	None found
Pork	1989 - 91 A: Ideological B: Environmental/ Animal health	1992 - 95 A: Ideological B: Environmental/ Animal health D: Personal/work	1996 – 99 D: Personal/work E: Market	2000 - 03 None found	2004 - D: Personal/work E: Market

To fit the motivations of the organic pork producers for converting to organic with the adopter categories in the diffusion model, the time span for each adopter category has been modified in accordance with the PLC cycle of the organic pork industry in terms of number of farms and pigs produced. The reason for this is because the PLC cycle for the organic pork industry to some extent is different than the overall organic sector due to the later start up of organic pork. As shown in figure 6.2.1 the PLC cycle for organic pork starts officially in 1989, but follows the same time span of growth, maturity and decline as the overall organic sector. In other words the introduction phase is much shorter for the organic pork sector due to the already well established organic market

Figure 6.2.1. The development of organic pork industry in relation to the overall organic farm sector 1989 - 2005



Source: Own figure based on data from the Plant directorate

Innovators

Starting with the ‘innovators’ ideological concerns A) was the main topic of motivation among the people behind the ideas of alternative farming. Organic farming was being regarded as a contribution and a way of transforming farm production solving major problems in society stemming from conventional farming with its high energy use, leaching from pesticides and fertilizers, farm industrialization and abolition of family farms and rural areas etc. The people around the production collective ‘Svanholm estate’ established in 1978, took it a step further regarding questions on property rights in a capitalist society as a reason for alienation and causing division between Man and Nature, men and women, labour and capital owners.

Person Interview no. I₄:

By transforming property relations in farming we believed that the environmental and social problems could be solved. This line of thought became therefore an important part of the ideological foundation and economic set up around the estate and its organic food and farm production as well its consumption.

Among the organic pork producers ideological concerns were more closely related to discussions on what a ‘true’ organic pork production system should be concerning stock size, housing and keeping pigs in/ or out-door. These discussions, trying to find a production system providing the best animal health and welfare, were held in contrast to the very industrialized system seen in the conventional agriculture with media focus on the medicine use, growth additives, new production diseases as well as welfare problems.

Person Interview no. I₁₇ :

We believed that it was possible also to produce organic pigs, both professionally

and giving maximum welfare to the pigs. For us that meant that the pigs should have 100 pct. access to the open air.

B) Environmental concerns were a second major concern for the innovators with the public debates on pesticides and nitrate leaching being at the front.

Early adopters

For the 'early adopters' Environmental concerns B) was the major topic stating that pesticides and their health were of the biggest concern. Asking the producers if they had any personal stories concerning pesticides in this regard, one vegetable producer said:

Person Interview no. I₁:

“There is one story that will always be in my mind. It was a very beautiful summer day, and the children had just arrived home after holiday. They ran down into the fields of carrots later on, which they liked to play in and they tasted the carrots. I had just been spraying the fields, so me and my wife drew like crazy to the hospital to have the kids pumped out. This is day I will never forget when you ask me about pesticides and fear concerning the use of them”.

The farmer telling this story has Parkinson disease today and suspects it coming from the use of strong pesticides used during the 1960's and 70'.

C) Economic concerns like the possibilities of higher residuals or higher freedom in production planning as well as sales came in as a second main concern for the early adopters.

Early majority

Contrary to the 'early adopters' Economic considerations C) were the major topic for the 'Early majority', which would also correspond to the steep rise in farmers converting together with the excessive demand for organic products in the period of 1993-1999. As a second main concern they expressed Personal considerations D) stating the importance of how the local community or society in general looked upon them as organic farmers gave them a sense of prestige.

As one farmer in this category stated:

Person Interview no. I₂₂:

“We feel much more in harmony with ourselves, with our work and with our local community. We feel we are looked upon in a more positive way, when we say we produce organic”.

Market concerns E) came in as number three.

Some of the late comers in the group of early majority could have E) as number two in a priority of motives for converting to organic.

Late majority

The ‘late majority’ were similar to the early majority although they were not concerned with public relations in regard to their work. Some of the producers in this group even supplies both conventional and organic vegetables, and have no dilemmas in this respect.

Person Interview no. I₁₃:

“We will deliver what the consumer wants. It is as simple as that”.

