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Cost of production estimates for wheat, milk and pigs in selected EU member states

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Abstract

This study summarizes cost estimates based on the EU Farm Accountancy Data Network using the General Cost of Production Model, developed, applied and tested within the FACEPA project. Results are provided for wheat, pigs and milk for the main producer countries of the EU for the period 1999 to 2007. Estimated input-output coefficients are generally based on monetary figures, expressing cost shares referring to total output. Effects of scale, specialization and location can be derived by estimates based on respective sub-samples. Costs per unit are derived based on input-output coefficients and output values, providing costs per hectare or ton for wheat and per ton of milk. There is a considerable variation between Member States not only of production costs, but also of output, and output plus subsidies (due to the national implementations of full or partially decoupling schemes), especially for wheat and milk.

Key words: econometric analysis, production costs

JEL: C39, Q12

Kurzfassung

In dieser Studie werden Schätzungen von Produktionskosten basierend auf EU-Testbetriebsdaten unter Verwendung eines in dem EU-Forschungsprojekt FACEPA entwickelten Modells durchgeführt. Ergebnisse werden bereitgestellt für Weizen, Milch sowie für Schweine für die Hauptproduktionsländer der EU und für den Zeitraum 1999 bis 2007. Die geschätzten Input-Output Koeffizienten drücken die durchschnittlichen Kostenteile zum monetären Output des zugrundeliegenden Samples dar. Einflussfaktoren auf die Kosten wie Betriebsgröße, Standort und Spezialisierung können mittels Schätzung auf Basis entsprechend geschichteter Samples analysiert werden. Die Kosten je Einheit werden basierend auf den Schätzkoeffizienten und Outputs abgeleitet, und zwar je Hektar (für Weizen) sowie je Tonne für Weizen und Milch. Zwischen den Mitgliedstaaten bestehen erhebliche Unterschiede sowohl bei den Produktionskosten, dem monetären Output als auch den gekoppelten Direktzahlungen vor allem für Weizen und Milch.

Schlüsselwörter: ökonometrische Analyse, Produktionskosten

JEL: C39, Q12

Executive Summary

This study summarizes cost estimates based on the EU Farm Accountancy Data Network using the General Cost of Production Model, developed, applied and tested within the FACEPA project. Results are provided for wheat, pigs and milk for the main producer countries of the EU (Germany, France, Italy, Spain, The United Kingdom, Denmark, Belgium, The Netherlands, Sweden, Poland and Hungary).

Estimated input-output coefficients are generally based on monetary figures, expressing cost shares referring to total output. They are linear-proportional to output and are representing the average shares of the farm sample. Effects of scale, specialization and location can be derived by estimates based on respective sub-samples. Estimates are realized for all sample farms and specialized farms. Data are aggregated to 3 periods referring to Common Agricultural Policy (CAP) reforms and price development: 1999-2003 (Agenda 2000); 2004-2006 (the Mid-term Review before or including the first year of decoupling of direct payments) and 2007 (including decoupling and the rise of prices for milk and arable crops). Costs per unit are derived based on I-O coefficients and output values, providing costs per hectare or ton for wheat and per ton of milk. As quantities of sales of pigs are not available, respective unit costs can only be calculated referring to Livestock Units (LU) or heads.

Analysis of **yields** and **prices** over the whole period shows the large spread and variation between EU Member States. While yields of wheat generally decreased since 2004, there was a steady increase of milk yields. Prices of wheat and milk were decreasing due to CAP reforms until 2006; they strongly increased under the price boom in 2007.

Cost estimates for wheat are given per hectare and per ton of product. For **soft wheat,** crop specific costs per ton in Germany increased by one third and became the most important cost item in 2007. In France costs increased mainly due to increasing crop specific costs; as for other countries, energy costs are of minor importance. Denmark shows higher shares of overheads, depreciation and other fixed costs. Costs for **durum wheat** per ton in Italy are almost double those of soft wheat in other Member States.

Estimates per ton of **milk** show more similarities between countries regarding the development of costs and output level over time. **Shares** of feed costs on total output are 40 % in Spain and almost 50 % in Italy. However, crop specific costs are almost zero in both countries due to production systems with high shares of purchased roughage fodder. The share of energy costs varies from 3 to 10 % and for crop specific costs from almost zero to 10 %. Other specific costs are about 5 to 20 % in Italy and Germany, respectively. The income margin is almost 40 % in Belgium, The Netherlands, Poland and Italy and 25 % in Germany, France and Sweden.

Costs of **pigs** are referring to pig livestock units. As the production system is different between countries there are large regional differences of absolute cost values. Feed cost is the most important cost item. In all countries but Italy and Spain there is an increase over time mainly due to rising prices for cereals and proteins. Energy costs play a minor role while other specific costs, depreciation and other fixed costs are important in Germany, France, Denmark and the Netherlands. Output figures vary between Member States with highest levels in Italy and lowest levels in Spain and the United Kingdom. Margins vary over time due to pig price cycles and became negative in 2007 in almost half of considered countries due to rising feed costs.

Scale effects are analysed referring to economic size classes of specialized farms. In the case of **wheat** production costs per hectare in most cases are decreasing with the size of wheat area. In about half of the countries considered, small farms have very small or negative margins. Productions costs of **milk** are decreasing with the size of the dairy herd in Germany, Italy, Sweden and the Netherlands. Medium and large sized farms in most cases have higher output (prices) per ton of milk. Higher margins in medium and large sized farms are realised in Italy, Belgium and Netherlands. In some countries, scale effects are rather low. The variation of margins between countries is rather high. In the **pig** sector there is no clear tendency of costs and margins by farm size. This might partly be influenced by the heterogeneity of production systems, where breeding is often concentrated in smaller farms and fattening in larger farms. Compared to milk there is a higher share of farm groups with low or negative margins.

It can be **summarized**, that in addition to costs also the returns should be considered simultaneously to get a full picture of the economic performance. Although most of the results look reasonable there are still some ‘outstanding results.’ Some of these problems could be solved by a further check of the data and application of the method only for large samples.

Zusammenfassung

Im Rahmen dieser Studie werden Schätzungen von Produktionskosten basierend auf EU-Testbetriebsdaten (FADN) unter Verwendung eines in dem EU-Forschungsprojekt FACEPA entwickelten Modells durchgeführt. Ergebnisse werden für Weizen, Milch sowie für Schweine für die Hauptproduktionsländer der EU (Deutschland, Frankreich, Italien, Spanien, Großbritannien, Dänemark, Belgien, Niederlande, Schweden, Polen und Ungarn) dargestellt.

Die geschätzten Input-Output Koeffizienten drücken die durchschnittlichen Kostenteile zum monetären Output des zugrundeliegenden Samples dar. Einflussfaktoren auf die Kosten wie Betriebsgröße, Standort und Spezialisierung können mittels Schätzung auf Basis entsprechend geschichteter Samples analysiert werden. Für die Schätzungen werden die

Daten mit Bezug zu den Rahmenbedingungen der EU Agrarpolitik zu 3 Perioden zusammengefasst: 1999-2003 (Agenda 2000); 2004–2006 (Halbzeitbewertung vor bzw. einschließlich des ersten Jahres der Entkopplung der Direktzahlungen) sowie 2007 (einschließlich der Entkopplung sowie des starken Anstiegs der Preise für Milch und pflanzliche Produkte). Die Kosten je Einheit werden basierend auf den Schätzkoeffizienten und Outputs abgeleitet, und zwar je Hektar (für Weizen) sowie je Tonne für Weizen und Milch. Da die Verkaufsmengen an Schweinefleisch nicht in den Daten verfügbar sind, beziehen sich die für Schweine ausgewiesenen Ergebnisse auf die Vieheinheit Schweine insgesamt.

Die **Erträge und Preise** weisen im zugrunde liegenden Zeitraum relativ große Unterschiede zwischen den EU-Mitgliedstaaten auf. Während die Hektarerträge von Weizen seit 2004 zurückgingen, stiegen die Milcherträge je Kuh kontinuierlich an. Die Preise für Weizen und Milch nahmen infolge der Stützpreissenkung im Rahmen der Reformen der EU-Agrarmarktpolitik bis 2006 ab; unter dem Preisboom in 2007 sind sie jedoch stark angestiegen.

