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The Danish Organic Pork Chain

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Preface

The purpose of the report is to analyze the development of the Danish organic pork chain and present possibilities for producer actions to promote further economic growth in the organic pork sector.

In the report emphasis is placed on identifying the economic forces and structural changes within the organic pork chain, focusing on power and how firms along the supply chain act or counteract as well as how market transactions are carried out.

The report is part of a research project supported by the Danish Research Centre for Organic Farming (DARCOF II), which is entitled "Future supply and marketing strategies in the Danish organic food-sector". This total research project contains also an analysis on the development of the Danish organic vegetable sector and includes the education of a Ph.D. candidate.

For further information on the report on the organic vegetable chain see:
www.foi.dk/publications

The work in this report has been carried out by researcher and Ph.D. student Paul Rye Kledal, while Research Director Mogens Lund have participated in the final editing of the report.

Director General Søren E. Frandsen
Institute of Food and Resource Economics
Copenhagen, April 2007

Summary

From its peak in 1999 with 533 organic pig farms, the number of farms has declined to 243 in 2005. However, the number of certified organic pigs has been fairly stable around 60- 70,000 with a low point of 46,000 in 2005, but rising again to an expected level of 70,000 in 2007.

There is a strong concentration in the organic pork production where 21 full-time producers cover almost 60 per cent of the production. More than half of all organic pork farms are classified as 'hobby' farms (1-39 sows) however these extensive farms cover only 14 per cent of the production.

Investment analyzes show that since growing consumer demand from 2004 it has overall been the large full-time producers who has invested in building, machinery and livestock. The concentration of the organic pork production is therefore likely to continue and grow relatively faster among the large full-time producers.

The economic value of the organic pork production at farm level has been calculated to 70 Mio. DKK (9.4 Mio. Euro). The export of organic pork was in 2005 approximately 45 Mio. DKK (6 Mio. Euro), and home market sales in retailing have been calculated to 61 Mio. DKK (8.2 Mio. Euro).

Sixty per cent of the Danish organic pork production is exported and ¾ of it goes to the UK market. On the UK market, which is the second largest organic meat market in the world, Denmark competes mainly with organic pork from Germany and Holland. However, analyzes show that the production in these two countries is generally more niche dominated and more extensive, and they seem less prepared to cope with a 100 per cent organic feeding from 2012 than the Danish producers.

From the qualitative interviews carried out with key players along the various nodes of the Danish organic pork chain bargain power was revealed to take place between the node of 'slaughtering – retailing', and the node of 'processing – retailing'. Due to the monopoly like situation on 'raw material' of Friland/Danish Crown, the bargain power from retailers towards the node of slaughtering was characterized as low/medium. Contrary to the processors who were in a strong competition with many other conventional products (like sausages, meat fillings etc.), the bargain power from the retailers was characterized as medium/high.

In relation to bargain power between producers and retailers economic analyzes of the development on consumer prices, respectively for organic and conventional pork meat, has been made.

Over a five year period from 2001 to 2005 organic chopped meat has declined with almost 22 DKK per kg, whereas conventional meat in the same period declined with only 4 DKK per kg.

However, organic producer prices have increased steadily since 2004 from 13 DKK pr kg to over 22 DKK pr. kg, and the economic productivity of the full-time and large full-time organic pork producers was far better off than their conventional counterparts in the same four year period.

The main explanation for this development is due to the fact that sales in organic pork 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

The monopoly position of Friland/Danish Crown towards retailers enables them indirectly to influence producer prices when demand is rising and supplies are insufficient. The organization form as a new generation cooperative, with control over entry, hands over automatically bargain power on supplies. A future strategy of the producers organized in Friland/Danish Crown would be to continue supply side control and expand on international markets as well. It is on the supply side that they have a product valued high in utility terms, and in the same time they can deliver something relatively scarce or unique in ownership for the other actors along the pork chain. The international expansion is important so steady supplies on relatively volatile national markets can be levelled out as well as counterbalance the bargain power of European retailer chains.

1. Introduction

1.1. Project background

During the second half of the 1990's the Danish organic sector, like in many other countries of the North, experienced a strong and steady growth in sales, number of farms and arable land converting to organic production. However, in many countries the growth in organic food was often concentrated within a few commodity groups. In the Danish case, it was first and foremost the dairy sector that supported the fast growth in the 90's, reaching a market share in consumer milk of around 30 per cent.

Parallel to the economic growth in the organic sector the Institute of Food and Resource Economics was involved in a research project called the "Potential of organic farming in a sustainable development" analyzing the growth potentials for organic farming in Denmark. A part of this project was a socio-economic study interviewing conventional farmers to ascertain the characteristics of who the potential organic farmer was, the commodities they pictured themselves producing and the various barriers they were expecting during their considerations of converting to organic (Kledal, 2000 & 2001).

Some of the conclusions were that organic dairy production would cease to grow, whereas new areas of potential growth were within pork and plant/vegetable production. The potential organic farmer was a person between 20 and 44, and would have a small to medium size farm.

Since organic pork production was relatively unexamined concerning various socio-economic aspects like farm types, production costs, market potentials and possible distribution channels as well as consumer preferences, this organic commodity sector was chosen for further research examining the growth potentials in the future supply of organic foods.

1.2. The aim of the project

The overall aim of this research project is to describe the future development of the Danish organic pork chain.

Emphasis is placed on market structure, bargain power and how firms along the supply chain act or counter act upon it, as well as how market transactions is carried out.

By linking the research results of economic changes with the behaviour of various firms and nodes along the supply chain in relation to power, the specific aims are to identify and explain the development of the Danish organic pork chain and formulate useful supply strategies stimulating growth among producers.

1.3. The organization of the report

The report starts in chapter 2 with a description of the methodological approach applied using qualitative interviews among key players along the organic pork chain, compared with quantitative data on farm gate as well as consumer prices.

Chapter 3 is a description of the Danish organic pork chain. It starts with the historical development concerning the various initiatives and struggles of establishing a well functioning market of organic pork from 1986 to 2006. Then the regulatory regime of today is described, and the network of the chain with its major nodes and links are explained. The primary production structure, slaughtering, processing and sales channels as well as the amount of organic pork being imported and exported are illustrated.

Chapter 4 analyzes the economic performance within the primary production, comparing the economic total productivity in the organic pork sector with similar production types in the conventional sector. Also a description of the governance structure in supplier – retailer relations is illustrated and discussed.

Chapter 5 concludes and sets the research results into a broader perspective.

2. Methodology and data collection

For the study of the development of the organic pork chain the following approach was adopted.

Firstly, the research methodology applied can be characterized as a micro analytic approach focusing on the actors along the nodes in the supply chain analyzing how transactions and bargain power is carried out.

Secondly, data collection was done by reviewing relevant literature, publications and studies to outline the Danish organic pork chain although there are few studies on that specific sector itself. During this process key players along the chain were found. Key players include producers, 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 questionnaires, 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 pork chain was functioning guided by questions in terms of production flows, contracting and power structures along the chain.

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 bargain power is exercised, what type of counter actions they could foresee or employ, and what prospects they saw for the future concerning the development and growth of organic pork production. During this process a more specific questionnaire was used (included in the Annex), and ten persons have been involved in these in-depth interviews.

The question of power along the food chain was overall by the suppliers expressed as coming from the retailers, confirming Boehlje & Schrader (1995), that the end user and the firms with intimate contact with the consumers are a point of power and control. However, a key player in the node of slaughtering having a monopoly position claimed that they and their suppliers were fairly equal in negotiations with the retailers. Contrary to this the players in the node of processing expressed that power was heavily exercised from the retailers, and access to shelf space was very competitive.

To evaluate the various claims from the qualitative interviews concerning bargain power and price pressure being exercised from the retailer node, monthly data on organic and conventional farm gate- and consumer prices from 2000 to 2004 were collected. Prices were not possible to obtain from post-slaughtering or post-processing. A regression model was formulated to calculate eventual changes in farm gate and consumer prices as well as to see if there was any contraction between organic and conventional prices.

The farm gate prices on organic and conventional pigs were collected from the Danish Agricultural Advisory Service (DAAS) dating from 1999 to mid 2006. The consumer prices were collected from GFK consumer data bought by FOI dating from 2001 to 2006. The GFK consumer data are based on a statistical sample of the whole population, where the consumer in the sample writes down on a weekly basis their purchases and prices.

From the Plant Directorate a special survey was obtained back in October 2005 concerning the number of organic pork producers, their location and the number of sows they had. 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 (70-199 sows) and large full-time producers (200-500 sows).

From DAAS accounts on the 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. DAS were in possession of 23 to 33 accounts during these five years.

The willingness to respond to interviews and to provide quantitative data differed significantly between the contacted persons and firms. The reason for this is first and foremost due to the fact that the organic pork chain is fairly small with especially very few players in the node of slaughtering and processing. In slaughtering only one firm is a dominant part, and in processing competition is very high among a few firms. Relevant interview information has where ever possible been crosschecked with quantitative data. However, organic pork production is a rather new area for collecting official statistics, so the results from interviewing the producers in this research project and checking them against the official statistics, have been a difficult task.

