Competitiveness of Swedish agriculture: indicators and driving forces

Gordana Manevska-Tasevska & Ewa Rabinowicz

Tel: 046 222 07 83
E-post: Gordana.Tasevska@slu.se, Ewa.Rabinowicz@slu.se

1. Introduction

Competitiveness is a relative measure, showing the ability of a firm or country to face competition and to succeed against such competition (Latruffe, 2010). Competitiveness can be assessed within the national or international context, in analyses at sector level. Sector competitiveness is often defined as persistency and good profitability to maintain market share in the domestic market and/or export markets (Ekman and Gullstrand, 2006). As classified by Latruffe (2010), measurements of competitiveness generally focus on: i) the production itself and trade characteristics (where competitiveness is measured with production trends, export or import indices, comparative advantage indices etc.), and ii) strategic management in terms of business structure and strategy (where competitiveness is measured by various cost indicators, profitability/viability, productivity and efficiency). So far, there is no agreement on how to define or measure competitiveness, so any results on competitiveness achievements need to be interpreted with caution. Moreover, given the relative dimension of existing competitiveness measures, the assessment of competitiveness requires comparisons of cases and of trends.

This working document focuses on trends in competitiveness within primary agricultural production in Sweden. The document considers analytical approaches and provides analyses

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and a literature review summarising findings on the competitiveness of Swedish agriculture at sector level, relative to the trends in competitiveness in some of Sweden's competitors in the sector (Denmark, Germany, Ireland, Finland, the Netherlands, UK and Poland). Specifically, this working document provides:

1) An overall analysis of how production, exports, profitability/viability, productivity and efficiency in Swedish agriculture have changed over the period 1990–2012.

2) A comparative analysis of competitiveness development indices in the competitor countries.

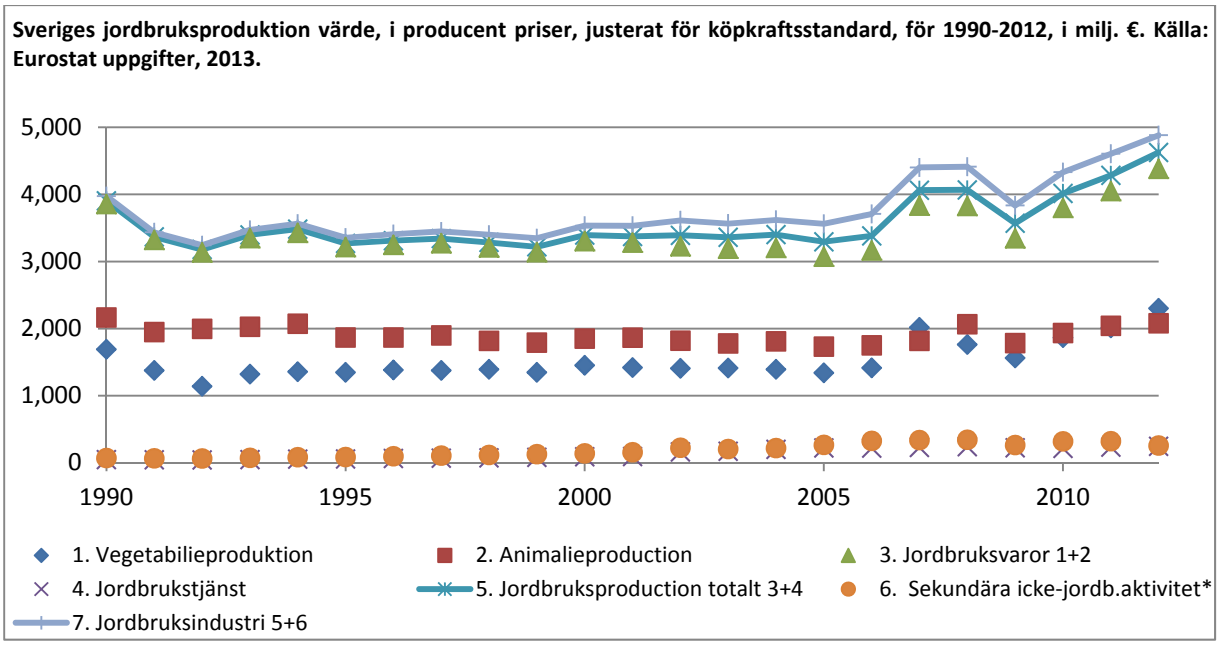
3) A review of published studies analysing factors contributing to higher competitiveness.

2. Agricultural production characteristics of Sweden and selected EU countries

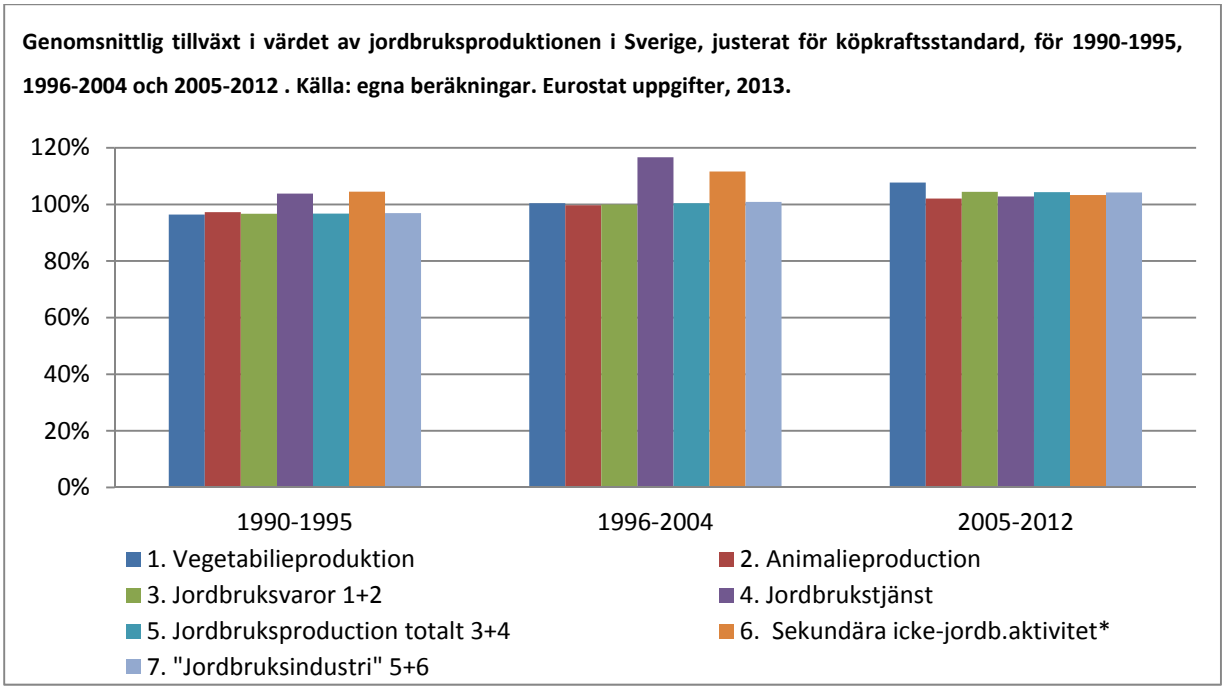
The value of agricultural production and development trends are initial indicators of the competitiveness of the agricultural sector. In this working document, development within agricultural production is described for: 1) Total agricultural production value (including: 1a. plant production, 1b. animal production and 1c. agricultural services: leasing of machinery and equipment, including personnel etc.); and 2) the agricultural "industry" (total agricultural production value and the inseparable non-agricultural secondary activities, such as processing of agricultural products on-farm). The analysis incorporates evidence for Sweden and seven selected competitor EU member countries: Denmark, Germany, Ireland, the Netherlands, Finland, UK and Poland. Development trends are shown for the period 1990-2012 using data from the Eurostat database. Definitions and concepts underlying terms and variables used in the Eurostat database are provided in the links given in footnotes[2].

Figure 2.1 shows the production value and development in agricultural production value in Sweden over the period 1990-2012. Additional background data on agricultural production value in Sweden and the selected EU countries can be found in the appendix (Tables A1-A5).

[2] Link: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-27-00-782/EN/KS-27-00-782-EN.PDF and http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2004R0138:20110401:SV:HTML.



Figur 2.1: Sveriges jordbruksproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012, i milj. €. Källa: Eurostat uppgifter, 2013.



Figur 2.2: Genomsnittlig tillväxt i värdet av jordbruksproduktionen i Sverige, för 1990-1995, 1996-2004 och 2005-2012 . Källa: egna beräkningar. Eurostat uppgifter, 2013.

Over the period 1990-2012, the value of the agricultural “industry” and total agricultural production in Sweden remained stable, but with a tendency to increase after 2006 (Figure 2.1). Compared with 2006, the output value of the agricultural “industry” increased by 31% by 2012 and agricultural production increased by 25%, mainly due to an increase in plant

production. A notable increase in agricultural services and in the value of inseparable non-agricultural secondary activities was observed over the period 1996-2004 (Figure 2.2).

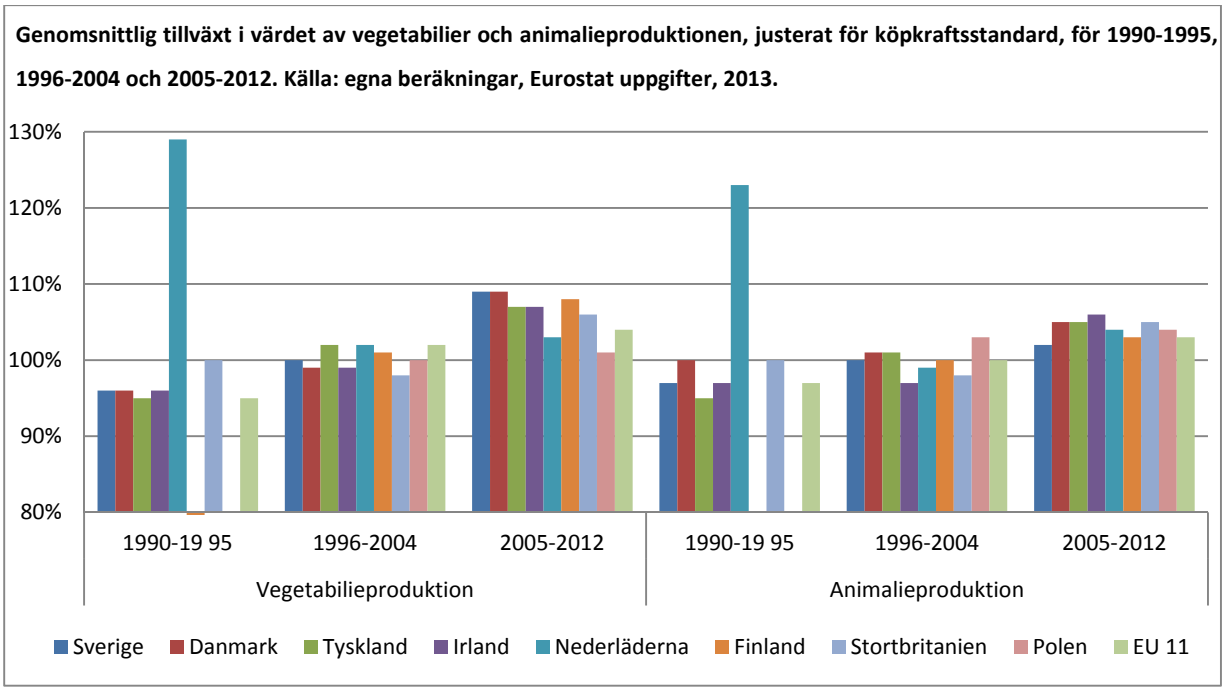
Table 2.1 shows the average growth in the production value of plant and animal production over three consecutive periods: 1990-1995, 1996-2004 and 2005-2012. A graphical representation of these data is given in Figure 2.3. The calculation procedure used involved estimation of the chain index for the annual change in production value and then estimation of average value for the three consecutive periods. These periods were selected for the present analysis to provide an image of development trends in the period before Sweden joined the EU (1990-1995), during the transition period (1995-2004), and after EU enlargement (2005-2112).

The highest growth in plant production output in Sweden was recorded for the period 2005-2012. The period before the 2005 was stagnant, with a stable level but with no development in production values. In the period 2005-2012, the growth in Swedish plant production value (9%) was among the highest observed in the selected EU countries used here for comparison (together with Denmark (9%) and Finland (8%)). High growth in plant production value was also achieved in Germany (7%), Ireland (7%) and UK (6%). The Netherlands was the leading country in terms of growth in agricultural production in the early 1990s (1990-1995), but since then its growth has decreased to within the EU11 average (2% for 1996-2005 and 4% for 2006-2012).

Tabell 2.1: Genomsnittlig tillväxt i värdet av vegetabilier och animalieproduktionen, justerat för köpkraftsstandard, för 1990-1995, 1996-2004 och 2005-2012.

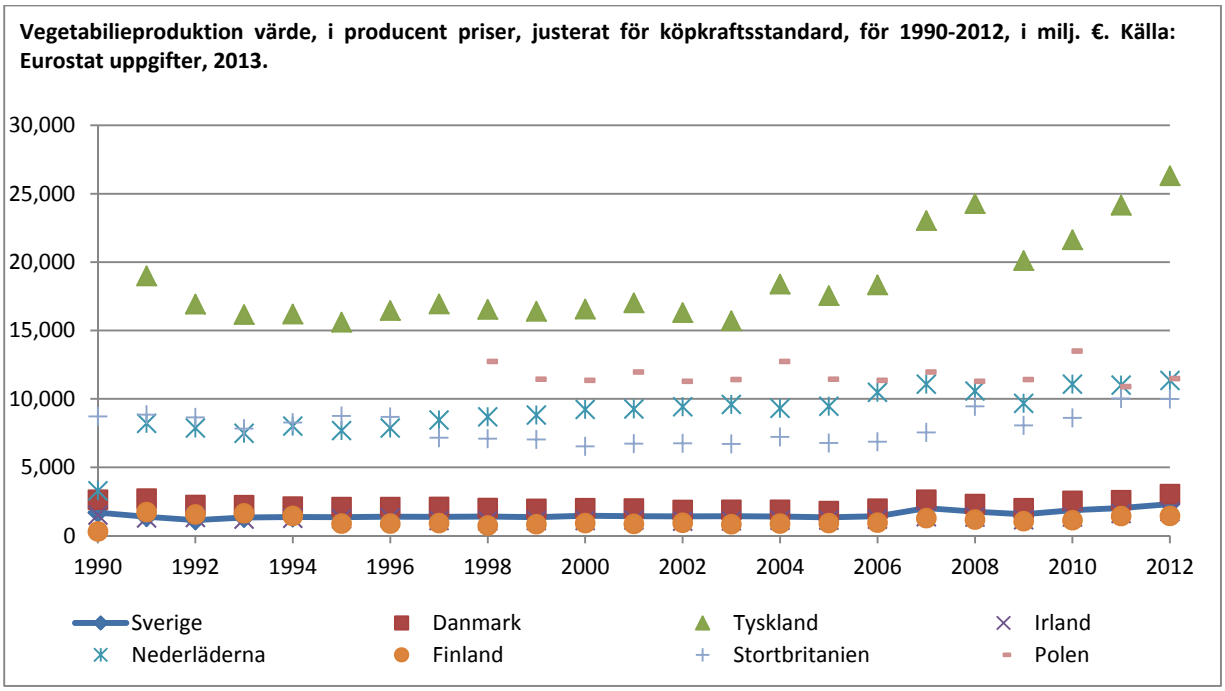
Land	Vegetabilieproduktion			Animalieproduktion		
	90/ 95	96/04	05/12	90/ 95	96/04	05/12
Sverige	96%	100%	109%	97%	100%	102%
Danmark	96%	99%	109%	100%	101%	105%
Tyskland	95%	102%	107%	95%	101%	105%
Irland	96%	99%	107%	97%	97%	106%
Nederländerna	129%	102%	103%	123%	99%	104%
Finland	-	101%	108%	-	100%	103%
Storbritannien	100%	98%	106%	100%	98%	105%
Polen	-	100%	101%	-	103%	104%
EU 11	95%	102%	104%	97%	100%	103%

Källa: egna beräkningar, Eurostat uppgifter, 2013.

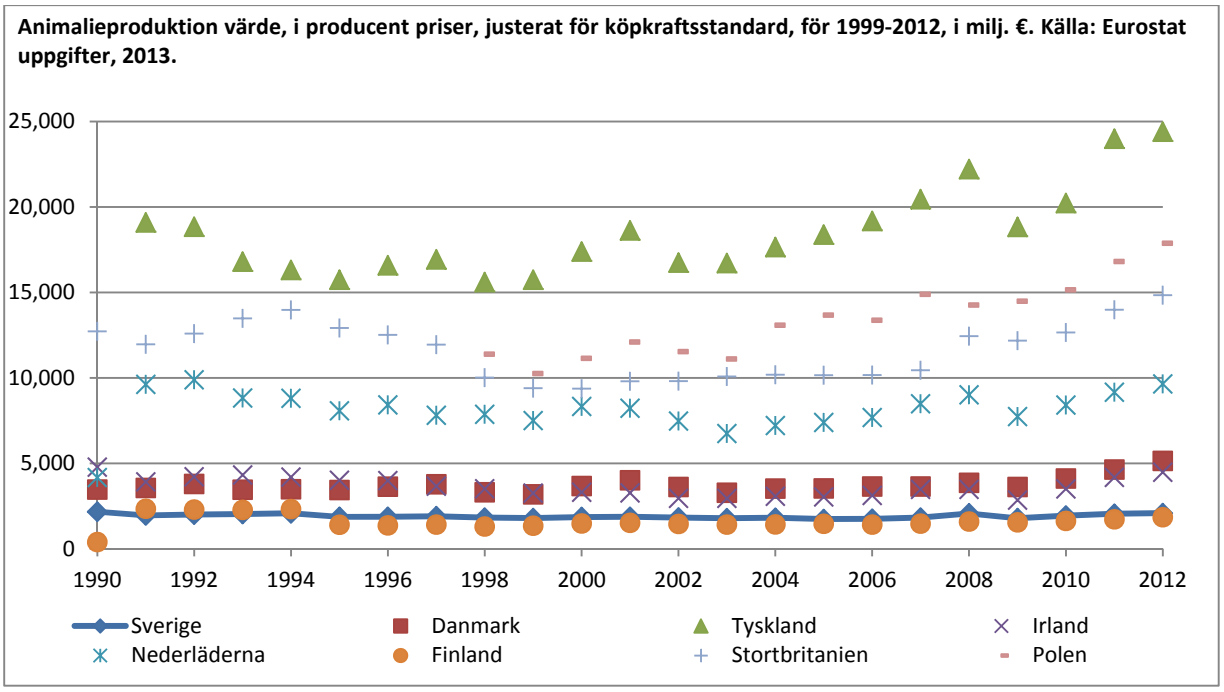


Figur 2.3: Genomsnittlig tillväxt i värdet av vegetabilier och animalieproduktionen, justerat för köpkraftsstandard, för 1990-1995, 1996-2004 och 2005-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013.

Development trends in plant and animal production value in Sweden and the selected EU countries over the period 1990-2012 are shown in Figures 2.4 and 2.5.



Figur 2.4: Vegetabilieproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012, i milj. €. Källa: Eurostat uppgifter, 2013.



Figur 2.5: Animalieproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012, i milj. €. Källa: Eurostat uppgifter, 2013.

The value of Swedish animal production remained relatively stable, but development in the sector stagnated over the whole period. Although improvements were noted for the period 2005-2012, the growth in production value was among the lowest of the selected EU competitor countries used for comparison. The average growth in animal production value in Sweden was 2% for the period 2005-2012, which is below the EU11 average (3%). Compared with plant production, the growth in animal production value was generally lower. Remarkable growth in animal production value for the period 2005-2012 was experienced in Ireland (6%) and in Denmark, Germany and UK (5%). As was the case for plant production value, the Netherlands had the highest growth rate in 1990-1995. However, it is notable that its relatively low growth value in 2005-2012 followed a peak in rapid growth in plant and animal production in 1991.

Table 2.2 shows the average growth in total agricultural production, agricultural services and agricultural "industry" in Sweden and the selected EU countries in the periods 1990-1995, 1996-2005 and 2006-2012. The procedure used involved estimation of chain index for the annual change in production value and then estimation of average growth value for the three consecutive periods. A complementary graphical presentation of the results is given in Figure 2.6.

