FAOS

MEAT UP FFIRE

WP2 National Report - Denmark

Structural characteristics of the pork value chain

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1. Introduction

This report is part of the *Meat Up Ffire project - Fairness, freedom and Industrial Relations across Europe: Up and Down the Meat Value Chain* under DG Employment. The overall aim of the project is to improve the expertise and knowledge of industrial relations through analysis and research in the specific field of the pork value chain.

This report is the Danish contribution to Work Package 2 in the project, aiming to describe the structural characteristics of the pork value chain in Denmark.

Thanks a lot to the interviewees from different organisations in Denmark that have given valuable insights in the Danish pork value chain and its position internationally. The list of interviewees is to be found under 'Sources' last in this report.

2. Overview Denmark

The share of the pig business in terms of export of meat, piglets and pigs is about 30 billion Danish kroner or 4 billion euro, equaling about 5 per cent of the Danish export. About 0.5 per cent of the labour force – 13,000 people – are employed directly in the pork value chain, but including transport, logistics and retail, it amounts to 33-34,000 – according to the interest organization Landbrug & Fødevarer.

The structural development in Denmark moves towards fewer and larger companies. This development includes both pig farms and slaughterhouses, and today there are around 3,200 farms (down from 30,000 in 1990), and eight major slaughter houses (down from 54 in 1970).

In breeding, we see still fewer, but bigger farms. Smaller farms have problems maintaining the needed efficiency, while bigger farm are able to deliver this; however many farms have a heavy debt burden.

At the same time we find increased specialization. Only 16 percent of the conventional pig farms are breeding both sows, piglets and pigs for slaughter, while the remaining 84 percent is specialized in either piglets or pigs for slaughter. 1,1 percent is ecological.

The international trend seen in other countries (starting in the US and spreading to other countries, e.g. Poland) that on big 'integrator', one big enterprise controls the whole chain from breeding to consumer – very much controlled by the consumer – has still not struck the Danish breeding industry. The bulwark against this business model seems to be the tradition of the Danish Cooperative Movement (*Andelsbevægelsen).* Andelsbevægelsen is a means of economical organization under leadership of consumer- or producer-controlled corporations, where each individual member owns a part of the corporation. This type of organization was especially used in the farming industry and in consumer organizations in Denmark from the 1790's to the 1960's. The members of the coorporatives seek to share the economic stress of producing or buying goods, and yearly divide the eventual financial surplus amongst them. Within farming, the whole process – from breeding over slaughtering to refinement and sale – was controlled by stakeholders, i.e. members of the movement – not to be understood as shareholders. Importantly, there has been a long tradition of not regarding each other as competitors per se. This means that there has been a long tradition of knowledge sharing and even today, farmers are sharing new innovations with other farmers. This might be an important explanation why the Danish pork farmers are so efficient.

While this business model is disappearing, interviewees finds that the culture and understanding of the model still prevails and makes is difficult for other models to find foothold. The – without comparison – largest Danish slaughter house, Danish Crown, is a conglomerate of many small slaughterhouses within Andelsbevægelsen – a fusion process that lasted almost five decades due to resistance within the movement, but also a development that was deemed necessary due to international competition. Even today management in Danish Crown is heavily controlled by their suppliers – the farmers. This means that there is a strong opposition among some farmers against other business models, like the integrator model, though it is often discussed if it is necessary to move in that direction to get more control over the total process and to become stronger in processing.

Generally the consumption of red meat is declining in Denmark, which is also the case with pig meat. However, this is of less concern as the vast majority of pigs and pig meat are exported. According to trend analysis reports from Danish Agriculture & Food Council Danish, consumers are mostly concerned about price and whether the meat has been produced in Denmark. Danish meat is regarded as a guarantee of quality by consumers. When consumers choose which pig meat to buy, animal welfare is the third most important criteria – before criteria as general quality of the meat, ecology and freshness.

Most of the meat is are exported to Germany and the UK, while piglets and pigs are exported to different destinations – where Germany and Poland are the major importers.

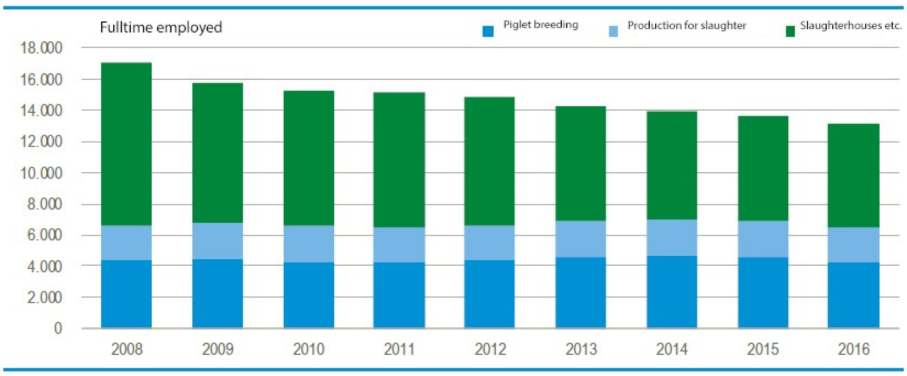
The breeding structure has changed over the years. From mainly production of pigs over 50 kilos to an even share of slaughter pigs (18 millions) and piglets (14 millions). This is mainly due to a 2002 change in German legislation (the Hartz-reforms), allowing low cost labour access to German slaughter houses. Furthermore, the space needed to breed piglets is only about 1/5 of the space needed to breed a slaughter pigs – and with scarce land resources, it has been a logical change in production.