3. The Danish Organic Pork Chain

3.1. Historical background

1987 - 1993

Organic production in Denmark has its legal and formal start with the establishment of the Organic National Association 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 Organic National Association, 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 Organic National Association [Danish: LØJ (Landsorganisationen af Økologiske Jordbrugere] 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.forbrugerrådet/markedsføring/breve/fødevarer/24 juni 2002; www.hanegal/publikationer/øvrige artikler/redegørelse 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 sup-

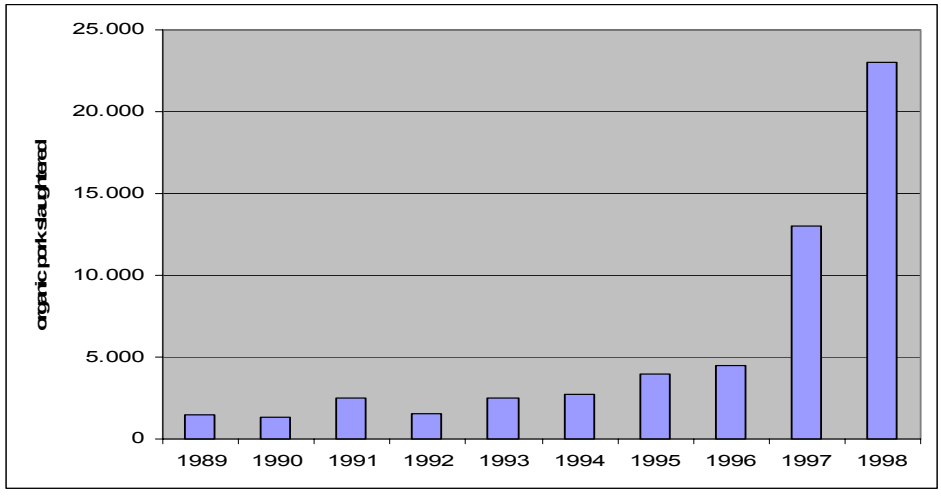
ply, 2) large disparities in meat quality and 3) no sustainable arrangements were able to be obtained with the existing slaughtering houses. Concerning the organic pig producers organized in Friland Food through ØKOKØD only a few were left, due to over production, small demand and farm prices under break 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 late1993 Ulrich Kern-Hansen, who was a supplier of the former Naturens Venner, starts together with his wife Fie Graugaard, the organic sales vendor Hanegal (cock-crow) 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 3.1

Figure 3.1. 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, 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, 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 revieled) 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 FødevareSundhed, 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 trough 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).

3.2. Regulatory regime

The legal foundation for regulating the organic pig production in Denmark 2006 has its point of departure in two sets of rules:

- Council Regulation (EEC) No. 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs [Danish (short): Rådets forordning (EØF) nr. 2092/91 af 24. juni 1991]

- Instruction on Organic Agriculture March 2006, The Danish Plant Directorate [Danish: Vejledning for Økologisk Jordbrug marts 2006, Plantedirektoratet]

The organic pig production follows in many ways the conventional outdoor production where sows are kept outdoors all year round. The difference between the two systems is especially in relation to weaning, medical treatment, feeding and when keeping pigs in indoor housing.

Besides these cost increasing differences within the organic production certain interim provisions or arrangements exist concerning using non-organic items within feed, litter and manure due to lack of a 100 per cent organic supply. However, the rules and the organic pig producers themselves are in general pushing for a phasing out of the various non-organic items.

In table 3.1 the rules on area requirement for organic production are described. The numbers in brackets in relation to the minimum m^2 indoor per animal are the requirements for conventional pigs. As seen the requirements of m^2 in conventional pig production are only half of those of the organic rules, being part of the reasons for higher production costs in organic pig production.

Table 3.1. Space requirement for organic pig production 2006

	Indoor area (netto) both rest- and residing area		Outdoor area (mating, no grazing)
	Minimum live weight (kg)	m^2/animal	m^2/animal
Lactating sows with piglets until 49 days		7,5 (3,75)	2,5
Piglets	< 30 kg but > 40 days	0,6 (0,3)	0,4
Young pigs	≤ 50	0,8 (0,4)	0,6
Finishing pigs	≤ 85	1,1 (0,55)	0,8
Finishing pigs	≤ 110	1,3 (1,0)	1,0
Breeding pigs (female)	-	2,5	1,9
Breeding pig (male)	-	6,0	8,0

Source: Plant Directorate, 2006.

In table 3.2 the interim arrangements concerning facing out non-organic feed are listed. From 2012 all feed in organic pig production is supposed to be organic.

Table 3.2. Interim arrangements concerning facing out the use of non-organic feed in organic pig production

Food item	Until		
	2007.12.31	2009.12.31	2011.12.31
Non-organic	Max. 15 %	Max. 10 %	Max. 5 %
Conversion feed	Max. 30 %, however max. 60 % if grown on own farm		
Fodder	Free access		
Organic feed	No upper limit		

Source: Plant Directorate, 2006.

However, already back in 1999 the Minsters of Agriculture decided at the EU Minister Council meeting 15th of June 1999 to phase out non-organic feed. This proposal was made in relation to the implementation of common rules regulating organic animal production in the EU countries. The new rules were to be part of the Council Regulation no. 2092/91. It was decided that these rules were to be implemented a year later, formally by the 24 of August 2000. On the matter of feed it was decided that the use of non-organic feed should be phased out after five years - 24th of August 2005.

Back in 1999 these proposals raised an ideological debate among the various actors in the organic pork chain concerning the economic consequences for organic pig production (Organic Farming, August 1999 [Danish: Økologisk Jordbrug], 1999). This

was both in regard to the problems of having a supply of high quality protein crops as well as the costs on area requirements for indoor housing. The indoor area requirements debated and agreed upon at the time are the ones listed in table 3.2, and these requirements are still prevailing today.

As the year 2005 were getting closer the problems of having a supply of necessary high quality protein feed sources were raised again.

The technical/biological problem concerning protein supply and feeding the pigs 100 per cent organic lies in: 1) since it is not allowed in organic agriculture to use synthetic amino acids it is necessary to overfeed with raw-protein to secure the optimal level of specific amino acids and thereby optimal growth of the animals. 2) The overfeeding of raw protein will cause a higher excretion of Nitrogen and phosphorus. 3) The potential protein sources have a rather high level of oil – soya, rape, sunflower and flax – which increase the risk of reduced fat quality since the oil in these raw materials are unsaturated. Therefore an in sufficient supply of essential amino acids to finishing pigs will give a slower growth, and a high level of raw protein in piglet feed will increase the risk of diarrhoea – even if the weaning takes place after seven weeks (Sundrum, Schneider and Richter, 2005 p.48).

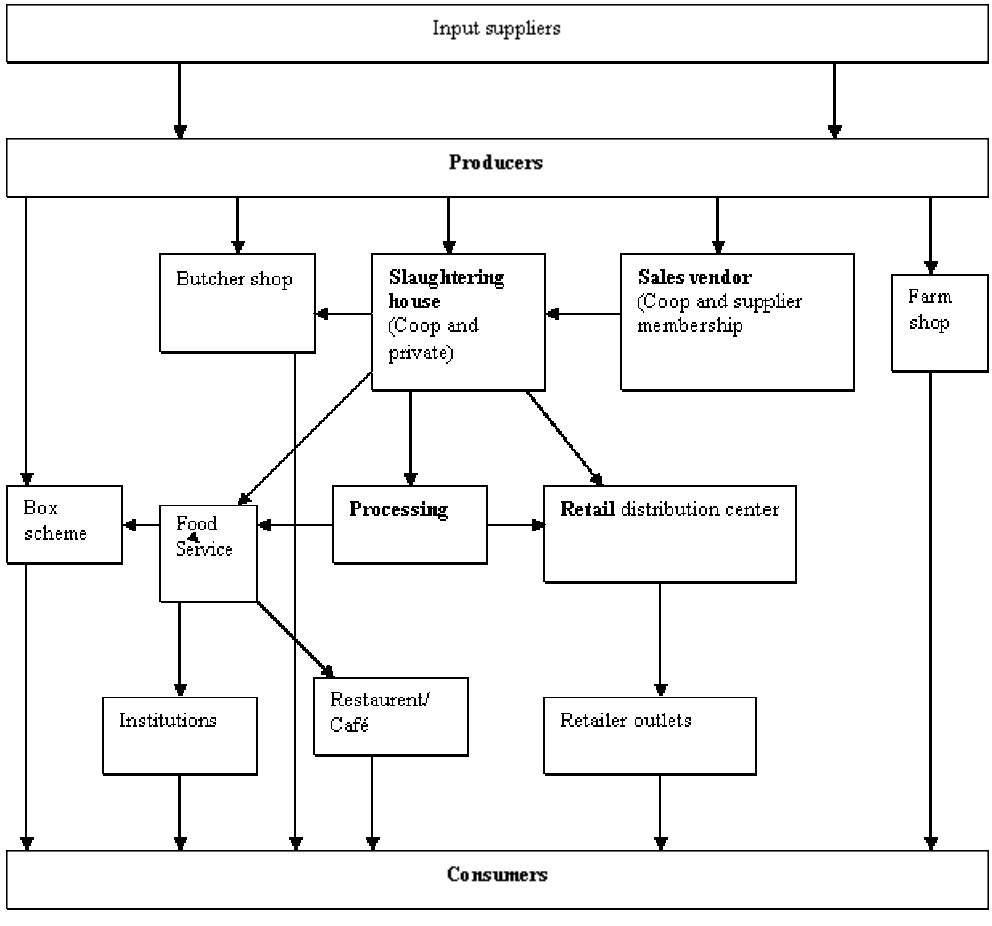
The problems of making another five year interim period to face out the non-organic feed in animal production raised some of the same ideological debate as previously among the actors within the organic pork chain. Especially, the question of having a first mover position in relation to a 100 per cent organic feed came into debate. The producers argued against a first mover position, because of the economic costs they had to carry in their competition with other organic pig producers in EU. Secondly, the problems of high quality protein supply as well as the animal welfare problems concerning diarrhoea among piglets was again put forward (Organic Farming, [Danish: Økologisk Jordbrug], December 2005).