Die Ergebnisse der Kostenschätzung für **Weizen** werden je Hektar und pro Tonne ausgewiesen. In Deutschland stiegen die spezifischen Kosten pro Tonne für Weichweizen um ein Drittel an. Auch in Frankreich ist eine erhebliche Zunahme festzustellen, während die Energiekosten von geringerer Bedeutung waren. Dänemark zeigt höhere Anteile bei den Gemeinkosten sowie Abschreibungen. Die Kosten für Hartweizen in Italien liegen je Hektar auf Niveau von Weichweizen in den anderen Ländern; bezogen auf eine Tonne belaufen sie sich auf annähernd das Doppelte.

Die Schätzungen pro Tonne **Milch** zeigen geringere Unterschiede zwischen den Ländern bezüglich der zeitlichen Entwicklung. Auf Futterkosten entfallen die höchsten Anteile in Spanien (40 %) und Italien (fast 50 %). Der Anteil der Energiekosten variiert zwischen 3 und 10 % und der spezifischen Kosten der pflanzlichen Produktion (für die Erzeugung von Grundfutter und selbsterzeugten Getreides) zwischen 0 und 10 %. Die sonstigen spezifischen Kosten belaufen sich auf 5 bis 20 % des Outputs in Italien und Deutschland. Die Nettowertschöpfung bezogen auf den Output ist mit 40 % am höchsten in Belgien, den Niederlanden, Polen und Italien; in Deutschland, Frankreich und Schweden beträgt sie 25 %.

Die Kosten für **Schweine** beziehen sich auf eine Schweine-Vieheinheit. Da das Produktionssystem zwischen den Ländern verschieden ist, gibt es große regionale Unterschiede in den absoluten Kostenniveaus. Futterkosten sind die wichtigste Kostenart. Mit Ausnahme von Italien und Spanien ist eine starke Zunahme hauptsächlich wegen steigender Preise für Futtermittel festzustellen. Energiekosten spielen eine geringere Rolle, während sonstige spezifische Kosten, Abschreibungen und Gemeinkosten in Deutschland, Frankreich, Dänemark und den Niederlanden bedeutender sind. Der Output weist große Unterschiede

zwischen den Mitgliedstaaten auf mit dem höchsten Niveau in Italien und dem niedrigsten in Spanien und Großbritannien. Aufgrund niedriger Schweinepreise und stark gestiegenen Futterkosten ergeben sich in der Hälfte der betrachteten Länder negative Einkommen.

Unterschiede in den **Kosten in Abhängigkeit von der Betriebsgröße** werden analysiert auf Basis von Samples von Betrieben mit Erzeugung des betreffenden Produktes, differenziert in jeweils drei Gruppen nach Anbaufläche für Weizen, Milchkühen bzw. Vieheinheiten Schweine. Im Fall von Weizen sind in den meisten Ländern mit dem Anbauumfang sinkende Produktionskosten pro Hektar festzustellen. In etwa der Hälfte der betrachteten Länder erzielen kleine Betriebe nur sehr geringe oder negative Einkommen im Weizenanbau. Die Produktionskosten von Milch nehmen mit der Größenklasse des Milchviehbestandes in Deutschland, Italien, Schweden und den Niederlanden ab. Mittlere und große Betriebe erzielen in den meisten Fällen etwas höhere Erlöse je Tonne Milch. In mittleren und großen Betrieben werden in Italien, Belgien und den Niederlanden höhere Einkommen erzielt. In einigen Ländern sind allerdings nur geringe Skaleneffekte zu verzeichnen. Im Schweinesektor zeichnen sich keine klaren Tendenzen in den Kosten und Einkommen in Abhängigkeit von der Betriebsgröße ab. Im Vergleich zu Milch gibt es einen höheren Anteil von Betriebsgruppen mit niedrigen oder negativen Einkommen.

Zusammenfassend ist festzustellen, dass bei überregionalen Vergleichen eine alleinige Betrachtung der Kosten nicht hinreichend ist, sondern dass die Erlöse und Einkommen simultan mit zu berücksichtigen sind. Obwohl die meisten Schätzergebnisse plausibel erscheinen, gibt es dennoch einige ‚Ausreißer', die u. a. auf die Modelspezifikation zurückzuführen sind. Einige dieser Probleme könnten durch eine weitere Überprüfung der Daten bzw. Anwendung des Modells nur für große Samples behoben werden.

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Abbreviations

FACEPA	Farm Accountancy Cost Estimation and Policy Analysis of European Agriculture
FADN	Farm Accountancy Data Network
FSS	Farm Structure Survey
GECOM	General Cost of Production Model
LU	Livestock Unit

Country Codes

BEL	Belgium
DAN	Denmark
DEU	Germany
ESP	Spain
FRA	France
HUN	Hungary
ITA	Italy
NED	Netherlands
POL	Poland
SVE	Sweden
UKI	United Kingdom

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1 Introduction

Standard farm-accounting information is typically restricted to aggregate or whole-farm input expenditures, without revealing production costs per unit of each enterprise's output[1]. Obtaining information on the per-unit production costs for the individual activities, measured by so-called input-output coefficients, is particularly important, both from a business-management and agricultural-policy perspective. Specifically, farmers may need this kind of information for evaluating the performances of their individual enterprises. Moreover, information on enterprise-level costs of production may be helpful in preparing activity budgets, planning yearly operations, applying for operational loans, and analyzing alternative marketing strategies. Likewise, policy-makers may want to have such kind of information, as it would considerably improve their capability of properly assessing the consequences of agricultural policy and technology scenarios on the economic performances of different types of farms. If aggregated to higher levels, costs shares derived from farm accounting data may also provide a source of up-to date information for aggregated economic agricultural sector models.

Direct collection of enterprise-level information via farm surveys is time-consuming and costly, and existing studies are therefore often limited to small samples. Alternative tools based on econometric techniques may offer an attractive alternative for obtaining reliable estimates of unit cost of production in agriculture at a significantly lower cost. It is the purpose of the research project *Farm Accountancy Cost Estimation and Policy Analysis of European Agriculture* (FACEPA) to implement this approach for the estimation of cost of production using existing information from Farm Accountancy Data Networks (FADN) for the EU and national Member States.

The study summarizes cost estimates based on EU-FADN using the 'General Cost of Production Model' (GECOM) developed, applied and tested within the FACEPA project. The report includes a short description of the econometric model and data processing. Results are given for 3 main products (wheat, pigs and milk) for main producer countries[2] (Germany, France, Italy, Spain, The United Kingdom, Denmark, Belgium, The Netherlands, Sweden, Poland and Hungary). Data are pooled for three periods, which refers to breaks in price developments: the first: 1999–2003; the second: 2004-2006; and the third: 2007. In addition to average figures, results are differentiated by farm size to identify possible scale effects.

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[1] See http://www2.ekon.slu.se/facepa/documents/FACEPA_DoW_2010_11_05.pdf.

[2] A list of country codes is given in Annex1, Table A1.3.

2 Methodology and data

2.1 Methodology

The econometric model aims at the estimation of Input-Output coefficients (better I-O shares) based on Farm Accounting Data of EU- or national FADNs. The principles were developed by POLLET et al. (2001) and PINGAULT and DESBOIS (2003). Within the FACEPA project, the method is further developed, tested in countries of project partners and applied using improved and more user-friendly software packages (OFFERMANN, 2011; KLEINHANß, 2011; OFFERMANN and KLEINHANß 2011).

The model estimates input-output coefficients from FADN data. To estimate the cost-allocation coefficients from farm accounting data a set of linear equations is considered where the derived demand from farm f for each input i is represented as a function of several outputs k. The output of the various products is denoted y_k (k = 1,..,K) and the x_i (i =1,...I) represent the non-allocated costs of the production factors. Assuming I inputs used by F farms to produce K outputs the set of equations can be written as (PEETERS and SURRY 2003):

$$x_{if} = \sum_{k=1}^{K} \beta_{ik} y_{kf} + u_{if} \ , \qquad [1]$$

where

- x_{if} is the total cost of input *i* paid by farm *f* (including subsidies and net value added),
- y_{kf} is the total value of output *k* produced by farm *f*,
- β_{ik} is the unknown technical production coefficient, which is defined as the average (for all farms) expenditure on input i required to produce one unit of output value *k*,
- u_{if} is the error term specific to each input and farm.