Economic concerns C) and Market concerns E) were the dominant topic for their motivation of going organic with no ideological concerns involved.

Among some of the producers in the supplier segment of ‘innovators’ and ‘early majority’ the non-ideological farmers in the late majority were regarded as camp followers and not ‘true’ organic farmers.

Laggards

Among the Laggards there were found no new vegetable or carrot producers. One organic pork producer was found (a couple). They have established a modern large scale organic pork production in 2005 with an expected production of 5.000 finishing pigs per year. They received the “Initiative price” given by the Ministry of Food, Agriculture and Fisheries March 2007 in this regard.

Person interview no. I₂₄:

For us it is important to combine a job that is sustainable economically, professionally as well as in relation to the surrounding society. To combine this in a large organic pork production, where the animals have access to open air, is of a great challenge in relation to monitoring the animals, control diseases and have a labour time in comparison with other type of jobs.

6.3 Summary and conclusion

The findings from the qualitative interviews showed, that there has been a move in motivations for converting to organic from a broader societal perspective to more narrow market oriented thinking. For the ‘innovators’ and ‘early adopters’ interviewed organic farming was regarded as a production system that could transform agriculture and solve various environmental and social problems. Most

of the farmers from these two segments were brought up in a farm environment and farm culture during the 1960's early 70's, stating that they in general felt alienated towards the rapid industrialization of agriculture and the environmental conflicts in the wake of the late 1970's.

For the 'early majority', farmers' motivations for converting were primarily a personal-community work relation. Good community relations, feeling personal satisfaction by having a production in harmony with societal values, had a high utility rating among the early majority. The prospect of new market opportunities, giving higher residuals than conventional products, was also important motivations.

For the 'late majority' purely market and economic concerns dominate the primary motivations for converting to organic vegetable production.

Laggards were only found in the pork industry. Their motivations converting to organic were similar to the early majority combining work and market reasons with the necessity of having a farm in harmony with societal values of sustainability and good community relations.

The results from the qualitative interviews could confirm the following hypothesis:

H₁: The innovators among organic suppliers in market period I were driven by alienation in relation to various societal and environmental problems caused by the industrial farm methods in conventional production.

H₂: The early adopters among organic suppliers in market period II were mainly driven by environmental concerns related to their profession as farmers

H₃: The early majority among organic suppliers in market period III were mainly driven by economic and professional work challenges

H₄: The late majority among organic suppliers in market period IV is mainly driven by economic and market requirements

However, hypothesis H₇

H₇: The laggards among the organic suppliers in market period V are mainly driven by aesthetical values and market requirements

could **not** be confirmed with the one pork producer found in the category of laggards. There were no vegetable producers found among the laggards.

7.0 Conclusions and discussions

7.1 Introduction

The research described in this thesis investigated the evolution of the Danish organic market using a theoretical framework of the Product Life Cycle (PLC) combined with Adoption/diffusion theory. Influenced by various counter culture movements during the 1960's and 70's the Danish organic farm movement had from its birth in 1981 - at least in terms of the number of farms and arable land - followed a development resembling the PLC: Slow introduction, fast growth during the 90's, maturity from 2000 and beginning decline in 2004.

The purpose of the research was to be able to predict some future outcomes of the Danish organic food sector. Would it continue to decline or could it reach a new growth phase?

Two organic industries had shown growth potentials during the maturity period and were therefore chosen as case studies for in-depth analyses: organic pork and organic vegetables. The in-depth analyses included a focus of interest on the bargaining power along their supply chains investigating the dynamics, counter actions and strategies of the actors along the supply chains, and thereby be able to predict some future developments paths of the organic sector.

Williamsons' level of social analysis were chosen as guideline using level 3 and 4 focusing on the governance structure and choice of resource allocation respectively along the nodes of the supply chains.

The results of integrating the PLC with the Adoption/diffusion model proceed as follows: First the historical evolution of the markets of the two industries was described. Then their networks with the key nodes of transactions taking place were drawn followed by analysis of the production structure, economic size and sales. The nodes where bargaining power takes place were given special attention illustrating how bargaining power is employed and how it has evolved. Economic analysis was made on farm gate- and consumer prices respectively to compare or document qualitative statements and statistical findings. Chapter 4 and 5 contains these results.