This change in breeding pattern from pigs to piglets has had a significant impact on the profitability of Danish slaughter houses as well as consequences for the need of man power. The union for slaughters, NNF, had some 42,000 members in its heydays half a century ago – whilst the number today is 16,000. Of these, some 8,000 are involved in pig slaughtering and processing.

Generally, the labour process have been Taylorised since the beginning of the 20th century. An enhanced mechanization has taken place from 1960's onwards, and this trend is continuing with enhanced robotization. Furthermore, efficiency within breeding as well as slaughtering had improved markedly over the years, leading to a generally lower employment rate within the pork value chain.

The figure below shows that about 17,000 were employed directly in the pig value chain in 2008, while the number was 13,000 in 2016.

Figure 6 Employment by primary pig production and manufacturing of pig meat in Denmark



Kilde: Statistikbanken.dk/ERHV1. Branchekoder 014610 Avl af smågrise, 014620 Produktion af slagtesvin og 101110 Forarbejdning af svinekød.

However, while employment in breeding has been less hard hit, employment in slaughtering and processing has taken a bigger blow:
Employees in breeding of piglets:
 6,470 in 2016 – down from 7,224 in 2008 (Statistics Denmark)
Employees in breeding of slaughter pigs
 4,158 in 2016 – down from 4,935 in 2008
Employee in processing for pig meat
 7,489 in 2016 – down from 10,033 in 2008

This out of a workforce of around 2.7 million, i.e. about half a per cent of the work force is directly employed in the pork value chain. However, according to the interest organisation Landbrug & Fødevarers internal calculations, up to 33-34,000 persons are in one way or another involved in pork production – this includes servicing, transport, retail etc.

An interesting side-product of the automatization of the slaughter houses is an increased interest for and production of Danish machinery and robots for slaughtering, which is now exported to other countries.

Furthermore, the general efficiency of the Danish pork industry entails that Denmark is selling turn-key slaughter houses to other countries, as Denmark is now branded as state-of-the-art in efficiency and hygiene. The same goes for the exported piglets, which have a reputation of very good genes.

Generally the pig industry is riddled by considerable health and safety issues due to the hardship of the processes and the speed of the production, but it has very high attention among employers and trade unions alike.

Regarding the health of animals, there is ongoing discussions on the issue, with animal welfare groups making their voices heard.

3. Breeding

The number of farms has decreased drastically over the last two decades, while the number of pigs per farm has increased – as a rule of thumb, the number of pig farms are halved every seven years. The figure below shows the number of pig farms (blue columns) and the number of pigs per farm. However, behind these averages, we find a small number of big farms and quite a few minor farms. As of 2017, the amount of pig farms is 3,226, down from some 30,000 farms in 1990 and 10,000 farms in 2004

Figure 1 Number of farms with pigs and the size of the farms

Kilde: Landbrugs- og gartneritællingen, Statistikbanken.dk/HDYR1, Statistikbanken.dk/REGNSV1, Statistikbanken.dk/JORD2

The farms are quite specialized; only 16 percent of the conventional pig farms produces both sows, piglets and pigs for slaughter, while the remaining 84 percent is specialized in either piglets or pigs for slaughter. 1.1 percent is ecological.

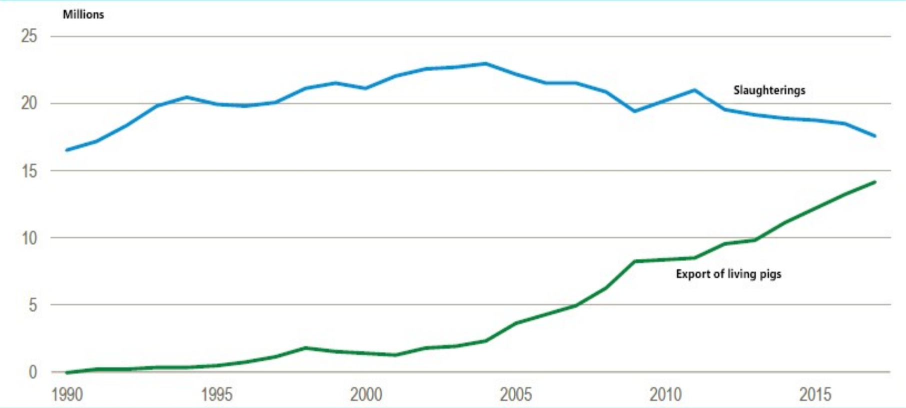
Denmark's export of living pigs – especially piglets – is growing. In 2017 Denmark exported 14.2 million piglets. In 2007 Denmark only exported 4.9 million piglets. The piglets are mainly exported to Germany and Poland. The export to Germany accounted for 44 percent and Poland for 42 percent of the total export of piglets in 2017.

This change towards production of piglets instead of pigs ready to slaughter is a result of several factors, of which two are deemed most important:

1) The Hartz-reforms from 2002 basically eliminated a minimum wage in the German pig slaughtering business – out-competing Danish slaughter houses
2) The environmental requirements entails that a piglet only need about 1/5 of the space compared to a full grown pig.

