Interregional and international competition in German piglet production

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Summary

The objective of this study on German piglet production is to identify the role of interregional and international trade with piglets for the fattening of pigs in Germany. Further, a comparison of piglet production costs and their determinants shall show some reasons for the advantages of the piglet producers in Denmark and the Netherlands.

The role of the interregional and international trade with piglets is illustrated by calculating regional supply balances. The results reveal a decreasing share of piglets produced in South Germany and an increasing share of piglets produced in East Germany, Denmark and the Netherlands. The comparison of the production costs and their determinants demonstrate the contribution of a better biological performance to a low level of piglet production costs in Denmark and the Netherlands. Further, the sow farms in these countries have bigger herds and realise more of economies of scale.

Keywords: Piglet production, supply balance sheet, piglet transport, international comparison of costs

Zusammenfassung

Interregionaler und internationaler Wettbewerb deutscher Ferkelproduzenten

Ziel dieser Studie über die Verflechtung der Ferkelversorgung ist es zum einen quantitativ darzustellen, welche Bedeutung interregionale und internationale Ferkellieferungen für die Schweinemast in Deutschland haben. Zum anderen sollen durch einen Vergleich der Produktionskosten und ihrer Bestimmungsgründe Ursachen für Wettbewerbsvorteile und Wettbewerbsnachteile im Bereich der Produktion identifiziert werden.

Die Bedeutung der interregionalen und internationalen Ferkellieferungen geht aus Bilanzrechnungen zur Ferkelversorgung in den Bundesländern hervor. Sie zeigen, dass die süddeutschen Ferkelerzeuger bei der Belieferung der nordwestdeutschen Veredelungsregionen Marktanteile an die Konkurrenten in den ostdeutschen Ländern und vor allem in Dänemark sowie den Niederlanden verloren haben. Aus dem Vergleich der Produktionskosten für Ferkel und der Analyse ihrer Bestimmungsgründe ist zu entnehmen, dass die Wettbewerbsvorteile der dänischen und niederländischen Konkurrenten zum einen aus besseren biologischen Leistungen resultieren. Zum anderen werden in Dänemark und den Niederlanden die Vorteile der Kostendegression in größeren Betrieben stärker genutzt. Hinzu kommt, dass es dort einfacher ist, größere und dennoch homogene Partien mit 200 und mehr Ferkeln zusammenzustellen.

Schlüsselwörter: Ferkelerzeugung, Versorgungsbilanz, Ferkeltransport, internationaler Kostenvergleich

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1 Introduction

The supply of piglets in Germany is characterised by growing deficits, since the stock of fattening pigs in Germany expanded in the preceding years, while the sow stock declined. The deficits have been compensated by imports from Denmark and the Netherlands. In addition to the international trade with piglets, there is an interregional trade in Germany, because the regional distribution of the sows does not correspond to the distribution of the fattening pigs.

The interregional and the international trade mean some risks in regard to the spread of epidemics and involve some problems for the requested coordination of piglet production and pig fattening (Schulte-Wülwer, 2008). But, there is a lack of quantitative information showing the contribution of the interregional trade to the piglet supply and illustrating the competiveness of piglet production in Germany.

Therefore, this study intends to give more insight into the regional distribution of piglet supply and the interregional and international competition by

- calculating surpluses and deficits of piglets at the regional level
- calculating costs of piglet production at the regional and international level and analysing further determinants of competitiveness (herd size, biological performance).

It starts by discussing the development of the pig stocks and its impact on the piglet supply in Denmark, the Netherlands and Germany. Then, the study presents regional balance sheets for piglets and discusses some reasons for the economic advantages of Danish and Dutch piglet production.

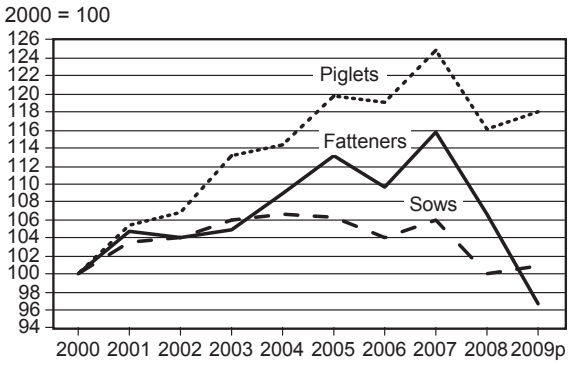
2 Development of the pig stocks

The stocks of sows and fattening pigs developed differently in Germany, Denmark and the Netherlands and induced nationally varying conditions for the supply with piglets (s. Figure 1).