In chapter 6 the motivations for farmers converting to organic were described. The farmers converting to organic during different market periods were categorized along the PLC and Adoption/diffusion model. The topics and related subjects for their motivations of conversion were similarly structured along the PLC/Adoption model.

Chapter 7 consolidates the findings and important conclusions of the previous chapters. In section 7.2 conclusions from core chapters and answers to research questions and hypothesis raised are presented. Section 7.3 will conclude on the overall question of the development prospects of the or-

ganic sector in Denmark and section 7.4 will end the chapter discussing limitations of the study and possibilities for future research.

7.2 Conclusions from chapters

In chapter 2, section 2.4 a theoretical framework was developed to meet the purpose of the research study. The framework was supported by eight hypothesis raised in relation to the five market periods illustrating the evolution of the Danish organic sector.

In table 7.2.1 the hypothesis are recalled to present major conclusions of the research. The hypothesis is shown in the first column on the left side with their corresponding market period in the following column. The third column shows the major conclusions based on the research approach applied, and the fourth column is telling if the hypotheses are confirmed or not.

Table 7.2.1.			
Hypothesis no	Market period	Major Conclusions	Hypothesis confirmed
H ₁ The innovators are driven by alienation in relation to various societal and environmental problems caused by the industrial farm methods in conventional farming	I Counter culture 1970 - 80	Organic farming was seen as a necessary transition in farming to re-establish harmony between Man and Nature. Alienation towards industrial processes and use of chemical and industrial fertilizers were a major drive for change Ideological change was inspired from three major grassroots movements: The collective living, the political left, environmentalism all coming together in the 'Svanholm' estate (The birthplace of organic farming in DK)	Yes
H ₂ The early adopters are mainly driven by environmental concerns related to their profession as farmers	II Market Adoption 1981 - 86	Entry of professional farmers concerned with animal welfare, personal health risks in relation to public debates on conventional farming methods	Yes
H ₃ The early majority are mainly driven by economic and professional work challenges	III Market Growth 1987 - 1999	Entry of other groups of professional farmers focusing on the possibilities of good public relations better earnings, better use farm constraints (buildings, land, investment prospects)	Yes
H ₄ The late majority are mainly driven by economic and market requirements H ₅ Organic farm gate and consumer prices will converge with conventional in a saturated market H ₆ Bargaining power is exercised from both the input factor node as well as the retailer node of the supply chain	IV Market Maturity 2000 - 03	Entry of farmers focusing on the market, economic earnings and new professional challenges Consumer prices on pork converged from a price difference of 40 DKK to 22 DKK in the period of 2001 to 2005 Consumer prices converge on carrots from a price difference of around 5.40 – 2.80/2.70 DKK Organic vegetable supply chain a clear employment of B.P from the retailer node using various control mechanisms like fees, period of credit etc.	Yes Yes for consumer prices No for farm gate prices on pork No confirmation on farm gate prices on carrots Yes for B.P. from the retailer node in the org. veg. chain No proof in the org. pork chain B.P. from input factor node rejected
H ₇ The laggards are mainly driven by aesthetical values and market requirements H ₈ Bifurcation among high tech and low tech organic farmers will increase	V Market Diffusion 2004 -	Laggards found resembles Early majority re-focusing on good public relations, production in harmony with societal values on sustainability as well as economic earnings A strong bifurcation and concentration of farm production found in the org pork in the period of 2005 - 07 Indication of concentration of production in org. veg between 2000 - 03	No laggards found driven by aesthetical values in relation to the product produced or specifically focusing on market requirements Yes for bifurcation in org. pork No confirmation of bifurcation in org. veg.

Source: Own table

The results from chapter 6 on farmer motivations for converting to organic production confirmed most of the hypothesis put forward on reasons for converting in the various market periods. Only H₇ concerning that laggards are mainly driven by aesthetical values in the market period of diffusion could not be confirmed. The motivations of the laggards resembled the ones found in the early majority focusing on good public relations, new and more interesting work challenges as well as positive economic prospects. The question one could raise here is: do we see the same type of motivations for converting, while the organic sector is moving into a similar shorter term period of market growth?