On each farm f, the observed costs in input i differ from the theoretical costs by a random term u_{jf} of zero expectation and is independent from one farm to the next. In order to achieve the accounting consistency of the model, a constraint ensures that the sum of output values equals the sum of input costs plus net value added the model is estimated subject to:

$$\sum_{k=1}^{K} \beta_{ik} = 1 \qquad [2]$$

This equation ensures that the production coefficients add up to one. Equations are specified without constant term. For the FACEPA project, the production cost analysis includes up to 18 aggregated input categories, including subsidies (defined as negative in-

put) and net value added, as well as 31 output categories. The model was estimated using SAS based on the so-called seemingly unrelated regression (SUR) procedure ('PROC SYSLIN'). A complete description of the GECOM model, the econometric specifications and estimation procedures is given in Surry et al., (forthcoming).

The subsidies enter the model as an independent variable with negative values. Thus, it is possible to derive the average amount of subsidies associated with the production of one unit of output value k. The net value added is composed of the sum of output value plus subsidies minus input costs. Using the aforementioned nomenclature this relation can be written as:

$$\text{Net value added}_{\text{f}} = \sum_{k=1}^{K} y_{kf} - \sum_{i=1}^{I-1} x_{if} \qquad [3]$$

If p_k is the price of one ton of output k , the unit cost of production per ton in x_i for y_k is:

$C_{ik} = \beta_{ik} * p_k$

Similarly, it is also possible to calculate costs per hectare or per livestock unit.

Input-output (I-O) coefficients are generally based on monetary figures, expressing cost shares referring to total output. They are linear- proportional to output and are representing the average shares of the farm sample. Effects of scale, specialization and location can be derived by estimates based on respective sub-samples.

The method has some limits: estimates are sensitive to outliers, the problem of multicollinearity exists and estimates are sometimes unstable for small samples. As a general rule, a minimum sample size of at least several hundred observations is required.[3] For this study, a procedure developed by vTI is used to delete observations with outliers (BAHTA et al., 2011).

2.2 Data

The Farm Accountancy Data Network (FADN) is a European system of sample surveys conducted every year to collect structural and accountancy data on farms, with the aim of monitoring the income and business activities of agricultural holdings and evaluating the impact of the measures taken under the Common Agricultural Policy. The FADN survey covers only farms above a minimum size (threshold) in order to include the most relevant

[3] Entropy estimators may provide an alternative for small samples (BERNER et al., 2011).

part of the agricultural activity of the EU Member States, i. e. at least 90 % of the total standard gross margin covered in the Farm Structure Survey (FSS). For 2007, the sample consists of approximately 78.000 holdings in the EU-27, which represent 5.4 million farms (39 %) out of a total of some 14 million farms included in the FSS.[4]

Given the great variety within the FADN field of observation, stratified sampling is applied to ensure that the sample of farms adequately reflects this heterogeneity. Stratification as well as procedures and methodology to select sample farms vary among Member States. Weighting factors are used to extrapolate the EU FADN sample. These weighting factors also have to be taken into account when specifying a cost of production model which aims to reflect the input-output allocation on the Member State level to prevent distorted results. An analysis of the representativeness of the EU-FADN comparing a set of various structural variables between EU-FADN and the FSS (HANSEN et al., 2009) indicate that, on an EU average, the coverage and representativeness is relatively large for the variables under study. However, considering the single Member States reveals that in some cases significant differences exist cross-sectionally.

For this study, information from the EU FADN covering the period 1999–2007 was used. To increase robustness of results and facilitating interpretation, yearly data were aggregated to 3 periods (referring to CAP reforms and price development): 1999–2003 (Agenda 2000); 2004–2006 (the Mid-term Review before or including the first year of decoupling of direct payments) and 2007 (including decoupling and the rise of prices for milk and arable crops).

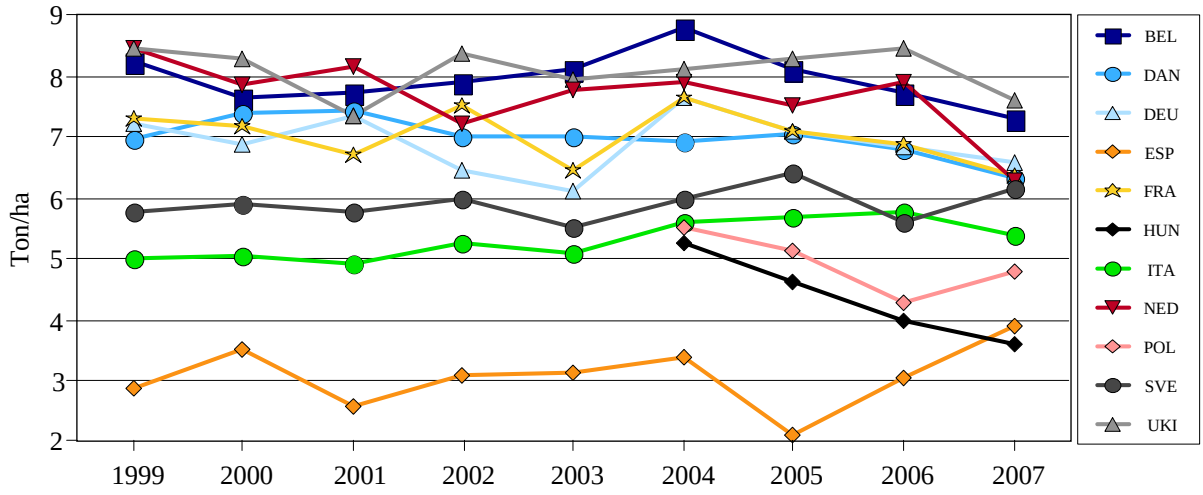
Costs per unit are derived based on I-O coefficients. This is done for costs per hectare or ton for arable crops and per ton of milk. As quantities of sales of pigs are not available, unit costs can only be calculated referring to Livestock Units (LU) or heads. In the analysis we use LU as denominator. Although the model is rather differentiated with regard to cost categories, we aggregate costs into main cost categories for the description of results (see Annex 1, Tables A1.1–A1.3). The income indicator used for the estimation is rather close to the definition of net value added, i. e. income in the following equals revenues including coupled subsidies minus all costs excluding land, labour and capital.

[4] http://ec.europa.eu/agriculture/analysis/fadn/index_en.htm

3 Trends in yields and prices

Figure 1 shows the development of yields of **soft wheat** derived from FADN data in the EU Member States considered. There is a wide spread of yields of about 3 tons/ha in Spain and of 8–9 tons/ha in the United Kingdom and Belgium, which is mainly determined by natural conditions. Yield trends can be characterized as follows: Almost stable yields from 1999–2001, decreasing yields until 2003, yield increases in 2004 and decreasing yields since then. In contrast to this trend there are some exceptions: almost stable yields over the whole period in Denmark and Sweden, increasing yields from 2003 to 2006 in Italy, low yields in Spain in 2005 due to draught and almost doubling of yields until 2007. In Poland and Hungary yield levels are below all other Member States but Spain; due to weather conditions yields decreased until 2006 in Poland and until 2007 in Hungary.