This has changed the Danish pork value chain – from production of pigs for slaughtering towards production of piglets for export. The figure below illustrates the change from slaughtering (blue line) toward production and export of live pigs and piglets (green line).

Figure 8 Number of pig slaughterings in Denmark and pig export

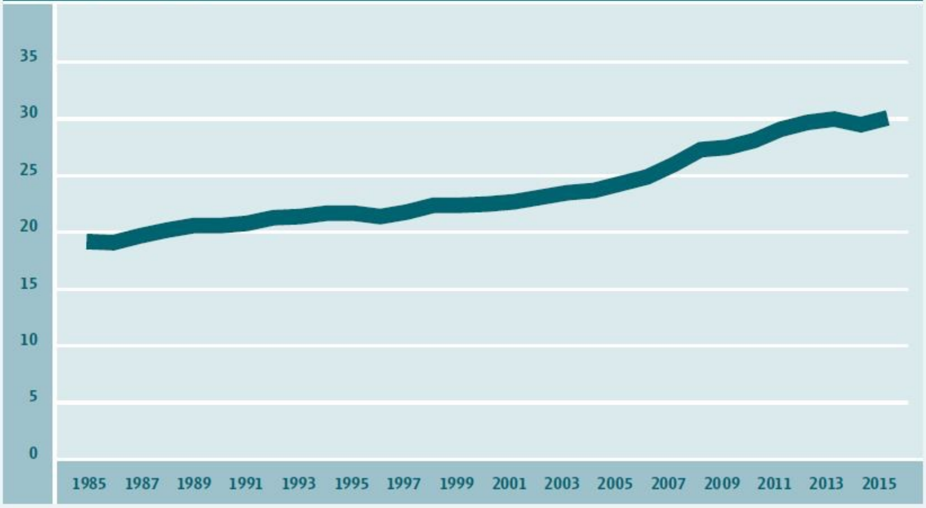


Kilde: Statistikbanken.dk/ANI5

As the figure below shows, the production of piglets per sow has increased significantly – from 19 piglets per sow in 1985 to 30 piglets per sow in 2015. The most effective farmers are able to produce up to 40 piglets per sow, and if farmers only produce 27-28 piglets per sow, they are basically not competitive.

Figure 9

Piglets per sow per year.



Source: SEGES.

The past decade there has been a great focus on animal welfare in Denmark as well as problems related to the use of antibiotics. Consumers are concerned with the general living conditions for pigs and the use of antibiotics. Furthermore there has been public debate concerning cutting the tales of piglets, which is widespread.

There has also been a major public debate regarding the spread of MRSA in the Danish pig industry. The debate about MRSA is not restricted to the media, but has also been a major discussion topic between scientists. Compared to neighbouring countries Denmark has a big problem with MRSA. The subject is greatly politicized and important because of Denmark's great export of pig meat. However, that is also considered an advantage that Denmark is not importing pigs, and at the same time health control in Denmark is regarded as very high in international comparison.

Another area of debate is the large number of deaths among piglets. According to a report from Aarhus University in 2010 the main explanation is the large number of born piglets per sow.

"The breeding towards larger litter size carried out since 1992 and until 2004 is probably a large part of the reason for the growing rates of both stillborn piglets and piglets that die after birth."

(Pattegrisdødligheden i DK, Udvalget for Fødevarer, Landbrug og Fiskeri, 2010)

The Danish pig production is concentrated in Jutland where most pig farms and slaughterhouses are situated. App. 10 mio. pigs in Jutland (Jylland), 1.2 mio. on Funen (Fyn), 1,4 on Zealand (Sjælland) and 0.3 on Bornholm. There are no apparent regional specialization. *(Source: Statistik Gris 2017 og DST 'Svineproduktion under forandring').*

Denmark imports almost no live pigs, while the majority of pigs and piglets produced in Denmark goes to export. Furthermore, 90 percent of the pig meat is exported – the majority to Germany and the UK.

Weight of the pork meat production out of total agricultural production and out of total meat production (as % of turnover)

Pork meat export out of total agricultural export:	19.2 percent
Pork meat export out of total animal export:	35.3 percent

Note: Animal export includes milk, butter etc.
Source: Statistik Gris 2017 – Landbrug og Fødevarer

Number of livestocks (distinguished for livestocks for fattening and for reproduction), companies involved in breeding, regional specializations

Production of pigs/sows 2017:	17.7 mio.
Production (export) of piglets 2017:	14.1 mio.
Total production of pigs 2017:	31.8 mio.
Number of farms with pig production:	3,226

Livestocks distinguished by stage of growth (pigs under or over 50 kg) or other descriptive data NICE

Number of pigs over 50 kg 1. Oct 2017:	4,155,000
Number of pigs/piglets under 50 kg 1. Oct 2017:	8,539,000
Total pigs/piglets 2017:	12,694,000

Note: Pigs over 50 kg is comprised of the following categories: Pregnant sows, boar (male pig), dry sows (goldsøer), gilts (gylt) and pigs for slaughtering.
Note: The number of pigs is derived from calculations of data from 2.500 selected farms.
Source: Statistik Gris 2017 LF

Import and export of live animals and carcasses

Export of live pigs 2017:	421,895 tons
Export of whole/half pigs 2017:	85,912 tons
Export of cuts/parts of the pig 2017:	1,007,134 tons
Export of biproducts 2017:	267,132 tons
Export of processed products 2017:	125,945 tons

Import of living pigs 2017:	0 tons
Import of whole/half pigs 2017:	155 tons
Import of cuts/parts of the pig 2017:	45,782 tons
Import of biproducts 2017:	68,338 tons
Import of processed products:	73,372 tons

Source: Statistik Gris 2017 LF

National prices for live animals if available distinguished for different weights
Average price for pigs in Denmark 2017: 1.57 euro/kg (11.69 DKK/kg)

Note: Price paid to farmer. It is hard to calculate the precise prices because this among other variables is depending on the quality of the meat. The average price above is including relevant charges and deductions. (afgifter og fradag) The price for ecological pig meat is significantly higher. The price for Antonius pigs are also higher than conventional pig meat.