In relation to the hypothesis (H₅) on convergence between organic and conventional prices economical analysis showed a clear convergence of conventional and organic consumer prices in both the organic pork as well as the organic carrots as expected during the market period of maturity. However, analysis on carrots showed during the market period of growth an increasing difference on consumer prices with rising prices on organic. The economic analysis confirmed hereby the statements from the qualitative interviews that farmers had a 'golden period' controlling prices and supply through the producer cartel 'Biodania'. The cartel breaks down in late 1999 due to the entry of new large professional producers being outside the cartel, and prices drop dramatically and have stayed stable since then with a price difference of 2,80 in the supermarket chain analyzed.

The decline of consumer prices on carrots in the discount chain showed a general trend of convergence with a slight drop in the late 1999. The economic analysis confirmed hereby the qualitative statements from the farmers that the discount chain was employing a fairer price policy than the supermarket chain analysed.

With regards to the hypothesis on bifurcation (H₈) analysis of the developments in the farm structure showed a clear bifurcation and concentration of farms and production in the organic pork industry from the period of 2005 to 07. Data before that is not possible to obtain. The results on production classification and structure developments are in this regard all new.

In the organic vegetable industry official data from 2000 to 03 showed a concentration of farms in the carrot production. However, no data on developments and changes on farm types have been collected or able to collect from official statistical sources.

7.3 Conclusions on the future evolution of the organic sector

The purpose of the research study was amongst others to predict some future outcomes of the Danish organic sector.

By implementing the theoretical framework of the PLC model investigations would focus on the factors influencing the evolution of the organic market in the past, which then could be used to pre-

dict some future market scenarios in period of market decline/diffusion. By combining the PLC theory with the Adoption model, supplier motivations gathered through qualitative interviews among laggards could then give some indications of future outcomes within the supply system. By adding a special focus on bargaining power analyzing counter actions and strategies along the chains analyzed, the result could then be picture about what type of innovations the various categories of suppliers would come up with in the near future.

The first part of the research started in a period of decline concerning the number of farms and arable land, but a status quo in the market size indicating a concentration of production was taking place. The second part of the research has been taken place when the market size since 2005 has increased and the number of farms and arable land is for the prognoses of 2007 for the first time rising (www.lr.dk/oekologi/oko-boom: 100 new organic farms on the way [Danish:100 nye økologiske landbrug på vej], pressemedd. 05.07.07). In other words: the research has been taken place during a time of both decline (farms, arable land), and a time of increasing market size and now prognoses of increasing number of farms and arable land again.

Despite these market fluctuations the findings of this research indicate that the new type of organic farmers entering the organic market in the near future will be both professional market oriented and have on average larger farms than the producers who entered previously during market maturity and decline. If the market grows, partly due to higher efficiency in the production and distribution system as well as changes in the demand system, an increase in smaller hobby or part time farmers might follow in the wake of the larger efficient ones. However the converging prices between organic and conventional would similarly keep a pressure on the organic farm structure with concentration of the production.

The support for these statements is first of all found in the organic pork industry. The producers supplying organic pork to Friland, slaughtering 81 per cent of total production, are for most of them full time producers. Full time producers have increased from 21 to 30 and full time producers in 2007 occupied 2/3 of all organic pork production. The producers in Friland will favour their own needs for expansion first, before letting newcomers enter the coop. Changes in the production structure in organic pork will therefore depend on the future policies of Friland, the development in demand for organic pork and the type of producers Friland will let in to meet the demand.

Secondly, in relation to the choice of new suppliers to Friland, this research ended up with a laggard profile having a very modern and large full time organic pork production. Again, depending on the size of demand in relation to supplies there are no indications from the in-depth case study of the pork chain that Friland would have to take in part time producers.

Thirdly, the demand system for organic pork is for 60 per cent of the production based on exports and 77 per cent of it goes to one country: the UK. The UK meat market is highly competitive, and

the products exported consist mainly of high quality products. The home market has besides high quality products also become a regular market for chopped pork, pates, fillings etc. Both markets are dominated by retailer chains, where the bargaining power is in the favour of the retailers in relation to processed pork products. With regards to fresh cuttings from slaughtering the producers organized in Friland has a greater influence on volume and price – especially when demand is higher than supply as the development on farm gate prices showed. The need for securing a critical mass in supply for the retail market, so all parts of the organic pork can be sold as organic and keep up the farm gate price will likewise in the near future support a production structure of larger efficient full time producers.