The Institute of Food and Resource Economics made a report calculating the economic costs using 100 per cent organic feed, 100 per cent litter as well as 100 per cent organic manure in organic pig production. The main conclusion was that the costs of producing 1 kg of organic pig meat would be between 14.50 and 19.00 DKK depending on the type of production system used and the animal density per hectare (Tvedegaard, 2005). In August 2006 the market price for 1 kg organic pig was 22.55 DKK (www.danishcrown.dk/landmandsinformation/noteringer & (Organic Farming/quotation prices [Danish: Økologisk Jordbrug/noteringer] July 2006).

3.3. 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 3.2 and the major nodes are marked with thicker letters.

Figure 3.2. 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, processing of 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.

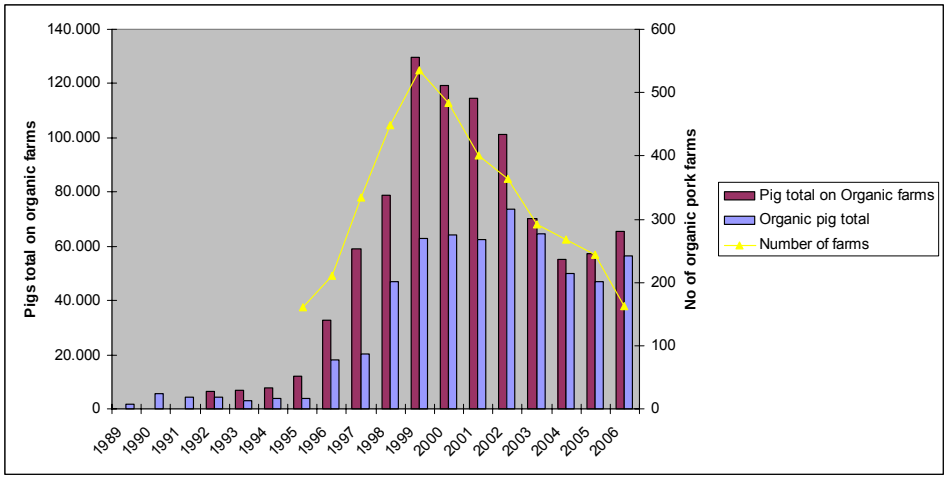
Key nodes, where bargain power is prevailing are according to the actors between slaughtering and retailing and processing and retailing. This will be discussed further in chapter 4.

3.4. 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 3.3. The development of organic pig farms, and the number of organic pigs produced from 1989 - 2007



Source: Plant Directorate, 1995 to 2007.

The number of pigs on the organic pork farms is illustrated by a red and a blue pillar. The red pillar symbolizes all pigs on the organic pork farms (Organic and non-organic under conversion). The blue pillar symbolizes the pigs classified as organic. As one can see the red pillar increases very fast during the mid nineties illustrating the positive expectations that farmers had to the organic pork market. However, when maturation 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 organic pigs.

Farm classification and production size

In the Danish organic pig production three production systems prevails:

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 analyzes 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 giving data on location as well as number of sows and/or finishing pigs produced. In the light of this information a classification on hobby producers, part time, full time and large 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 is categorized as 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 3.4 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

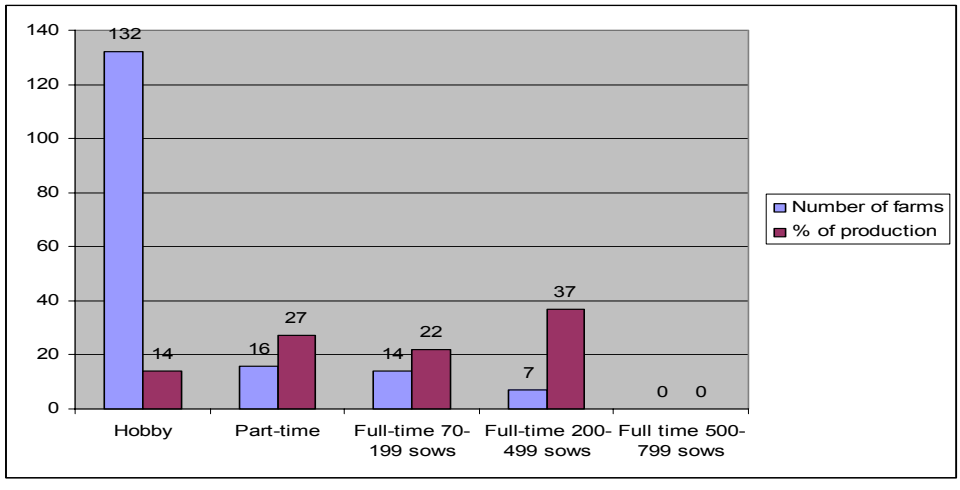
[1] A sow kept for 365 feed days (Christiansen, 2005).

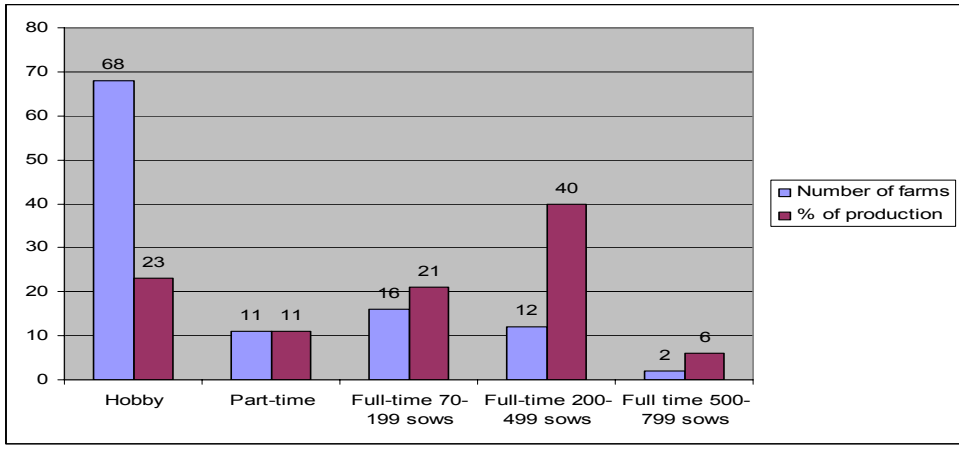
hobby- and part time farmers, where the hobby farmers have declined with more than 50 per cent from 132 farms to 68. The part time farmers have decreased from 16 to 11 farms. In 2005 the 16 Part-time farms had 27 per cent of the production, and the hobby producers, which constituted 78 per cent of all 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.

The classification shows a high degree of concentration within the organic pork production. The 21 full time farms produced 37,575 finishing pigs – being almost 60 per cent of the production. The 16 Part-time farms produced 17,130 finishing pigs – having 27 per cent of the production, and the hobby producers, which constituted 78 per cent of all organic pork farms, produced only 8.592 finishing pigs – being 14 per cent of the pork production. This is illustrated in figure 3.4.

Figure 3.4. 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.