In exports the prices also vary depending on the transport expenditures.

Export of pig meat
The figure below shows the export countries, Germany being the main importer of pig meat, closely followed by the UK. However, the Asian market is expending rapidly, and Danish meat has a very good reputation in Asia in terms of hygiene and quality.

Trend in Pigmeat Export

Main countries

Tonnes	**1997**	**2007**	**2016**	**2017**
Germany	321,344	503,709	561,495	553,455
Poland	19,210	122,378	274,396	301,441
UK	236,023	303,661	213,498	204,628
Italy	101,189	153,256	119,218	118,659
Sweden	42,382	68,792	38,164	35,273
Other EU-countries	229,600	188,215	135,247	157,059
Total EU	**949,749**	**1,340,011**	**1,342,019**	**1,370,516**
China/Hong Kong	2,674	48,955	312,279	244,078
Japan	156,724	159,831	127,488	119,179
Australia	163	32,924	56,827	44,535
USA	51,755	45,119	31,730	34,625
Other countries	221,775	246,036	92,317	95,084
Total 3rd countries	**433,091**	**532,864**	**620,640**	**537,500**
Total	**1,382,840**	**1,872,875**	**1,962,659**	**1,908,017**

1,000 DKK	**1997**	**2007**	**2016**	**2017**
Germany	5,019,537	5,554,593	6,786,825	7,774,279
UK	4,598,336	5,388,593	3,468,915	3,429,463
Poland	258,303	1,385,268	3,672,364	4,868,673
Italy	1,604,702	2,062,189	1,688,519	1,812,124
Sweden	784,645	1,347,273	769,520	751,761
Other EU-countries	3,618,121	2,405,780	2,166,789	2,746,263
Total EU	**15,883,643**	**18,143,696**	**18,552,931**	**21,382,563**
China/Hong Kong	21,656	284,368	3,829,797	2,854,754
Japan	4,475,171	3,786,371	3,920,904	3,695,071
USA	1,172,204	1,044,847	967,290	1,031,157
Australia	2,927	698,017	1,111,142	993,417
Other countries	3,092,609	3,178,873	1,990,825	2,053,241
Total 3rd countries	**8,764,568**	**8,992,476**	**11,819,958**	**10,627,642**
Total	**24,648,211**	**27,136,172**	**30,372,889**	**32,010,205**

Danish import of intermediate products:

Whole and half pigs	155 tons
Cuts/parts	45,782 tons
Bi-products	68,338 tons

Below, we see the development of the export of pig meat over time. We find that the bacon export and other processed pig meat has gone down, while the export of livestock went up from 66,367 tons in 1997 to 421,895 tons in 2017.

Trend in Pigmeat Export

Products

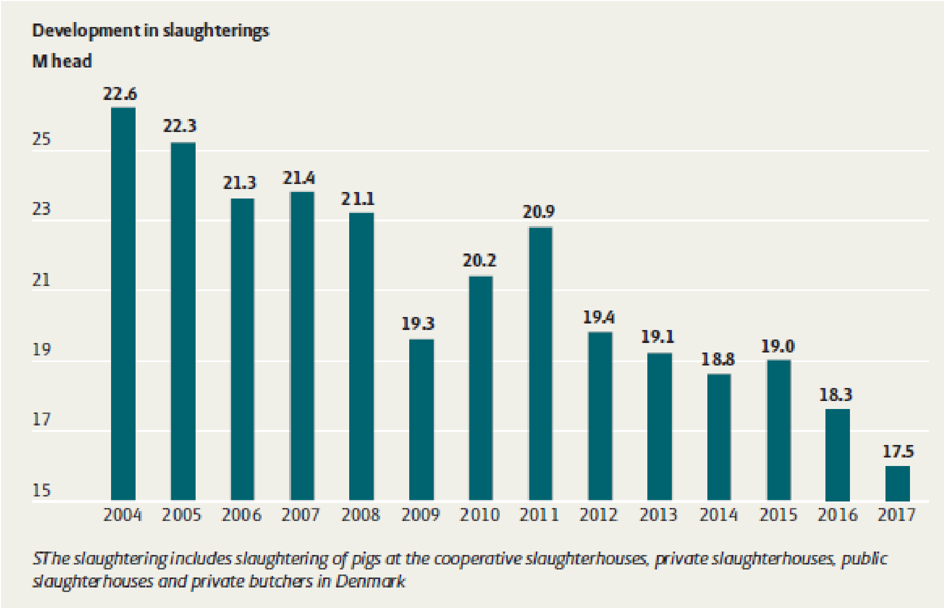
Tonnes	1997	2007	2016	2017
Bacon	130,115	94,884	53,975	42,719
By-products	169,316	263,709	298,164	267,132
Live pigs and sows	66,379	227,198	394,209	421,895
Sausages	58,002	33,429	35,710	34,139
Canned meat	118,204	65,636	51,691	49,087
Cuts	795,976	1,114,979	1,040,905	1,007,134
Carcasses pigs/sows	49,373	73,041	88,004	85,912
Total	**1,387,365**	**1,872,875**	**1,962,659**	**1,908,017**