Denmark expanded the stock of fattening pigs as well as the sow stock until 2007. The stock of fattening pigs increased more after 2004. However, due to the rising productivity the piglet production grew most and profited by increasing sales opportunities in Germany and East Europe.

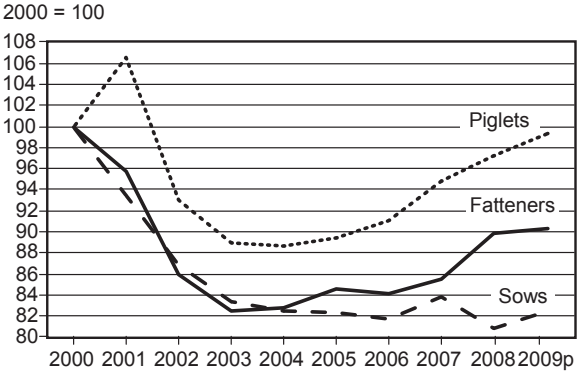
The development in the Netherlands is characterised by a general decrease of the pig stock after 1998 due to several policy measures (Hoste, 2008). However, due to the rising productivity in piglet production the number of piglets decreased less than the stock of sows and of fattening pigs and recovered more after 2005.

Germany's sow stock has declined, while the stock of fattening pigs increased. The impacts of the decreasing sows on the supply of piglets have been nearly compensated by the increasing number of piglets weaned per sow annually. But, this increase was not large enough to meet the rising demand for fattening. The pronounced reduction of the sow stock after 2007 caused increasing deficits.



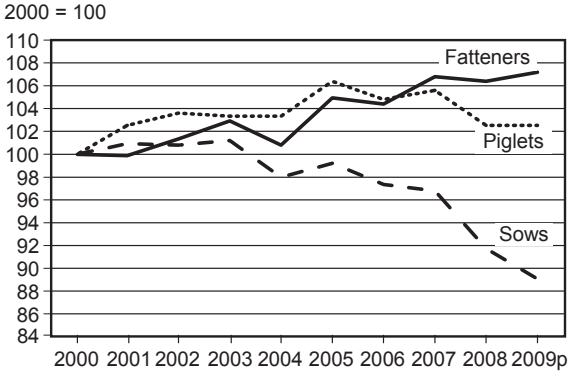
p = preliminary.
Source:Statistikbanken Danmark; own calculation.

Figure 1a:
Development of the pig population in Denmark from 2000 to 2009



p = preliminary.
Source:CBS Landbouwtelling; LEI-bewerking; own calculation.

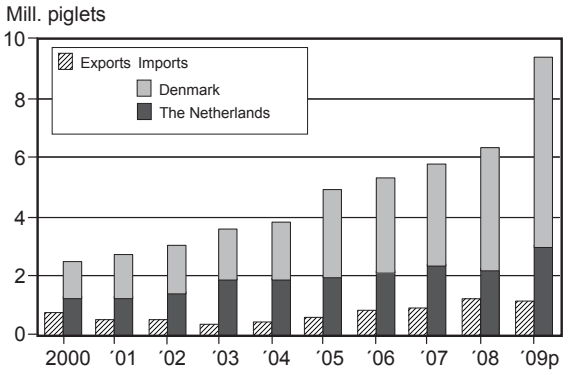
Figure 1b:
Development of the pig population in the Netherlands from 2000 to 2009



p = preliminary.
Source: SBA, BMELV (425); own calculation.

Figure 1c:
Development of the pig population in Germany from 2000 to 2009

Comparing the development of the pig stocks in the three countries it becomes obvious that the supply of piglets in Denmark and the Netherlands expanded more than the domestic demand, while the domestic supply of piglets in Germany did not grow enough. Here, the growing demand needed to be completed more and more by imports from Denmark and the Netherlands (s. Figure 2). The German market is even important for the piglet exports of its neighbour countries; it takes approximately 50 % of the Dutch and 90 % of the Danish exports (Hoste, 2008).



p = preliminary.
Source: SBA, ZMP, DMA, PVE; own calculation.