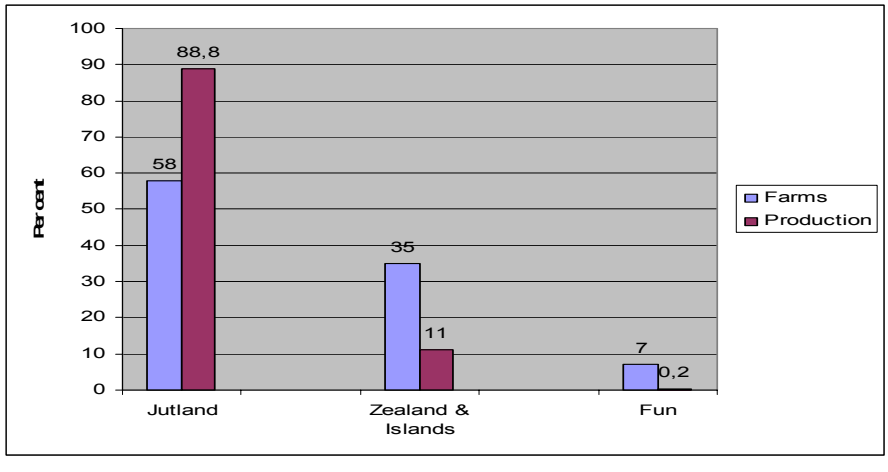
According to Director Karsten Deibjerg Kristensen (I_{18}) Friland had in 2005 forty five pig producers as suppliers and members and suppliers and slaughtered 38.000 finish-

ing 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 3.5 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 3.5. 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 3.5 also show is that the organic pig production is much more concentrated in Jutland than on Zealand and Fun. 58 per cent of the organic pig farms in Jut-

land produce 89 per cent of all organic pigs, whereas Zealand and Fun 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 is therefore concentrated in Jutland and the hobby producers on Zealand and Fun.

3.5. 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 3.3.

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 3.3. 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 (own estimation)
	70		
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 trough 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 til 2003 Hanegal had around 50 suppliers who were member 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 3.4.

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 3.4. 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).

3.6. 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 (Supermarket handbook [Danish: Supermarkeds håndbogen], 2006).

In table 3.5 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 12,5 per cent turnover of the total sales of the Irma chain.

Table 3.5 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.

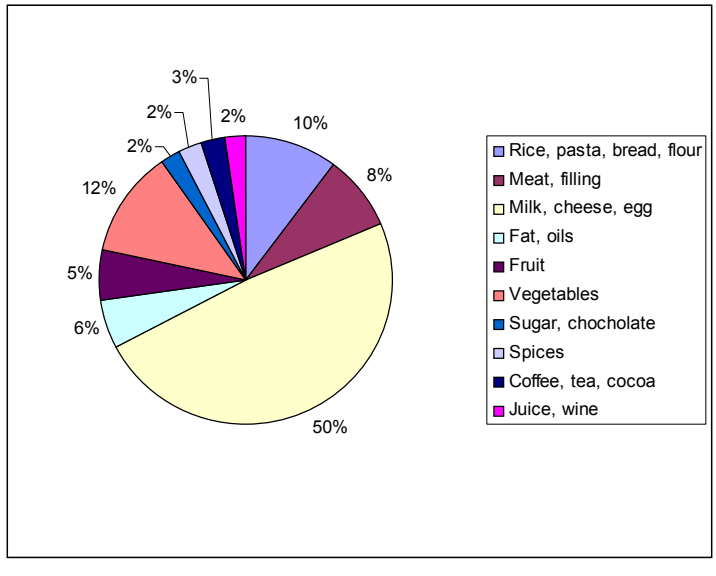
In the Danish Supermarket Group the discount chain Netto has the highest sale of organic reaching more than half a billion DKK. Netto started in 2005 to use organic as a serious profile distinguishing themselves as a 'soft' quality discount chain in contrast to the 'hard' discounts like Aldi and Lidl, 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. For more discussion on this topic see FOI report 182/2006: The Danish Organic vegetable chain. www.foi.dk/publikationer

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 becoming 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 3.6 the composition of the organic retail sale is illustrated. As figure 3.6 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 3.6. Product composition of organic sales in retailing 2005



Source: Denmark Statistics, May 2006.

In table 3.6 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).

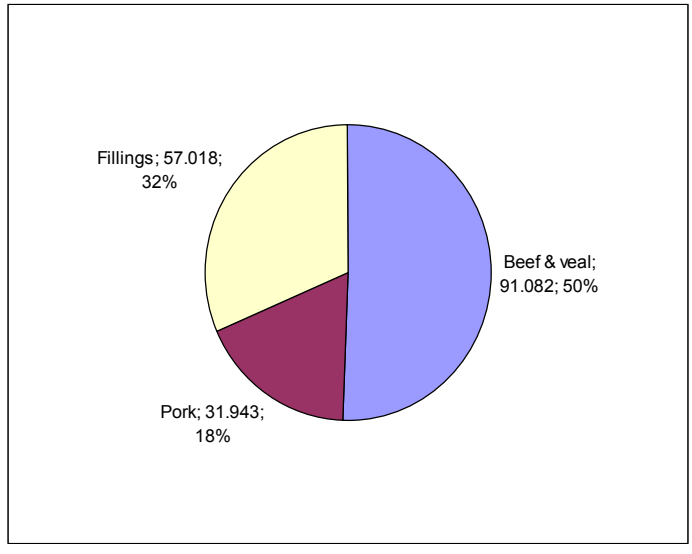
Table 3.6. Turnover in organic retailing from 2003 to 2005 (DKK)

	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, chocholate	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: Denmark Statistics, May 2006.

However, organic meat and fillings consists also of veal and chicken. In figure 3.7 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 Mio. DKK/2 = 28.5). Organic pork meat would then have a total value in retailing of 61 Mio DKK (8,2 Euro) (32 Mio + 29 Mio. DKK = 61 Mio. DKK) amounting to almost one third of the total turnover value in organic meat sales in retailing (61/194 x 100 = 31 %).

Figure 3.7. The composition of organic meat sales in retailing



Source: Denmark Statistics, May 2006.

In table 3.7 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 x 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 x 100 = 28 %).

Table 3.7. 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: Denmark Statistics, May 2006.

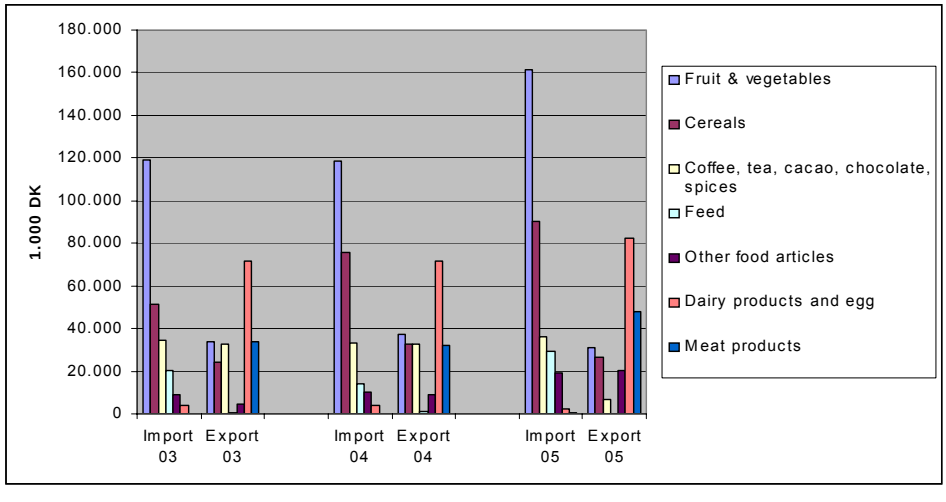
3.7. Danish import and export of organic pork

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 2005 account statistics for organic farming in 2004).

In figure 3.8: *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 3.8. Foreign trade with organic food from 2003 to 2005



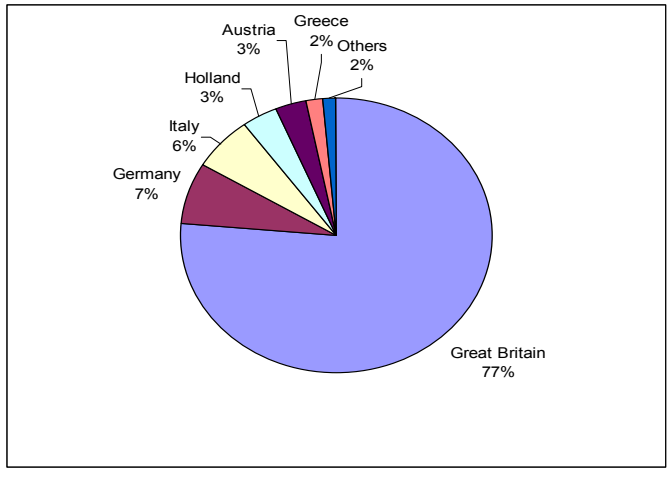
Source: Denmark Statistics, November 2006.

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 3.9 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/FødevareSundhed Monday 17th of January 2005 newspaper article on Farre Ltd on its export value to Germany.