1,000 DKK	1997	2007	2016	2017
Bacon	2,985,272	2,071,692	1,066,640	888,269
By-products	1,151,070	1,707,513	3,038,969	2,645,605
Live pigs and sows	881,613	2,397,793	6,296,560	8,136,874
Sausages	1,162,076	766,658	965,693	961,899
Canned meat	2,543,240	1,435,288	1,321,912	1,312,283
Cuts	15,427,618	18,076,039	16,824,056	17,087,247
Carcasses pigs/sows	576,840	681,189	859,059	978,027
Total	**24,727,729**	**27,136,172**	**30,372,889**	**32,010,205**

As mentioned, the Danish value chain has changed from emphasis on pigs ready to slaughter to piglets. This has had major consequences for employment in the slaughterhouses.

4. Slaughtering and processing

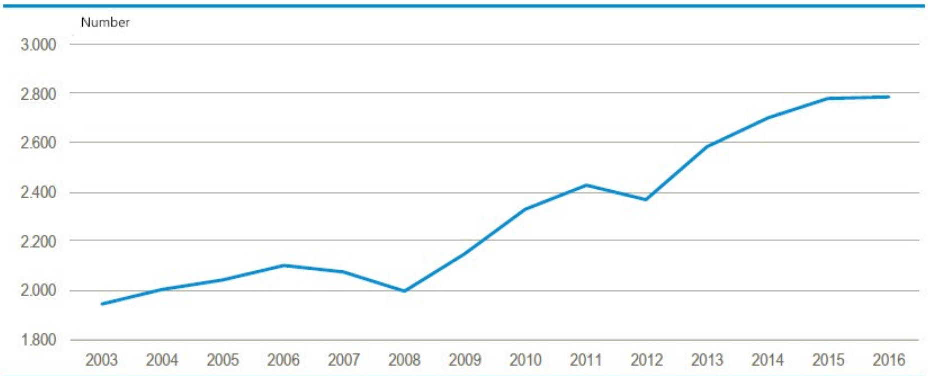
The number of pigs slaughtered in Denmark has gone down from 22.6 million in 2004 to 17.5 million in 2017 – see figure below.



The number of slaughterings has not decreased as much as the rise in export of piglets might suggest. This can be explained by the development in the breeding process where the pigs grow faster and the sows give birth to a larger number of piglets.

The number of employed within the sector has decreased quite considerably and the employment within the slaughtering business is the lowest to date. This development is mainly due to a continuously more effective way of organizing work. While the average number of pigs slaughtered per full time employee was less than 2,000 in 2003, the number had increased to 2,800 in 2016 – see figure below.

Figure 7 **Number of pig slaughterings per fulltime employee on slaughterhouses**



Kilde: Statistikbanken.dk/ANI5 og Statistikbanken.dk/ERHV1. Branchekode 101110 Forarbejdning af svinekød.

New technologies – and robotization – has had a major impact, and being a high wage country, the incentive to work on different ways to streamline the production has been strong in Denmark.

An interesting side-effect is that Danish industrial companies now are exporting robots and advanced slaughtering technology. Furthermore, Denmark delivers turn-key slaughterhouses to other countries, including South-East Asia. Recently, Danish Crown made a deal with the Chinese internet company

Alibaba to deliver a turn-key slaughterhouse with technology, work organization, hygiene control etc. Other countries have bought 'Danish designed' turn-key slaughterhouses too.

Export markets

The Danish pig export primarily consists of fresh and frozen parts (udskæringer). The front parts of the pig is primarily exported to Germany and Russia, the middle parts to Great Britain and Japan while hams are exported to France, Italy and Sweden and other countries. The cuts/parts are mainly used for further processing in the importing countries. *Source:* https://www.lf.dk/viden-om/foedevareproduktion/slagtning/svineslagteri

Fresh pig meat are mainly exported to other European countries. As mentioned, above, in 2017 Germany was the largest importer followed by UK, Poland and Italy. The frozen meat is mainly exported to countries outside Europe. In 2017 the largest importer of frozen meat was Japan followed by China, Autralia and USA. UK was the largest European importer of frozen meat.

Number and size of companies involved in slaughtering

There are eight main slaughterhouses in Denmark – down from 54 in 1970.

Development in number of slaughterhouses

End year:	1970	1980	1990	2000	2010	2016	2017
Cooperatives	50	18	5	3	2	1	1
*Private owned**	4	2	8	12	8	7	7
Total slaughterhouses	**54**	**20**	**13**	**15**	**10**	**8**	**8**

** Slaughterhouses with more than 10,000 pigs per year. No exact figures are available for private owned slaughterhouses in 1970 and 1980.*

Source: Statistic Gris, s.13.

Seven private and one large cooperative slaughterhouse company, which consists of seven smaller slaughterhouses on different locations.