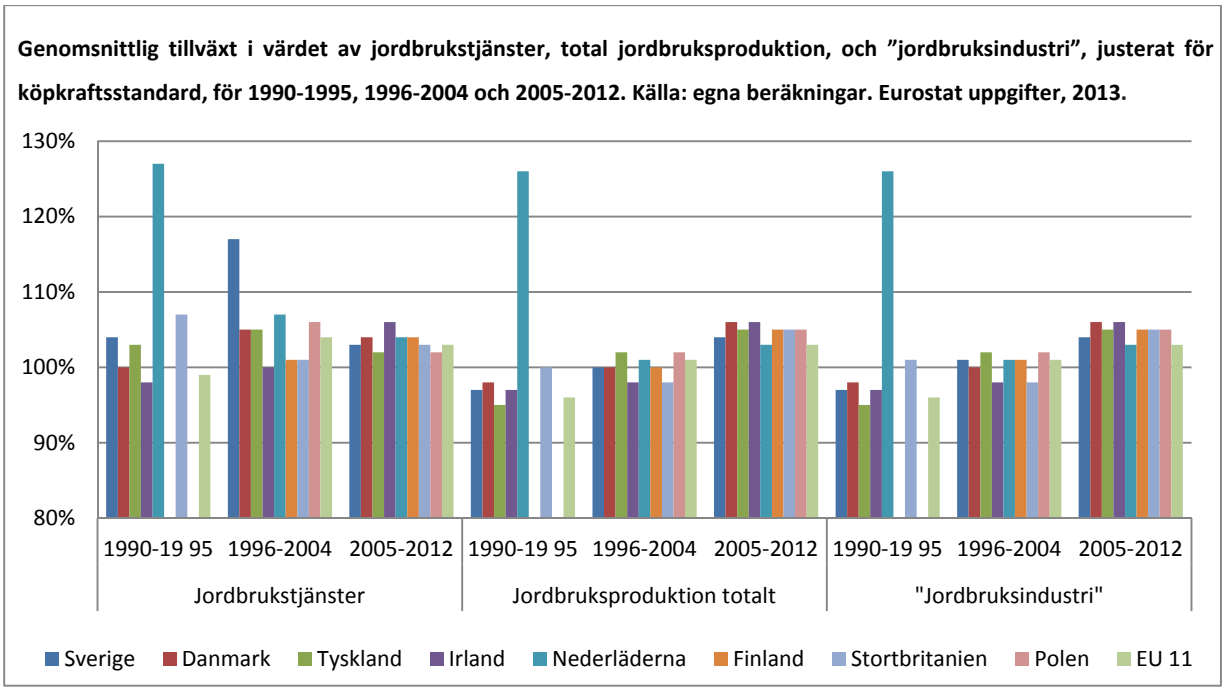
Tabell 2.2: Genomsnitt tillväxt i värdet av den total jordbruksproduktion, jordbrukstjänster och ”jordbruksindustri”, justerat för köpkraftsstandard, for 1990-1995, 1996-2004 och 2005-2012.

Land	Jordbruksproduktion totalt			Jordbrukstjänster och (sekundera icke-jordbruks aktiviteter)			”Jordbruksindustri”		
	90/ 95	96/04	05/12	90/ 95	96/04	05/12	90/ 95	96/04	05/12
Sverige	97%	100%	104%	104% (105%)	117% (112%)	103% (103%)	97%	101%	104%
Danmark	98%	100%	106%	100%	105%	104%	98%	100%	106%
Tyskland	95%	102%	105%	103%	105%	102%	95%	102%	105%
Irland	97%	98%	106%	98%	100%	106%	97%	98%	106%
Nederländerna	126%	101%	103%	127%	107%	104%	126%	101%	103%
Finland	188%	100%	105%	213%	101%	104%	188%	101%	105%
Storbritannien	100%	98%	105%	107%	101%	103%	101%	98%	105%
Polen	-	102%	105%	-	106%	102%		102%	105%
EU 11	96%	101%	103%	99%	104%	103%	96%	101%	103%

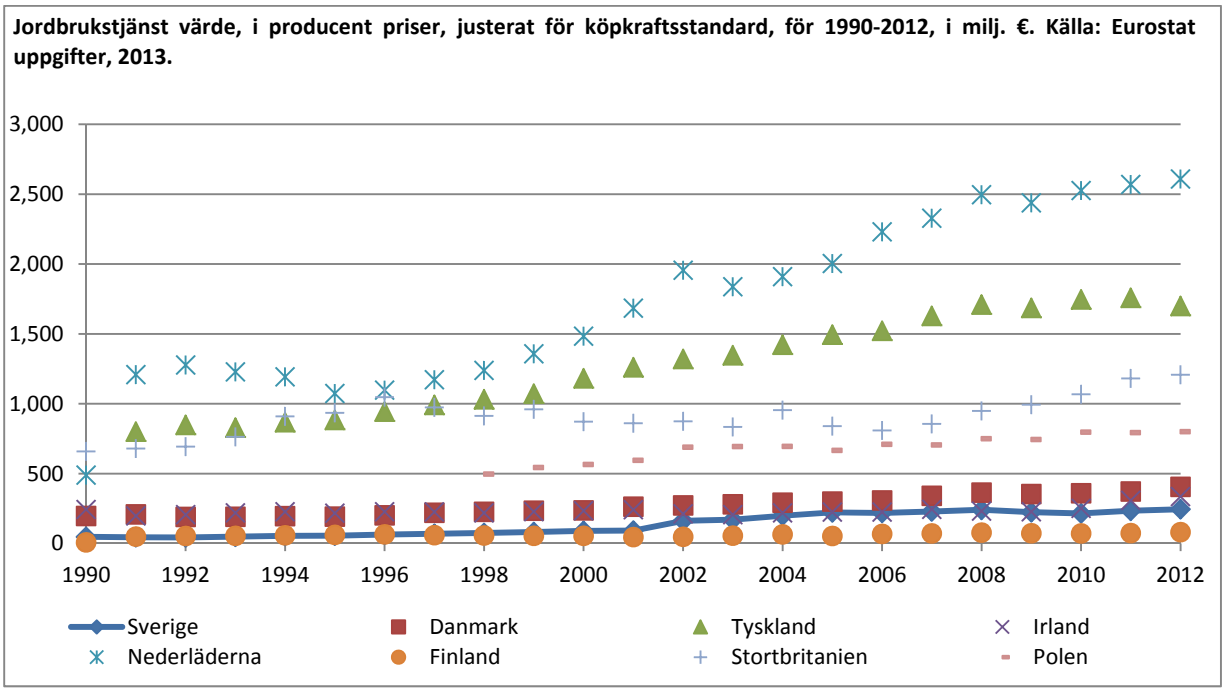
Källa: egna beräkningar. Eurostat uppgifter, 2013.

On aggregate, Swedish development trends for all categories presented in Table 2.2 over the whole period were within the EU11 average. A marked difference was seen only for the value of agricultural services (Sweden 17% and EU 4%; 1996-2004), and the value of inseparable non-agricultural activities (Sweden 12%, 1996-2004). In the period 1996-2012, growth in agricultural services value in Sweden was basically among the highest of all countries studied. Aggregated values also showed that growth in agricultural production in Sweden approached that of the best-performing countries over the latter two periods (1996-2004 and 2005-2012). The average growth in total Swedish agricultural production and the agricultural “industry” over the period 2005-2012 was 4%. For the same period, the highest average growth of total agricultural production value and the agricultural “industry” value was experienced by Denmark and Ireland (6%), followed by Germany, Finland, UK and Poland with average growth of 5%.

Development trends and values (absolute) for agricultural services, total agricultural production and the agricultural “industry” in Sweden and the selected EU countries over the period 1990-2012 are given in Figures 2.7-2.9.

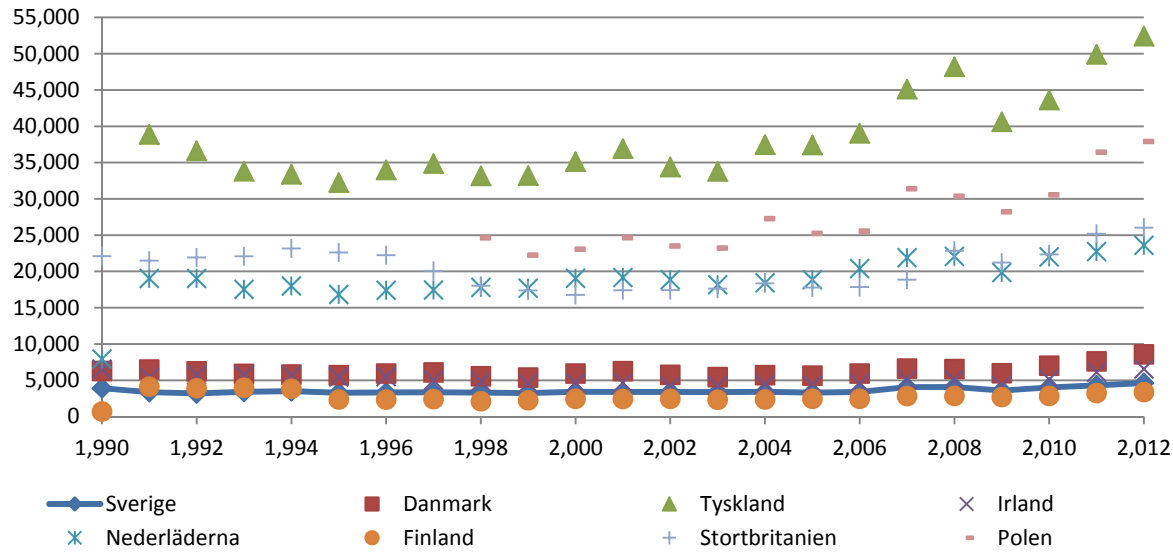


Figur 2.6: Genomsnitt tillväxt i värdet av jordbrukstjänster, total jordbruksproduktion, och ”jordbruksindustri”, justerat för köpkraftsstandard, för 1990-1995, 1996-2004 och 2005-2012. Källa: egna beräkningar. Eurostat uppgifter, 2013.



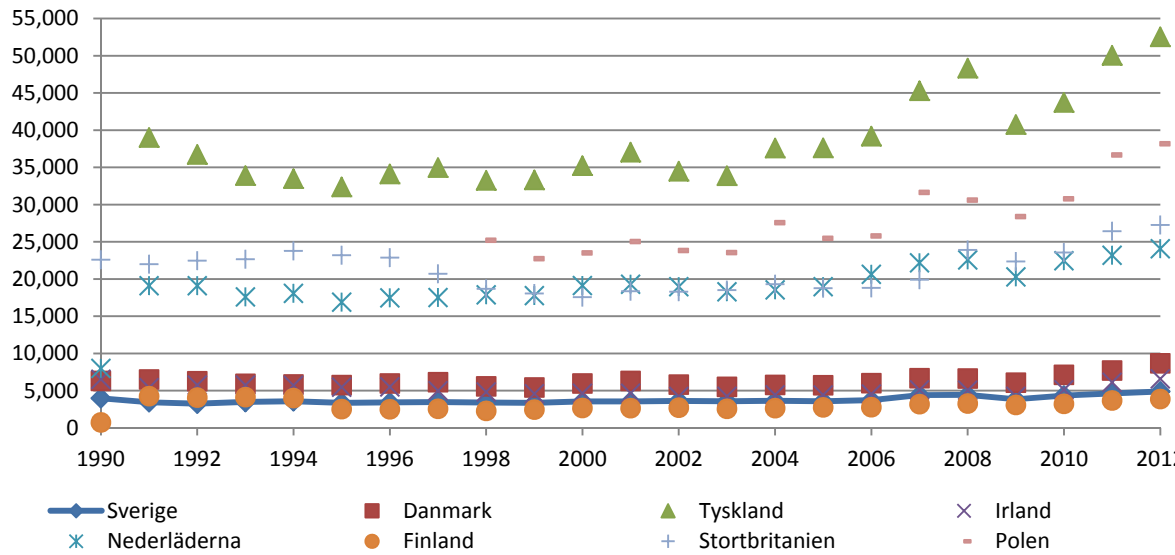
Figur 2.7: Jordbrukstjänst värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012. Källa: Eurostat uppgifter, 2013.

Totalt jordbruksproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012, i milj. €. Källa: Eurostat uppgifter, 2013.



Figur 2.8: Totalt jordbruksproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012. Källa: Eurostat uppgifter, 2013.

”Jordbruksindustri” värde (totalt jordbruksproduktion värde och ej särskiljbara, sekundära icke-jordbruks aktiviteter), i producent priser, justerat för köpkraftsstandard, för 1990-2012, i milj. €. Källa: Eurostat uppgifter, 2013.



Figur 2.9: ”Jordbruksindustri” värde (totalt jordbruksproduktion värde och ej särskiljbara, sekundära icke-jordbruks aktiviteter), i producentpriser, justerat för köpkraftsstandard, för 1990-2012. Källa: Eurostat uppgifter, 2013.

Summary of production characteristics

Agricultural production in Sweden in 1990-2012 was stable, but with a tendency for faster growth after 2006. Average annual growth in total agricultural production value (plant and animal production, including agricultural services) and the agricultural "industry" (total agricultural production and the inseparable non-agricultural secondary activities) in Sweden was -3% in 1990-1994, 1% in 1995-2004 and 4% in 2005-2012 (Table 2.2). Although this growth was within the EU11 average (3%), it approached the level observed in the selected competitor countries (except the Netherlands) in the periods 1996-2004 and 2005-2012. In those periods, the highest average growth in total agricultural production value and the value of the agricultural "industry" was observed for Denmark and Ireland (6%), followed by Germany, Finland, UK and Poland (5%). Average growth in agricultural production value in the Netherlands was 3%, i.e. the lowest among the selected countries.

The growth in the value of the agricultural "industry" in Sweden was mainly due to strong development trends in the value of plant production, agricultural services (leasing machinery, equipment and personnel) and the inseparable non-agricultural secondary activities (processing of agricultural products on-farm). The development trend in plant production value in Sweden over the period 2005-2012 was among the highest (9%) of the selected EU countries, together with Denmark (9%), and Finland (8%) (Table 2.1). High growth in plant production value was also achieved in Germany (7%), Ireland (7%) and UK (6%). The Netherlands was the leading country as regards growth in agricultural production in 1990-1995, but the development trend decreased thereafter to within the EU11 average (2% for 1996-2005, 4% for 2006-2012). A remarkable increase in the value of agricultural services and the value of inseparable non-agricultural activities was observed in Sweden for the period after 1995, with the highest increases of 17% and 12%, respectively, for 1996-2004, followed by stabilisation and average growth of 3% in 2005-2012, which was within the EU11 average. Swedish animal production value remained relatively stable, characterised by stagnation in the development trend for the sector over the whole period 1990-2012 (Table 2.1). Although some progress was recorded for the period 2005-2012, the growth of Swedish animal production value was among the lowest (2%) of the EU competitor countries compared, and was below the EU11 average growth (3%). Ireland (6%), Denmark, Germany and UK (5%) achieved the highest progress in animal production value for the period 2005-2012.

Sammanfattning: jordbruksproduktionens utveckling

Jordbruksproduktionen i Sverige under perioden 1990-2012 är stabil med en tendens till en snabbare tillväxt efter 2006. Den genomsnittliga årliga ökningen av värdet av den totala jordbruksproduktionen (vegetabilie- och animalieproduktion, inklusive jordbrukstjänster) och ”jordbruksindustrin” (total jordbruksproduktion och sekundära icke-jordbruksaktiviteter) i Sverige är 1990-1995 -3 procent, 1995-2004 1 procent, och 2005-2012 4 procent (tabell 2.2). Tillväxttakten motsvarar genomsnittet för EU11 (3%) men är något lägre än tillväxten för de studerade konkurrentländerna (utom Nederländerna) under perioden 1996-2004 och 2005-2012. Gapet till dessa länder minskar dock. Under samma period finns den högsta genomsnittliga tillväxten av den totala jordbruksproduktionen och den totala ”jordbruksindustrin” i Danmark och på Irland (6%), följt av Tyskland, Finland, Storbritannien och Polen som har en genomsnittlig tillväxt på 5%. Den genomsnittliga ökningen av jordbruksproduktionens värde i Nederländerna är 3%, vilket är den lägsta bland de analyserade länderna.

Ökningen av den totala jordbruksproduktionen (”jordbruksindustrin”) i Sverige beror främst på den snabba ökningen av vegetabilieproduktionen, serviceverksamheten (uthyrning av maskiner och utrustning med personal) samt de sekundära icke- jordbruksaktiviteterna på gårdarna (bearbetning av jordbruksprodukter). Ökningen av vegetabilieproduktionen i Sverige under perioden 2005-2012 (9%) tillhör tillsammans med Danmark (9 %) och Finland (8%) de högsta i EU. Hög tillväxt av vegetabilieproduktionen uppnås också av Tyskland (7%), Irland (7%) och Storbritannien (6%). Nederländerna var det ledande landet i EU när det gällde tillväxten av jordbruksproduktionen i början av nittiotalet (1990-1995), men tillväxttakten har sjunkit och ligger på genomsnittet för EU11 (2%) för 1996 till 2005, och 4% för 2006-2012). En snabb ökning av produktionen av jordbrukstjänster och de sekundära, ej separerbara icke-jordbruksaktiviteter i Sverige kan noteras för perioden efter 1995, med den högsta ökningen på 17% respektive 12% (1996-2004) följd av stabilisering och genomsnittlig tillväxt på 3% (2005-2012) som motsvarar genomsnittlig tillväxt för EU11. Utveckligen av den svenska animalieproduktionen är relativ stabil, på gränsen till stagnerande, sett över hela perioden 1990-2012. Även om framsteg har registrerats under perioden 2005-2012, är tillväxten av produktionsvärdet ett av de lägsta (2%) jämfört med utvalda EU-länder, och är lägre än EU11 genomsnittets tillväxt (3%). Irland (6%), Danmark, Tyskland och Storbritannien

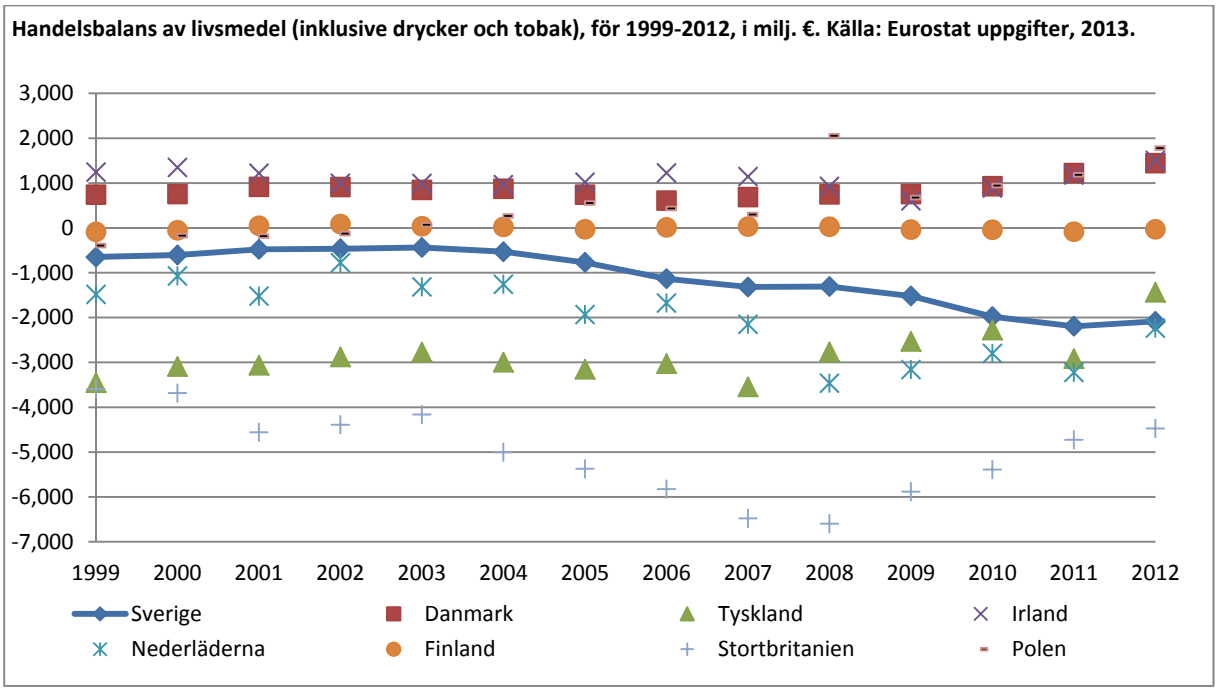
(5%) har haft största framsteg när det gäller utvecklingen av animalieproduktionen under perioden 2005-2012.

3. Trade and market share indicators

The international competitiveness of sectors is commonly assessed by evaluating trade and market share indices and comparing trends of countries competing on the international market. In this working document, the actual values and changes in: Trade balance (TB), Grubel–Lloyd (GL) index, Revealed Comparative Advantage (RCA) and Relative Import Advantage (RIA) were estimated for Sweden and selected EU competitor countries (Denmark, Germany, Ireland, the Netherlands, Finland, UK and Poland) over the period 1999-2012. Eurostat data on external trade (imports and exports) for the period 1999-2012 were used, complemented with data presented in other related studies.

The Trade Balance Index shows the difference between exports (E_{fp}) and imports (I_{fp}) of food products (fp) (including drinks and tobacco), $TB=E_{fp}-I_{fp}$. According to the statistical classification of economic activities in the EU, food products are: meat, fish, dairy, bread, sugar, confectionery and other food products, drinks and tobacco.