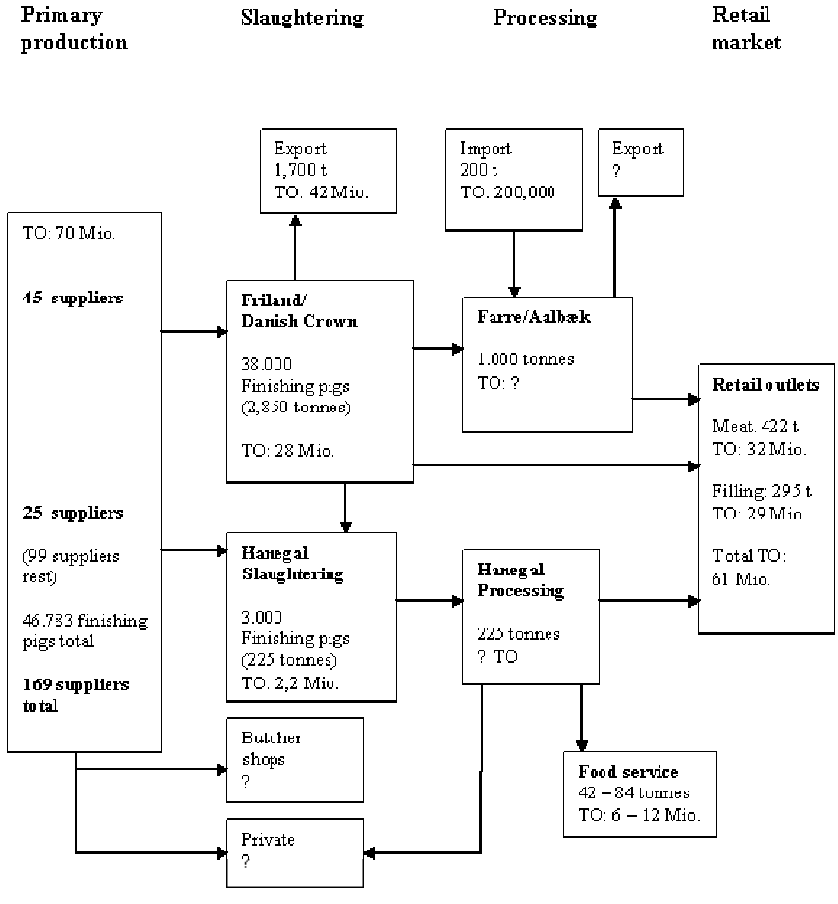
Figure 3.9. Major countries where Denmark exports organic pork (2005)



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

To sum up the most important data from the previous parts of chapter 3 the following diagram 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 3.10. Flow diagram of the organic pork in tonnes and value terms (DKK) in 2004/05



Source: 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

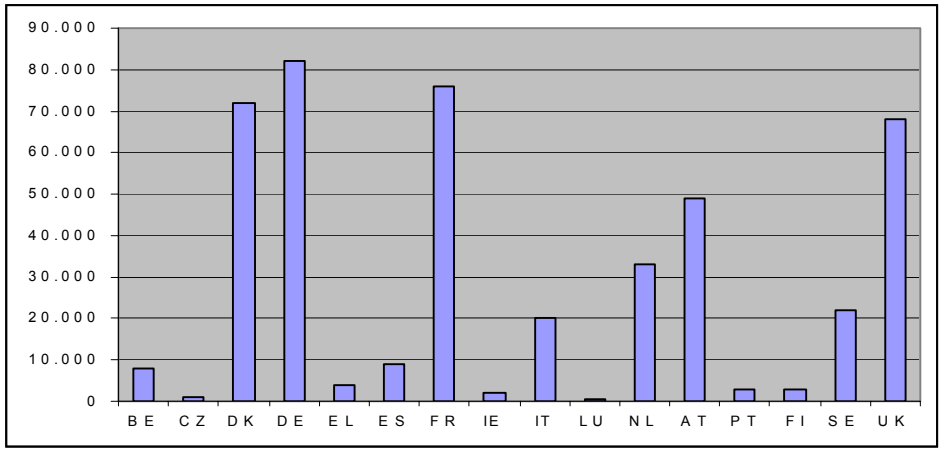
would be between 6-12 Mio. DKK (200-400 Mio. DKK/ 61 Mio. DKK). The flow in tonnes of organic pork in the node of Food service is then estimated to be between 42 to 84 tonnes (derived from 422 tonnes of organic pork in retailing sold at 61 Mio. DKK = 6,9 tonnes per Mio. DKK x 6-12 Mio. DKK).

3.8. The European organic pork markets

In 2003, EU-15 certified organic pigs amounted to 450.000 head or about 0,4 per cent of the total pig herd (European Commission, 2005).

As illustrated in figure 3.11 Germany, France, Denmark and UK are the four largest producers, with respectively 83.000, 76.000, 72.000, and 68.000 certified organic pigs. These four countries had 2/3 of all the organic pork production in EU-16. However, the overall number of organic pigs might have declined since 2003 due to overproduction, low market prices and maturated markets from 2001 to 2004.

Figure 3.11. Number of certified organic pigs in EU-16 in 2003



Source: European Commission, 2005.
The 16 Countries in the table are named in the following order: Belgium, Czech Republic, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxemburg, Holland, Austria, Portugal, Finland, Sweden, United Kingdom.

In both Denmark and the United Kingdom the number of certified pigs has fallen respectively to 46.000 and 55.000 in 2005. In the UK the number of *finishing pigs* is

40.000 (Plant directorate, 2006 & Department for Environment, Food and Rural Affairs - UK national statistics June 2005).

From a Danish perspective the development in the European organic pig production, and especially the development in the UK, are of special interest. Since almost 60 per cent of the Danish organic pork production is exported and more than ¾ of this goes to one single market– the UK market (2006) – the Danish organic pork suppliers can be very vulnerable to larger changes in demand and supply.

The UK market is the second largest organic meat market in the world (www.organicmonitor.com march 2005). The market is at the moment undersupplied and demand is growing like in most European countries as well as in US. The UK imports approximately 25 per cent of its organic pork consumed (www.organicmonitor.com 11.07.06 & personal conversation with Mike Wijnberg Sales Manager at Dalehead Flagship Foods owned by Danish Crown August 2006).

The UK market is estimated to be lacking between 13-15.000 finishing pigs (40.000/100 x 75).

However, to illustrate the volatility of the organic pork market in UK, and the question of undersupply the following calculation has been made.

If the UK pig production is increased by ten new full-time organic pig producers, with a herd of 80 sows having 18 piglets per year sow, then the under supply of the UK organic pork would be solved by an increase of 14.400 finishing pigs.

This calculation illustrates very clearly why the small organic markets can be volatile and risky for suppliers investing in a market like organic pork. Longer term market partner ships between suppliers and buyers as well as various kinds of governmental market support for farmers to convert to organic production, would be important measures to overcome some of the risks and costs placed solely on the farmers.

Friland is, as described earlier, expecting to expand its production with ten new suppliers with approximately 20.000 finishing pigs by March 2007. How much of this expansion is due to increasing demand in the home market or the export market has not been revealed during the interviews.

In relation to the estimation of the UK undersupply it has been examined which other countries UK retailers import organic pork from. It is mainly loin from Germany and bacon from Holland besides Denmark with similar products (www.soilassociation.org Organic Food and Farming Report 2004).

Further investigation went on to find out what the prospects of the organic pig production were in both Germany and Holland, but neither the Ministerie van LNV in Holland, nor the German Oekolandbau had data on the organic pork production or the export size. Markus Rippin from Oekolandbau in Germany gave an estimate of an export of 500 animals, which, if every part of the pig was sold would be an export of 37.5 tonnes. This would be a very small share compared to the estimated Danish export of 1.700 tonnes. Both the German and Dutch organic pork production supplies primarily the national home markets.

The German and Dutch organic pork production is generally more niche dominated and more extensive than the Danish, and the organic production in these two countries seem less prepared to cope with a 100 per cent organic feeding to the pigs (DS-Nyt no. 10/2004). The economical results in German organic pork production show in both piglet and in finishing pig production low income, which does not allow for any bigger investments. These investments will be needed in the out-door run production to fulfil EU-regulation 1899 by 2010 (Löser, 2006).

4. The governance structure and economic performance

4.1. Primary production analyzes

The income source for organic pork producers is based on the quotation price. The quotation price structure (or farm gate price) for organic pork is based on three supplements added to the quotation of conventional producers (www.friland.dk):

- an organic supplement
- a quality supplement
- a market supplement (variable)

The organic supplement is based on the extra costs producing organic pigs (finishing pigs and piglets) in comparison to the conventional production. The quality supplement is related to certain quality requirements concerning weight, content of fat and the thickness of fat on the loin. The market supplement is a *variable* supplement related to the demand for organic pork as well as the price for conventional pig.

In figure 4.1 the quotation structure for organic pork is illustrated and with prices from week 34/2006 added on.