Figure 2:
Exports and imports of piglets in Germany

On the other hand, Germany also exports piglets by realising more sales opportunities in East and South Europe instead of competing with imports from Denmark and the Netherlands (Beckhove, 2010; Dorsch, 2010).

In contrast to international trade, statistics on the interregional trade with piglets are not available. Therefore, the contribution of the interregional trade to the piglet supply will be roughly estimated here by calculating regional surpluses and deficits. The calculation presented in the following does not exactly determine the volume of the interregional trade, but it gives an insight into its role by showing the minimum amount of trade required to achieve a balance of regional supply and demand for piglets.

3 Calculation of regional surpluses and deficits

The procedure to calculate regional piglet supply has already been described in preceding papers (Haxsen, 2001, 2004). It determines the supply by utilizing the data on the regional stock of sows and the number of piglets weaned annually per sow. The calculation of the demand is based on the values of the regional stock of fattening pigs and on assumptions concerning the turnover of the fatteners per pig place per year.

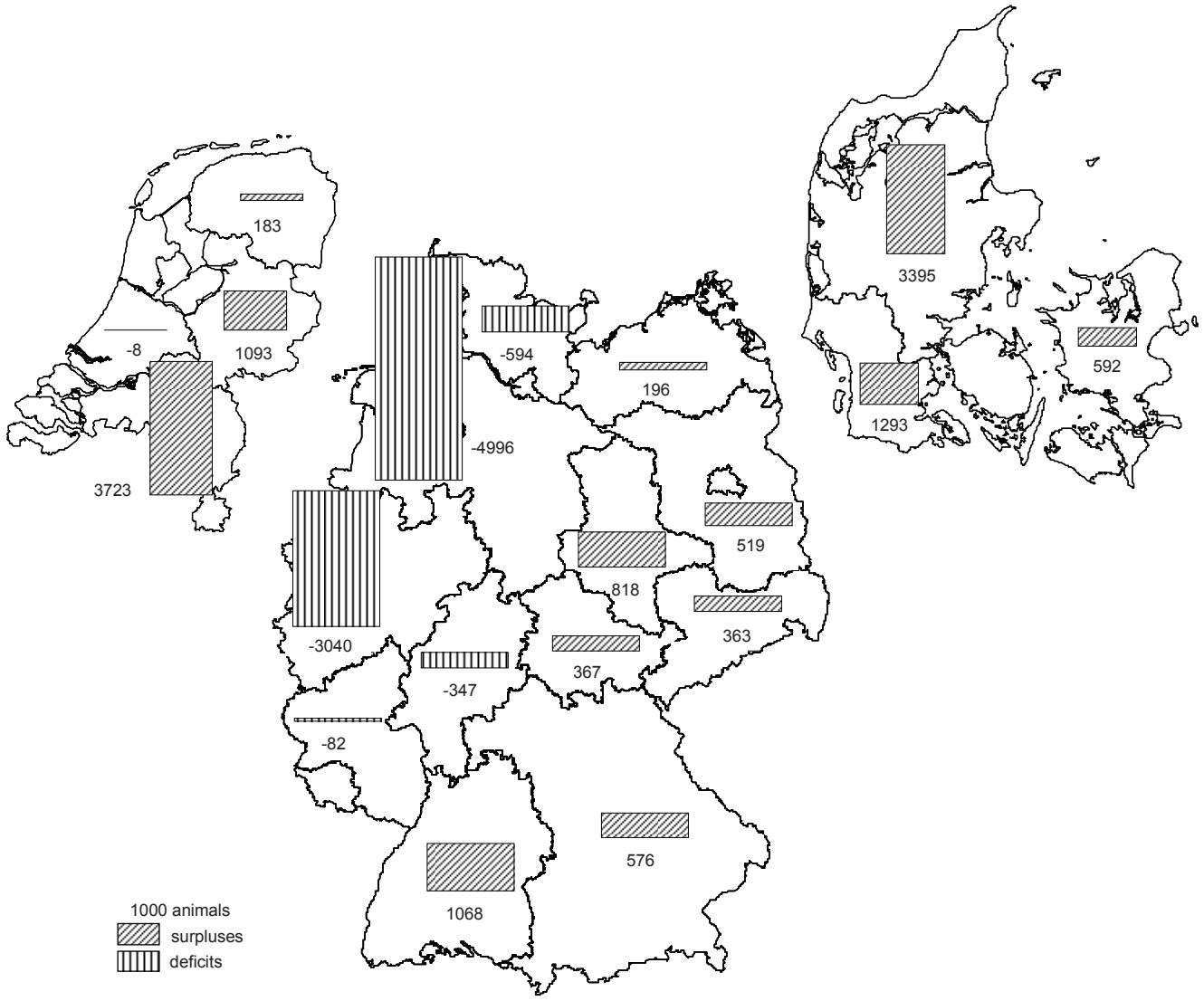
Map 1 shows results of the 2008 regional balance sheets for Germany as well as for the Netherlands and Denmark. It illustrates the concentration of deficits in North Germany and gives an insight into the distances between the surplus and the deficit regions. The deficits in the north cannot be balanced only by the surpluses of the southern and the eastern regions of Germany, they have also to be filled by imports from the Netherlands and Denmark. The map demonstrates that the Dutch piglets produced mainly in the east of the Netherlands and exported to the German market have advantages due to the relatively short distance to the deficit regions in the Northwest Germany (Recke, 2007), while the majority of the piglets exported from Denmark to Lower Saxony and North Rhine-Westphalia have longer distances than the piglets produced in South and East Germany. However, more than two millions piglets have been exported from North Denmark to the intensive livestock regions in Northwest Germany.