The common reasoning is that large exports and high TB index values are signs that the "industry" in question is competitive on the market, whereas the trends over time give an indication of the development in competitiveness. Figure 3.1 shows the trade balance for food products (including drinks and tobacco) in Sweden.



Figur 3.1: Handelsbalans av livsmedel (inklusive drycker och tobak), för 1999-2012, i milj. €. Källa: Eurostat uppgifter, 2013.

Up until 2004, the trade balance for food products in Sweden was negative, but approaching the equilibrium, and was relatively stable with a low rate of improvement. As shown in Table 3.1, in the period 1999-2004 farm exports increased at a faster (9%) rate than farm imports (4%), and thus the positive trend observed was due to higher exports. For the period 2005-2012, the trade balance for food products in Sweden consistently decreased (Figure 3.1). Although the export value of food products maintained an increasing trend (8%), the faster growth in import value (12%), caused by an increase in food consumption, resulted in an overall negative trend (LRF, 2012). Figure 3.2 provides a graphical presentation of the average change (growth) in the export and import value of food products in the periods 1999-2004 and 2005-2012, complementing Table 3.1. The calculation procedure in Table 3.1 was based on estimation of chain index for the annual change in export and import value, followed by estimation of average value growth value for the two consecutive periods.

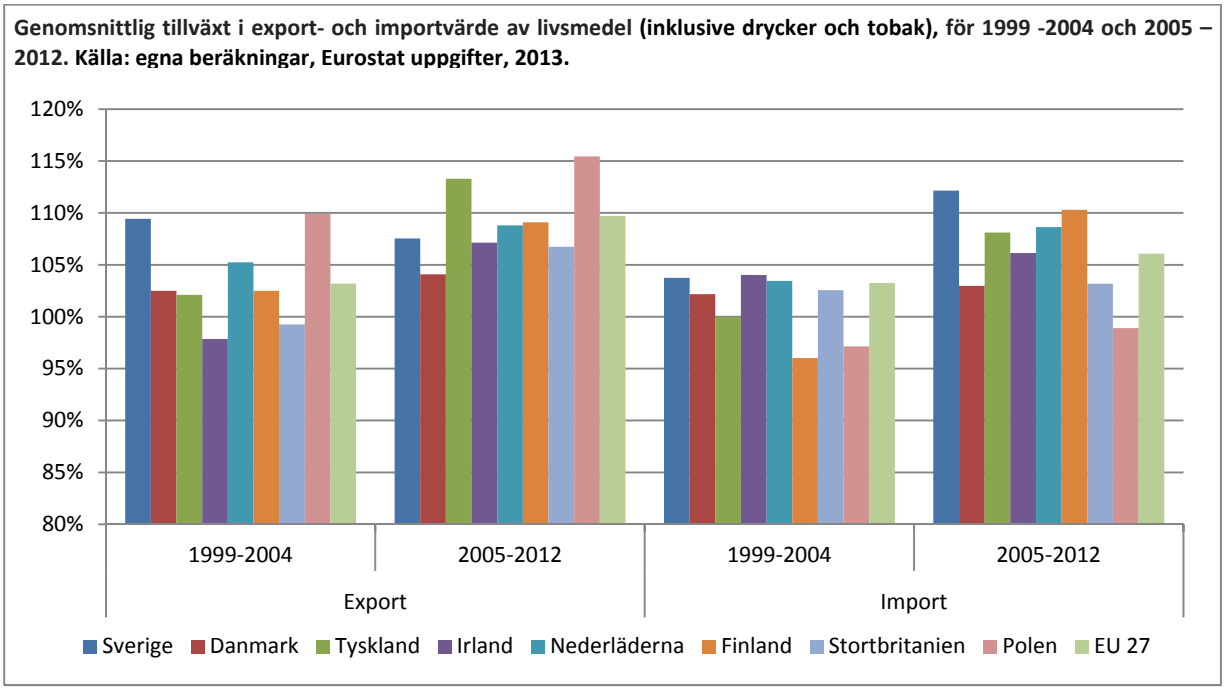
Tabell 3.1: Genomsnittlig tillväxt i export- och importvärde av livsmedel (inklusive drycker och tobak) för perioden 1999 -2004 och 2005 - 2012.

Land	Export		Import	
	1999 - 2004	2005-2012	1999-2004	2005-2012
Sverige	109%	108%	104%	112%
Danmark	103%	104%	102%	103%
Tyskland	102%	113%	100%	108%
Irland	98%	107%	104%	106%
Nederländerna	105%	109%	103%	109%
Finland	102%	109%	96%	110%
Storbritannien	99%	107%	103%	103%
Polen	110%	115%	97%	99%
EU 27	103%	110%	103%	106%

Källa: egna beräkningar. Eurostat uppgifter, 2013.

Compared with the selected competitor countries, Sweden had an intermediate position. The highest trade balance values were found in Denmark and Ireland. The Danish position was stable over the whole period, keeping the growth in exports and imports unchanged (Table 3.1, Figure 3.1). The Irish position was slightly weaker for the period 1999-2004, due to slower export growth, but was stable afterwards (2005-2012). Over the whole period, the trade balance in Finnish food products was balanced at a level close to

equilibrium. The highest development in trade balance occurred in Poland, with export growth of 10% (1999-2004) and 15% (2005-2015), and a decreasing trend in import growth of -3% (1999-2004) and -1% (2005-2012). UK and Germany had the highest negative trade balance values, but with a tendency for improvement after 2008.

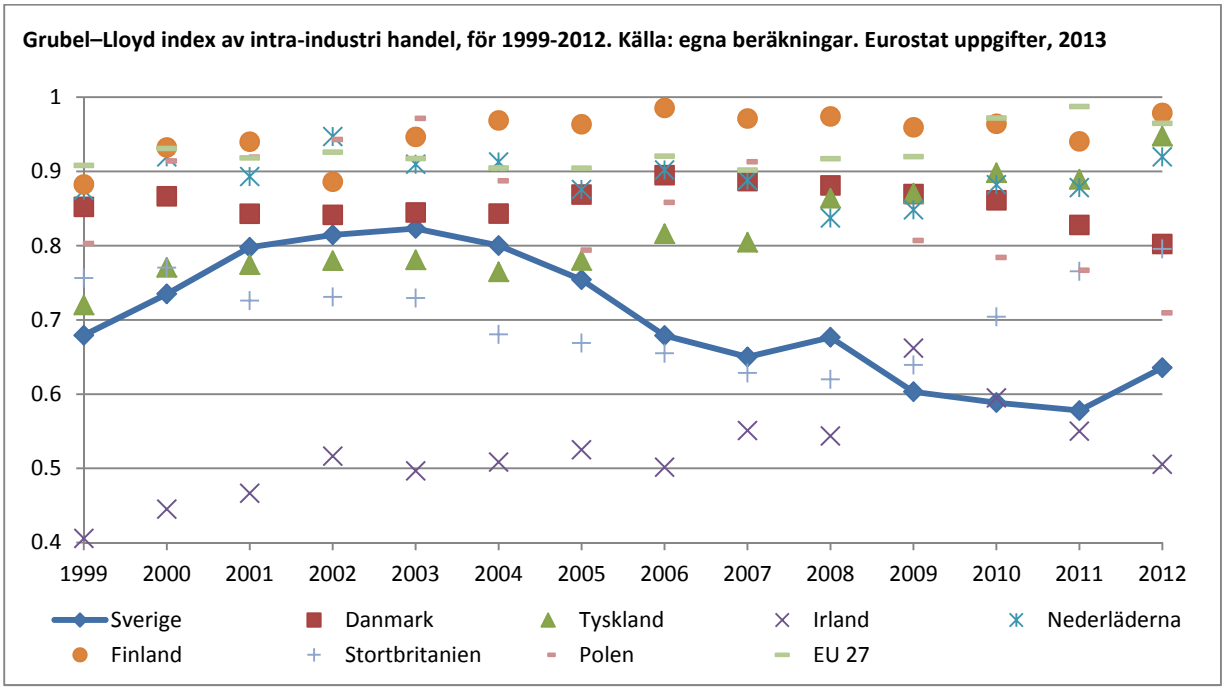


Figur 3.2: Genomsnittlig tillväxt i export- och importvärde av livsmedel (inklusive drycker och tobak), för 1999 -2004 och 2005-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013

The Grubel–Lloyd Index was used to determine the change in intra-industry trade in the food sector in Sweden and the selected EU countries. This was calculated as GL_{fp}= 1- (($apsE_{fp}$-I_{fp})/E_{fp}+I_{fp}), where (E_{fp}) and (I_{fp}) are the export and import value of food products (fp) (incl. drinks and tobacco). The GL index ranges in value from 0 to 1, where a value approaching 1 is an indication of typical intra-industry trade, meaning simultaneous export and import of products belonging to the food sector. Intra-industry trade refers to trade exchange in food products belonging to different food categories (such as fish, meat, drinks) and in food products with different degrees of processing (such as fresh meat and sausages). A scale of GL values ranging between 0.50 and 0.75 is used to explain weak intra-industry trade tendencies, and between 0.75 and 1.00 to explain strong intra-industry trade tendencies. At the opposite of the scale, GL values approaching 0 indicate the existence of inter-industry trade or high differences between the export and import value of food products from a country. A scale of GL values ranging between 0 and 0.25 is used to indicate strong inter-

industry trade tendencies, whereas the range 0.25-0.50 is used to explain weak inter-industry trade tendencies.

As Figure 3.3 shows, the GL values for Sweden fluctuated in the study period, but were within the range indicating weak intra-industry trade tendencies.



Figur 3.3: Grubel–Lloyd index av intra-industri handel, för 1999-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013.

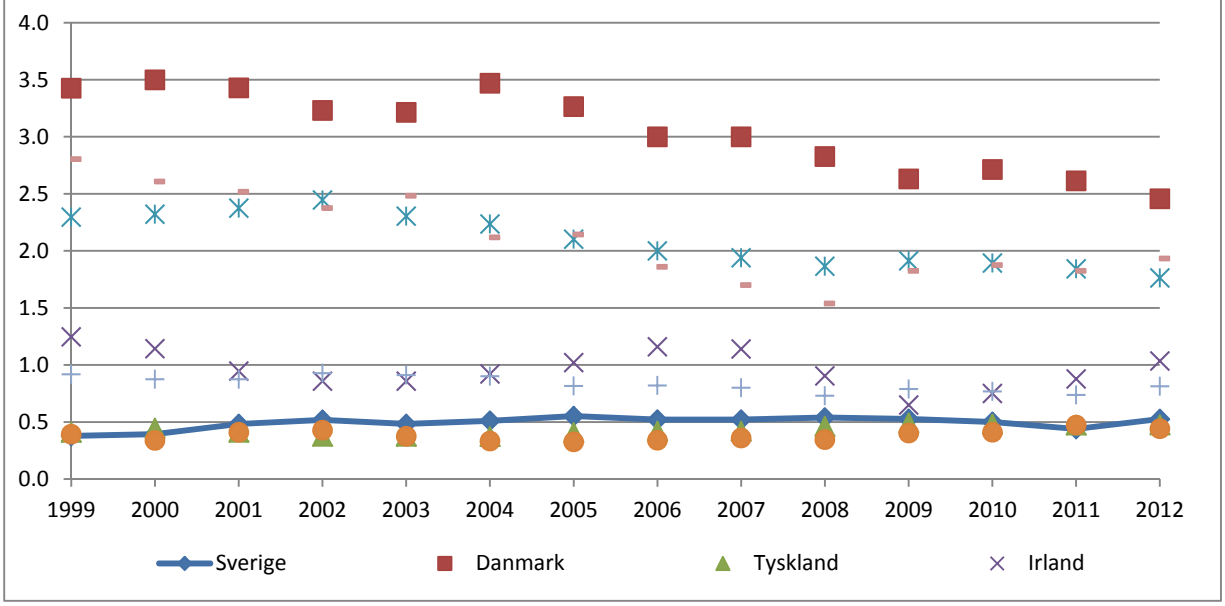
The average estimated GL value for Sweden for the periods 1999-2005 and 2006-2012 was 0.77 and 0.63, respectively. This indicates the existence of relatively balanced exchange (export and import) of food products. It is notable that after 2003, the difference between the value of exported and imported food products increased. A similar decrease in GL index was seen for UK for the period 2004-2009 and for Poland for 2005-2012. Denmark, Germany, the Netherlands and Finland formed a group with strong intra-industry trade tendencies, i.e. trade in food-related products. Details of the changes in food product exports and imports are given by the indices that follow.

The Revealed Comparative Advantage (RCA) is a market share indicator representing the comparative advantage of an industry or company relative to its European or world competitors (Balassa, 1965, 1977). In this working document, we determined the Swedish export value of food products (including drinks and tobacco) relative to total export value and to the corresponding export performance of the EU 27. For this we calculated RCA as: $(E_{land\ agricultural\ exports}/E_{land\ total\ exports})/(E_{agricultural\ exports\ EU27}/E_{total\ exports\ EU27})$. The Swedish RCA

values and trends were then compared with the corresponding values and trends for the selected EU countries. For analytical purposes, RCA was used to assess the existence of comparative advantage in a sector, ranking countries or sectors based on RCA values, and also as an index of sector specialisation. In general, RCA values greater than 1 indicate a comparative advantage and a country's specialisation in exports for that sector, meaning that the sector is competitive within the economic system of the country with respect to other sectors. Values less than 1 indicate that a country has not specialised in that sector and that it has no comparative advantage. RCA values <0.8 indicate weak comparative advantage, whereas the comparative advantage is normal for RCA = 0.8-1.25, strong for RCA = 1.25-2.5 and strongest for RCA >2.5. However, as the index is given in absolute values and is affected by the size of the economy, it is rarely comparable among countries. Rather, it is the RCA trend which is compared. Trends over a period indicate what is happening in competitive terms.

Figure 3.4 shows the estimated values of the RCA index for Sweden and the selected EU countries.

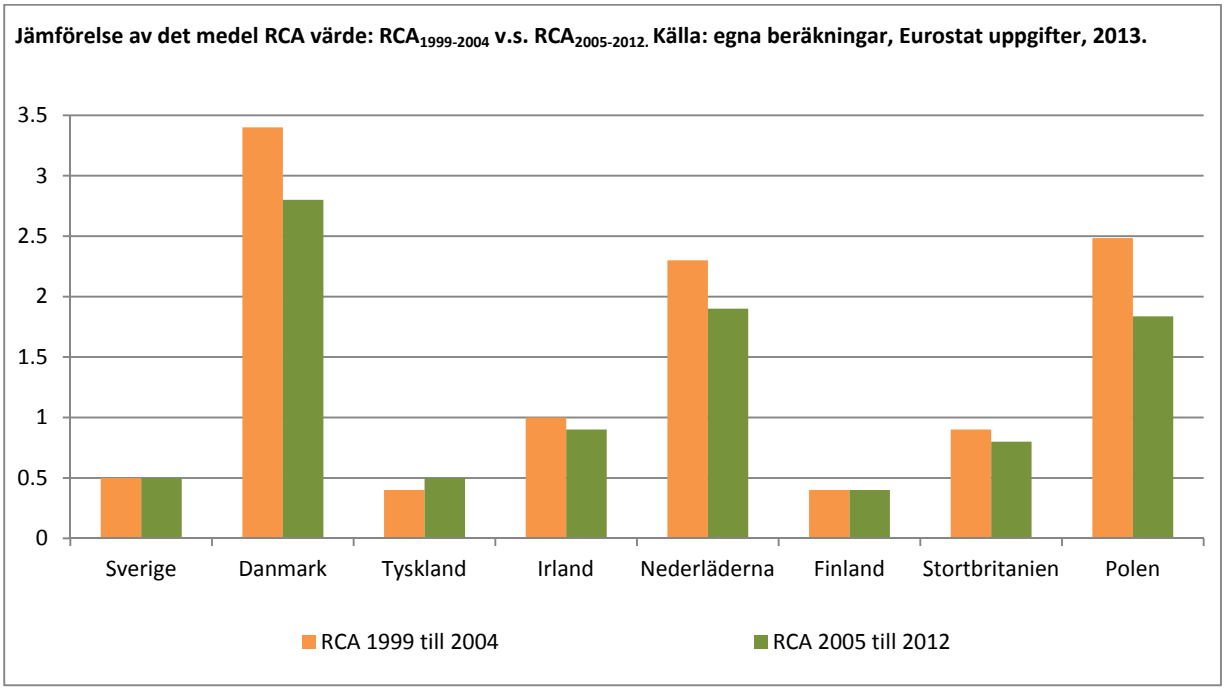
Revealed Comparative Advantage (RCA), värde och trend, i förhållande till exporten av EU 27, för 1999-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013.



Figur 3.4: Revealed Comparative Advantage (RCA), värde och trend, i förhållande till exporten av EU27 för 1999-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013.

The average value of the Swedish RCA index (1999-2012) was 0.5. Thus based on the RCA index scale, Sweden is not specialising in agricultural production (see Table A6 in appendix). However, over the years the value of Swedish RCA remained rather constant

(Figures 3.4 and 3.5), indicating a stable position on the European food market. Finland and Germany were found to have similar characteristics, with an average RCA index value of less than 0.8 (see Table A6 in appendix). Over the years, however, the average value of the Finnish RCA index remained constant, whereas that for German agricultural production improved for the period 2005-2012 ($RCA_{1999\text{-}2004}$ = 0.4, $RCA_{2005\text{-}2012}$ = 0.5) (Figure 3.5). A notable decrease in RCA values after 2004 was seen for Denmark, the Netherlands and Poland. These countries are highly specialised in exporting agricultural products, with RCA index values >2. Comparing the periods 1999-2004 and 2005-2012, the average value of the RCA index decreased by 17% for Denmark and the Netherlands and by 26% for Poland. This decrease is an indication of loss of market share and thus of a competitive position on the EU market. A slight decrease in the RCA value was also found for Ireland and UK (-9%) between 1999-2004 and 2005-2012. Figure 3.5 provides a graphical presentation of the average RCA values over the period 1999-2004 and 2005-2012, as a complement to Table A6 (appendix).



Figur 3.5: Jämförelse av det medel RCA värde, $RCA_{1999\text{-}2004}$ v.s. $RCA_{2005\text{-}2012}$. Källa: egna beräkningar, Eurostat uppgifter, 2013.

Relative import advantage (RIA) is the counterpart market share indicator to RCA, measuring the import features of the food products (including drinks and tobacco) as ($E_{land\ agricultural\ imports}/E_{land\ total\ imports}$)/($E_{agricultural\ imports\ EU27}/E_{total\ imports\ EU27}$). As with RCA above, RIA was estimated for Sweden and the selected EU countries relative to the import performance of

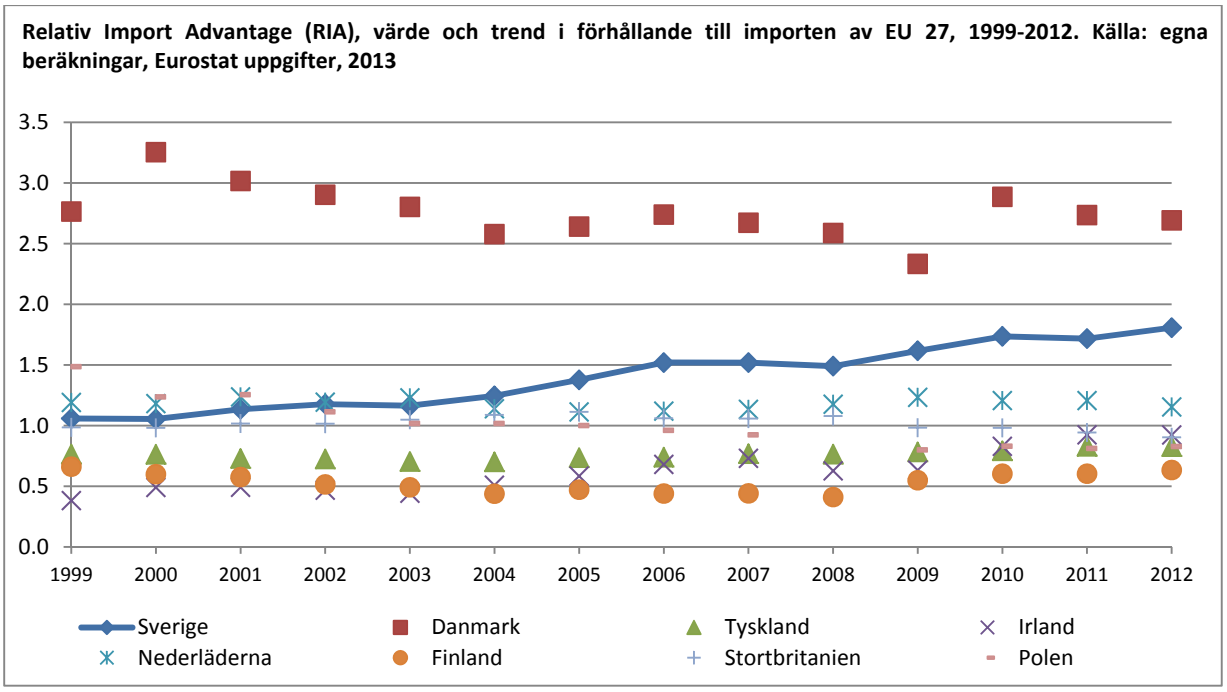
the EU 27. Index values >1 and an increasing trend are indicators of low specialisation in the respective sector and comparative disadvantage of that sector.