Within the organic vegetable industry the picture is a bit different. Four packagers are at the same time the node of control concerning distribution to the retailers, and in the same time in fierce competition with each other on price and volume securing access to the retailers. This competitive environment on price and deliverance pushes less efficient vegetable producers out of the market opening up opportunities for more professional and larger farms to stay in the vegetable production delivering to the packagers. However, to have something extra to offer the retailers some of the packagers pay other plant/cereal farmers to produce smaller portions of special vegetables so the packager can have a basket of variety towards the retailers during bargaining. Two opposite trends are therefore seen in the vegetable industry. At one end, the production of the ‘bulk’ vegetables from the ‘top ten list’, becomes concentrated, while at the other end farmers in plant/cereal starts to have a smaller plot of land to grow special vegetable crops. This could be an explanation for the increasing number of vegetable farms being registered while the arable land declines from 2000 to 2003. However, if demand for organic vegetables continues to grow a professional market oriented vegetable grower would in the future be expected to start up a specialized production producing at lesser cost what several farmers do at small plots. Over time the trend of professional market oriented farmers having on average larger farms than previously seen entering the organic market, would also be expected taking place in the organic vegetable industry. Similarly the qualitative interviews could be an indication of this trend with one packager claiming he is considering establishing trans national packager networks between him, Scandinavian and German packagers to combat some of the bargaining power from the retailers.

The prognoses from DAAS on the new farmers converting to organic supports the findings of this research indicating the new comers to be professional farmers with larger farms than previously. The average farm for 2007 is 74 hectare whereas in 2001 they were 35 hectare.

The Adoption/diffusion theory opens up for interpreting that in the long run a new second wave of innovators could emerge. This research was therefore investigating if the period of market decline would foster a group of new innovators eventual laying the ground for a new second wave of the

organic PLC. The findings did **not** indicate a laggard type of this kind. Instead they had the same supplier profile as the early majority found when the organic market last time experienced growth.

7.4 Limitations of the study and further research

As discussed in the theoretical chapter there is ambivalence using the Product Life Cycle as a tool for predicting. On one hand the concept of product birth, growth, maturity and decline has considerable value when used for explaining market dynamics. However, the simplicity of the Product life Cycle concept makes it vulnerable especially when it is used as a predictive model for anticipating when changes will occur. For how long is a period of decline? Is it declining when farmers become less in numbers yet the market is status quo?

The purpose of this research has not been to predict the length of an eventual decline in farms and arable land, but to “catch” how the actors along a supply chain would react under a market pressure of status quo, and thereby be able to predict some future outcomes of the organic farm sector as a whole.

One of the challenges of analyzing and moving into predictions of the organic market is as presented in the introduction chapter depending to a certain extent on the industry in motion. For example if there is an increasing demand for meat or dairy products, the size of the demand will determine the pull for fodder production and farmers growing cereals. If one, like in this research, makes case studies on two sectors that might not be in motion at the time, the conclusions on the overall sector can therefore be misleading.

The second challenge is that the overall organic sector is by and large a small sector in Danish agriculture, and therefore limitations on data will occur. Once you move into specific industries some data do not exist at all.

The third challenge is if, as in this research, one would like to compare between industries. Problems can occur if some type data is possible to obtain in one industry, but not in the other. You end up describing different industries, but can not compare them using the same parameters.

Using qualitative interviews as a method of obtaining specific data connected to a small and unexamined industry, as the organic pork and vegetables chosen for this research, increases only the problem of possible bias and distortions in conclusions. Sensitive data, typically on economic power or dependency in supply, can be a problem to obtain, because rounding up the “whistleblowers” will not be a problem.

In this research an in-depth analysis was made only on the supply system. The research question involved was to investigate if a new type of innovators among the farmers were emerging during a

market period of sales maturity and decline on farms and arable land. However, none were found yet demand has been rising since 2005. This indicates that organic farming is not any longer a supply driven sector as it was in the 1980' and beginning of 90', but overall demand driven. In this regard future research should focus more on the demand factors driving organic growth and also go further down the supply chain investigating on how processing industries develop partnerships with retailing on innovation, sales promotions and how shelf access is negotiated.