- Danish Crown (cooperative slaughterhouse, seven different locations). Total app. 13.1 million slaughterings per year
- Danish Pork Meat (private, Danish, Glumsø) app. 0.1 million slaughterings per year
- Hvidebæk slagteri (private, Danish) app. 0.1 million million slaughterings per year
- SB Pork (bought by Tönnies Fleisch in 2005) app. 1.5 million slaughterings per year
- Danepork (private, Danish) app. 0.3 million slaughterings per year
- Moesgaard-Meat, (private, Danish) app. 0.1 million slaughterings per year

- Sevel slagteri (joint-stock company) app. 0.1 million slaughterings per year
- Tican slagteri, (bought by Tönnies Fleisch in 2016) app. 1.8 million slaughterings per year

Note: The number of slaughterings is based on the report 'Statistik Gris 2017'. The numbers may vary compared to the information on the companies' websites. For example Tican states on their website, that they produce 3.4 million pigs yearly, while the report 'Statistik Gris 2017' states that it has slaughtered 1.8 million pigs in 2017.
Note: Only slaughterhouses with more than 10.000 slaughtered pigs per year is mentioned. A few smaller local slaughterhouses exist too.

- **Danish Crown (cooperative slaughterhouse, seven different locations). Total app. 13.1 million slaughterings per year**
  Cooperative owners app. 7.150
  Production: app. 21 million pigs and sows yearly (app. 13 million in Denmark)
  Danish Crown has production in Denmark and a number of European countries as well as China. The company has market access to more than 130 countries worldwide. Danish Crown has a yearly turnover of app. 62 billion kroner/ 8 billion Euros and employs about 25.000 workers in Denmark and abroad. In the fiscal year 2016/17 the export value was 27 billion kroner/3.6 billion Euros. That is app.

- **Danish Pork Meat (private, Danish, Glumsø) App. 0.1 million slaughterings yearly**
  Employs 24 workers. Focus on pig meat products. Export is 70% of the total turnover.

- **Hvidebæk slagteri (privatejet, Dansk) App. 0.1 million slaughterings**
  Small family owned slaughterhouse.

- **SB Pork (bought by Tönnies Fleisch in 2005) App. 1.5 million slaughterings**
  SB Pork is an international food producing company with a focus on production and sale of fresh and frozen pig meat for retail and industry costumers. The company specialises in pig slaughtering, cutting and boning. It is the third largest slaughterhouse in Denmark.

- **Danepork (private, Danish) App. 0.3 million slaughterings**
  DanePork - former Slagtergården St. Lihme A/S – is a privately owned slaughterhouse in Jutland. DanePork employs app. 155 workers.

- **Moesgaard-Meat, (private, Danish) App. 0.1 million slaughterings**
  Moesgaard Meat is a modern company with a brand new production

line. It has the capability to slaughter 120 pigs or 60 sows an hour. With complete cooling facility the company is able to slaughter 100.000 sows per year. This makes export and transport of living sows to Germany unnecessary. Moesgaard Meat does not do cutting and further processing of the meat, but exports whole and half carcasses to other European countries. Moesgaard Meat focuses on animal welfare and avoids the long transport of living animals to Germany.

- **Sevel slagteri (joint-stock company) App. 0.1 million slaughterings**
  Sevel Slagteri is a modern slaughterhouse which focuses on sows for export. In 2013 H & S Westergaard A/S bought Sevel Slagteri A/S. H & S Westergaard A/S employs 28 workers
  Note: Not clear if the 28 workers is solely the employed with H&S Westergaard or if they include the workers on Sevel slagteri.

- **Tican slagteri, (bought by Tönnies Fleisch in 2016) App. 1.8 million slaughterings**
  Tican employs around 1,100 workers. Tican international food producing company with a focus on production and sale of fresh and frozen pig meat for retail and industry costumers. Tican has a yearly production of 3.4 million pigs. This number deviates from the number of slaughterings in reports from the industry organisation LF.
  Note on Tönnies Fleisch: The company is headquartered in Rheda-Wiedenbrück. Tönnies employs approximately 8,000 people across seven German and one Danish production facility. The Tönnies group is active worldwide, and with 25 international offices, is always closely in touch with the market. Our exports account for about 50% of our production.

Sources: The number of slaughterings is derived from Statistik Gris 2017 by Danish Agriculture & Food Council. The information on each slaughterhouse is taken from the companies own websites. In some instances there are varations in the information. For example regarding the number of slaughterings.

5. Characteristics of the labour market in the pork value chain

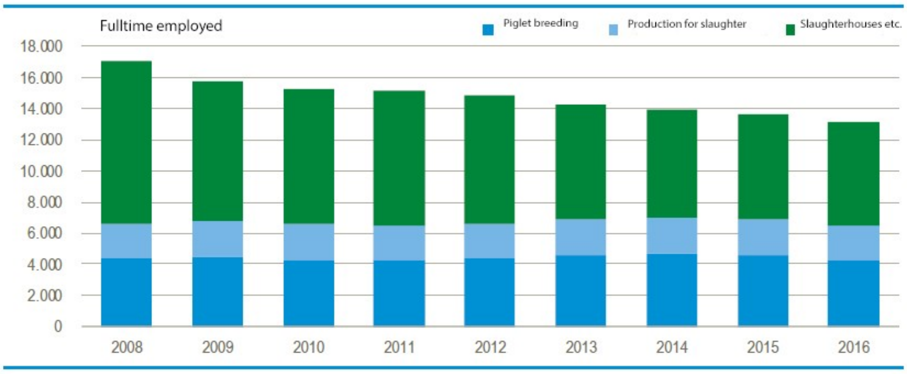
Generally, the breeding efficiency as well as slaughtering and processing efficiency has developed quite markedly over the years – as pointed out above. Compared to most other countries, the amount of pigs produced and slaughtered per employee is very high.