Figure 3.6 shows the estimated values of the RIA index for Sweden and the selected EU countries. Starting from 1999, the value of the Swedish RIA index continually increased over the period. The average increase in 1999-2004 and 2005-2012 was around 3% and 5% per year, respectively. The average increase between the two periods was 45%. The RIA index values increased for Germany and Ireland, while the Netherlands, Finland and UK had balanced imports, whereas the RIA index value for Denmark and Poland decreased.

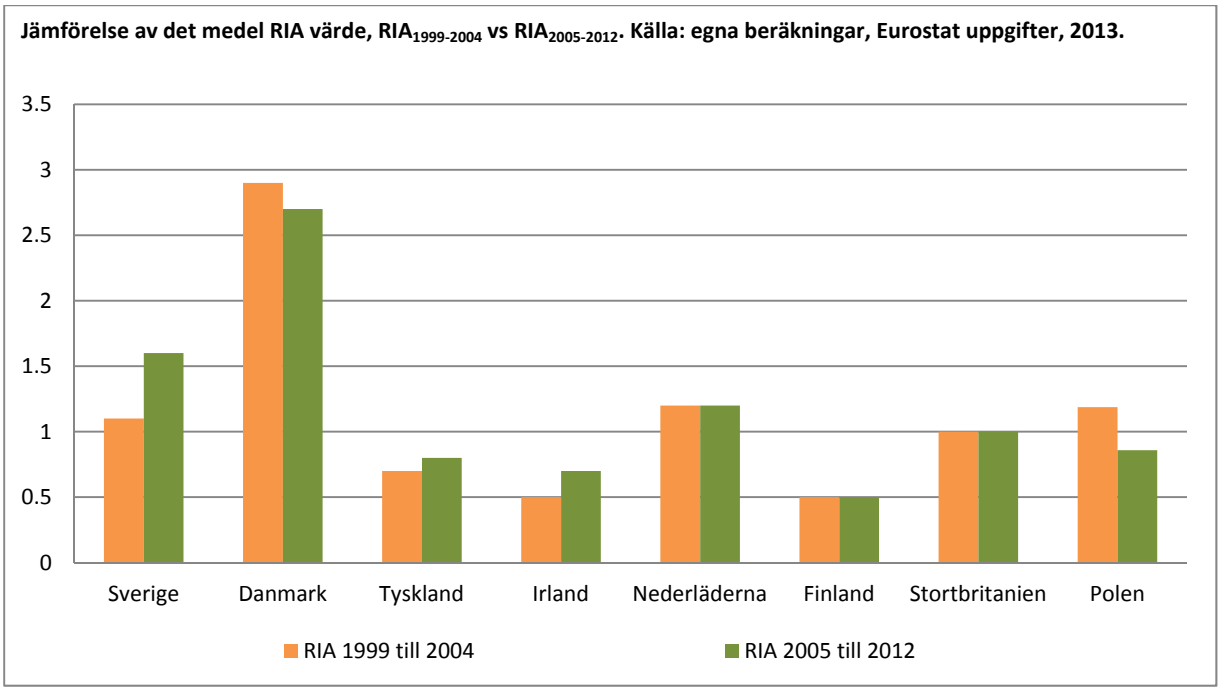
Figure 3.7 provides a graphical presentation of RIA average values for the periods 1999-2004 and 2005-2012, as a complement to Table A7 (appendix).

The findings obtained for the trade indices, explaining the competitiveness position of Swedish agriculture, confirm and extend those of several previous analyses of the competitiveness of the agricultural sector across Europe.

Carraresi and Banterle (2008) assessed the competitiveness of the food industry and the agricultural sector of different European countries within the EU market over the period 1991-2006, comparing the changes in exports and various comparative advantage indices. Those authors showed that during the period 1991-1994, Sweden and Finland were among the countries with the lowest export market share, weak competitive position, not specialised, and with high import levels. After the new EU member states joined in 2003-2006, Sweden and Finland remained among the countries with the lowest export market share, but with stable trends for comparative advantage. During the whole period, Denmark and Ireland held an intermediate position, with medium export market share in the food and agriculture industry and very specialised in the food industry, but over time their position deteriorated. The Netherlands and Germany were among the countries with the highest export market share. The Netherlands, which was originally in the best position, lost ground greatly over the years, showing loss of competitiveness. In the same period Germany continued to have a high share of the export market, although not specialised, with constant improvements in comparative advantage.



Figur 3.6: Relativ Import Advantage (RIA) värde och trend, i förhållande till importen av EU27. Källa: egna beräkningar, Eurostat uppgifter, 2013.



Figur 3.7: Jämförelse av det medel RIA värde, $RIA_{1999-2004}$ v.s. $RIA_{2005-2012.}$ Källa: egna beräkningar, Eurostat uppgifter, 2013.

Wijnands et al. (2008) assessed the competitiveness of the EU15 food industry relative to Australia, Brazil, Canada and the United States for the period 1996-2004. They found that EU15 had very low competitiveness compared with Brazil in terms of revealed comparative advantage and export market share, but higher competitiveness in terms of world market share growth (although lower in terms of RCA growth). The strongest overall competitiveness of the EU15 member states was found for Ireland. The Netherlands ranked rather high among large exporting countries, whereas Germany, the UK and Denmark were classified as countries having weak competitiveness of the food industry.

Similarly, Banterle and Carraresi (2007) analysed the competitive performance of the EU countries for the pig meat processing sector in 1990-2003. They found that Sweden and the UK were not specialised in the prepared swine meat sector, and had a low level of competitiveness (low values of RCA and a negative net export index). Both countries were major importers of prepared meats and display strong inter-industry trade. Germany showed positive competitive performance, accompanied by a high level of intra-industry trade and low specialisation. Denmark characteristically had the highest competitiveness indices (typical export-orientated economy), but showed declining competitive performance over the last 15 years. A similar trend was observed for the Netherlands. Ireland and Finland had an intermediate position; their index values were not very high, but grew over the study period. Ireland was among the countries with the best competitive performance in the EU15 over the years, with substantial growth in its indices due to the increase in exports.

Summary of trade and market share indicators

The trade balance for food products (meat, fish, dairy, bread, sugar, confectionery and other food products, drinks and tobacco) in Sweden was negative, on average -€0.5 billion in 1999-2004 and -€1.51 billion in 2005-2012 (graphical presentation in Figure 3.1). In 1999-2004, the export value of food products increased faster (9%) than the import value (4%). Although the development trend in export value over the following period (2005-2012) remained constant (8%), the trade balance of food products in Sweden decreased. This was due to faster growth in the value of imported food products (12%, 2005-2012), caused mainly by increased food consumption in Sweden (LRF, 2012).

Compared with the selected competitor countries, Sweden had an intermediate position (Table 3.1 and Figure 3.1). The highest positive trade balance values were found in Denmark (€0.9 billion) and Ireland (€1.1 billion) (1999-2012). However, Denmark maintained a stable position over the whole period, whereas the Irish position was slightly weaker in 1999-2004, due to slower export growth, but remained stable afterwards (2005-2012). Over the whole period, Finland was close to equilibrium. Poland showed the highest development in trade balance, with export growth of 10% and 15% for 1999-2004 and 2005-2012, respectively, and a decreasing trend in import growth of -3% and -1% for 1999-2004 and 2005-2012, respectively. UK and Germany had the highest negative trade balance values, but with a tendency for improvement after 2008.

Swedish exchange of food products is within the frame of weak-intra industry trade, with an average Grubel-Lloyd index value of 0.77 (1999-2004) and 0.63 (2005-2012). This indicates the existence of relatively balanced exchange (exports and imports) of food products. It is notable that after 2003, the difference between the value of exported and imported food products increased. A similar decrease in Grubel-Lloyd index was found for UK in 2004-2009 and for Poland in 2005-2012. Denmark, Germany, the Netherlands and Finland showed strong intra-industry trade tendencies, i.e. trade in food-related products[3].

The results obtained for trade balance indexes (revealed comparative advantage (RCA) and relative import advantage (RIA)), showed that: 1) Sweden is not specialised in exporting food products (RCA index for 1999-2012 was on average 0.5); 2) Sweden has stable exports

[3] Note: Exchange of food products from different categories such as fish, drinks, tobacco, etc. and exchange of products with different degrees of processing are both considered intra-industry trade.

on the European (EU27) food market (stable RCA values over the whole period 1999-2012; Figures 3.4 and 3.5); 3) compared with EU27, Swedish import of food products increased faster than the import of other non-food related products (RIA increased on average by 3% (1999-2004), and 5% (2005-2012) per year).

Low specialisation in food exports, relative to exports of other non-food products, was also found for Finland and Germany. However, while over the whole period the Finnish position on the European (EU27) food market was stable, Germany's comparative advantage improved ($RCA_{1999-2004} = 0.4$, $RCA_{2005-2012} = 0.5$). A marked decrease in comparative advantage after 2004 was found for countries highly specialised in exporting food products (RCA>2), such as Denmark, the Netherlands and Poland. Over the periods 1999-2004 and 2005-2012, the average decrease in RCA index was 17% for Denmark and the Netherlands, and 26% for Poland (Figure 3.5).

Banterle and Carraresi (2007) analysed the competitive performance of EU countries in pig meat processing in 1990-2003 and found that Sweden and UK had a low level of competitiveness (low RCA values), with strong inter-industry trade. Germany had positive competitive performance, a high level of intra-industry trade and low specialisation. Denmark had the highest competitiveness index values, but declining competitive performance. A similar trend was observed in the Netherlands. Ireland and Finland had an intermediate position, with low but growing index values. For the pig meat sector, Ireland was among the countries with the best competitive performance (1990-2003), characterised by substantial growth due to increased exports. In another study, Wijnands et al. (2008) found low competitiveness of the EU15 food industry compared with Australia, Brazil, Canada and the United States for the period 1996-2004.

Sammanfattning av resultat av handels -och marknadsandelsindikatorer

Handelsbalansen för livsmedel (kött, fisk, mejeriprodukter, bröd, socker och andra livsmedel, drycker och tobak) är negativ för Sverige: -0.5 milj. € för 1999-2004, 1.51 milj € för 2005-2012. Under 1999-2004, ökade exporten av livsmedel snabbare (9%) än importen (4%). Även om ökningen av exportvärdet under den följande perioden 2005-2012 förblev konstant (8%), försämrades handelsbalansen för livsmedel i Sverige. Detta beror på den snabbare tillväxten av importen av livsmedel (12%, från 2005 till 2012) som beror på ökningen av livsmedelskonsumtionen i Sverige (LRF, 2012).

Jämfört med de utvalda konkurrentländerna befinner sig Sverige i ett mellanläge. Den högsta positiva handelsbalansen återfinns i Danmark (0.9 billion €) och Irland (1.1 billion €) (1999-2012). Danmark behåller sin ledande position under hela perioden medan den irländska positionen förvärras något för perioden 1999-2004, på grund av en långsammare exporttillväxt, men är stabil senare (2005-2012). Under hela perioden ligger Finland nära jämvikt. Bäst har handelsbalansen utvecklats för Polen, med en exporttillväxt på 10 % respektive 15 % för 1999-2004 och 2005-2015 samt minskad import på -3% respektive -1% för 1999 till 2004 och 2005 till 2012. Storbritannien och Tyskland har de högsta negativa handelsbalansvärdena, med en tendens till förbättringar efter 2008. Den svenska handeln med livsmedelsprodukter kan karakteriseras som en svag intra-industrihandel med ett genomsnittligt värde på Grubel-Lloyd index på 0.77 (1999-2004) och 0.63 (2005-2012). Med intra-industrihandel menas en samtidig export och import av produkter som tillhör samma sektor. En minskning av indexet indikerar en utveckling mot inter-industriell handel där olika produkter importeras respektive exporteras. En liknande minskning av Grubel-Lloyd index hittas för Storbritannien för perioden 2004-2009 och för Polen 2005-2012. Danmark, Tyskland, Nederländerna och Finland kännetecknas av stor intra-industriell handel.

De två index som relateras till handelsbalansen (RCA och RIA) visar att: 1) Sverige är inte specialiserat på export av livsmedelsprodukter (RCA-index för 1999-2012 är i genomsnitt 0.5); 2) Sverige har en stabil export på den europeiska (EU-27) livsmedelmarknaden (stabila RCA-värden under hela perioden 1999-2012; 3) i jämförelse med EU-27 ökar den svenska importen av livsmedelsprodukter snabbare än importen av andra icke-livsmedelsrelaterade produkter (RIA ökar med i genomsnitt 3% (1999-2004), och 5% (2005-2012) årligen).

Såväl Finland som Tyskland saknar komparativa fördelar i livsmedel. Finlands brist på komparativa fördelar inom livsmedel har bestått under hela perioden medan tyskarnas

komparativa fördelar förbättrades, ($RCA_{1999-2004}$=0.4 vs. $RCA_{2005-2012}$=0.5). De länder som är högst specialiserade på export av livsmedelsprodukter (RCA > 2), dvs. Danmark, Nederländerna och Polen, försämrade däremot sin position. Under perioden 1999-2004 och 2005-2012, är den genomsnittliga minskningen av RCA-index 17% för Danmark och Nederländerna och 26% för Polen (figur 3.5).

Banterle and Carraresi (2007) analyserade konkurrenskraften i EU-länderna för grisköttsförädlingssektorn under 1990-2003. Resultaten visade att Sverige och Storbritannien hade låg konkurrenskraft (låga värden på RCA) med stark inter-industriell handel. Tyskland kännetecknades av positiv prestanda, hög nivå av inom-industriell handel och låg specialisering. Högst men sjunkande konkurrenskraftsindex hade Danmark. En liknande trend observerades i Nederländerna. Irland och Finland hade låga men stigande värden. En studie (Wijnands et al., 2008) kom fram till slutsatsen att konkurrenskraften för EU15:s livsmedelsindustri under 1996-2004 var låg jämfört med Australien, Brasilien, Kanada, och USA.

4. Profitability and productivity-orientated indicators of competitiveness

The agricultural sector's ability to strengthen its competitiveness in the international market is dependent on the existence of viable, low-cost orientated and productive industries. In this working document, viability and productivity-orientated indicators were used to: i) identify the production performance of agriculture in Sweden and in the selected EU countries; and ii) allocate the opportunities and factors contributing to production at lower cost or higher output values. The working document incorporated analysis and findings of studies analysing the viability, productivity and efficiency of farms in Sweden and in the selected EU competitors. The following indicators were identified: Real (deflated) income per annual work unit (AWU), the ordinary Total Factor Productivity (TFP) index, the Hicks-Moorsteen Productivity (HM-TFP) index, and the technical efficiency coefficient.

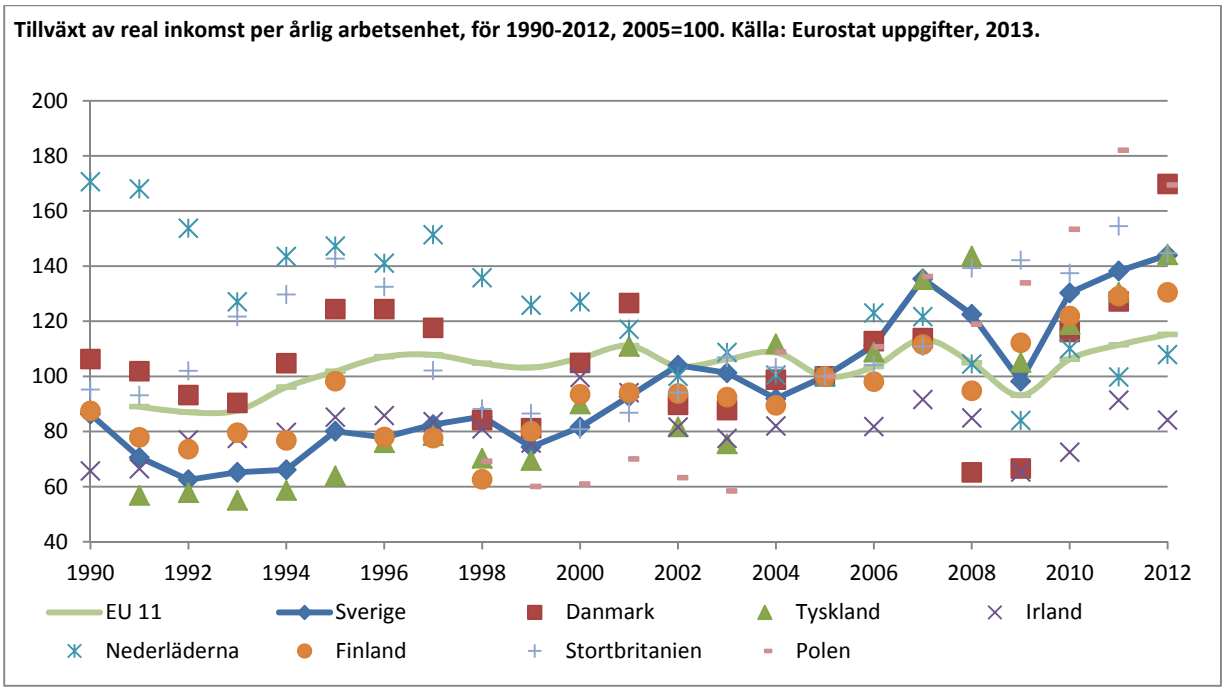
4.1 Viability

In this working document we analysed the financial viability of agricultural production by determining the ability of the farm business to generate income and achieve higher margins. The real (i.e. deflated) income indicator of factors in agriculture per annual work unit was used for this.

The real farm income of factors in agriculture per annual work unit (known as the Farm Net Value Added (FNVA) at factor cost of agriculture per total annual work unit) corresponds to the total output minus total operating costs. It is calculated by subtracting from the value of agricultural output at basic prices the value of intermediate consumption and the consumption per unit fixed capital, and adding the value of the (other) subsidies less taxes on production. The percentage change in real farm income per annual work unit is known as Farm income indicator A, and is presented here for the period 1990-2012, with 2005 used as the base year (Figure 4.1). Data from the Eurostat database were used in these calculations.

Figure 4.1 shows the development of real farm income per annual work unit in Sweden, the selected EU competitors and the average value of the EU11, relative to 2005 (base year). According to the results, up until 1999 the growth in Swedish farm income was on average lower than that in most other countries included in the analysis and the average for the EU11. After 1999, Swedish farm income gradually increased, on average by 2% for the period 1995-2005 and 7% for 2005-2012. Post-2005, farm income in Sweden was highest in 2007

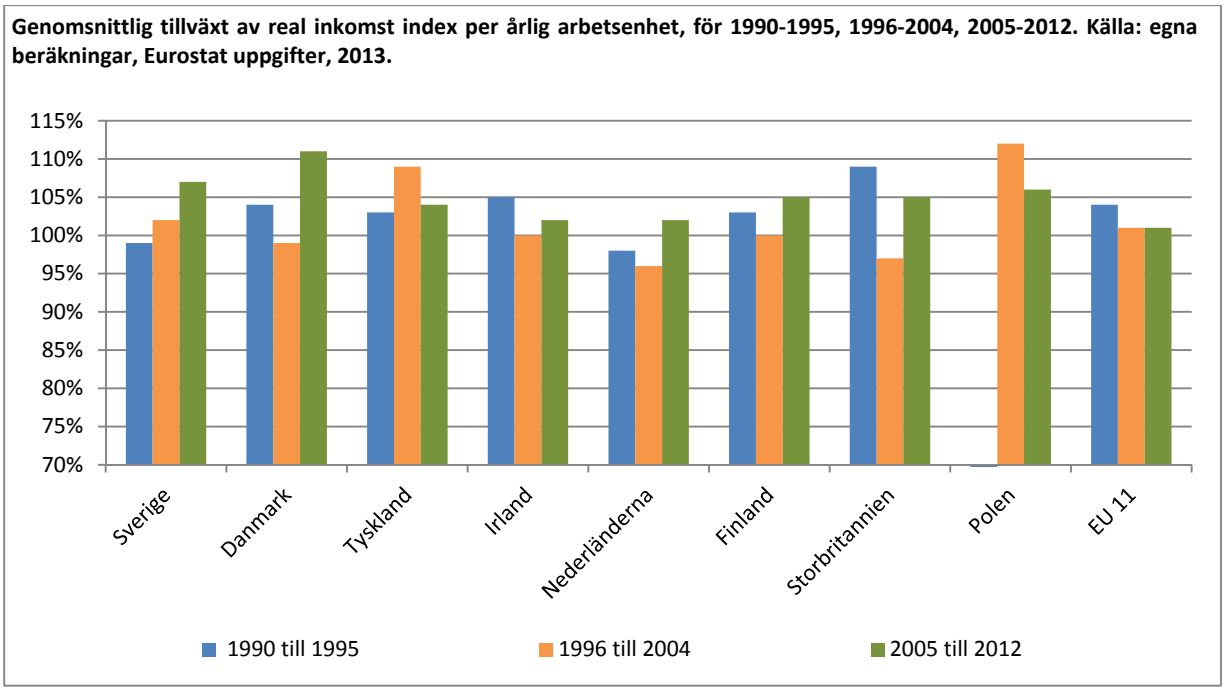
(36% higher than in 2005). In 2008 and 2009 it decreased again, eventually to the 2005 level. After 2009 the income level began increasing again and, compared with 2005, farm income in 2010-2012 was on average 38% higher. Over the whole period the income value, and thereby the FNVA index value, increased for almost all countries included in the analysis. The greatest contrast in the index was found for the Netherlands, where compared with the early 1990s, farm income in 2005 was around 50% lower. After 2005, farm income in the Netherlands increased on average by 2%. Farm income in Sweden (5%), Poland (9%), Denmark (5%) and Germany (7%) showed on average the highest growth after 1999. The corresponding average income growth for EU11 member states for the period after 1999 was 1%.