Figure 4.1. The quotation price structure for organic pork week 34/2006

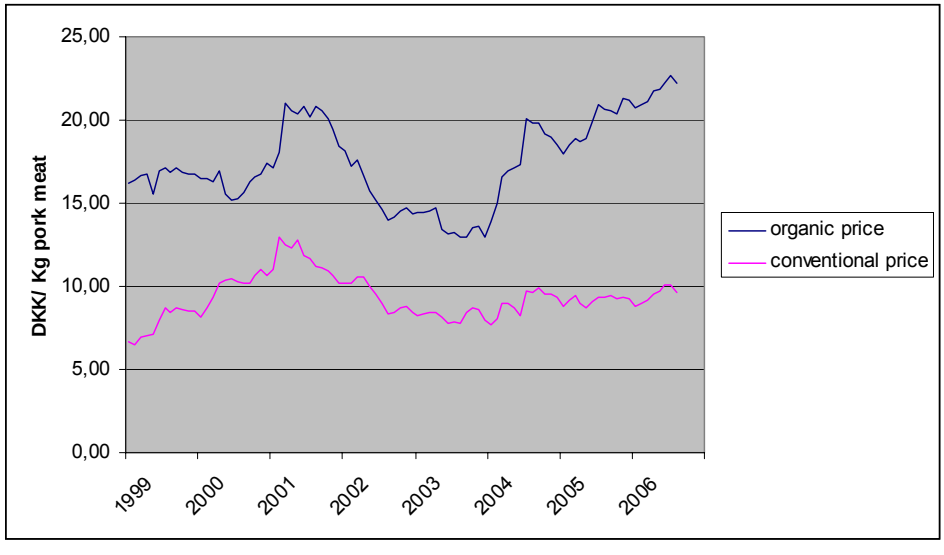
Type		Price DKK / Kg meat
Conventional pork (best quality)		9,90
Organic pork	Organic supplement	4,00
	Quality supplement	2,00
	Market supplement	6,65
Organic premium		12,65
Total organic pork price		**22.55**

Source: www.Friland.dk and www.danishcrown.dk

The quotation price has increased heavily since 2004 due to a rising demand for organic meat, and a supply that has not kept pace. However, this is not only a Danish phenomena, but a global trend, expecting to cause supply shortages in a foreseeable future where production will continue to lag demand, because of the conversion period for organic products (www.organicmonitor.com press release 11/07/2006).

In figure 4.2 the quotation price from 1999 to 2006 is illustrated. As one can see the quotation price for organic pork has been close to 15,00 DKK/ kg until a short peak during 2001 reaching around 20.00 DKK/kg. Then followed again by a severe decline where the organic market supplement decreases due to falling prices on conventional pork. From 2004 the quotation price starts to rise from the very low price of 13.00 DKK/kg and has continued to grow since then reflecting rising demand and shortages in supply.

Figure 4.2. Quotation price for organic and conventional pigs from 1999 to 2006



Source: Danish Agricultural Advisory Service, 2006.

To analyze more in detail how the quotation price development has affected the organic pork economy in comparison with the conventional, the following survey has been made.

Based on the classification made in chapter 3.4 between hobby, part-time, full-time and large full-time pork producers, the accounts in the period of 2001 to 2004 from respectively conventional and organic producers within these categories have been collected from two sources.

Firstly, from FOI a sample of 345 conventional pork accounts representing a population of 5.521 conventional pork producers within the four categories was collected. Secondly, from the Danish Agricultural Advisory Service (DAAS) a similar division on farm type was made in relation to collecting the accounts from the organic pork producers in the period 2001 to 2004. However, the accounts from DAAS represented only a sample between 25 to 33 producers during this period, and with no statistical guarantee of representing the total population of all 169 organic pork producers in 2005.

In table 4.1 the number of accounts from DAAS, in the period from 2001 to 2004, are categorized in relation to the division of farm type and the total population of organic pork produces. The closest representation is among the full-time and large full-time producers, but one needs to know the full population to be able to calculate the statistical significance of the sample.

Table 4.1. Representation of DAAS accounts on organic pork producers between 2001 and 2004 and their total population in 2005

	Hobby	Part-time	Full-time	Large full-time	Total
DAAS accounts	10-18	3-4	6-10	3-6	23-33
Total population (2005)	132	16	14	7	169

Secondly, an economic productivity calculation was made to compare the two production systems within the four categories. The economic productivity calculation is based on (Hansen, 1990):

$$\text{Economic total-productivity} = \frac{\text{Economic value from sales}}{\text{Total costs}}$$

In practise the calculation was based on values representing

Gross output/ (variable costs + fixed costs + family remuneration (using the payment
per hour from FOI statistics) + calculated interest (4 per cent of the net capital)).

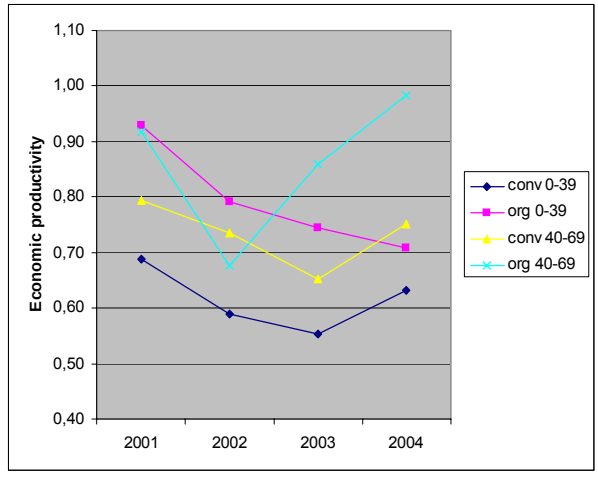
The value of the economic total productivity with calculated interest illustrates if the production can cover all costs. An economic productivity value of one (1.00) represents the economic value where production covers exactly all costs. Below 1.00 the economic value of production does not cover all costs. Above 1.00 the economic value is higher than all costs.

In Figure 4.3 the development in economic productivity among the conventional and organic pork farms respectively hobby (0 – 39 sows) and part-time (40 – 69 sows) are illustrated.

For the hobby producers, both conventional and organic, the economic value does not cover all costs, and typically the income will be supplemented by work from outside the farm. In 2004 the economic productivity among organic hobby farmers was lower than their conventional counter part. Organic part-time producers have had a rising economic productivity since 2002, which in 2004 are close to cover all costs (being almost 1,00) and well above the economic productivity level among conventional hobby and part-time producers.

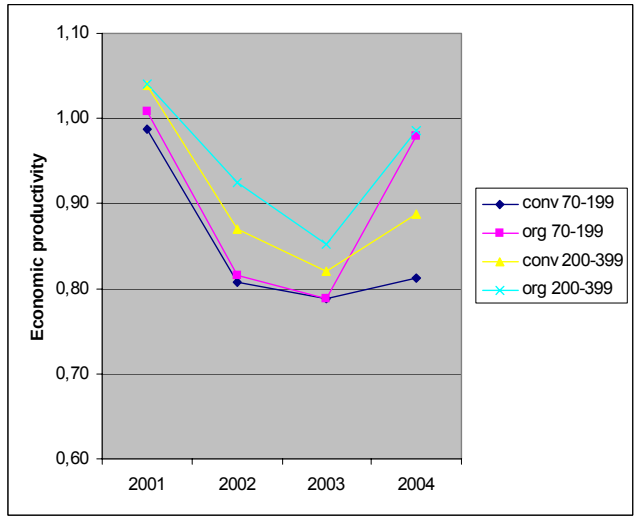
In figure 4.4 full-time and large full-time producers are illustrated. Both conventional and organic producers have experienced a decline from 2001 to 2003 in the economic productivity falling from a level of around 1.00 to 0.80. In 2004 the economic productivity rises in both conventional and organic, but for the organic full-time and large full-time producers the economic productivity level reaches almost 1.00 again.

Figure 4.3. Economic Productivity: hobby and part-time



Source: own calculations.

Figure 4.4. Econ. Prod: full-time and large full-time

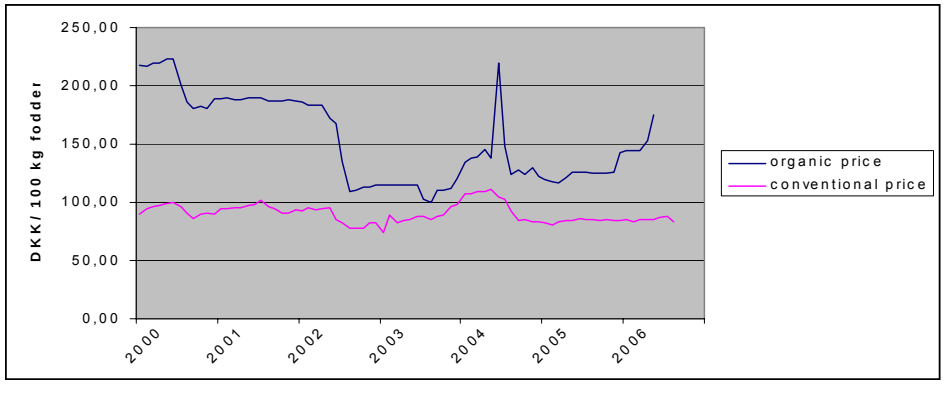


Source: own calculations.