The supply of piglets varies also from district to district within each federal state of Germany. Map 2 illustrates the varying supply by classifying districts in regard to the level of their deficits or their surpluses respectively above or below the average.[1] The map demonstrates that there are districts with surpluses as well as districts with deficits within each federal state. States with large deficits like Lower Saxony for example have even districts with surpluses not far away from regions with deficits. On the other hand states with large surpluses like Baden Wurttemberg for example have districts with deficits in the neighbourhood of surplus regions.

The results of the regional balance sheets are also utilized here to calculate the minimum number of piglets to be transferred across borders of districts and across borders of the federal states for achieving regional equilibrium of supply and demand for piglets. Table 1 demonstrates, with the data of 2007, how the minimum transfer can be computed. Concerning the federal states the total surpluses amount to 3.709 millions piglets. Given the export of 900 thousand piglets 2.089 millions have to be transferred from federal state to federal state. The same amount results by subtracting the import of piglets (5.779 millions) from the sum of all deficits.

Similarly it can be computed how many piglets have to be transferred at minimum from district to district. The total surpluses of the districts amount 2007 to 6.22 millions, taking into account the export of 900 000 piglets 5.32 millions have to be transferred at the level of the districts.

[1] The average value of the districts with surplus is 78 piglets per 100 ha, the average value of the districts with deficit is –135 piglets per 100 ha. The deficits and surpluses have been calculated by the method of regional balance sheets already considered above. But, in the interest of transparency the map does not show the amount of the surplus or deficit respectively for each district.



Source: CBS, SBA, Denmarks Statistic, own calculation.

Map 1:

Regional surpluses and deficits of piglets in Germany, Denmark and the Netherlands 2008

Table 1:

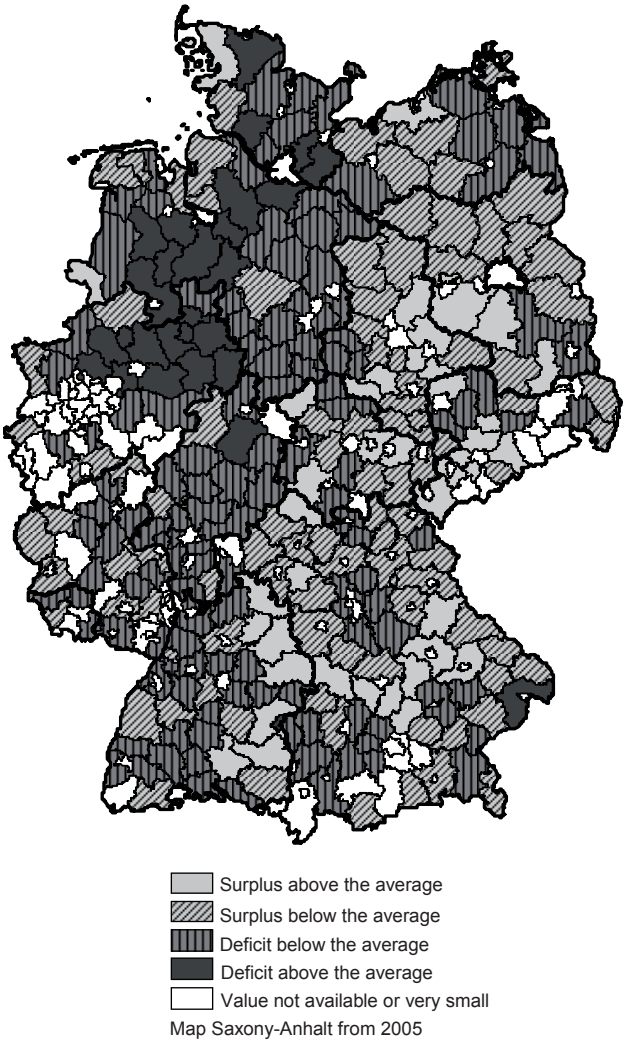
Calculation of interstate and interdistrict transfers of piglets in Germany 2007

Federal state level			
Total surpluses	3709	Total deficits	8588
- Exports	900	- Imports	5779
= Interstate transfers	2809	= Interstate transfers	2809
District level			
Total surpluses	6220	Total deficits	11099
- Exports	900	- Imports	5779
= Interdistrict transfers	5320	= Interdistrict transfers	5320

Source: SBA, own calculation

4 Development of regional surpluses and deficits within Germany

The analysis of the regional supply and the demand for piglets must not be confined to only some years, but may consider a longer period similar to the period of the imports and exports considered above. Therefore, Table 2 presents results of calculating the balance of piglet supply and demand in 2009 and 2001. It documents an impressive decrease of the surpluses in Baden Wurttemberg and Bavaria. On the other hand, all federal states in East Germany expanded their surpluses. But, this expansion has not been strong enough to compensate the decrease in South Germany. Further, the deficits in Schleswig-Holstein,



Source: SBA, own calculation.

Map 2:

Regional surpluses and deficits of piglets 2007 (Piglets per 100 ha farm land)

Lower Saxony and North Rhine-Westphalia increased and resulted in an expansion of imports. Here the degree of self sufficiency has declined 2009 below 70 %, on the average for all Germany the degree is still above 80 %.

Figure 3 shows the development of piglet supply and piglet demand for all years from 2001 to 2009 in the north, east, south and southwest of Germany. In the interest of transparency the figure presents results for four groups instead of single federal states or smaller regions. The federal states within a group are characterized by a similar development of piglet production or pig fattening respectively. But the four groups differ in regard to their development in pig supply and demand:

Table 2:

Calculated supply and demand for piglets in the German federal states

	Supply 2009	Demand 2009	Balance 2009	Balance 2001
	1000 animals			
Bavaria	4050,6	3291,7	758,9	1757,2
Baden Wurttemberg	5915,3	5999,2	-83,9	1012,9
South Germany	**9965,9**	**9290,9**	**675,0**	**2770,1**
Brandenburg	1600,1	1076,0	524,0	361,1
Mecklenburg-West Pomerania	1392,6	1216,7	175,8	109,3
Saxony	1343,1	940,0	403,1	318,4
Saxony Anhalt	2161,9	1507,2	654,7	33,3
Thuringia	1414,8	1051,4	363,4	127,1
East Germany	**7912,4**	**5791,3**	**2121,1**	**949,2**
Lower Saxony	9771,2	15450,7	-5679,5	-3438,1
North Rhine-Westphalia	8417,9	11975,2	-3557,3	-1862,2
Schleswig Holstein	1877,6	2787,7	-910,1	-371,7
North Germany	**20066,6**	**30213,6**	**-10146,9**	**-5672,0**
Hesse	955,4	1350,6	-395,1	-197,2
Rhineland-Palatinate	391,9	489,6	-97,7	-29,2
Saarland	15,4	23,6	-8,2	-13,5
Southwest Germany	**1362,7**	**1863,7**	**-501,0**	**-239,8**
Total Germany	**39308,5**	**47162,1**	**-7853,6**	**-2190,8**

Source: Stat. Bundesamt, own calculation.