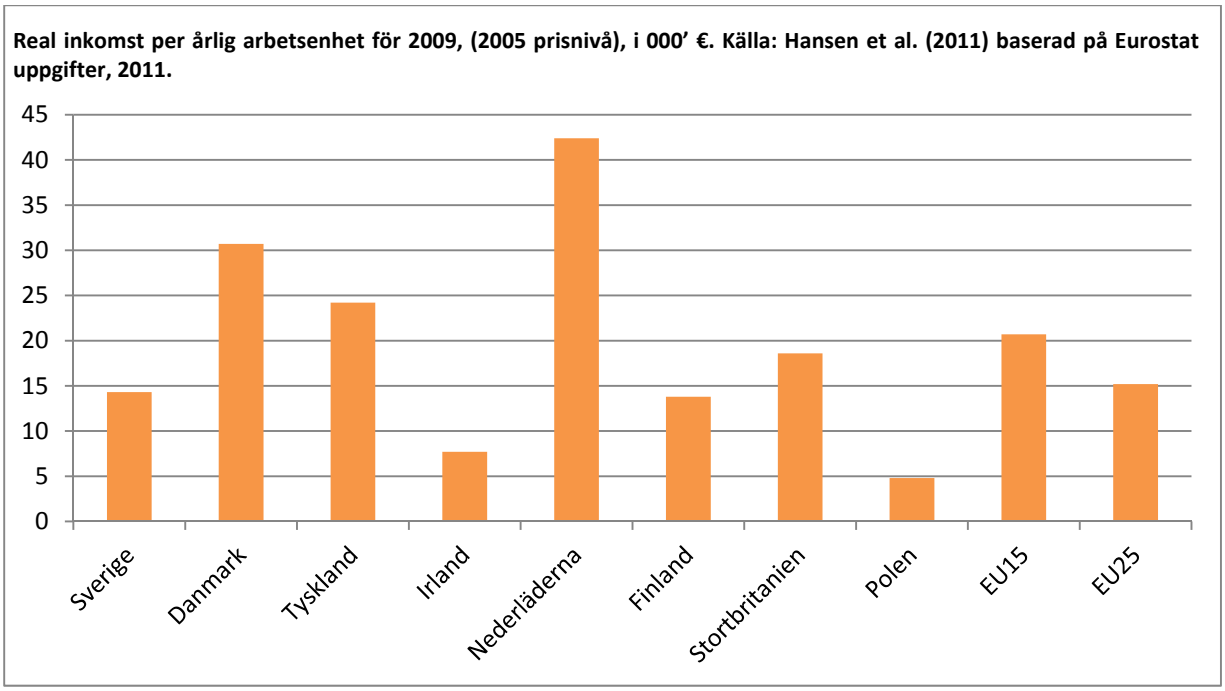
Figur 4.1: Tillväxt av real inkomst per årlig arbetsenhet, för 1990-2012, 2005=100. Källa: Eurostat uppgifter, 2013.

Average growth in real income for the periods 1990-1995, 1996-2004 and 2005-2012 is presented in Figure 4.2. Additional background data on the changes in average real income can be found in Table A8 (appendix).

As Figure 4.2 indicates, farm income per annual work unit (AWU) in Sweden for the period 2005-2012 grew faster than in EU11. However, in absolute terms (2009), Swedish income per AWU was still lower than in EU 15 (Figure 4.3).



Figur 4.2: Genomsnittlig tillväxt av Real inkomst per årlig arbetsenhet för 1990-1995, 1996-2004, 2005-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013.

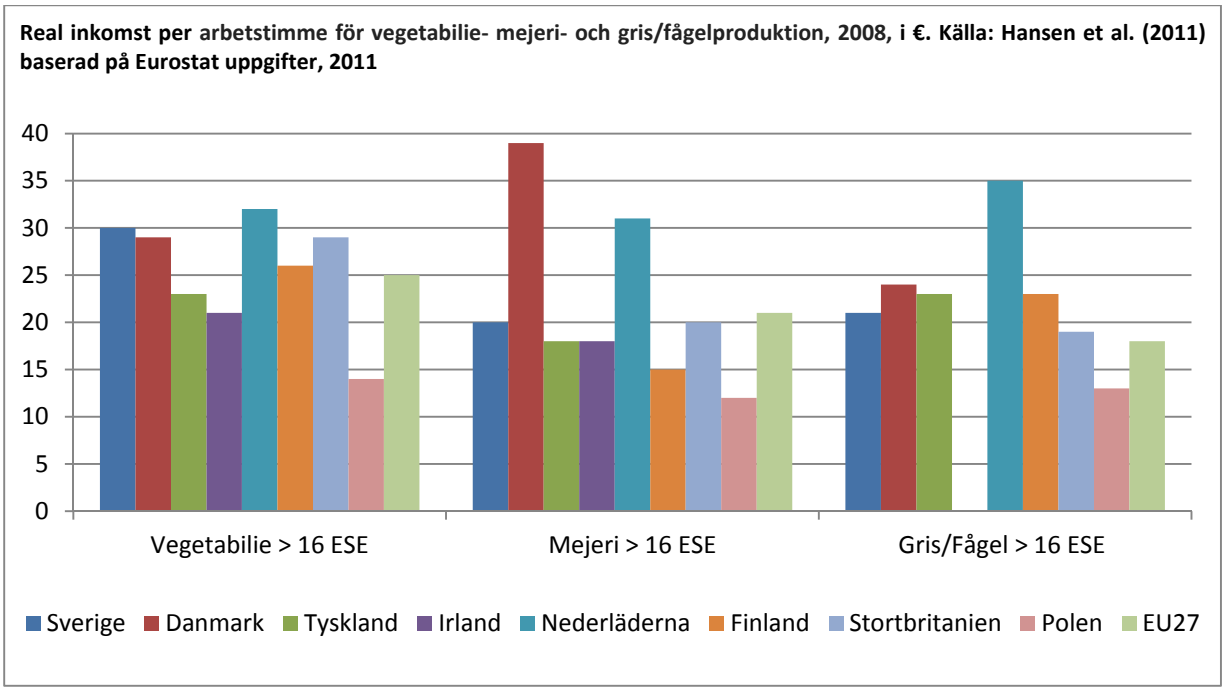


Figur 4.3: Real inkomst per årlig arbetsenhet för 2009, (2005 prisnivå) 000' €. Källa: Hansen et al. (2011) baserad på Eurostat uppgifter, 2011.

According to Hansen et al. (2011), gross value added per AWU in Sweden (using aggregated Eurostat data, adjusted for purchasing power parity - PPP) in 2009 (2005 price level) was €14 300, which is below both EU15 (€20 700) and EU25 (€15 200). The highest level was found in

the Netherlands (€42 400), Spain and Denmark (€30 700). The gap has declined, however, as income in Sweden grew much faster between 2000 and 2009 than in the EU on average. The UK, with large farms in terms of area, showed both a relatively low level and slow growth in income. According to LRF (2012), real farm income at farm (enterprise) level (2000-2011) on Swedish farms was in line with the EU15, with 2007 as the best year and 2009 the worst.

Due to uncertainty regarding measurement of labour inputs, Hansen et al. (2011) also looked at real income (gross value added) per hour (Figure 4.4). When all farms in EU27 were included in the comparison, many of which are small, income per hour in Sweden was much above the EU average, especially for crops.



Figur 4.4: Real inkomst per arbetstimme för vegetabilie- mjölk- och gris/fågelproduktion 2008, i €. Källa: Hansen et al. (2011) baserad på Eurostat uppgifter, 2011.

Hansen et al. (2011) argue, however, that such a comparison may be a poor indication of competiveness and therefore looked at larger farms, those above 16 European Size Units (ESU) (Figure 4.4). According to Eurostat, farms above 16 ESU in size represent approximately 30% of total farm enterprises in Sweden, Ireland and UK; 40% in Finland; 50% in Germany; 60% in Denmark; and 80% in the Netherlands. However, in Sweden approximately 90% of total agricultural production takes place on farms above 16 ESU in size. Farms above 16 ESU produce >95% of total agricultural production in the Netherlands, Denmark, Germany and UK, and 80% of total agricultural production in Ireland, Finland and

EU27. For those farms having above 16 ESU, growth value added per hour in crop production in Sweden is among the highest in the EU27 (120%). For milk production, Sweden is slightly below the EU average (95%) and for pork and poultry above (117%). Swedish income per hour for milk is higher than for Germany, Ireland and Finland and similar to UK. However, the Danish income per hour is almost twice the Swedish level. The Netherlands also shows high productivity in milk. In the case of pork/poultry, the Netherlands is the most productive country. Productivity in Sweden is 13% lower than in Denmark and in actual terms lower than in Finland.

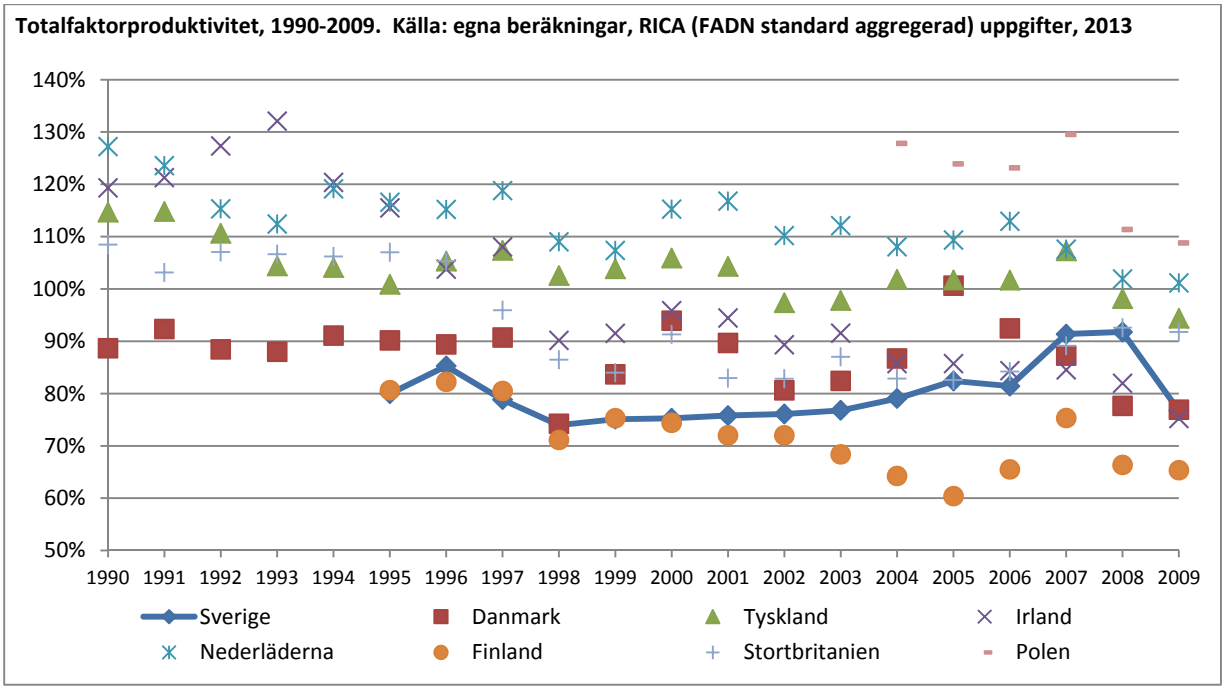
4.2 Productivity

Farm productivity is a performance measure showing the ability of the farm to produce more outputs with fewer inputs. Farm productivity can be assessed as aggregated value of total outputs and inputs included in production and, partly, as the total output value and the value of a selected input (such as labour, capital etc.) used in the production process. In this working paper, the aggregate, i.e. total factor productivity, is presented for Sweden and the EU competitors over the period 1990-2009, using the Farm Accounting Data Network Tools standard estimates. The total factor productivity (TFP) index was calculated as the ratio between the value of: 1) total outputs (sales + intermediate consumption + changes in stock of products + change in valuation of livestock-purchases of livestock + various non-exceptional products) and 2) input use (specific costs + overheads + depreciation + external factors) = Total output/Total inputs.

The development in TFP index was analysed here relative to 1990, which was taken as the base year. Findings on TPF were supported and explained using existing reports on production cost analysis and profitability analysis. In addition, data on partial farm productivity (based on Hicks-Moorsteen productivity index) were taken from a recent study (Manevska-Tasevska et al., 2013) analysing the competitiveness of Swedish agriculture in efficiency terms over the period 1998-2008.

Figure 4.5 shows the TFP values for Sweden and the selected EU competitors over the period 1990-2009. According to the diagram, TFP was lowest in Finland and Sweden, pointing out the existence of high input costs relative to production value. In Sweden, the output value obtained through the production process was on average 22% (1995-2004) and 15% (2005-2009) lower than the costs necessary to cover the input use. Up until 2000,

Finland and Sweden had similar TFP trends. However, after 2001 TFP increased for Sweden to approach the TFP of farms in Denmark and UK. The Finnish TFP showed a continuous downward trend until 2005, when it reached the minimum value (TFP index = 60%; i.e. only 60% of the input costs were covered with the output value obtained). In the years that followed, the TFP index for Finnish farms returned to the level in the previous period.

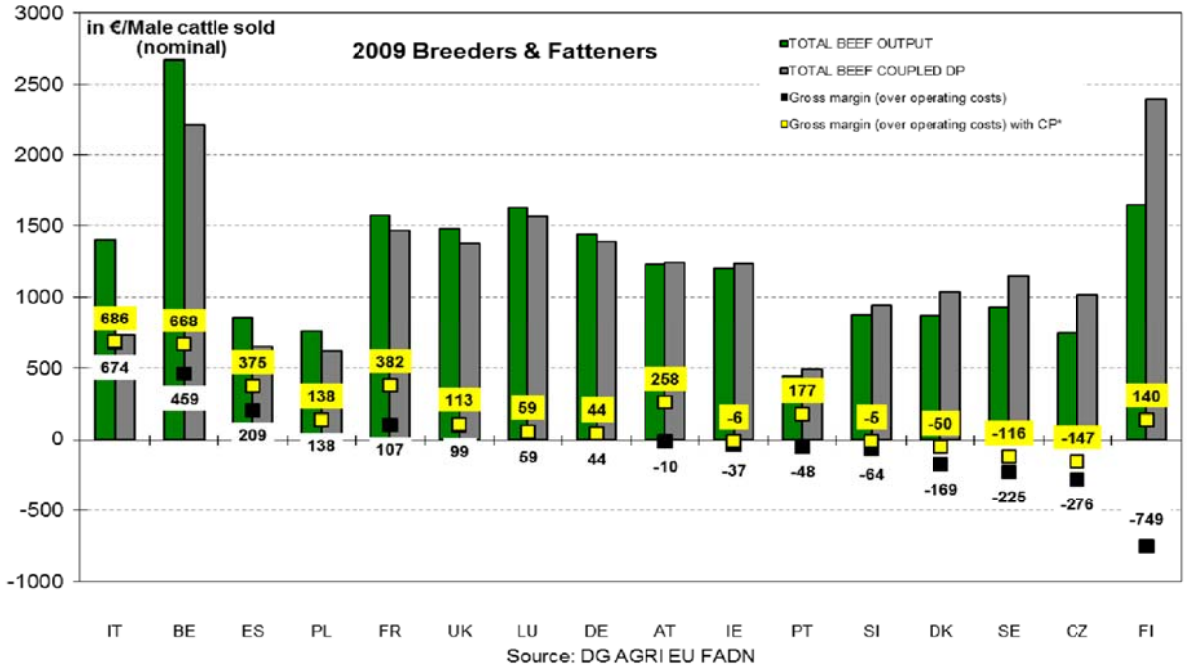


Figur 4.5: Total faktorproduktivitet, 1990-2009. Källa: egna beräkningar, RICA (FADN standard aggregerad) uppgifter, 2013.

Farmers in the Netherlands, Germany and Poland operated under the highest TFP. Relative to the competitor countries, the Swedish disadvantages in TFP can be linked mainly to the high agricultural production costs originating from the climate and thus constrained agricultural potential, high capital investments, feed costs, high labour costs (due to high farm wages, which follow those in other domestic industries) and the strict production regulations (Ekman and Gullstrand, 2006; LRF, 2012). High wages also explain the rising costs of other inputs and services linked to agricultural production (Ekman and Gullstrand, 2006). Details on production costs and gross margins for different agricultural specialisations are given in the LRF report on the competitiveness of agricultural production (LRF, 2012). Based on that report, the competitiveness of grain production is relatively good, especially in southern Sweden. Pig and beef production are sensitive, however, as they are operating under high costs and low margins.

The European Commission analysis (European Commission, 2013a) of gross margins (based on FADN data) for beef cattle breeders and fatteners in EU member states ranked Sweden, Denmark and Finland (without coupled payments) among the countries with the lowest values (Figure 4.6). However, Finnish beef cattle breeders and fatteners achieved positive margins when coupled payments were included. Germany and UK operated under positive gross margins, both with and without subsidies considered. The gross margins of Polish producers were among the highest values recorded, together with Belgium, Italy, France and Spain.

LRF (2005) reported that pork production in Sweden, Finland and Germany has 15, 20 and 8 % higher production costs compared with Denmark. That report attributed the Swedish disadvantage to low productivity (measured as pigs produced per sow), higher feed prices, high labour requirement and high building costs. The higher feed costs were attributed in turn to higher transport costs and the higher building costs to Swedish animal welfare legislation (which specifies larger floor area per pig) and differences in building construction.

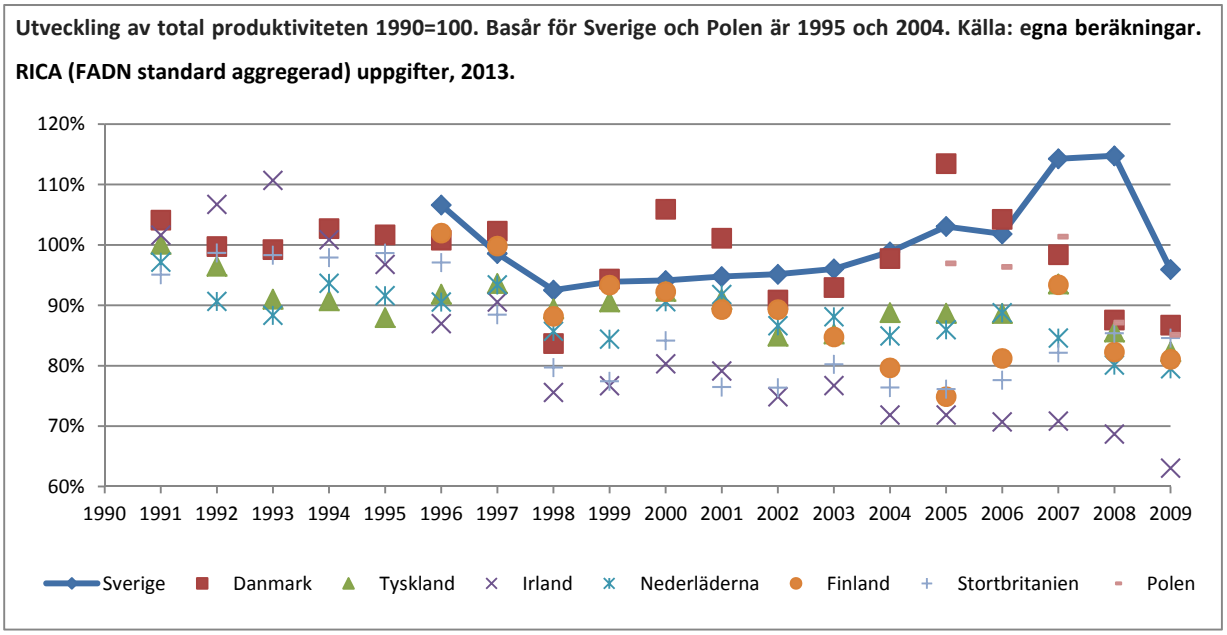


Figur 4.6: Bruttomarginaler av nötkottproducenter inom EU länder, uppfödare 2009. Källa: European Commission (2013a).