Another factor of consideration is the growing international trade of organic products. The overall growth of the Danish organic market is supported by a 30 per cent increase in organic imports. In this thesis the import and export of the two industries was analyzed. According to the producers in the vegetable industry approximately 10 per cent of organic carrots sold were imported in 2005. A similar size was exported. In pork 60 per cent was exported and almost nothing imported.

Future research questions in relation to the growing international trade of organic products could be:

- How much is the Danish organic market part of a growth in the global organic market?
- Is the Danish organic market part of a new global division of farms and products?
- How much of the growth in the Danish organic market is related to North-North trade or South to North?

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c/o:

Title:

Type₂ consumers

Type₃

Numbers:

Type₁

Type₂

Type₃

Output to (tonnage/money):

Type₁

Type₂

Type₃

6. Type of market transactions:

Upstream

Downstream

7. Why the chosen market transaction/organization?

8. Why organic production?

9. When organic production?

10. Future prospects:

Conflicts (horizontal/ vertical)

New markets

New products

Annex II: Interview list

Inter- view No	Date	Firm/Adress	Name	Position
1	15.03.04	Søris I/S, organic vegetable farm/Packaging www.soeris.dk	Hans Algreen-Petersen	Retired vegetable producer
2	15.03.04	- do -	Jan Algreen	Vegetable producer/manager
3	04.03.04	BioDania, organic vegetable sales vendor www.biodania.dk	Bo Nytofte	Sales manager
4	04.05.04	Svanholm Estate, organic production collective/Packaging www.Svanholm.dk	Poul Henrik Hedeboe	Logistics/sales manager
5	07.05.04	Superbrugsen, Søndersø Retailer, Toftekær 4, 5471 Søndersø	Tommy Christensen	Procurement officer
6	18.05.04	Barritskov Estate, organic plant/vegetable production, creative lab www.aarstiderne.com	Thomas Hartung	Director
7	18.05.04	Aarstiderne, virtuel E-box food company www.aarstiderne.com	Jesper Kongsted	Logistics/sales manager
8	14.11.04	Danish Advisory Service www.lr.dk	Ole Bloch Engelbrecht	Vegetable consultant
9	02.05.05	Skytte organic vegetable farm www.skyttes.com	Lars Skytte	Vegetable producer
10	05.05.05	Øko One ApS, vegetable farm Grønvej 105, Volderslev 5260 Odense S. 66 15 27 25	Michael Balle	Vegetable producer
11	25.07.05	Marienlyst Horticulture farm/ packaging www.marienlyst.net	Mogens Hansen	Vegetable producer/manager
12	31.07.05	Dan Organic, Vegetable packaging www.danorganic	Leon Poulsen	Director
13	02.08	Tange	Klaus Vestergaard	Vegetable producer/packaging
14	04.03.05	Brøndby Ferskvareterminal	Jonne Sørensen	Logistic manager
15	05.06.05	Solhjulet, Food service	Niels Ebbe	Director
16	19.12.05	Danish Advisory service www.lr.dk	Tove Serup	Pork consultant
17	27.01.06	Hanegal, organic slaughterhouse/processing www.hanegal.dk	Fie Graugaard	Production manager
18	07.02.06	Friland, organic pork sales vendor	Karsten Deibjerg Kristensen	Director
19	09.02.06	Farre A/S	Henry	Sales manager
20	16.02.06	Organic pork farm Lydumgårdvej 10	Søren Bak	Pork producer

		6830 Nr. Nebel		
21	20.02.06	Stubbekloster Gods	Leo Bisgaard	Pork producer
22	15.03.06	Organic pork farm Lindknudvej 6 6682 Hovborg	Nicolai Petersen	Pork producer
23	12.04.06	Organic pork farm Toftlundvej 7B 7430 Ikast	Gert ladegaard Jensen	Pork producer
24	25.06.06	Egebjerggård, organic pork farm 4500 Nykøbing Sjælland	Jesper Adler	Pork producer