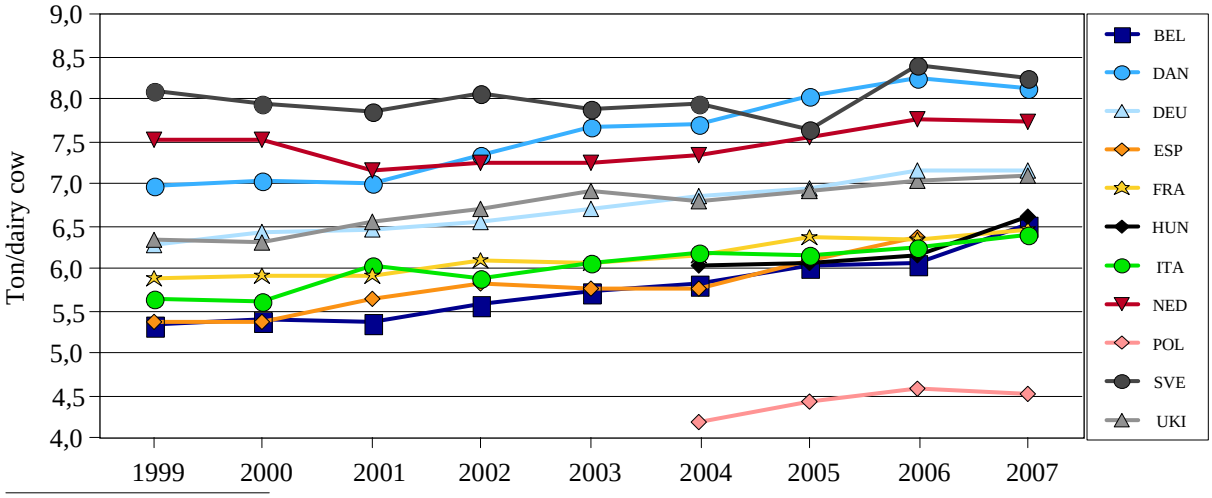
Figure 1: Development of yields of soft wheat per hectare



Source: EU-FADN-DG AGRI L-3; FACEPA.

Milk yields per dairy cow were rather stable from 1999 to 2001 (Figure 2). Since then they continuously increased until 2007, resulting in an accumulated increase by approximately 1 ton/cow in most countries. Milk yields are much below averages in Poland but increased by about 0.5 ton/cow since accessing the EU. Yields in Hungary are slightly below EU average yields. Yields are highest in Sweden, Denmark and The Netherlands, of which Denmark shows highest increases of about 1.5 tons/cow in the underlying period.

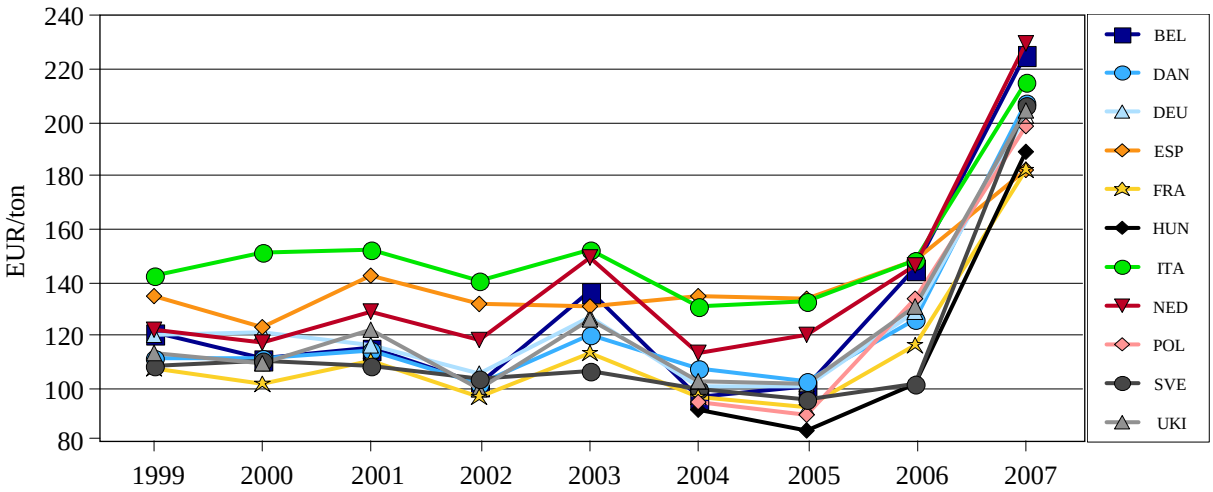
Figure 2: Development of milk yields per dairy cow



Source: EU-FADN-DG AGRI L-3; FACEPA.

The development of **soft wheat prices** is shown in Figure 3. There is a price spread of about 40 EUR/t between Member States, with Italy at the top level, and France, Sweden and Hungary at the lowest level. From 1999 to 2005 there was a decreasing price trend with a recovery in 2003. This development is mainly determined by lowering intervention prices during CAP reforms. While prices in this period were mainly determined by supply, they became demand driven in the later years. While prices in 2006 moved up to 2003 level, they drastically increased by more than one third in 2007, and the price spread became smaller. Highest prices were reached in the Netherlands and Belgium.

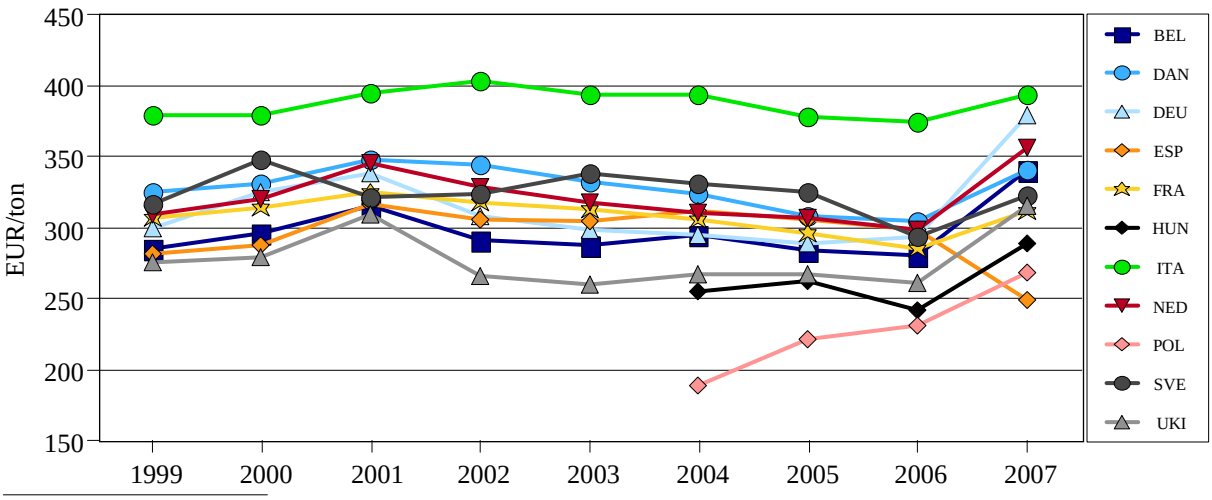
Figure 3: Development of soft wheat price



Source: EU-FADN-DG AGRI L-3; FACEPA.

Milk prices increased until 2001 and then decreased due to milk market reform with a lowering of intervention prices (Figure 4). The price increase in 2007 is above average in Germany, while surprisingly there were decreasing milk prices in Spain. Italy shows the highest milk price level, while it is lowest in the United Kingdom. Prices are even lower in Poland and Hungary, however in Poland they increased by more than 70 EUR/t since EU membership.

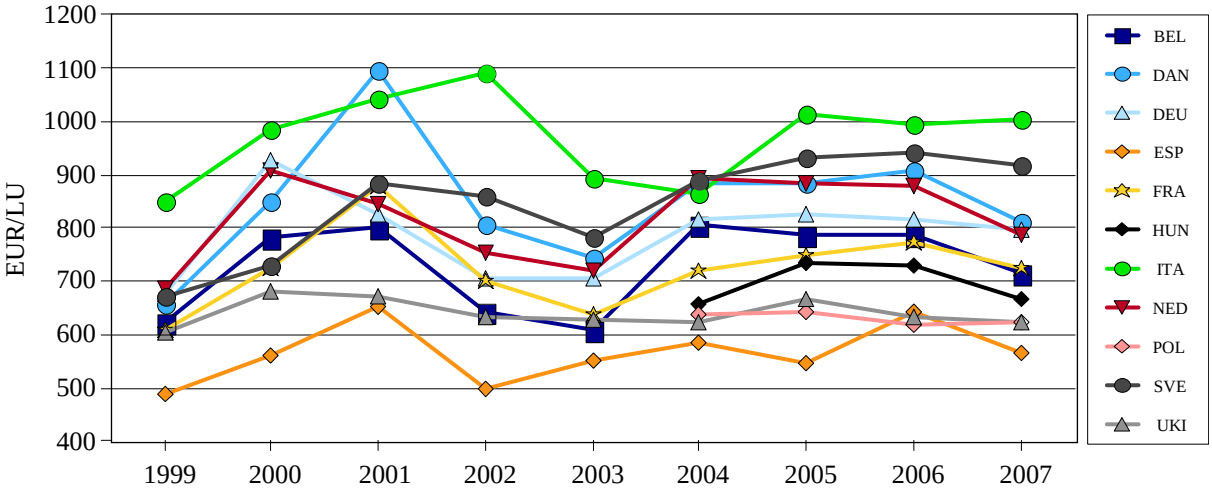
Figure 4: Development of milk price



Source: EU-FADN-DG AGRI L-3; FACEPA.