The group in the south is characterised by a small decrease of piglet production, while the number of fattening pigs has increased and thus induced diminishing surpluses of piglets.

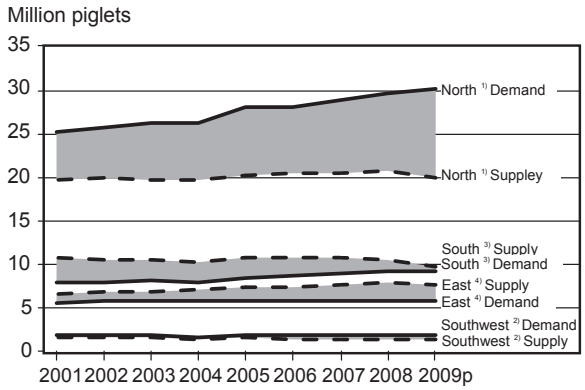
In the east the level of pig fattening remained nearly unchanged while the piglet production grew and resulted in an expansion of surpluses, which are meanwhile larger here than in the south.

The pig producers in the north have expanded the piglet production as well as the pig fattening, but the number of fattening pigs grew more and induced rising deficits.

The development in the southwestern part is characterised by decrease of the stock of sows and constant stock of pigs for fattening, therefore the deficits have increased.

In all, the development of the imports, exports, regional surpluses and deficits in Germany indicates a decrease of the interstate transfers. Figure 4 shows the decrease by illustrating the contribution of intraregional resources, imports and interstate transfer to the total supply of piglets from 2001 to 2009. The share of imports has grown at the costs of interstate transfers. The intraregional resources still contribute the dominant portion of the piglet supply.

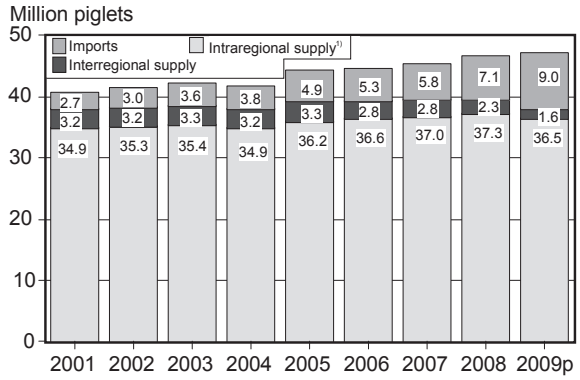
But, the growing imports from Denmark and the Netherlands reflect an improved competitive position of the piglet production there.



p = preliminary.
1) Schleswig-Holstein, Lower Saxony, North Rhine-Westphalia
2) Hesse, Rhineland-Palantinate, Saarland
3) Baden-Wurttemberg, Bavaria
4) Mecklenburg-Westpomerania, Brandenburg, Saxony-Anhalt, Thuringia, Saxony
Source: SBA, ZMP, vTI-MA, own calculation

Figure 3:

Demand and supply of piglets in the North, South, East and Southwest of Germany



p = preliminary.
1) Including piglets produced on farm.
Source: Own calculation.

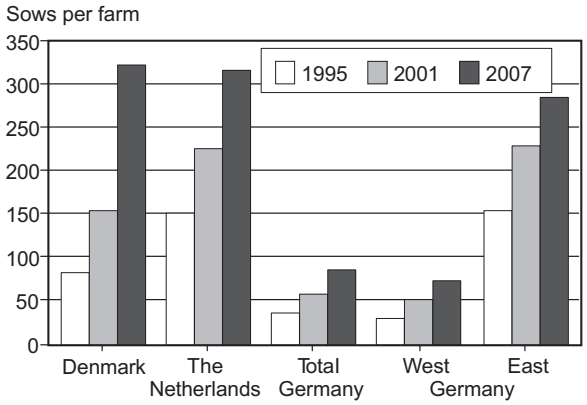
Figure 4:

Contribution of imports, interstate transfer and intraregional sources to the supply of piglets in Germany

5 Advantages of piglet production in Denmark and the Netherlands

The advantages of the Danish and the Dutch piglet production result mainly from a better biological performance and from the structural advantages of the bigger sow farms with their potential to deliver bigger, and even homogenous, batches of piglets and their cost advantages due to economies of scale.