While the employment is relatively unchanged over the years, the farms are producing still more pigs, i.e. efficiency has improved markedly.

In slaughtering and processing, the labour process have been Taylorised since the beginning of the 20th century. Enhanced mechanization has taken place from 1960's onwards, and this trend is continuing with enhanced robotization.

The figure below shows that app. 17,000 were employed in the pig value chain in 2008, while there was 13,000 employed in 2016 – in the whole value chain of breeding, slaughtering and processing.

Figure 6 Employment by primary pig production and manufacturing of pig meat in Denmark



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Employees in breeding of slaughter pigs: 4,158 in 2016 – down from 4,935 in 2008
Employees in processing for pig meat 7,489 in 2016 – down from 10,033 in 2008
(Statistics Denmark)

The amount of foreigners employed in farming is quite high. About 35 % of the employed in breeding of piglets were foreign nationals in 2016. Romanians and Ukrainians dominate among the foreign workers.

Employed in breeding of piglets	Danish	Polish	Romanian	Lithuanian	Ukrainian	Employees from other countries	Total
2000	6371	27	14	65	24	190	6691
2001	5982	30	24	82	61	173	6352
2002	6049	39	26	95	123	186	6518
2003	5960	34	41	89	158	188	6470
2004	5929	44	50	106	229	180	6538
2005	5668	55	66	108	321	184	6402
2006	5600	99	112	117	526	227	6681
2007	8865	204	315	181	1246	392	11203

Employed in breeding of piglets	Danish	Polish	Romanian	Lithuanian	Ukrainian	Employees from other countries	Total
2008	8166	165	450	156	1566	362	10865
2009	7643	154	493	161	1549	398	10398
2010	7235	142	701	167	1316	418	9979
2011	7091	146	1008	209	1167	401	10022
2012	7027	177	1252	194	1073	393	10116
2013	6923	165	1360	187	1095	394	10124
2014	6736	178	1528	174	1204	411	10231
2015	6410	146	1666	146	1239	362	9969
2016	6220	158	1814	150	1258	352	9952

Source: Calculations made especially for this report by Jonas Felbo-Kolding, FAOS, based on register data from Statistics Denmark
The figures in the table deviate from the sector total shown in the figure above as the figures in the table cover the total number of employees in the sector regardless of their number of working hours, whereas the figure above displays the number of full-time employees recalculated based on the number of working hours of all employees.

In breeding of slaughter pigs, the amount of foreigners is about 23 % (2016), and again mostly Romanians and Ukrainians.

Employed in breeding of slaughter pigs	Danish	Polish	Romanian	Lithuanian	Ukrainian	Employees from other countries	Total
2000	6059	11	2	42	29	143	6286
2001	5504	11	4	53	61	155	5788
2002	5384	12	9	56	77	141	5679
2003	5068	12	12	36	82	141	5351
2004	5045	18	20	43	106	110	5342
2005	4927	25	41	35	158	104	5290
2006	4491	36	52	44	229	90	4942
2007	6299	72	135	91	550	160	7307
2008	5971	88	180	76	700	195	7210
2009	5631	99	198	65	690	228	6911
2010	5340	90	289	100	612	221	6652
2011	5157	76	440	129	524	231	6557
2012	4997	70	509	108	492	218	6394
2013	4956	73	582	112	475	221	6419
2014	4788	70	652	105	508	192	6315
2015	4665	85	665	96	577	184	6272
2016	4534	68	761	85	570	193	6211

Source: Calculations made especially for this report by Jonas Felbo-Kolding, FAOS, based on register data from Statistics Denmark
The figures in the table deviate from the sector total shown in the figure above as the figures in the table cover the total number of employees in the sector regardless of their number of working hours, whereas the figure above displays the number of full-time employees recalculated based on the number of working hours of all employees.

In slaughterhouses and processing, the share of foreigners is 25 % – which is in accordance to statements from interviews with HR-managers in the two dominant slaughter houses, who estimate a share of 20-30 % in the slaughter houses. The table below shows quite a lot of Polish workers, but lately also workers from Myanmar, Sri Lanka and Vietnam is more prevalent in this part of the value chain.

Employed in slaughtering and processing of pork meat	Danish	Polish	Romanian	Employees from other countries	I alt
2000	14916	16	3	848	15783
2001	15172	15	3	937	16127
2002	15702	17	5	503	16227
2003	13788	16	5	1058	14867
2004	13840	24	8	1044	14916
2005	13482	18	5	1138	14643
2006	13127	70	4	1519	14720
2007	12304	784	20	1738	14846
2008	11363	1167	32	1587	14149
2009	9390	1061	45	1271	11767
2010	8807	1252	59	1225	11343
2011	8548	1168	59	1190	10965
2012	8306	1231	66	1143	10746
2013	7943	1236	66	1099	10344
2014	7306	1338	48	1007	9699
2015	6968	1378	72	1035	9453
2016	6569	1538	68	1100	9275

Source: Calculations made especially for this report by Jonas Felbo-Kolding, FAOS, based on register data from Statistics Denmark
The figures in the table deviate from the sector total shown in the figure above as the figures in the table cover the total number of employees in the sector regardless of their number of working hours, whereas the figure above displays the number of full-time employees recalculated based on the number of working hours of all employees.