Prices of pork can't be derived from FADN data because slaughter weights are not available. Therefore pig prices are represented by sales value per Livestock Unit (LU); see Figure 5. As the intensity of pig production differs, there is a large spread of pig output from 500 to 1.000 EUR/LU. In some of the Member States, like Sweden and the United Kingdom, prices are rather stable in time, but there is a considerable variation in Denmark, Italy and Germany. The price development is largely influenced by pig price cycles, although yearly averages don't show the rather large variations which are observed in shorter time periods.

Figure 5: Development of pig output



Source: EU-FADN-DG AGRI L-3; FACEPA.

4 Results of cost estimations

In the following, results are presented for selected EU Member States estimates based on the total sample. In a further step, results are shown differing by farm size based on sub-samples of farms with positive output values of products considered. In a last step results are aggregated for Member States of EU-15 and EU-10, respectively.

4.1 Estimates by Member States

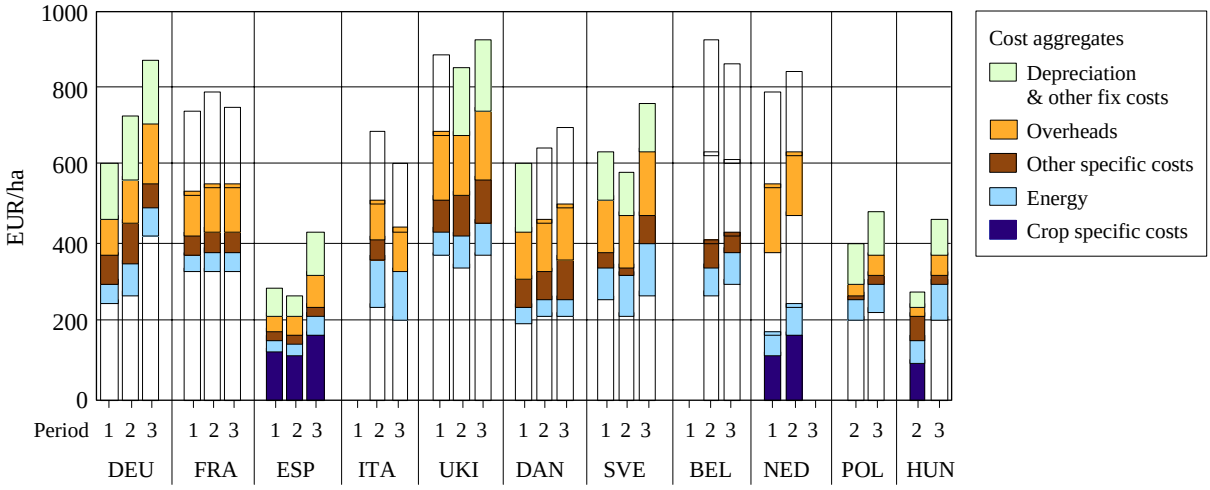
4.1.1 Production costs for wheat

As mentioned before estimates were realised summarizing observations for three periods, 1999 to 2003, 2004 to 2006 and 2007. Instead of soft wheat we included durum wheat for Italy, which is more important considering market shares and reliability of the estimates.

Figure 6 shows costs aggregated over different items.[5] To get an impression on income, the total of output as well as output plus coupled subsidies is shown in Figure 7. In the income figure (Net Value Added) coupled subsidies are included. In Germany costs per hectare continuously increased, being mainly driven by crop specific costs of 250 EUR/ha in the first period to 420 EUR/ha in the last period. Costs for energy vary between 50 and 90 EUR/ha. Depreciation and other fixed costs are about 150 EUR/ha and therefore an important cost factor. Output was almost stable in the first and second period and increased by half in the last period. Due to decoupling, the share of coupled subsidies fell from 320 EUR/ha in the first period to almost zero in the last period. The income of 525 EUR/ha in the first period fell to one-third in the second, and recovered in the third period. Costs in France were rather stable over time. Output is a little lower than in Germany while the subsidy level is higher and still existing in the third period due to ongoing coupling of one quarter of arable crop payments. Income shows a similar tendency as in Germany. Costs in Spain are at the lowest level in EU-15 and close to those of Poland and Hungary. Costs increased by almost half in 2007, which is mainly determined by rising variable costs related to higher yields. Compared to yields, income was rather stable at around 300 EUR/ha.

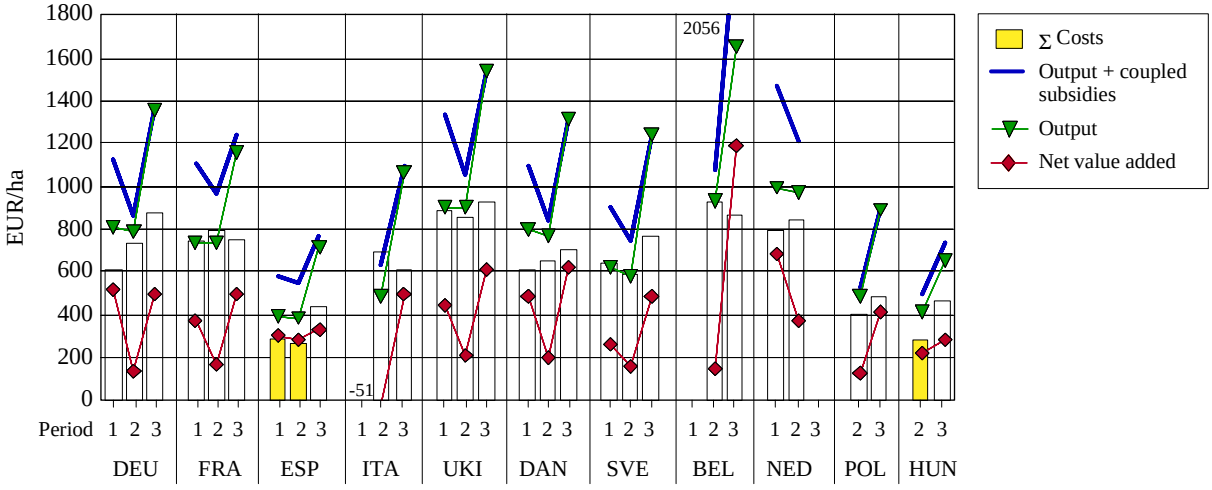
[5] See Annex 1, Table A1.2. Referring to the definition of Net Value Added ‘LANDCO’ is included in the NetValAd shown in the figures. Details of cost estimates including statistical test values are given in Annex 2, Tables A2.1–A2.3.

Figure 6: Costs of wheat production per hectare by periods (Italy: durum wheat)



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Figure 7: Costs, output and income of wheat production (Italy: durum wheat)



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

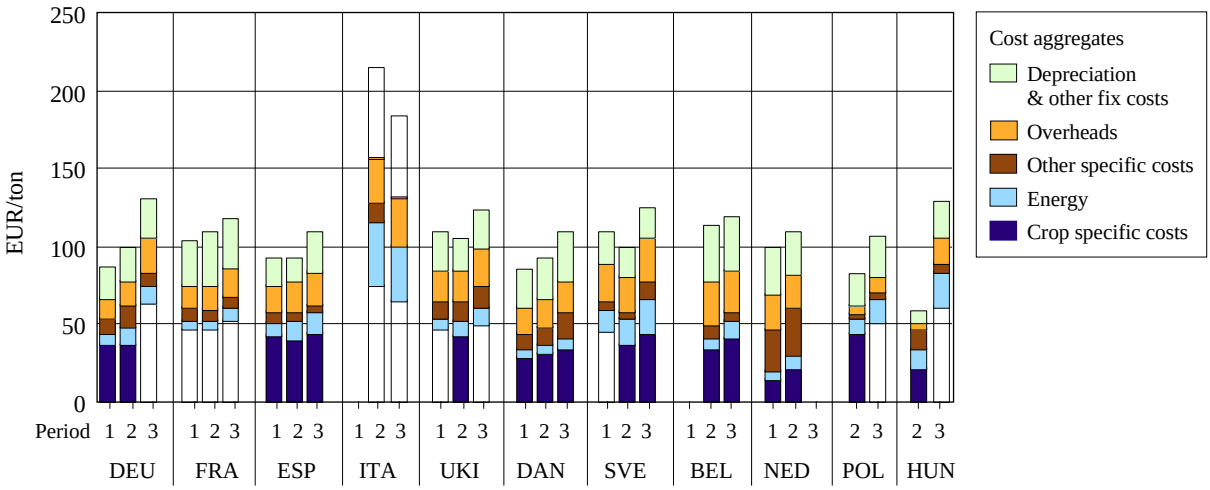
Cost estimates for Italy refer to durum wheat. Costs are at the level of soft wheat in other Member States. Income was negative in the second period due to the implementation of decoupling of most subsidies, but it recovered in the third period thanks to the rise of product price.