Compared with Denmark, Sweden has also been found to have higher production costs in broiler production (LRF, 2005). As for pork production, these higher costs are attributable

to expensive feed and transport and higher building- and labour costs, salmonella and GMO control. Sipilainen et al. (2008) made an international comparison of regional productivity differentials on dairy farms in Denmark, Finland and Sweden in 2003, using farm level data. The findings showed that Danish milk production technology is slightly better than the technologies of the other countries and that in Finland is slightly worse. That in Sweden is intermediate, achieving on average 85-97% of the output level of Danish technology.

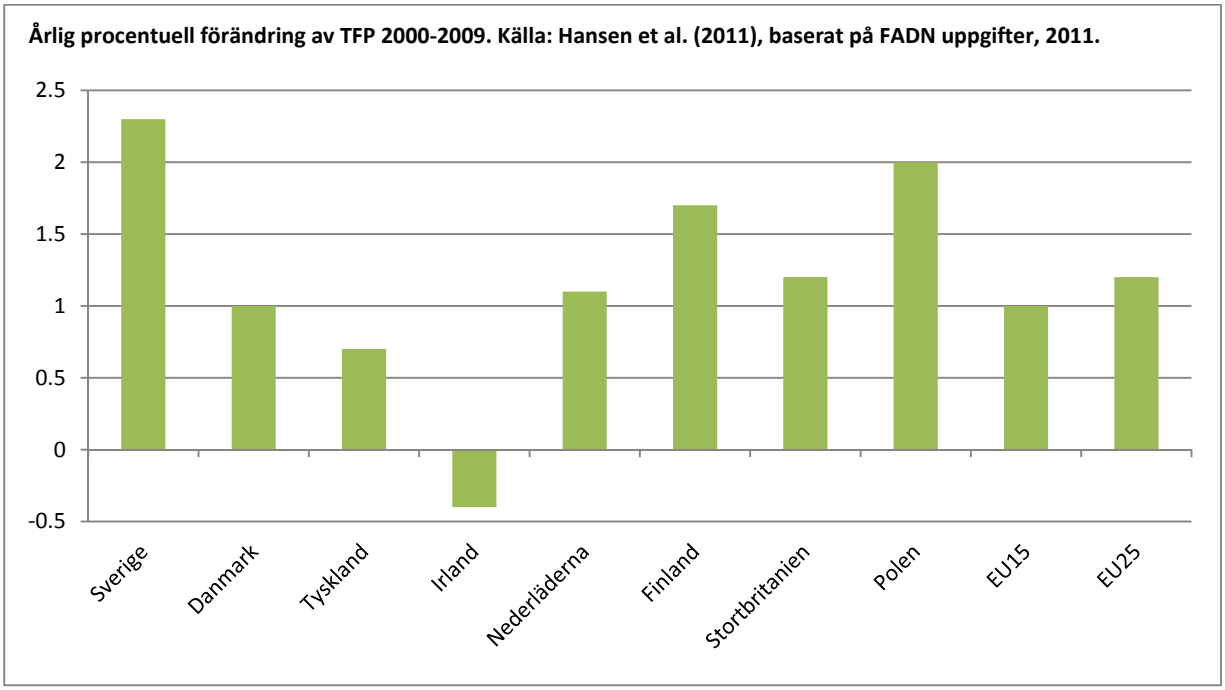
Looking at the development trend for the TFP index (Table A9 (appendix) and Figure 4.7), it can be seen that Sweden was among the countries (together with Denmark) with the highest average TFP growth, especially for the period 2004-2008. In 2009 the TFP index dropped by 17% (relative to 2008). The most dramatic change in the TFP index occurred for Irish agriculture, where compared with the 1990s the value of the TFP index dropped by approximately 40%. Over the whole period (with 1990=100), the TFP index was on average constant in Sweden (100%) and approaching constant in Denmark (98%). The TFP index decreased by up to 7% in Poland, 10% in Germany, 12% in the Netherlands and Finland, 14% in UK and 17% in Ireland. Figure 4.7 shows development in the TFP index relative to 1990 (1995=100 for Sweden and 2004=100 for Poland).



Figur 4.7: Utveckling av totalproduktiviteten 1990=100. Basår för Sverige och Polen är 1995 och 2004. Källa: egna beräkningar. RICA (FADN standard aggregerad) uppgifter, 2013.

Hansen et al. (2011) estimated TFP for the EU agricultural sector as a whole for the period 2000-2009 (Figure 4.8). The calculations were based on quantity indices for output and inputs (compared with the value indices above, which were calculated in value terms,

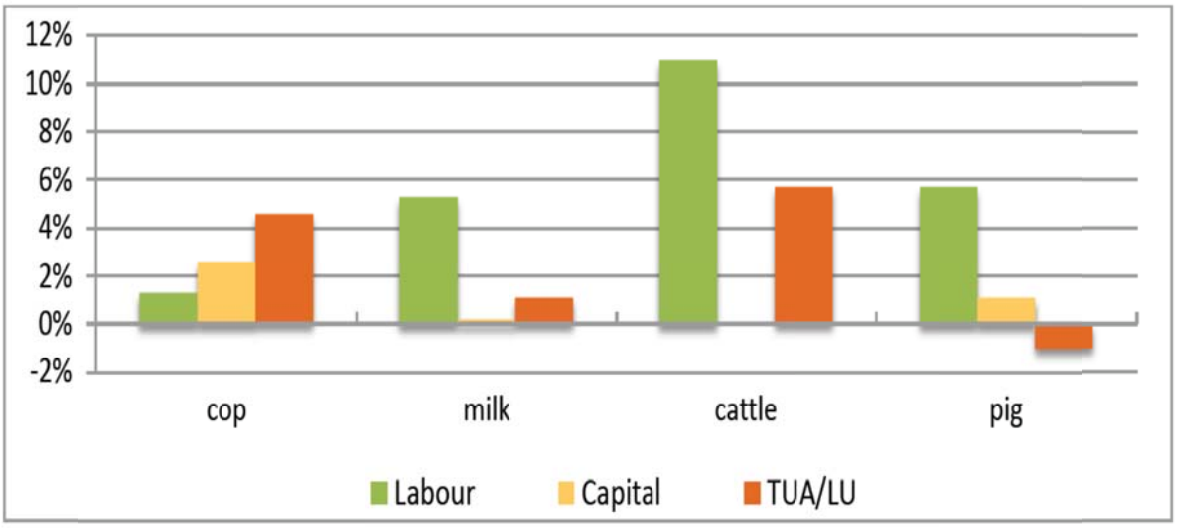
i.e. not adjusted for inflation). TFP in Sweden grew at a rate of 2.3% per annum, which compares very favourably with the average growth of 1% for EU15 and 1.2% for EU25. A relatively strong growth rate was also exhibited by Poland (2.0%) and Finland (1.7%), while Denmark, the Netherlands, UK and Germany showed modest productivity growth (1%, 1.1%, 1.2%, 0.7%, respectively). Ireland experienced falling TFP (0.4%) per annum. The fast growth in TFP in Sweden was mainly due to a strong decline in labour inputs and a decline in the use of intermediate inputs. Output grew at 0.8%. Denmark outperformed almost all EU countries in terms of growth of labour productivity (4.8%). However, capital intensity grew even faster (5.5%). In Sweden, labour productivity grew at the same rate as capital intensity (3.6%). Since Sweden performed much better in terms of TFP, this comparison indicates that replacement of labour by capital does not necessarily pay in terms of overall efficiency. Labour productivity declined in Ireland (and Greece), probably due to the counter-cyclical role of agriculture, with the sector absorbing rather shedding labour in times of economic crisis (Hansen et al., 2011).



Figur 4.8: Årlig procentuell förändring av TFP 2000-2009. Källa: Hansen et al. (2011) baserat på FADN uppgifter, 2011.

Brümmer et al. (2002) analysed the TFP change (1991 and 1994) for dairy farms in Poland, Germany and the Netherlands and found a productivity increase for farms in Germany (6%) and the Netherlands (3%). During the same period, the productivity of Polish farms worsened (5%), mainly due to technological regress (of about 7%).

Manevska-Tasevska et al. (2013) analysed the Hicks-Moorsteen Total Factor Productivity (HM-TFP) index (Coelli et al., 2005) for the period 1998-2008 as an indication of the growth in output less input growth. The following mathematical expression was used: $TFP\ Index = Growth\ in\ output\ /\ Growth\ in\ input = Output\ quantity\ index\ /\ Input\ quantity\ index$. The farm output is given in monetary units, incorporating farm income from production and the subsidy payments. Separate calculations were made for labour, production unit (agricultural area or livestock units for animal production) and capital (materials use) productivity, for farms specialising in crop, milk, beef and pig production (Figure 4.9).

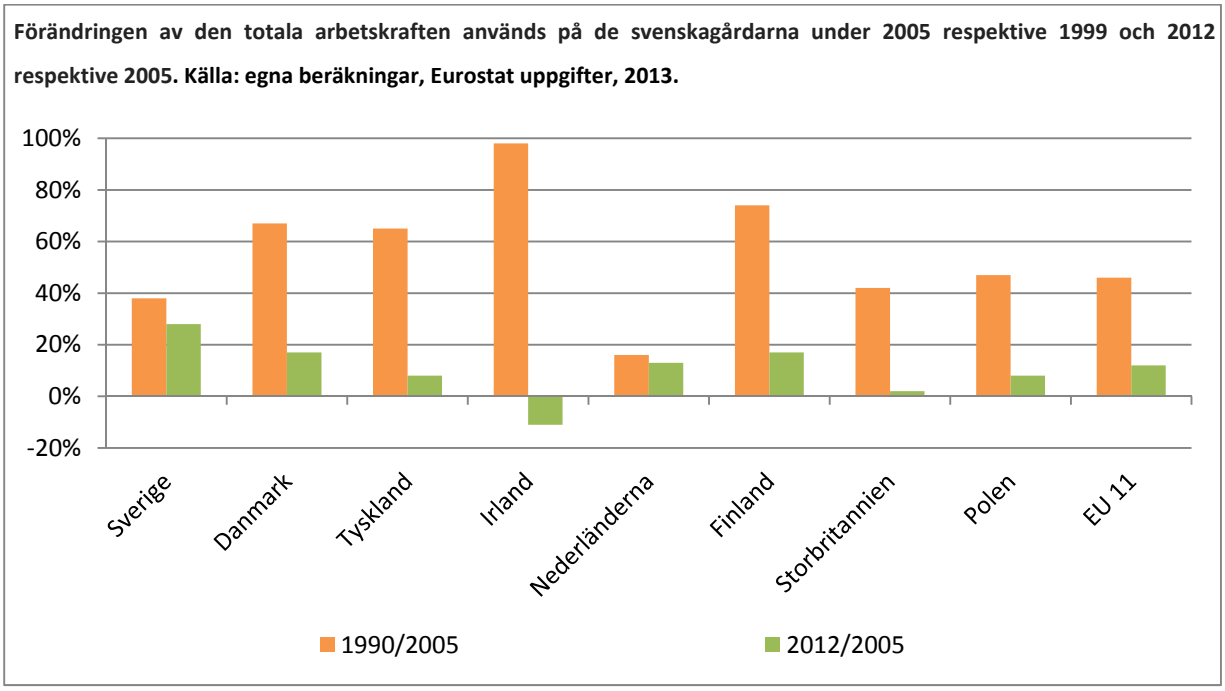


Figur 4.9: Hicks-Moorsteen produktivitsets index: arbetskraft, kapital och produktionsenhet produktivitet (TUA/LU) vid spannmål, mjölk, nöt-och grisgårdar (1998-2008). Källa: (Manevska-Tasevska et al., 2013).

The results showed that farms specialising in livestock production had on average experienced the largest labour productivity improvement. Dairy farms had improved their labour productivity by 5.3%, beef farms by 11.2% and pig farms by 5.7%. Improvements in capital utilisation ranged from 0.2% for dairy farms, to 1.1% for pig farms and 2.6% for crop farms. Dairy farms had increased livestock unit productivity by 1.1%, whereas it decreased by 1% on pig farms.

As can be seen in Figure 4.9, the highest productivity increase was found for labour use. The total labour inputs on Swedish farms and farms in the selected EU member countries over the period 1990-2012 (2005=100) are given Table A9 (see appendix). The change in total labour use on Swedish farms in 2005 relative to 1999 and in 2012 relative to 2005 is given in Figure 4.10.

The trend in labour use is an obvious indicator that Swedish farming is labour-saving. The labour use change was approximately 38% (2005/1990) and 28% (2012/2005). The labour use decrease in 2005 compared with 1990 was highest in Ireland (98%), Finland (74%), Denmark (67%) and Germany (65%).



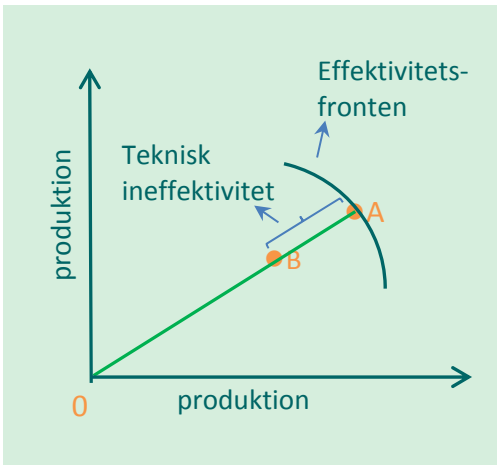
Figur 4.10: Förändring av den totala arbetskraften används på de svenska gårdarna under 2005 respektive 1999 och 2012 respektive 2005. Källa: egna beräkningar, Eurostat uppgifter, 2013.

Compared with the other selected EU countries, Sweden had the largest labour decrease for 2012 relative to 2005. Finland and Denmark were in joint second position, with a 17% decrease. Ireland was the only country where the labour use in 2012 had increased (11%) relative to 2005. Data reported in the European Commission's annual reports (e.g. European Commission, 2013a, b) on production and the economic achievements of EU farms show that Sweden is the second most labour-saving member state, after Denmark. For example, the labour use on cereal farms in Sweden, Denmark and Finland is estimated to be 0.7 AWU (the European average is 1.3 AWU per farm). Sweden uses 1 AWU/42 cattle livestock units (LU), whereas the Danish average is 1 AWU/96 LU.

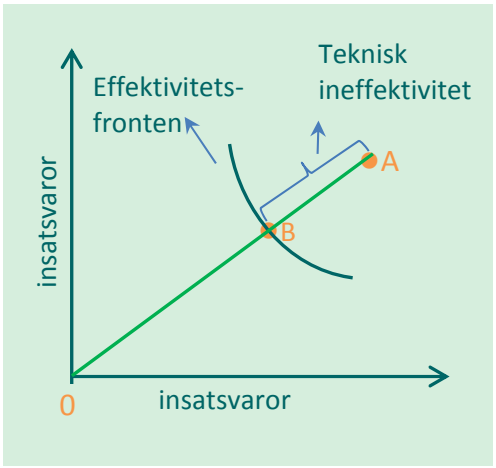
4.3. Efficiency

Competitive agriculture is dependent on proper farm resource management, i.e. on farms using their resources effectively. Efficient resource use can be observed as profit-maximising i.e. output perspective, and cost-minimising, i.e. input perspective. The output efficiency (Figure 4.11a) provides evidence of farms' possibility to increase their output (expressed in yield or revenue) without increasing resource/input use (in volume or monetary units). The input efficiency (Figure 4.11b) shows the farms' possibility to decrease their input use by keeping the output(s) fixed. By definition, farm efficiency shows the relative achievements of the farms included in the analysis (data sample), meaning that farm efficiency is measured in relation to the most efficient farms in the sample, which together construct the efficiency frontier. Therefore, a comparative analysis where results are obtained from two different datasets must always be performed with caution. In fact, the coefficient value shows how heterogeneous the farms are in their input use and output production. Figure 4.11 provides a graphical presentation of the efficiency/frontier models, analysing the output orientation (a) and the input orientation (b).

a)



b)



Figur 4.11: Grafisk illustration av teknisk effektivitet, a) input (kostnad) orientering och b) produktion (intäkt) orientering.

In Fig. 4.11a, A represents one of the most efficient farms included in the data sample, while the difference between A and B shows how inefficient B is compared with A. If the output of B increases without increasing the inputs, B will improve its efficiency and will approach A. In Fig. 4.11b, B is on the efficiency frontier using less inputs and thus B is more efficient than A. To be as efficient as B, A needs to decrease its input use without decreasing its output (revenue, yield etc.)

The efficiency coefficient for an individual farm can vary on a scale between 0 and 100%, where higher values symbolise higher efficiency level, i.e. the most efficient farms have an efficiency value of 100%. Farms with similar structure, applying similar technological practices and operating under similar market and policy conditions are expected to be close in their efficiency achievements.

Comparative analyses of international efficiency achievements are of great interest. An extensive efficiency analysis comparing the efficiency of farms in Sweden and in selected EU member states (e.g. over the period 1990-2012) requires the use of country-specific data from a harmonised data source (such as FADN data), in order to estimate a joint/international efficiency frontier of the countries considered in the analysis. Farm success in a specific country has to be analysed relative to the best performing farms in the selected data set. So far, such an analysis does not exist. When country specifics are analysed, a separate estimation is conducted for each country and such an analysis is not appropriate for international comparisons. In this working document we summarised the results of existing efficiency studies analysing Swedish and European agriculture (with the emphasis on the selected European countries: Denmark, Germany, the Netherlands, Ireland, Finland, UK and Poland). In the literature, comparative efficiency analyses in which Sweden or some of the selected EU countries are included are mainly available for grain and dairy production.

Barnes and Revoredo-Giha (2011) reported that the average efficiency of dairy and crop farms in EU8 in the period 1995-2007 was about 90% (relative to their country-specific frontiers). The average estimated efficiency relative to the joint efficiency frontiers for crop and dairy production were: 69% vs. 88% for UK, 78% vs. 63% for Denmark, 79% vs. 77% for Germany, 68% vs. 51% for Ireland, 77% vs. 60% for the Netherlands, and 69% vs. 93% for Poland.

In another study (Bakucs et al., 2012), efficiency estimates of crop farms for the period 1990-2006 ranged from 74-83% for Sweden and 72-92% for EU8 member states. In the study, the best performing farms were Netherlands crop farms, with an average efficiency of around 90%. Efficiency on Swedish and German farms was about 80%. The ten-year (1995-2004) efficiency average of Swedish, German and Netherlands crop farms has also been estimated (Zhu and Lansink, 2010). It was found that crop farms in the Netherlands were the

most efficient, achieving an average value of 76%. The efficiency estimates for the Swedish and German farms were 71% and 64%, respectively.

According to Latruffe et al. (2012), the average efficiency of EU11 dairy farms in the period 1990-2007 was generally high, ranging from 85% to 96%. However the estimates for the selected EU competitors were calculated based on their country-specific frontier. The following results were obtained: 96% for Ireland, 94% for Denmark, the Netherlands and UK, and 92% for Germany. Average estimates from the efficiency analysis by Zhu et al. (2008) of dairy farms in Sweden, Germany and the Netherlands for 1998-2002 were 79%, 59% and 55%, respectively. In an older study, Brümmer et al. (2002) calculated yearly efficiency for dairy farms in Poland, Germany and the Netherlands during 1991-94, relative to both the country and the international frontier. The average efficiency scores for each country representing the country-specific and the international frontier were: Germany 96% vs. 53%; Poland 76% vs. 31%, and the Netherlands 90% vs. 82%.

Efficiency estimates for Swedish agriculture relative to the country frontier are available for all farm specialisations. Recent findings on the country-specific efficiency/frontier show that Swedish farming is benefiting from efficient input use/output production. Manevska-Tasevska et al. (2013) and Manevska-Tasevska et al. (2014) found that the technical efficiency of Swedish farms (1998-2008 and 2008-2011) was fairly high, accompanied by technological progress for all farm specialisations. For the period 1998-2008, the estimated mean output-orientated technical efficiency of Swedish crop, dairy, beef and pig farms was 90%, 92%, 83% and 89%, respectively. These results suggest that while keeping the input amount fixed, the output value can be increased by: 10% on crop farms, 8% on dairy farms, 17% on beef farms, and 11% on pig farms. It is important to note that output was recorded as total farm income, coming both from sales and subsidies. The results are an indication of the existence of homogeneous, adjusted technology. The most heterogeneous farms in terms of production practices and achievements, and thus those with the lowest average efficiency (83%) and minimum value of efficiency estimates (22%), were beef farms. An analysis of the input-orientated efficiency showed that Swedish beef producers can decrease their costs by on average 20-25%, but input use and operational adjustments are necessary (Manevska-Tasevska et al., 2014).

4.3.1 Selected factors contributing to more efficient/productive agriculture. Evidence from Sweden

Farm achievements in using resources in an efficient way cannot be isolated from: environmental conditions prevailing on the farm, such as farm and farmer characteristics, farm operating practices, regional characteristics and agricultural policy. The influences of characteristics such as size, experience, production orientation, specialisation and diversification, intensification, regionalisation and impact of specific policy measures on farm efficiency are of great research interest.