The unions do not ask their members about nationality, but their websites are accessible in Polish, German and English, and they translate the collective agreements as well.

While the union density in breeding is unknown as well as the wage conditions, there is – due to the concept of Andelsbevægelsen – a certain amount of social control; one farmer pretty much knows what another farmer is doing, and it is expected that working conditions and wages are pretty much the same across the industry. However, this will be explored further in WP3.

In slaughtering and processing, union density is 92.5 per cent (2016). Below are the membership base of NNF, according to gender and age.

Meat industry – w/o cattle

Members of NNF according to age and gender

Age groups	Female	Male	Total
15-25	36	74	110
26-35	63	179	242
36-45	119	252	371
46-55	226	374	600
56-65	168	283	451
66+	1	12	13
Total	613	1.174	1.787

Slaughtering – w/o cattle

Members of NNF according to age and gender

Age groups	Female	Male	Total
15-25	62	418	480
26-35	174	1.030	1.204
36-45	252	1.452	1.704
46-55	281	1.600	1.881
56-65	155	1.004	1.159
66+	1	27	28
Hovedtotal	925	5.531	6.456

Automatization is an ongoing process in slaughtering and processing. The approach from the slaughters' union, NNF, is that they embrace it; the idea is that it will entail redundancies, but it will be even worse – read outsourcing – if NNF and the employees do not cooperate. Hence, they cooperate with the major slaughterhouses on how to use and implement automatization (interviews).

The incentive to work on automatization and robotization in Danish slaughterhouses is high, due to the in international comparison relatively high wage level. This has had the interesting side-effect of an internationally acknowledged production of robots and other machinery for slaughtering and processing. It has not been possible to find data on the amount of workplaces created within this area.

6. Description of the main critical aspects in the pork value chain in Denmark

As pointed out the structural development in Denmark moves towards fewer and larger companies. This development includes both pig farms and slaughterhouses, and the number of farms is halved every seven years. At the same time we find increased specialization.

While the move from slaughter pigs to production of piglets could seem like a move down the value chain, it is not that simple. The piglets actually produce less slurry and pollution and take up less space, adding value to the farmers within a short time frame. Furthermore, the quality (health, hygiene and genes) of Danish piglets are internationally acknowledged, and due to almost no imports of live pigs, the general trust in high level of hygiene of Danish pigs and porkmeat is high.

While the number of employees working with production of pigs and piglets has been relatively constant the past ten years, the number of workers in slaughterhouses has fallen significantly and the international competition is tough. There are fewer slaughterings, but higher productivity and changes in end products has also contributed to the development. Higher productivity is partly caused by greater specialization and the introduction of robots in the slaughtering process. From 2003 to 2016 the number of slaughterings per full time worker has gone up from app. 1,950 to app. 2,800.

While it does lead to fewer work places, it also brings Denmark to the forefront in automatization and production of robot and machinery for slaughtering and processing – and Denmark is delivering turn-key slaughter houses around the world.

Two of the large slaughterhouses in Denmark has been bought by the German Tönnies Fleisch in 2005 and 2016, which makes Tönnies the second largest player in Denmark after the cooperative slaughterhouse Danish Crown. Danish Crown is owned by the cooperation movement (Andelsbevægelsen); while this entails a tradition of knowledge sharing and hence a fast dissemination of production enhancing measures in farming, it might also create inertia and resistance in order to implement necessary structural changes in Danish Crown.

90 percent of the pork production goes to export, making the Danish pork business highly dependent on export markets but rather unaffected by recent changes in Danish diet habits.

Strengths and weaknesses in the Danish pork value chain

	Strengths	Weaknesses
Breeding	World famous genes High productivity No import → high hygiene	Very few farms, survival of the fittest
Slaughtering/ processing	Automatization Good brand abroad (clean meat, high quality) Strong brand internationally, big market High hygiene Strong cooperation movement (owns Danish Crown) → knowledge sharing, innovation	High labour costs and automatization→ Losing jobs by the day to new technology and competition The coop movement might inhibit necessary structural changes in the value chain
The Joker	Exporting a lot →Relatively independent on national diet habits *More jobs in robot manufacturing*	Exporting a lot of piglets and pigs → losing the value adding processing process Robots and machines → new niche in exports

Main sources

This report is build several sources, including, literature, reports from interest groups, websites, newspaper articles and researchers. Sources are mentioned in the text, but main sources have been the following

Statistics and numbers

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Interviews

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- Jim Jensen, forbundsnæstformand, NNF
- Bjarne Thomsen, chefkonsulent, NNF
- Karsten Flemin, markedsanalytiker, SEGES, Landbrug & Fødevarer
- Finn Udesen, chefkonsulent, SEGES, Landbrug & Fødevarer
- Andreas Friis, Vice President, Group HR, Danish Crown
- Birgit Frederiksen, HR chef, Tican