For the organic producers the steep rise in economic productivity is caused by two combining factors. The first is an increase in the quotation price from 13.00 to 20.00 DKK/Kg during 2003 to mid 2004 (see figure 4.2). The second factor is due to low fodder prices. Fodder costs on integrated organic pork farms (both sows and finishing pigs) are calculated to constitute of 41 per cent of the gross output (own calculations based on DAS accounts and Tvedegaard, 2005 p.69). On conventional integrated farms the fodder costs are estimated to make up between 50 to 60 per cent of the gross output (Hundrup, 2005).

In figure 4.5 the development in farm gate prices for organic fodder wheat from 2000 to 2006 is illustrated and compared with the conventional ditto. The prices of organic fodder wheat has fallen from 220 DKK/100 Kg in 2000 to its lowest in 2003 with 100 DKK/ 100 Kg. In 2004 the fodder wheat price had a short rise reaching the same level as in 2000, but falling shortly after to a level of 120 DKK/100 Kg. Since 2006 the fodder wheat price has been rising again due to a growing demand for organic food and lack of supply. The current situation of undersupply could put some restrain on the gross output in organic pork production, all depending on the level and length of time consumers will demand more organic meat and the organic fodder production will increase.

Figure 4.5. Development for organic and conventional fodder wheat prices from 2000 to medio 2006



Source: Danish Agricultural Advisory Service, 2006.

Tvedegaard (2005) calculated the breakeven quotation price in the production system where sows are kept outdoor and finishing pigs indoor to 14,50 DKK/kg organic pork. The calculation was based on that all feed, straw and manure were organic, and the price conditions for feed was 120 DKK/hkg, land was 90,000 DKK/ha , labour cost 135 DKK/hour and an interest rate at 4 per cent. Tvedegaard made sensitivity calculations on these input factors and with land prices (2007) at 150,000 DKK/ha, feed 170 DKK/Hecto kg. and labour 155 DKK/hour, breakeven price for the above mentioned production system would need to be 19,00 DKK/kg organic pork meat. With a market price at 22,55 DKK there is not a large buffer to take eventuel outside 'push' or 'shock' like if the interest rate would increase above the 4 per cent used in Tvedegaard's price conditions.

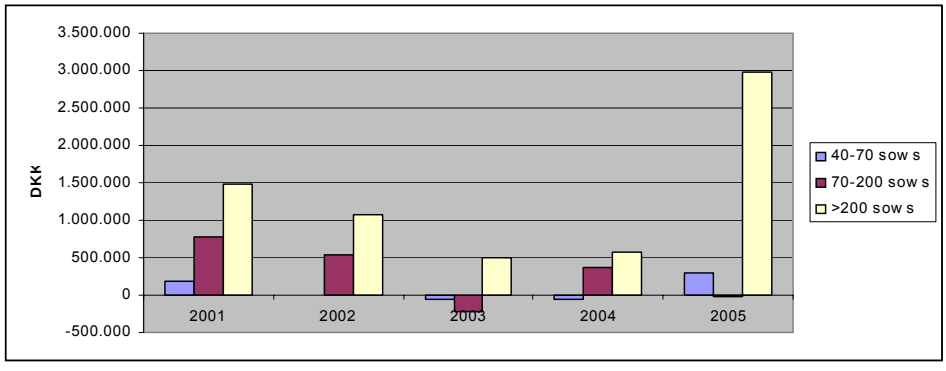
So although the market price for organic pork have never been higher, and demand have been rising for the last two years, the calculation above shows there could be some difficulties in finding new farmers willing to start up organic pork production. The most likely scenario would be that the more efficient and already established organic pork producers will expand their production.

In figure 3.3 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 4.6 the producer categories made in chapter 3.4 (hobby, part time, full time and large full time) are illustrated in relation to their 'netto farm investments' from 2001 to 2005. However, 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 4.6 there is a close correspondence with the decline in total economic productivity from 2001 to 2003 shown in figure 4.3 and 4.4 with the general decline in investments for all categories of organic pork producers in the same period. However, in 2004 the full time producers increases their investment relatively high, and in 2005 the large full time producers are the backbone of all netto farm investments in organic pork production.

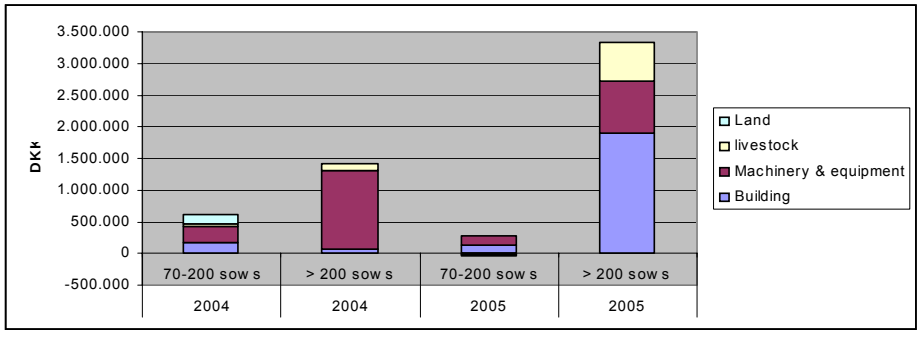
Figure 4.6. Netto farm investments in organic pork production (part-time, full-time and large full-time) from 2001 to 2005



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

In figure 4.7 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.

Figure 4.7. 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 4.7 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.

4.2. Governance structure in supplier – retailer relations

From the interviews carried out along the various nodes of the Danish organic pork chain bargain 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 bargain 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 supply. Qualitative inter-

views 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 bargain power prevails very strongly between processors and retailers in the 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 4.2 the governance structure imposed on processors by retailers has been listed.

Table 4.2. 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
Bargain 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.

4.3. Contraction between organic and conventional consumer prices

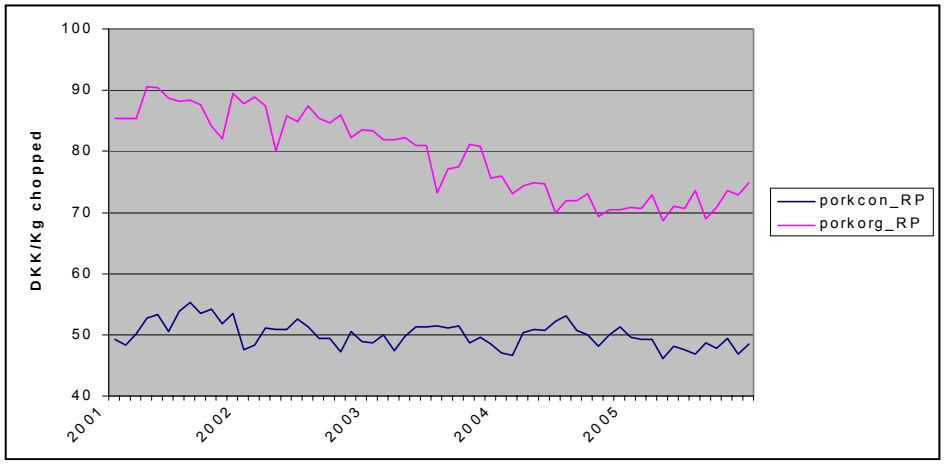
The possibility for the organic suppliers to have a quasi rent on their price premiums over time due to ownership of a critical resource with high utility and relatively scarcity, would accordingly to mainstream economic theory only be temporary, and therefore a contraction between organic and conventional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

To test this hypothesis developments within both organic and conventional consumer prices have been made.

In the following the monthly average consumer prices on chopped organic pork as well as conventional, were collected from GFK representing the period of 2001 to 2005. The data have been converted into *real* prices, and analyzed to evaluate the price trend in organic and conventional pork.

In figure 4.6 the development in real 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.

Figure 4.8. The development between organic and conventional consumer prices on 1 kg of chopped pork 2001-2006



Source: Own calculation based on GFK price data.

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

$$P_{it} = \mu + \alpha_i X + \beta_t T + \beta_i XT + \varepsilon_{it}$$

Where:
P = is price
μ = is the intercept

X = is the product type, i, for organic and conventional chopped pork
T = time effect (slope trend)
XT = is the interaction effect (for different slopes)
α_i, β_t and β_{ti} are the parameter coefficient for the estimates
and the error term is represented by $\varepsilon_{ti,} \sim N(0, \sigma^2)$

In this specification 'time x product type' (slope) is of interest, since it catches the difference in price trend for organic and conventional chopped pork.

The estimated results are illustrated in table 4.3

Table 4.3. Development on consumer prices respectively on organic and conventional chopped pork (2001-2005)

Variable	Estimate	SE	T-value	Significance level
Intercept (conv.)	51.75939	0.60553	85.48	< .0001
Organic	38.16536[2]	0.85635	44.57	<.0001
Time (conv.)	-0.05825	0.01770	-3.29	0.0013
Time x org.	-0.30250[3]	0.02503	-12.08	<.0001

Source: own calculation.