Farm size. Structural development, whereby farmers expand their business, could be expected to be an appropriate strategy to make production more efficient. However, findings show that increased farm size does not of itself guarantee efficiency, without a balanced increase in both costs and income (Manevska-Tasevska et al., 2014). Manevska-Tasevska (2013) analysed farm-level data for Swedish agricultural production (1998-2008) and showed that in order to improve efficiency, only crop farms needed to grow in size, whereas beef and pig farms needed technological improvements. Dairy farms were found to be working at optimal scale. A study working with farm-level data (Zhu and Lansink, 2010) showed that farm size was an important driver of technical efficiency change on dairy farms in Sweden in the period 1995-2004. In the same period, possibilities for technological improvements were found for Swedish and German crop farms (Zhu et al., 2008).

Experience and education. Young farmers have a key role to play in structural development. Farms managed by younger farmers are often found to be more efficient. This was mainly associated with their higher level of education, implying knowledge of more advanced technology, interest in structural adjustments/investments, enthusiasm etc. Older farmers tended to have less up-to-date knowledge on advanced technologies, be more resistant to structural changes, or allowed their decision making to be influenced by the income generated over the years.

Diversification/specialisation. High farm specialisation is often expected to be a driver of efficient farming, resulting from specialist skills and knowledge, economies of scale, time saving etc. Diversification management helps in establishing a balance between costs and revenues, thus making Swedish agricultural production more efficient (Manevska-Tasevska et al., 2013; Manevska-Tasevska et al., 2014). It is important to stress that those authors do not claim that specialist farms should not exist, but rather that there should be a certain

level of diversification activities on farms specialising in a specific agricultural production (crop, dairy, beef, pigs etc.). This helps farms to buffer the price shocks of inputs included in production (e.g. lower risk of feed shortages and thus of high production costs), generate income from other activities, increase utilisation of under-used inputs, etc.

Conventional/organic. The economic success of Swedish producers is also linked to production orientation, with organic beef farming reported to be more profitable (Salevid and Kumm, 2012). However, the profitability of beef production tends to rely on the high environmental payments for producing organically. When farm support is not included, beef farmers in transition to organic are less efficient than both existing organic and conventional farms (Manevska-Tasevska et al., 2014). The reasoning behind this is that even without subsidies, organic farms benefit from the higher prices paid for organic products, whereas farms in transition to organic cannot benefit from the higher prices, but have extra costs for technological adjustments. Manevska-Tasevska et al. (2013) found that farm support compensates for the high costs originating from organic farming on crop, dairy and beef farms in Sweden. Only pig farms applying **organic practices** were found to be less efficient than conventionally managed farms. The failure of Swedish organic pig production is explained by the highly competitive Danish pig industry and technological applications.

Partnership. Larsén (2010) analysed the potential benefits of partnership for farm efficiency on crop and animal farms in Sweden over the period 2001–2004. The findings showed that although partnership farms did not have lower capital costs per hectare, they were on average more efficient, especially for machinery-intensive production. Indeed, the average efficiency value of partnership farms was higher for about 11% of crop farms and 1% of animal farms. Even if the capital costs remain, more advanced technology may give increased yields, better product quality, and/or labour-saving effects. In another study Manevska-Tasevska et al. (2013) found that partnership arrangements between Swedish dairy farms decrease farm efficiency.

Feeding practices. Feed costs have been found to represent the highest share of total costs in livestock production (European Commission, 2013a; Manevska-Tasevska et al., 2013). Thus feed costs are the main area where large savings (in absolute terms) can be made. This implies that proper combination and application of proper feeding practices is of great importance for efficient livestock production**.** Swedish beef farms with large grazing area per animal and farms located in regions with a longer grazing period (implying low-cost

feeding for the animals) are on average more efficient (Manevska-Tasevska et al., 2014). Similarly, Kumm (2009) and Salevid and Kumm (2011) reported that availability of a large area of semi-natural pasture is a precondition for good profitability of Swedish beef production. Although grazing animals and managing grazing areas is a labour-intensive activity involving increased costs due to the requirement for harder work, the results suggest that the additional cost of the work in this case is offset by reduced feed costs. For Swedish farms specialising in beef production, the marginal contribution of the production materials (mostly feedstuff) is twice the marginal contribution of the labour use (Manevska-Tasevska et al. 2013). Other findings (Nordin and Manevska-Tasevska, 2013) show that the extra labour use primarily consists of increased employer's hours rather than new employees and does not influence the production costs. Hansson and Ohlmer (2008) showed that feeding cattle hay instead of only silage and forage reduces farm efficiency in the long-run. Hay-based feeding is also more labour-intensive than silage making, and a negative influence from the extra labour costs can be expected.

Technological development/intensification. Improvements in technology are essential for increasing farm productivity and thus reducing production costs (in that new or improved technology can compensate for e.g. high labour costs or a less favourable climate). However, capital investments are not ultimately beneficial for the improvement of farm performance. In a recent study, Petrick and Kloss (2012) showed that EU agriculture (seven EU members, among which Denmark, Germany and UK) appears to be dominated more by over-capitalisation. The change to robotic milking systems in Sweden gave improvements in animal welfare and the working conditions of farmers, but not in farm profitability (Bergman and Rabinowicz, 2013). Higher capital use on Swedish beef farms was found not to have an effect on farm efficiency.

Regionalisation. The concept of economically sustainable production systems depends on the regional conditions and the sensitivity of the environment. Regional differences in farm performance are a common finding for Swedish farms. Grain and dairy farms are generally found to be better performing in southern Sweden (LRF, 2012). In two different studies, Manevska-Tasevska et al. (2013) and Manevska-Tasevska et al. (2014) found that Swedish farms in less favoured areas were on average less efficient than the corresponding farms in other regions. Even with the support received, such areas were generally not compensated for the competitive disadvantages arising from the natural handicaps.

Exceptions were dairy farms in northern Sweden, which were found to be slightly overcompensated, very likely due to the special Nordic aid. On Swedish farms specialising in beef production, differences in farm economic performance are related to the grazing period and access to pasture. Farms located in regions with a longer grazing period and access to grazing land have on average lower production costs and are more efficient (LRF, 2012; Manevska-Tasevska et al., 2014).

Policy impact. Subsidisation of farmers is one of the primary instruments used to drive farm efficiency (income support subsidies) and to compensate for variations resulting from differences in agri-environmental practices and regional agricultural potential (environmental subsidies). Although farm payments are provided to all EU member countries for the same objectives, There is no single confirmed impact of this farm support on farm efficiency. In the literature, both positive and negative influences of farm support on farm efficiency have been reported. The findings are related to: country specifics, production specialisation and methodological application. However, it is a common finding that dependence on subsidies, or a large share of subsidies in total revenue, has a negative impact on farm efficiency (for all specialisations). Income support subsidies in Sweden have been found to have a positive influence on the efficiency of dairy farms (Manevska-Tasevska et al., 2013) and crop farms (Zhu and Lansink, 2010), whereas a negative impact has been found for beef farms (Manevska-Tasevska et al., 2013). A general opinion is that the effect of the decoupled payments on farm efficiency is mainly positive. Decoupled payments are considered less distortive, switching the influence of the income support payments from negative to positive. According to Manevska-Tasevska et al. (2013), investment subsidies do not have any significant influence on the efficiency of Swedish farms. The result was interpreted both as poor targeting of investment support and as an effect of investment subsidies only being apparent in the long run. Environmental subsidies are in general beneficial for the efficiency of Swedish agriculture (Manevska-Tasevska et al., 2013).

Summary on viability, productivity and efficiency

From 1990 to 1999, Sweden had on average the lowest growth in real farm income per annual working unit of all the competitor countries compared in this analysis and the EU11 member state average. However, after 1999, Swedish farm income gradually increased, with 2% growth in 1995-2004 and 7% in 2005-2012. Over the whole period (1990-2012), real income displayed an upward trend for almost all countries included in the analysis. On average, highest income growth in 1999-2012 was found for farms in Poland (9%), Germany (7%) Sweden (5%) and Denmark (5%). The corresponding average income growth of EU11 member states for that period was 1%. Farms in the Netherlands had around 50% lower income in 2005 compared with the early 1990s, but after 2005 their income increased by on average 2%.

Although farm income per annual work unit (AWU) in Sweden in 2005-2012 grew faster than in EU11, in absolute terms Swedish income per AWU was still lower than in EU 15. The gross value added per AWU in Sweden in 2009 (2005 price level) was €14 300, compared with €20 700 for EU15 and €15 200 for EU25. The highest level was found in the Netherlands (€42 400) and Denmark (€30 700) (Hansen et al., 2011). The highest growth in value added per hour in Sweden was in crop production; dairy production had slightly below the EU average, but a higher value than Germany, Ireland and Finland, and similar to UK. However, the Danish value added per hour was almost twice the Swedish level. The Netherlands exhibited high productivity in dairy and was most productive in pork and poultry (Hansen et al., 2011). LRF (2012) reported that real farm income at farm (enterprise) level (2000-2011) on Swedish farms was in line with that in EU15, with 2007 the best year and 2009 the worst.

Sweden (and Finland) is among the countries with lowest Total Factor Productivity (TFP), with the output value attained through the production process being on average 22% (1995-2004) and 15% (2005-2009) lower than the expenses necessary to cover input use (income subsidies excluded). After 2001, the TFP for Sweden increased to the level found for farms in Denmark and UK (input costs still higher than production output). The highest TFP value (1999-2009) was found for farmers in Poland (121%), the Netherlands (113%) and Germany (104%), i.e. output value outweighed input costs by 21%, 13% and 4%, respectively. Low values of TFP index indicate the existence of high input costs respective to production value. Sweden's disadvantages in TFP relative to competitor countries are linked mainly to its high

agricultural production costs originating from the potential constraints related to climate, large capital investments, feed costs and high labour costs.

However, Sweden was among the countries showing high average TFP growth, especially for the period 2004-2008 (Sweden 3.7%, Poland 1.3%, Germany 0.2%). Hansen et al. (2011) estimated that in 2000-2009, TFP in Sweden grew at a rate of 2.3% per annum, which compares very favourably with the average growth of 1% for EU15 and 1.2% for EU25. A relatively strong growth rate was also shown by Poland (2.0%) and Finland (1.7%), while Denmark, the Netherlands, UK and Germany showed modest productivity growth (1%, 1.1%, 1.2% and 0.7%, respectively). Ireland experienced falling TFP at 0.4% per annum.

The fast growth in TFP in Sweden is mainly due to a strong decline in labour input. From the early 1990s, labour use in Sweden decreased almost by 38% by 2005. Compared with the other EU countries used here for comparison, Sweden had the largest labour decrease for 2012 when related to 2005 (28%). Finland and Denmark were in second position, with a 17% decrease. Ireland was the only country where labour use in 2012 increased compared with 2005 (11%).

In addition to high TFP growth, Sweden benefits from the relatively good efficiency of its farms. The efficiency of crop farms in Sweden in 1990-2006 was within the EU8 average (80%). In 1995-2004, Swedish crop farms had efficiency results close to those of German farms, but were 10% less efficient than farms in the Netherlands. Dairy farms in Sweden were among the best performing (about 90%) in efficiency terms, measured both at national level and internationally (compared with the international production frontier). However, Swedish beef farms are less efficient and less profitable at both national and international level.

Farm achievements in using resources efficiently are not independent of environmental conditions prevailing on farms. Thus structural development whereby farms expand and/or increase specialisation does not necessarily make production more efficient. Increased farm size does not itself guarantee efficiency, without a balanced increase in both costs and income. A farm-level analysis of Swedish agricultural production (1998-2008) showed that Swedish crop farms need to grow in size, whereas beef and pig farms need technological improvements. Dairy farms were operating at optimal scale. Furthermore, a certain level of diversification activities on farms specialising in a specific enterprise helps them to buffer price shocks in production inputs, generate income from other activities, increase utilisation

of under-used inputs, etc. (Manevska-Tasevska et al., 2013; Manevska-Tasevska et al., 2014). Technological improvements are generally essential for increasing farm productivity and reducing production costs, but capital investments are not necessarily beneficial for farm performance. EU agriculture (seven EU members including Denmark, Germany and UK) appears to be overcapitalised (Petrick and Kloss, 2012). For example, the change to robotic milking systems in Sweden showed improvements in animal welfare and the working conditions of farmers, but not in farm profitability (Bergman and Rabinowicz, 2013). Higher capital use on Swedish beef farms does not improve farm efficiency (Manevska-Tasevska et al., 2013; Manevska-Tasevska et al., 2014).

The economic success of Swedish producers is also linked to partnership arrangements, production orientation (conventional vs. organic) and feeding regime. Higher benefits of partnership arrangements are obtained on machinery-intensive crop farms (Larsén, 2010). Overall, organic farms are more efficient only when income from environmental payments is considered. Feed costs represent the highest share of the total costs of the livestock production (European Commission, 2013a; Manevska-Tasevska et al., 2013), and feed is thus the main area where larger savings (in absolute terms) can be made. Swedish beef farms with large grazing area per animal and farms located in regions with a longer grazing period (implying low-cost feeding for the animals) are on average more efficient (Manevska-Tasevska et al., 2014).

The concept of economically sustainable production systems depends on the regional conditions and the sensitivity of the environment. Regional differences in farm performance are common on Swedish farms. Cereal and milk farms in southern Sweden are generally better performing (LRF, 2012). Swedish farms in less favoured areas are on average less efficient than corresponding farms in other regions. Even with the support received, such areas are generally not compensated for the competitive disadvantages arising from the natural handicaps (Manevska-Tasevska et al., 2013; Manevska-Tasevska et al., 2014).

Subsidisation of farmers is one of the primary instruments to drive farm efficiency (income support subsidies) and to compensate for variations resulting from differences in agri-environmental practices and regional agricultural potential (environmental subsidies). Although farm payments are provided to all EU member countries for the same objectives, their influence on farm efficiency is uncertain. However, dependence on subsidies, or having a large share of subsidies in the total revenue, generally has a negative impact on farm

efficiency (all specialisations), while the effect of the decoupled payments on farm efficiency is mainly positive.

Lönsamhet, produktivitet och effektivitet: Sammanfattning

Mellan 1990 och 1999 upplevde Sverige en liten ökning av realinkomsterna per årsarbetskraft (AWU) i jordbruket jämfört med de flesta av de analyserade konkurrentländerna och jämfört med EU11 i genomsnitt. Efter 1999 har emellertid de svenska jordbrukarnas inkomster börjat öka successivt, tillväxten var 2% mellan 1995 och 2004 och 7 procent 2005-2012. Under hela perioden (1990-2012) visar realinkomsterna en uppåtgående trend för nästan alla de länder som ingår i analysen. Högsta inkomsttillväxten finns för jordbrukare i Polen (9%), Tyskland (7%), Sverige (5%) och Danmark (5%). Den genomsnittliga inkomstutvecklingen för EU11 -länderna för perioden 1999-2012 är 1%. Holländska bönder har cirka 50% lägre intäkter under 2005 jämfört med början av nittiotalet. Efter 2005 har de nederländska jordbrukarnas inkomster i genomsnitt ökat med 2%.

Trots den snabba ökningen av inkomsterna i Sverige under den senare delen av perioden är dessa fortfarande betydligt lägre än i många EU länder. Bruttoförädlingsvärdet per AWU i Sverige 2009 (2005 års prisnivå) var 14300 euro. Att jämföra med 20700 i EU15 och 15200 i EU25. Den högsta nivån finns i Holland (42400) och Danmark (30700) (Hansen et al., 2011). Författarna fann vidare att förädlingsvärdet per timme i växtodlingen i Sverige är betydligt högre än genomsnittet i EU, att förädlingsvärdet i mjölkproduktionen ligger något under genomsnittet i EU, men är högre än för Tyskland, Irland och Finland. Emellertid är det danska förädlingsvärdet nästan två gånger så högt som det svenska. Holland uppvisar hög produktivitet när det gäller mjölk och är det mest produktiva landet i fråga om griskött/fågel. LRF (2012) rapporterade att företagens inkomst per oavlönat årsverke under (2000-2011) vid de svenska gårdarna ligger i linje med EU15, med 2007 som det bästa året och 2009 som det värsta.

Sverige (tillsammans med Finland) är bland de länder som har den lägsta totala faktorproduktiviteten, där outputvärdet i genomsnitt är 22 % (1995-2004) och 15% (2005-2009) lägre än kostnaderna för input (exklusive alla subventioner). Efter 2001 ökar faktorproduktiviteten i Sverige och närmar sig den totala faktorproduktiviteten för gårdarna i Danmark och Storbritannien (insatskostnader är fortfarande högre än produktionens värde). Högsta totalfaktorproduktiviteten (1999-2009) finns för jordbrukare i Polen (121%), ,Nederländerna 113% och Tyskland 104%. I dessa länder är produktionens värde större än ingångskostnaderna med 21%, 13% respektive 4%. Relaterat till konkurrentländerna är svenska nackdelar i TFP kopplade till de höga produktionskostnaderna inom jordbruket som

härrör från jordbrukets begränsningar i fråga om klimat, stora kapitalinvesteringar, höga foderkostnader och höga arbetskostnader.

Dock är Sverige ett av de länder som uppvisar en hög genomsnittlig ökning av totalfaktorproduktiviteten (TFP), särskilt för perioden 2004-2008 (Sverige 3,7%, Polen 1,3%, Tyskland 0.2%). Hansen et al. (2011) uppskattade att TFP i Sverige ökade i en takt på 2,3 % per år för perioden 2000-2009, vilket mycket väl kan jämföras med den genomsnittliga tillväxten på 1% för EU15 och 1.2 % för EU25. En relativt stark tillväxt finns också i Polen (2%) och Finland (1,7%), medan Danmark, Holland, Storbritannien och Tyskland visar blygsam produktivitetstillväxt (1%, 1,1%, 1,2%, 0,7% för respektive land). Irland har upplevt sjunkande TFP på 0,4 % per år.

Den snabba tillväxten av TFP i Sverige beror främst på en kraftig minskning av arbetsinsatsen. Från början av nittiotalet fram till 2005 har arbetsanvändningen i Sverige minskat med nästan med 38%. Jämfört med de andra utvalda EU-länderna har Sverige den största arbetskraftsminskningen också mellan 2005 och 2012, 28%. Finland och Danmark håller en andra plats, med 17%:s minskning. Irland är det enda landet där arbetskraften under samma period har ökat.

Förutom den höga TFP-tillväxten gynnas Sverige av den relativt goda effektiviteten på gårdsnivå. Effektiviteten för växtodlingsgårdar i Sverige under perioden 1990-2006 har visat sig motsvara genomsnittet för EU-8 (80%). Under perioden 1995-2004, har svenska växtodlingsgårdar visat sig ha effektivitetsresultat liknande de för tyska gårdar, men har varit 10 % mindre effektiva än de holländska gårdarna. Mjölkgårdar i Sverige uppnår de bästa resultaten (cirka 90%) i effektivitetstermer mätt både på nationell nivå och internationellt. De svenska nötkreatursgårdarna är mindre effektiva och mindre lönsamma både i nationella och internationella jämförelser.

Jordbrukarnas förmåga att använda resurserna på ett effektivt sätt är inte oberoende av förhållanden som råder på gårdarna. Till exempel kan ökad gårdstorlek och ökad specialisering vara lämpliga strategier för att göra produktionen mer effektiv. Resultaten av effektivitetsanalyser visar dock att en ökning av gårdsstorleken i sig inte garanterar effektivitet utan en balanserad ökning av både kostnader och inkomster. En analys som omfattar uppgifter på gårdsnivå (1998-2008) visade att svenska växtodlingsgårdar behöver växa i storlek, medan nötkreatur- och svingårdar behöver tekniska förbättringar. Mjölkgårdar hade däremot en optimal storlek. Dessutom visar resultaten att

diversifieringsaktiviteter på gårdar som är specialiserade på en viss typ av jordbruksproduktion hjälper gårdarna att buffra prischocker på insatsvaror som ingår i produktionen, generera intäkter för andra aktiviteter samt öka användningen av underutnyttjande resurser etc. (Manevska-Tasevska et al., 2013, Manevska-Tasevska et al., 2014). Tekniska förbättringar är i allmänhet nödvändiga för att öka jordbrukarnas produktivitet och därmed för att minska produktionskostnaderna. Kapitalinvesteringar leder dock inte nödvändigtvis till att prestationerna förbättras. Färska studier visar att EU: s jordbruk (sju EU- däribland Danmark, Tyskland och Storbritannien) verkar vara överkapitaliserat, (Petrick och Kloss, 2012), att anpassningen till robotmjölkningssystem i Sverige ger förbättringar i djurskyddet och arbetsförhållandena men förbättrar inte generellt gårdens lönsamhet (Bergman och Rabinowicz, 2013). Högre kapitalanvändning vid de svenska nötköttsgårdarna påvisades inte ha effekt på gårdens effektivitet (Manevska-Tasevska et al., 2013; Manevska-Tasevska et al., 2014).