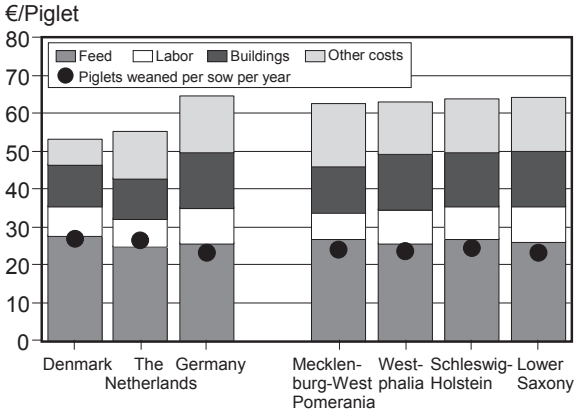
The pig farms in Denmark and the Netherlands have been bigger than in Germany for decades already. Meanwhile their average size is larger than in East Germany (s. Figure 5). Especially the Danish farms grew faster than the German. The bigger farms have less problems meeting the demand of the fattening farms for charges with more than 200 piglets from one producer guaranteeing a sufficient status of animal health (Poker, 2008). Further, they have lower production costs, because they utilize the degression of costs and realise a better biological performance in piglet production. The number of piglets reared annually per sow in Denmark and the Netherlands exceeds the values in Germany (s. Figure 6).



Source: ZMP 1997, 2003, SBA 2008, Statistikbanken Denmark Land- en tuinbouwcijfers 2008.

Figure 5:

Average size of the sow herds in Denmark, the Netherlands and Germany



1) Cost of a piglet with standardised weight of 30 kg.
Source: InterPIG (2009); ZDS (2009); SSBSH 2009; SKBR 2009; LWK Niedersachsen: ER Westfalen: own calculation.

Figure 6:

Cost of piglet production 2008[1)]

The cost advantages of Danish and Dutch piglet production become obvious by comparisons of piglet production costs. A model to compute internationally comparable values of production costs has been already applied by InterPIG[2], an informal network of agricultural economists from several countries. The network has a common pool of data to be utilized for calculating costs of pig production by a method unique for all participating countries (Haxsen, 2008). Initially, InterPIG developed its model for calculating the costs of the total process of pig production from the insemination of the sow to the sale of the slaughter pigs. Its main results show costs per kg slaughter weight. However, the model can also be applied for computing production costs per piglet. It takes into account that the weight after weaning varies from country. Therefore, it computes costs of production for piglets with standardised weights for piglets with 25 kg and 30 kg respectively. The model has also been applied here for an international and an interregional comparison of costs and biological performance in piglet production. The results for piglets with a standardised weight of 30 kg presented by Figure 6 illustrate the costs advantages of the Danish and the Dutch sow farms due to better biological performance and degression of fixed costs. There, the production costs per piglet are approximately 10 to 12 Euro lower than the average in Germany. The cost advantage is reflected mainly by the lower level of labour costs and building costs.

The production costs vary also from region to region within Germany, but the interregional differences are smaller than the differences to Denmark and the Netherlands. Also within Germany the cost per piglet are the lower the more piglets are weaned annually per sow.

6 Conclusion

Since pig fattening has a better competitive position than piglet production in Germany, the imports of piglets have grown. Nearly 20 % of the demand for piglets is met meanwhile by imports. On the other hand, there are also regions with surpluses. However, calculations of regional balance sheets indicate that the share of the trade with piglets between the federal states in the total supply has decreased, it is less than 5 %. The share of piglets from intraregional resources in the total supply is still dominant, but it has also decreased in favour of imports. Important disadvantages of the German piglet production result from less the favourable structure of the sow farms and higher production costs due to a lower level of biological performance.

[2] International Pig Information Group

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