Costs in the United Kingdom were relatively high (about 900 EUR/ha) and almost stable in time, as were individual cost items. While output was at the total cost level, it increased to 1.550 EUR/ha in 2007. Income shows the same development and levels as in France and Germany. Total costs in Denmark and Sweden are similar but with a higher

share of energy costs in Sweden. The output level is slightly higher in Denmark and hence income as well. Costs for The Netherlands are only plausible in the first and second period; they are slightly increasing while incomes lowered due to decoupling. Estimates for Poland and Hungary only cover the second and third period. Costs were about 400 EUR/ha in Poland and 300 EUR/ha in Hungary in the second period; they increased to 450 EUR/ha in both countries in the third period. Output increased by two thirds. As in the New Member States subsidies are almost fully decoupled under the SAPS regime (Single Area Payment Scheme) they don't influence the income development. Income (Net Value Added) increased from about 150 to 350 EUR/ha.

Due to the large variation of yields **costs referring to quantities produced (ton)** are more appropriate for an EU-wide comparison (see Figures 8 and 9). Costs for **durum wheat** in Italy are almost double those of soft wheat in other Member States. In the second period costs were considerably higher than output, which indicates that durum production without coupled subsidies was not competitive at that time. However it became competitive in 2007 thanks to high prices.

Figure 8: Costs structure per tonne of soft wheat production (Italy: durum wheat)

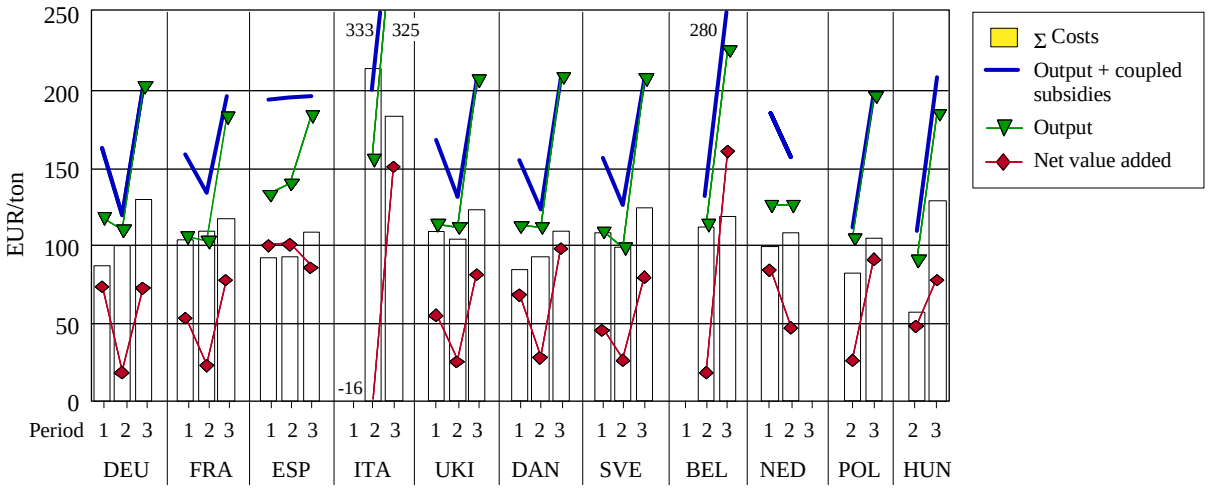


Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

For **soft wheat,** crop specific costs in Germany increased by one third and became the most important cost item in 2007. In France costs increased from 105 to 120 EUR/t mainly due to increasing crop specific costs; as for other countries, energy costs are of minor importance. In the United Kingdom the cost level is close to France but with a lower cost level in the second period. In the first and second period costs were equal to output imposing low incomes without subsidies. Cost level and development in Denmark is close to Germany but with a higher share of overheads, depreciation and other fixed costs. Costs in Sweden show a comparable development to the United Kingdom but with a higher share of energy costs. Costs in The Netherlands were rather stable in the first and

second period. Costs in Poland are a bit lower in the two considered periods with high shares of variable costs. In Hungary costs were only 60 EUR/t in the second period, but doubled in the third period.

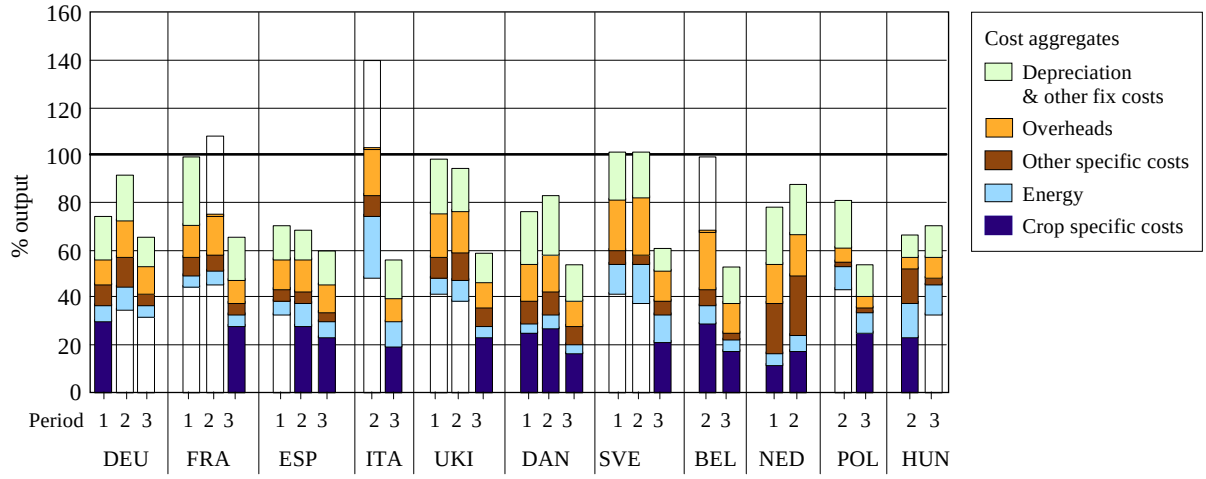
Figure 9: Costs, output and income of soft wheat production (Italy: durum wheat), per tonne



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Cost shares for wheat are shown in Figure 10 and Annex 3, Table A3.1. As mentioned earlier, costs for land, labour and capital are not included in the cost aggregates and therefore the share of total costs is less than 100 % in most cases, even if not regarding subsidies. Energy costs are around 5 to 15 % of output. Especially depreciation and other fixed costs show a high variation between countries.