Given the average consumer prices of chopped pork in 2001, the conventional pork price decreased by 0.06 DKK per month (see -0.05825 in table) during the period of 2001 – 2005 (both years respectively). Further analysis supports that organic pork price decreased significantly by 0.36 DKK per month reflected by the difference in slope indicated by 'Time x org.' coefficient (-0,30250 + -0,05825).

The conclusion is a clear contraction in consumer prices between organic and conventional chopped pork in the five year period of 2001 – 2006. The organic consumer price had fallen with 21.6 DKK and the conventional consumer price had declined with 3.6 DKK – a decline in the organic consumer price of 20 per cent. Despite all the fluctuations on farm gate prices during the five year period the regression analysis show a clear decline on consumer prices.

[2] This value represents the difference in starting point between the slope of organic and conventional price.

[3] This value represents the difference between the slopes of organic and conventional.

However, since 2004 the organic pork market has experienced a situation where the farm gate prices have been rising. The main explanation for this development according to the interviews conducted among key players along the pork chain, 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

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.

Conclusions and perspectives

From the first attempts in 1986 of trying to define what the concept of an organic pig should be, the Danish organic pork production is today the third largest in Europe and the biggest exporter of organic meat in Europe. However, the start-up and distribution of organic pork meat has had all the typical problems of launching a new product to consumer markets. These concerns: 1) the challenges of securing a 'critical mass' of supply that could interest the retail node and 2), a product that could interest the actors along the chain to a degree where they are willing to take part of the risks of promoting it to the consumers by entering into various types of medium to long term partnerships.

From its peak in 1999 with 533 organic pig farms the number has declined to 243 in 2005. However, the number of certified organic pigs has been fairly stable around 60-70.000 with a low point of 46.000 in 2005, but is now rising again to an expected level of 70.000 in 2007.

However, there is a strong concentration in the organic pork production where seven large full-time farms (200-500 sows) cover 37 per cent of the overall organic pig production in Denmark. Fourteen full-time farms with 70-200 sows cover 22 per cent of the production, and sixteen part-time farms (40-70 sows) cover another 27 per cent. More than half of all organic pork farms are classified as 'hobby' farms (1 to 39 sows), and these extensive farms cover only 14 per cent of the organic pork production.

Investment analyses show that it has overall been the large full-time producers who have been investing in building, machinery and livestock since growing consumer demand from 2004. The concentration of the organic pork production is therefore likely to continue and grow relatively faster among the large full-time producers.

Although the market price for organic pork meat is as high as ever, the cost of producing organic pig have risen on land, labour and feed as well. Sensitivity analyzes indicate that only a small buffer of making a profit exist if other areas of costs will rise. It will therefore be likely that existing large full-time producers will expand relatively more to fulfil demand rather than new comers will convert and start organic pork production.

The economic value of the organic pork production at farm level has been calculated to 70 Mio. DKK (9.4 Mio. Euro). The export of organic pork was in 2005 approximately 45 Mio. DKK (6 Mio. Euro), and home market sales in retailing have been calculated to 61 Mio. DKK (8.2 Mio. Euro). The prospects of continuing high growth on the organic pork market have in 2007 led to the entry of strong conventional processing companies offering organic products in competition with the more 'pure' organic meat processors. A similar development was seen during the last growth wave between 1996 and 1999 in other organic sectors, which later led to several mergers of the smaller organic companies during market maturation from 1999 to 2003.

Sixty per cent of the Danish organic pork production is exported and ¾ of it goes to the UK market. On the UK market, which is the second largest organic meat market in the world, Denmark competes mainly with organic pork from Germany and Holland. However, analyzes show that the production in these two countries is generally more niche dominated and more extensive, and they seem less prepared to cope with a 100 per cent organic feeding from 2012 than the Danish producers. The UK market has currently an undersupply of 13-15.000 organic pigs. With the expected Danish expansion in terms of pigs and investments as well as the producer's strong position on export, the prospects of the Danish organic pork production to achieve a larger share of the UK market seem promising.

From the qualitative interviews carried out with key players along the various nodes of the Danish organic pork chain bargain power was revealed to take place between the node of 'slaughtering – retailing', and the node of 'processing – retailing'. Due to the monopoly situation on 'raw material' of Friland/Danish Crown, the bargain power from retailers towards the node of slaughtering was characterized as low/medium. Contrary to the processors, who were in a strong competition with many other conventional products, the bargain power from the retailers was characterized as medium/high. The processors are forced to put more effort and resources on in-store sales, and thereby seems to follow the Wal-Mart trend of retailers 'outsourcing' their (shelf)space to suppliers increasing competition on store access.

However, the growing demand, and in the same time under-supply of organic pork products, gives the suppliers along the chain a stronger bargain position for negotiating longer term innovation contracts as well as various types of seller-buyer partnerships. A supplier strategy focusing on partnership rather than short term price increases has some more viable prospects in the long run due to the strong competition among supermarkets themselves. Supermarkets in general see organic as an important

brand to distinguish their stores from the hard discount chains only focusing on low prices. By offering organic supermarket chains try to signal among others increasing customer loyalty, variety and quality products to attract customers willing to pay higher premiums.

Analysis of organic and conventional consumer prices on chopped pork meat showed that from 2001 to 2006 organic consumer prices declined with almost 22 DKK per kg, whereas conventional consumer prices declined with only 4 DKK per kg., illustrating a significant contraction between organic and conventional consumer prices on chopped meat. However, among organic pork producers farm gate prices from 2004 have been increasing with 9.00 DKK. The main explanation for this development according to the interviews conducted of key players along the pork chain, 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 both the producers and consumers with a better market price
ii) the cost of distribution and sales of organic pork have declined significantly

In the same time the monopoly position of Friland/Danish Crown enables them to some degree to counterbalance the bargain power of the retailers, making producers benefit too from a higher efficiency in distribution. The organization form of Friland as a new generation cooperative, with control over entry, is important to secure the monopoly on supply.

A future strategy of the producers organized in Friland/Danish Crown would be to continue control over supply and expand on international markets as well. It is on the supply side that they have a product valued high in utility terms, and in the same time they can deliver something relatively scarce or unique in ownership for the other actors along the pork chain. The international expansion would likewise be important so supplies can be levelled out when different national markets maturate in the future and bargain power moves in the favour of retailers. The various national organic pork markets are small and therefore volatile when changes occur on either demand or supply.

The case and positive development of the Danish organic pork chain, which at the same time can offer lower consumer prices and sustainable farm gate prices, opens up for further important research questions within the other organic sectors, such as:

- If organic producers and sales vendors cooperate and organize themselves within large conventional processors and distributors with a relatively stronger bargain power towards retailers, what prospects do new generation cooperatives open up for in relation to securing the organic idea of integrity and future innovation?
- What type of partnerships between suppliers and retailers could minimize the risk of investments for all parties so the critical mass in supply can be exploited and benefit all actors along a supply chain?

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Annex I

Addresses and websites:

Major organic slaughter houses:

Friland A/S
Brårupgade 3
7800 Skive
Phone: 9757 4799
www.friland.dk

Hanegal Økologisk Kød A/S
Resenbrovej 29
Voel
8600 Silkeborg
Phone: 8685 3672
www.hanegal.dk

Processors:

Hanegal Økologisk Kød A/S
Resenbrovej 29
Voel
8600 Silkeborg
Phone: 8685 3672
www.hanegal.dk

Dansk Landbrugsrådgivning
Landscentret
Udkærsvej 15
8200 Århus N
Phone: 8740 5000
www. landscentret.dk

Aalbæk Specialiteter
Stilbjergvej 4 A
7190 Billund
Phone: 7670 4000
www.aalbækspecialiteter.dk

DEFCO A/S
Helsingforsgade 4
8200 Århus N
Phone: 8739 1900
www.defco.dk

Stryhn's A/S
Vestre Kirkevej 13-19
4000 Roskolde
Phone: 4630 0740
www.stryhns.dk

Annex II

Qustionaire.

Open Questionnaire:

Future supply of organic foods

1. Name of firm:

2. Type of firm:
Number of employees ___ Full time ___ Part time,
season _____

3. C/O:
Employer Employee

4. Suppliers:
$Type_1$ seed seedlings
Name of firm(s)

$Type_2$ farmers

c/o:
Name

$Type_3$

Numbers:
$Type_1$
$Type_2$
$Type_3$
Input from (tonnage/money):
$Type_1$
$Type_2$
$Type_3$

5. Buyers:
$Type_1$ supermarkets

Name of firm(s)

c/o:

Title:

$Type_2$ consumers
$Type_3$

Numbers:
$Type_1$
$Type_2$
$Type_3$

Output to (tonnage/money):
$Type_1$
$Type_2$
$Type_3$

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