Dessutom är den ekonomiska framgången för svenska producenter också kopplad till partnerskap, produktionsorientering (konventionell kontra ekologisk) och fodertillgång. Större fördelar med partnerskap erhålls för maskinintensiva grödor (Larsen, 2010). Ekologiska gårdar visar sig vara mer effektiva bara om inkomster från miljöersättningar inräknas. Foderkostnader svarar för den största andelen av de totala kostnaderna för animalieproduktion (Europeiska kommissionen, 2013a; Manevska-Tasevska et al., 2013). Därför finns det potentiellt störst besparingar för dessa kostnader. Svenska nötköttsgårdar med stora betesområden per djur och gårdar som ligger i regioner med längre betesperiod (vilket innebär billig utfodring för djuren) är i genomsnitt mer effektiva (Manevska-Tasevska et al., 2014).

Det finns stora regionala effektivitetsskillnader i Sverige. Spannmåls- och mjölkgårdar har i allmänhet visat sig ha bättre prestanda i den södra delen av Sverige (LRF, 2012). Svenska gårdar i mindre gynnade områden är i genomsnitt mindre effektiva än motsvarande företag i andra regioner, även om subventionerna inräknas vilket betyder att dessa områden i allmänhet inte har kompenserats för de konkurrensnackdelar som följer av de naturbetingade svårigheterna (Manevska-Tasevska et al., 2013; Manevska-Tasevska et al., 2014).

Även om gårds- och miljöstöd ges till lantbrukare i samtliga EU-länder för samma mål finns det inga entydiga resultat för hur jordbruksstödet påverkar gårdens effektivitet. Men

ett vanligt resultat är att beroendet av subventioner, eller en stor andel bidrag i de totala intäkterna, har en negativ inverkan på gårdens effektivitet (för alla inriktningar), samt att effekten av frikopplade stöd på gårdens effektivitet är huvudsakligen positiv.

Sammanfattning

Konkurrenskraft är ett relativt begrepp. Intuitivt handlar det om förmågan att hävda sig på marknaden mot andra producenter eller i det här fallet andra länder. Det finns inget vedertaget sätt att definiera och mäta konkurrenskraft. I denna rapport används därför ett flertal olika indikatorer. Dessa relateras dels till utvecklingen av produktion och handel och dels till olika mått på produktivitet och effektivitet.

Jordbrukssektorns totala produktion (inklusive tjänster och sekundära icke-separabla aktiviteter) utvecklades mellan 1990-2012 i paritet med EU11 men något långsammare än i de viktigaste konkurrentländerna. Under den senare delen av perioden fanns det en tendens till en snabbare produktionstillväxt. Produktionsökningen berodde huvudsakligen på vegetabilieproduktionen, tjänsterna samt de sekundära aktiviteterna medan animalieproduktionen kännetecknas av en svag utveckling även om förbättringar kan noteras under 2005-2012.

Sveriges negativa handelsbalans för livsmedel har försämrats ytterligare mellan 2005-2012 till följd av en snabbare ökning av importen än exporten. Detta återspeglar sig också i de index som mäter handelsprestationerna. Index över komparativa fördelar visar ett lågt men stabilt värde. Indexet jämför livsmedelsexportens andel i den totala exporten för Sverige med en motsvarande andel för EU. Motsvarande andelsberäkning på importsidan visar att det relativa importberoendet växer. Sveriges handelsutbyte med livsmedel kan karakteriseras av att liknande varor exporteras och importeras samtidigt, men tendensen har försvagats.

Olika indikatorer kan användas för att analysera de svenska lantbrukarnas relativa inkomstsituation. Det bör dock påpekas att inkomstjämförelserna mellan länderna är osäkra eftersom det finns en stor osäkerhet när det gäller omfattningen av arbetsinsatsen. Samtliga mått visar en tydlig förbättring över tiden från mitten av 2000-talet. Bruttoförädlingsvärdet per årsarbetskraft är lägre i Sverige än i EU i genomsnitt. Räknat per timme och för större företag står sig emellertid de tre viktigaste produktionsinriktningarna rätt väl. Vegetabilierna ligger i topp och mjölken något under. Även fläsk/fågel ligger över EU snittet. Dock ligger Sverige klart under de produktivaste länderna, Danmark och Nederländerna. LRFs analyser visar att företagarinkomsterna är jämförbara med andra EU-länder.

Effektivitet och produktivitet är viktiga aspekter av konkurrenskraften. Det svenska jordbruket i sin helhet uppvisar en snabb ökning av den totala faktorproduktiviteten (TFP)

jämfört med andra länder i EU, dvs. produktionen har växt snabbare än den totala användningen av produktionsfaktorerna. Den snabba tillväxten av TFP i Sverige beror främst på en kraftig minskning av arbetsinsatsen.

Produktivitet och produktivitetsutvecklingen kan jämföras mellan gårdarna för att bedöma effektiviteten. Effektivitet mäts som förmåga att producera mer utifrån samma resurser eller använda mindre resurser för samma produktionsmängd. Mätningen utgår från de effektivaste gårdarna i urvalet. I de studier där svenska gårdar jämfördes med utländska har svenska växtodlare visat sig ha samma effektivitet som tyska men tio procent lägre än holländska producenter. Jämförs svenska gårdarna med varandra kan den internationella konkurrenskraften inte bedömas. En låg genomsnittlig effektivitet visar dock att spridningen är stor och att många gårdar inte är effektiva. Den genomsnittliga effektiviteten är 90 % för mjölk men ligger under 80 % för nötkött. Det finns en betydande geografisk spridning av effektiviteten.

Storleksökning, specialisering och kapitalinvesteringar framställs ofta som medel att öka effektiviteten. Analyserna ger dock inte något tydligt stöd för dessa rekommendationer. Växtodlingsgårdar behöver växa i storlek medan nöt- resp. svingårdar behöver tekniska förbättringar. Mjölkgårdar befanns ha en optimal storlek. Högre kapitalanvändning vid de svenska nötgårdarna visades inte ha någon effekt på effektiviteten och varken specialisering eller storlek hade någon positiv effekt på effektiviteten.

Appendix A: Tabeller

Tabell A1: Sveriges jordbruksproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012 i milj. €. Källa: Eurostat uppgifter, 2013.

Produktion	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1. Vegetabilieproduktion	1 690	1 376	1 139	1 322	1 357	1 347	1 382	1 375	1 393	1 348	1 453	1 418	1 407	1 411	1 392	1 340	1 415	2 017	1 761	1 562	1 864	2 009	2 300
2. Animalieproduktion	2 166	1 947	1 996	2 027	2 071	1 867	1 866	1 897	1 816	1 790	1 851	1 864	1 820	1 779	1 810	1 731	1 749	1 816	2 066	1 783	1 934	2 041	2 080
3. Jordbruksvaror 1+2	3 857	3 323	3 135	3 349	3 428	3 214	3 248	3 271	3 209	3 138	3 304	3 281	3 227	3 190	3 202	3 071	3 164	3 833	3 827	3 345	3 798	4 050	4 380
4. Jordbrukstjänst	47	44	43	48	54	56	63	69	74	81	89	92	162	170	199	222	218	229	241	223	215	234	245
5. Jordbruksproduktion totalt 3+4	3 904	3 367	3 178	3 397	3 482	3 269	3 311	3 340	3 283	3 219	3 393	3 373	3 389	3 360	3 400	3 294	3 382	4 062	4 067	3 569	4 013	4 284	4 625
6. Sekundära icke-jordbruksaktivit.	70	66	64	73	82	86	96	107	116	127	139	158	224	205	220	267	326	339	344	265	318	321	256
7. ”Jordbruksindustri” 5+6	3 974	3 433	3 242	3 470	3 564	3 355	3 407	3 447	3 399	3 346	3 532	3 531	3 613	3 565	3 620	3 561	3 708	4 401	4 411	3 834	4 331	4 605	4 881

Tabell A2: Vegetabilieproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012 i milj. €. Källa: Eurostat uppgifter, 2013.

Länd	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sverige	1 690	1 376	1 139	1 322	1 357	1 347	1 382	1 375	1 393	1 348	1 453	1 418	1 407	1 411	1 392	1 340	1 415	2 017	1 761	1 562	1 864	2 009	2 300
Danmark	2 628	2 712	2 244	2 231	2 119	2 087	2 090	2 096	2 016	1 958	2 006	1 983	1 876	1 885	1 891	1 795	1 975	2 632	2 314	2 002	2 548	2 593	3 033
Tyskland	-	18 986	16 929	16 164	16 201	15 603	16 460	16 944	16 535	16 403	16 563	17 023	16 304	15 714	18 393	17 544	18 327	23 039	24 271	20 105	21 633	24 157	26 305
Irland	1 507	1 290	1 324	1 210	1 275	1 240	1 299	1 104	1 095	1 101	1 110	1 143	1 060	1 085	1 131	1 142	1 209	1 383	1 362	1 163	1 361	1 616	1 762
Nederländerna	-	8 206	7 864	7 481	8 004	7 682	7 873	8 455	8 691	8 822	9 232	9 261	9 430	9 584	9 309	9 464	10 480	11 071	10 573	9 674	11 078	11 003	11 348
Finland	305	1 722	1 556	1 636	1 445	881	888	921	740	842	919	858	947	835	879	923	956	1 282	1 176	1 064	1 134	1 435	1 449
Storbritannien	8 717	8 840	8 640	7 823	8 270	8 750	8 676	7 156	7 087	7 025	6 528	6 728	6 744	6 705	7 211	6 768	6 865	7 545	9 444	8 053	8 608	10 023	9 985
Polen	-	-	-	-	-	-	-	-	12 727	11 427	11 340	11 955	11 278	11 398	12 727	11 427	11 340	11 955	11 278	11 398	13 487	10 888	11 468

Tabell A3: Animalieproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012, i milj. €. Källa: Eurostat uppgifter, 2013.

Länd	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sverige	2 166	1 947	1 996	2 027	2 071	1 867	1 866	1 897	1 816	1 790	1 851	1 864	1 820	1 779	1 810	1 731	1 749	1 816	2 066	1 783	1 934	2 041	2 080
Danmark	3 463	3 560	3 792	3 458	3 485	3 438	3 632	3 770	3 301	3 184	3 673	4 011	3 610	3 281	3 520	3 534	3 645	3 642	3 862	3 617	4 108	4 636	5 143
Tyskland	-	19 098	18 848	16 804	16 316	15 748	16 587	16 933	15 601	15 743	17 390	18 630	16 746	16 723	17 651	18 389	19 182	20 459	22 221	18 834	20 235	23 998	24 409
Irland	4 778	3 910	4 213	4 312	4 195	4 004	3 986	3 662	3 512	3 261	3 303	3 267	2 949	2 945	3 074	3 036	3 116	3 469	3 470	2 850	3 498	4 180	4 478
Nederländerna	-	9 622	9 891	8 819	8 799	8 071	8 420	7 811	7 862	7 506	8 324	8 224	7 470	6 744	7 215	7 386	7 680	8 487	9 006	7 734	8 410	9 155	9 646
Finland	391	2 339	2 291	2 276	2 318	1 407	1 368	1 417	1 305	1 352	1 475	1 513	1 453	1 411	1 419	1 461	1 411	1 473	1 588	1 548	1 628	1 722	1 844
Storbritannien	12 717	11 962	12 587	13 474	13 975	12 917	12 509	11 945	10 007	9 391	9 366	9 798	9 803	10 074	10 178	10 157	10 157	10 440	12 441	12 173	12 655	13 981	14 835
Polen	-	-	-	-	-	-	-	-	11 378	10 248	11 139	12 088	11 527	11 102	13 076	13 665	13 367	14 887	14 254	14 482	15 146	16 804	17 873

Tabell A4: Jordbrukstjänst värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012, i milj. €. Källa: Eurostat uppgifter, 2013.

Länd	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sverige	47	44	43	48	54	56	63	69	74	81	89	92	162	170	199	222	218	229	241	223	215	234	245
Danmark	197	208	190	191	195	192	202	219	227	234	237	263	272	280	292	300	308	341	364	353	360	372	406
Tyskland	-	800	848	829	868	884	943	992	1 032	1 072	1 182	1 261	1 320	1 347	1 422	1 495	1 523	1 629	1 710	1 686	1 746	1 759	1 700
Irland	242	197	206	219	226	216	226	226	219	228	233	241	211	206	219	224	225	244	231	227	251	308	335
Nederländerna	489	1 208	1 277	1 228	1 192	1 073	1 097	1 171	1 238	1 358	1 483	1 683	1 955	1 837	1 910	2 003	2 230	2 328	2 496	2 438	2 526	2 569	2 608
Finland	8	49	54	55	59	61	65	59	57	55	54	46	48	56	65	54	69	72	78	73	72	75	81
Storbritannien	659	679	692	763	909	934	1 047	973	913	960	872	860	873	834	954	840	808	855	948	993	1 067	1 180	1 207
Polen	-	-	-	-	-	-	-	-	495	543	565	594	688	693	694	665	708	704	749	743	796	792	800

Tabell A5: Totalt jordbruksproduktion värde, i producent priser, justerat för köpkraftsstandard, för 1990-2012, i milj. €. Källa: Eurostat uppgifter, 2013.

Länd	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sverige	3 904	3 367	3 178	3 397	3 482	3 269	3 311	3 340	3 283	3 219	3 393	3 373	3 389	3 360	3 400	3 294	3 382	4 062	4 067	3 569	4 013	4 284	4 625
Danmark	6 288	6 480	6 226	5 881	5 799	5 716	5 924	6 085	5 544	5 377	5 916	6 257	5 758	5 446	5 703	5 629	5 928	6 615	6 539	5 972	7 015	7 600	8 582
Tyskland	-	38 885	36 625	33 797	33 385	32 235	33 990	34 869	33 168	33 218	35 135	36 914	34 371	33 784	37 466	37 428	39 031	45 127	48 203	40 625	43 615	49 913	52 414
Irland	6 528	5 397	5 744	5 741	5 696	5 460	5 511	4 992	4 826	4 590	4 647	4 651	4 220	4 237	4 424	4 402	4 550	5 097	5 062	4 239	5 110	6 104	6 575
Nederländerna	7 943	19 036	19 033	17 527	17 995	16 827	17 390	17 437	17 791	17 685	19 040	19 169	18 855	18 166	18 434	18 853	20 390	21 887	22 074	19 846	22 014	22 727	23 602
Finland	704	4 110	3 901	3 967	3 822	2 350	2 321	2 397	2 102	2 249	2 448	2 416	2 448	2 302	2 363	2 438	2 436	2 827	2 842	2 686	2 834	3 232	3 374
Storbritannien	22 092	21 480	21 920	22 060	23 153	22 601	22 232	20 074	18 008	17 376	16 766	17 386	17 421	17 612	18 343	17 764	17 830	18 841	22 833	21 219	22 331	25 184	26 028
Polen	-	-	-	-	-	-	-	-	24 600	22 218	23 043	24 638	23 493	23 193	27 257	25 218	25 544	31 368	30 344	28 196	30 535	36 398	37 895

Tabell A6: Revealed comparative advantage (RCA) index 1999-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013.

Länd	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Medelvärde 1999-2012	Medelvärde 1999-2004	Medelvärde 2005-2012
Sverige	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5
Danmark	3.4	3.5	3.4	3.2	3.2	3.5	3.3	3.0	3.0	2.8	2.6	2.7	2.6	2.5	3.1	3.4	2.8
Tyskland	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5
Irland	1.2	1.1	0.9	0.9	0.9	0.9	1.0	1.2	1.1	0.9	0.6	0.8	0.9	1.0	1.0	1.0	0.9
Nederländerna	2.3	2.3	2.4	2.4	2.3	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.8	1.8	2.1	2.3	1.9
Finland	0.4	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.5	0.4	0.4	0.4	0.4
Storbritannien	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.9	0.8
Polen	2.8	2.6	2.5	2.4	2.5	2.1	2.1	1.9	1.7	1.5	1.8	1.9	1.8	1.9	2.1	1.8	0.8

Tabell A7: Relativ import advantage (RIA) index 1999-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013.

Länd	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Medelvärde 1999-2012	Medelvärde 1999-2004	Medelvärde 2005-2012
Sverige	1.1	1.1	1.1	1.2	1.2	1.2	1.4	1.5	1.5	1.5	1.6	1.7	1.7	1.8	1.4	1.1	1.6
Danmark	2.8	3.3	3.0	2.9	2.8	2.6	2.6	2.7	2.7	2.6	2.3	2.9	2.7	2.7	2.8	2.9	2.7
Tyskland	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8
Irland	0.4	0.5	0.5	0.5	0.4	0.5	0.6	0.7	0.7	0.6	0.6	0.8	0.9	0.9	0.6	0.5	0.7
Nederländerna	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Finland	0.7	0.6	0.6	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.5	0.5	0.5
Storbritannien	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.0	1.0	0.9	0.9	1.0	1.0	1.0
Polen	1.5	1.2	1.3	1.1	1.0	1.0	1.0	1.0	0.9	-	0.8	0.8	0.8	0.8	1.0	1.2	0.9

Tabell A8: Genomsnittlig tillväxt av real inkomst index, 1990-1995, 1996-2004 och 2005-2012. Källa: egna beräkningar, Eurostat uppgifter, 2013.

Länd	1990 till 1995	1996 till 2004	2005 till 2012
Sverige	99%	102%	107%
Danmark	104%	99%	111%
Tyskland	103%	109%	104%
Irland	105%	100%	102%
Nederländerna	98%	96%	102%
Finland	103%	100%	105%
Storbritannien	109%	97%	105%
Polen	-	112%	106%
EU 11	104%	101%	101%

Tabell A9: Kedjeindex av den totala faktorproduktiviteten, 1990=100, 1995=0 för Sverige, och 2004=0 för Polen. Källa: egna beräkningar, RICA (FADN standard aggregerad) uppgifter, 2013.

Länd	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	200	2002	2003	2004	2005	2006	2007	2008	2009	Genomsnitt tillväxt 1991 till 2009
Sverige	-	-	-	-	-	107%	99%	93%	94%	94%	95%	95%	96%	99%	103%	102%	114%	115%	96%	100%
Danmark	104%	100%	99%	103%	102%	101%	102%	84%	94%	106%	101%	91%	93%	98%	113%	104%	98%	88%	87%	98%
Tyskland	100%	96%	91%	91%	88%	92%	94%	89%	91%	92%	91%	85%	85%	89%	89%	89%	94%	86%	82%	90%
Irland	102%	107%	111%	101%	97%	87%	91%	76%	77%	80%	79%	75%	77%	72%	72%	71%	71%	69%	63%	83%
Nederländerna	97%	91%	88%	94%	92%	91%	93%	86%	84%	91%	92%	87%	88%	85%	86%	89%	85%	80%	80%	88%
Finland	-	-	-	-	-	102%	100%	88%	93%	92%	89%	89%	85%	80%	75%	81%	93%	82%	81%	88%
Storbritannien	95%	99%	98%	98%	99%	97%	88%	80%	77%	84%	76%	76%	80%	76%	76%	78%	82%	85%	85%	86%
Polen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	97%	96%	101%	87%	85%	93%

Tabell A10: Basindex av den totala arbetskraften används på de svenska gårdarna med 2005=0. Källa: egna beräkningar, Eurostat uppgifter 2013. Källa: egna beräkningar av förändringen, Eurostat uppgifter, 2013.

Länd	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Förändring 1990/2005	Förändring 2013/2005
Sverige	138%	134%	132%	131%	129%	125%	121%	118%	112%	107%	106%	105%	104%	103%	102%	100%	99%	91%	87%	84%	79%	75%	72%	38%	28%
Danmark	167%	161%	158%	155%	148%	142%	141%	137%	130%	124%	120%	121%	115%	111%	106%	100%	97%	94%	92%	88%	86%	83%	83%	67%	17%
Tyskland		165%	164%	153%	143%	136%	131%	127%	125%	123%	118%	113%	109%	105%	102%	100%	98%	95%	93%	91%	90%	99%	92%	65%	8%
Irland	198%	176%	175%	170%	164%	156%	156%	144%	141%	129%	103%	103%	107%	111%	108%	100%	103%	101%	100%	99%	111%	111%	111%	98%	-11%
Nederländerna	116%	117%	119%	119%	115%	114%	117%	117%	115%	114%	113%	109%	107%	105%	104%	100%	98%	96%	94%	93%	91%	90%	87%	16%	13%
Finland	174%	169%	166%	159%	152%	146%	143%	139%	131%	123%	116%	113%	111%	111%	107%	100%	97%	95%	92%	90%	85%	84%	83%	74%	17%
Storbritannien	142%	139%	137%	134%	132%	129%	127%	125%	122%	118%	113%	110%	106%	103%	102%	100%	98%	96%	95%	93%	93%	95%	98%	42%	2%
Polen	-	-	-	-	-	-	147%	138%	125%	109%	109%	110%	99%	100%	100%	100%	100%	100%	100%	97%	92%	92%	92%	47%	8%
EU 11		146%	139%	132%	128%	124%	122%	120%	119%	114%	112%	111%	108%	104%	103%	111%	99%	97%	95%	92%	91%	89%	88%	46%	12%

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Kontakt

AgriFood Economics Centre
Box 730, 220 07 Lund
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