Figure 10: Cost shares (aggregated) of wheat referring to output



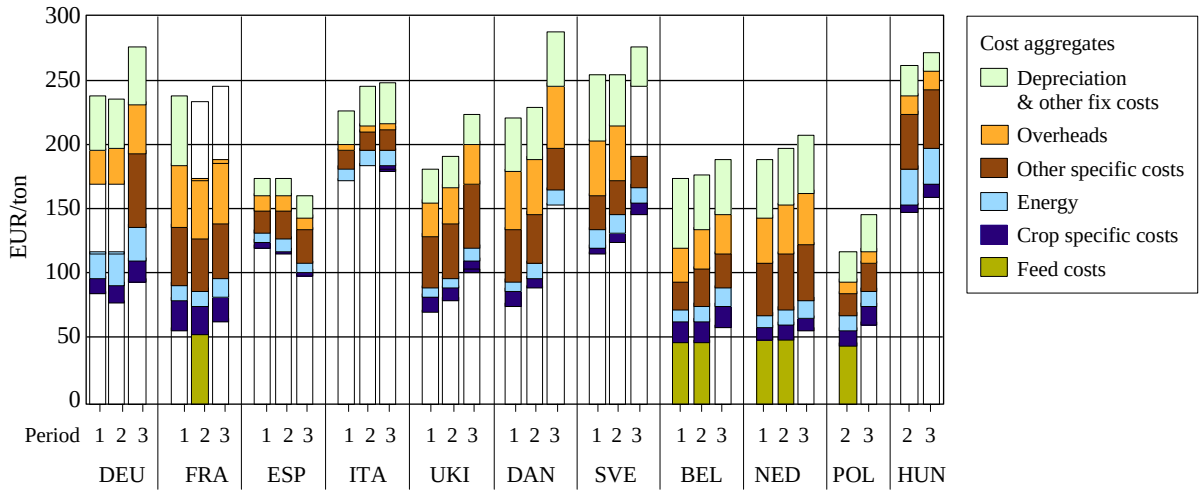
Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Generally, the results show that production costs per ton of wheat increased over the three periods in most countries. While costs as a share in total output increased from periods one to period two, in 2007 the increase in output prices was higher than that of input prices, leading to higher incomes of producers.

4.1.2 Production costs of milk

Cost estimates per ton are shown in Figures 11 and 12. Compared to wheat there are more similarities between countries regarding the development of costs and output level over time. While costs were stable in the first and second period, they increased in 2007 mainly due to increasing feed costs. Total cost level is quite different with costs of 220 to 280 EUR/ton in Germany, France, Italy, Denmark and Sweden. With the exception of Italy, price levels and income development are quite similar. Milk prices in Italy are highest, and with costs of around 250 EUR/t, the income is high and almost double that of farms in France.

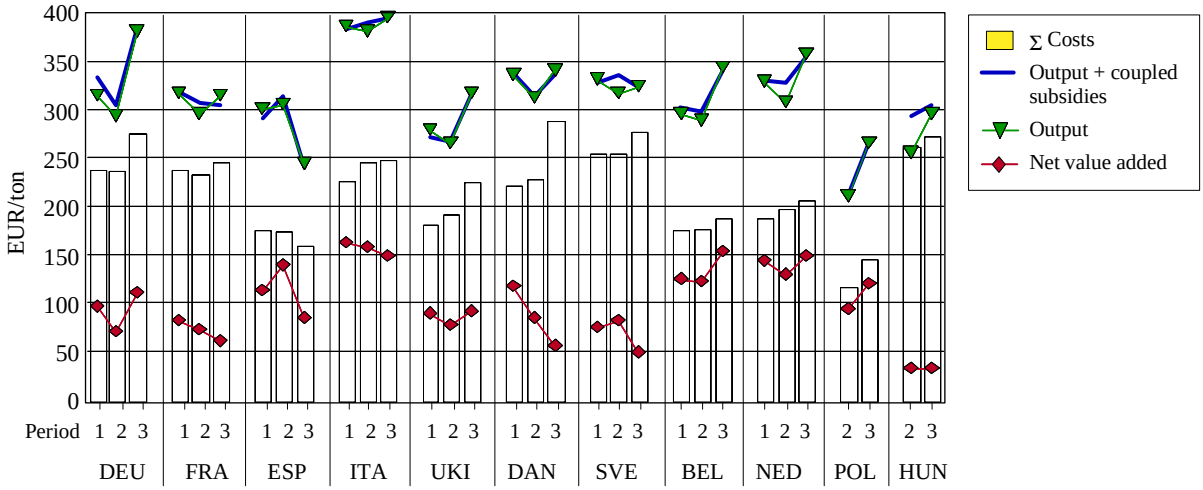
Figure 11: Cost structure of milk production



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Lower costs with 170 to 200 EUR/t are given for Spain, the United Kingdom, Belgium and the Netherlands. Income in Belgium and The Netherlands is rather high. While costs are lowest in Poland, Hungary ranges at the top level, and the income situation is worse in Hungary. What's interesting is the different cost structure, especially between feed and remaining cost categories. While feed costs are around 60 EUR/t of milk in France, Belgium and The Netherlands, they reach 160 to 180 EUR/t in Italy and also relatively high levels in Spain and Sweden. Some of these differences might be due to high shares of purchased concentrated and roughage feed.

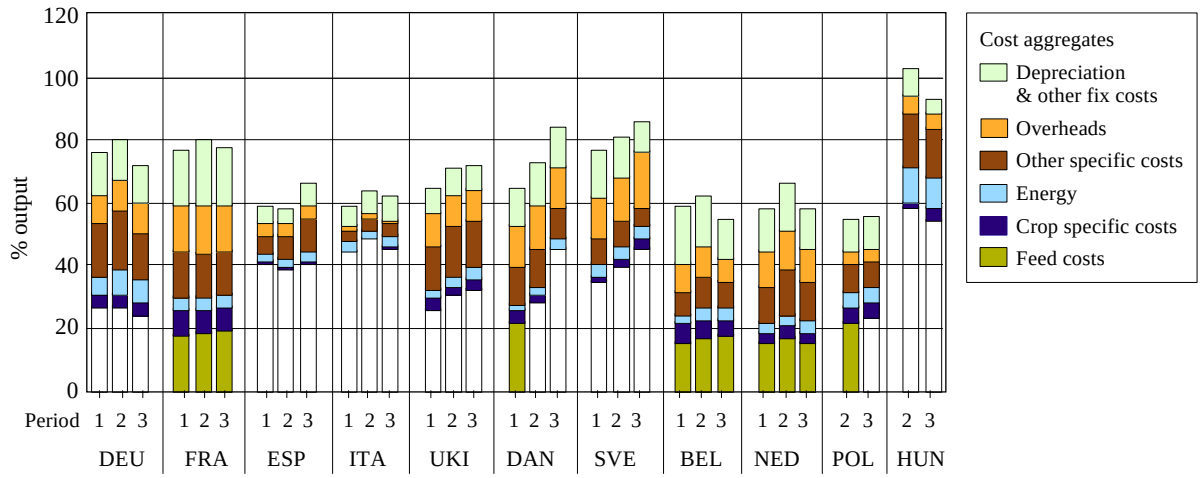
Figure 12: Costs, output and income of milk production



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Regarding **cost shares** shown in Figure 13 and Annex 3, Table A3.2, there are high shares of feed costs of 40 % in Spain and almost 50 % in Italy. On the other side crop specific costs are almost zero in both countries due to production systems with high shares of purchased roughage fodder. The share of energy costs vary from 3 to 10 % and for crop specific costs (implicit costs for roughage fodder production) from almost zero to 10 %. Other specific costs are about 5 to 20 % in Italy and Germany, respectively. Cost shares for overheads as well as depreciation and other fixed costs are in the same magnitude. The income share is almost 40 % in Belgium, The Netherlands, Poland and Italy and 25 % in Germany, France and Sweden.

Figure 13: Cost shares (aggregated) of milk production

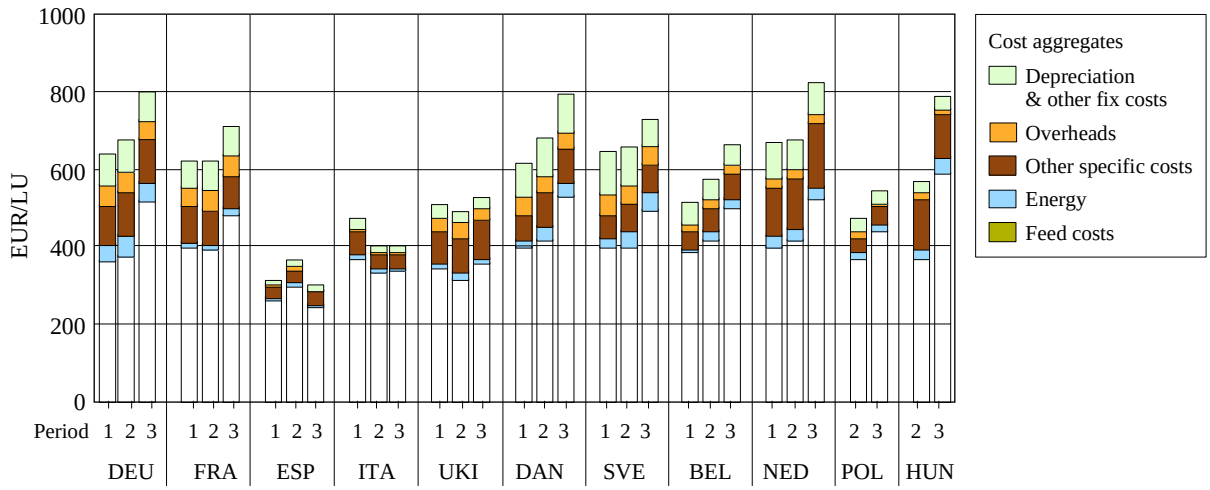


Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

4.1.3 Production costs of pigs

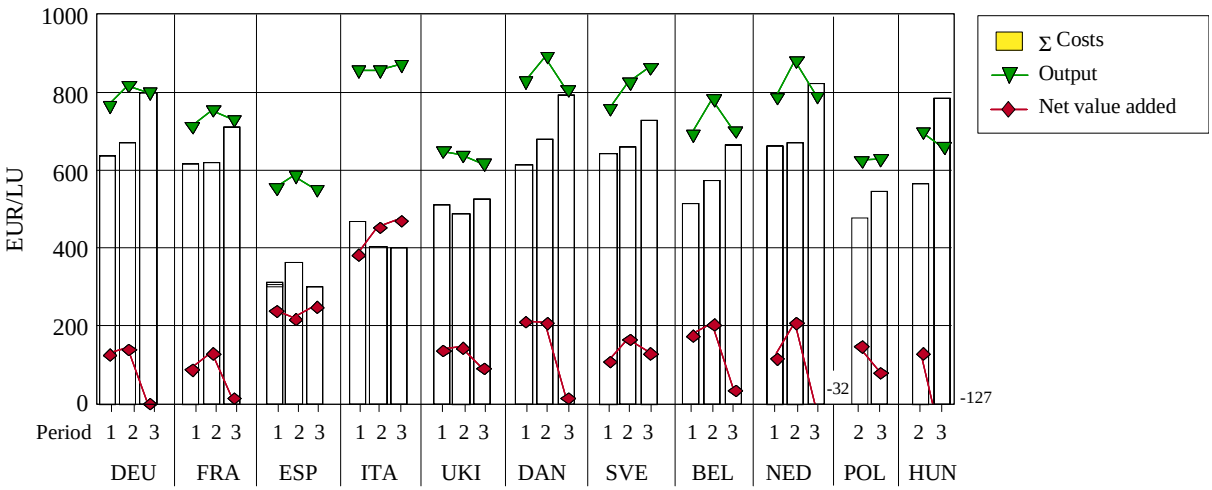
In Figure 14 and 15 costs refer to Livestock Units (LU). As the production system is different between countries there are large regional differences of absolute cost values. Of interest are therefore margins between total costs and output (=income). It has to be mentioned that no subsidies for pig production were considered in the model specification and livestock replacement is implicitly included in net-output or other specific costs.

Figure 14: Cost structure of pig production



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Figure 15: Costs, output and income of pig production



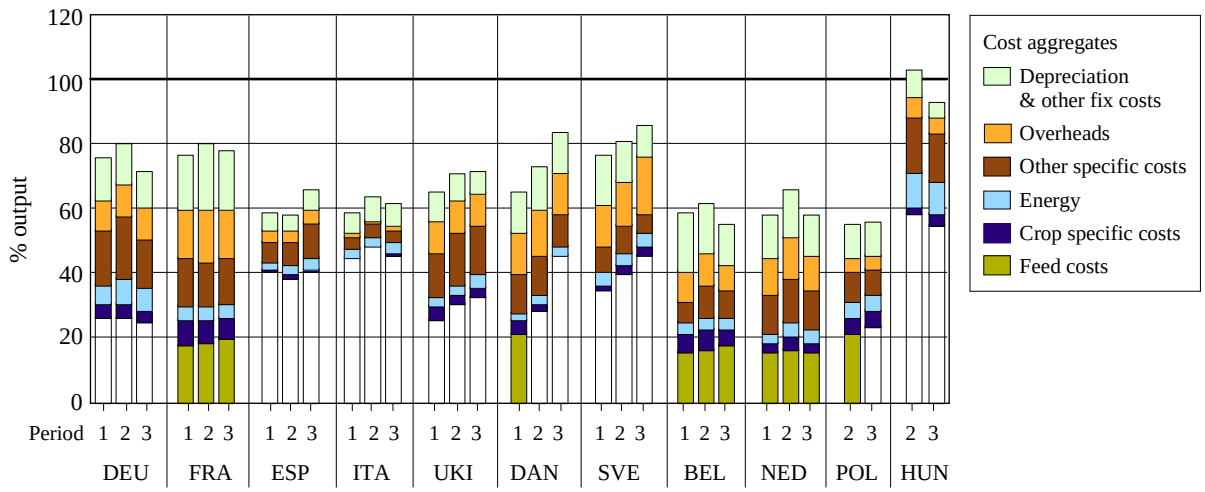
Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Feed cost is the most important cost item. In all countries but Italy and Spain there is an increase in time mainly due to rising prices for cereals and proteins. Energy costs play a minor role while other specific costs, depreciation and other fixed costs are important in Germany, France, Denmark and the Netherlands.

Output figures vary between Member States with highest levels in Italy and lowest levels in Spain and the United Kingdom. Thanks to price levels income is highest in Italy, followed by Spain. In main pig-producing countries, income is about 100 to 200 EUR/ LU. It varies in time due to pig price cycles and became negative in 2007 in almost half of considered countries due to rising feed costs.

Cost shares referring to output are shown in Figure 16 and Annex 3, Table A3.3. In most countries, the share of feed costs is about 45 to 55 %, while it is only 40 % in Italy. Other cost items are in a range of 30 % of output in main producer countries and the remaining income is about 15 to 25 %. The other cost items account for only 10 % of output value in Spain and Italy, so that high margins remain.

Figure 16: Cost shares (aggregated) of pig production



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

4.2 Differentiation of production costs by farm size

Impacts of size, location, etc., can be assessed by estimating production costs for respectively stratified subsamples. In the following sections, the subsamples selected for the three analysed products include only farms with a positive value of wheat area, dairy cow livestock unit, or pig livestock unit, respectively. Within these subsamples a further dif-

ferentiation is made by three size classes (S = Small; M = Medium; L = Large) according to the following delimitations:

– Total wheat area : ‘S’: >0 -<25 ha; ‘M’: 25–100 ha; ‘L’: >100 ha
– Total LU dairy cows: ‘S’: >0 -<25 LU; ‘M’: 25–100 LU; ‘L’:>100 LU
– Total pig LU : ‘S’: >0 -<50 LU; ‘M’: 50–150 LU; ‘L’: >150 LU

In case of small samples or inconsistent estimates, results were excluded in the following figures.

4.2.1 Production costs for wheat by farm size

Results for wheat are shown in Figure 17 by Member States, periods and size within the periods; they are expressed on a hectare base. In Germany, there are significant cost reductions between the 1st and 2nd size classes of about 250 EUR/ha, while there are slightly higher costs in large farms. Energy costs, other specific costs and overheads are the main determinants of higher costs of small farms. Margins are close to zero in the smallest farms and the 2nd size class achieves the highest net value added.

In France there is a continuous cost digression over all size classes and rising margins with size; this is true for all periods. Income in the 3rd size class (in period 3) is of about 450 EUR/ha higher than in small farms, which is partly due to higher returns of larger farms, especially in the last period (2007).

Results for Spain show decreasing costs with farm size in the 1st and 2nd period. While costs are significantly lower in the largest farms, size effects are rather low in period 3. Output is lower in larger farms especially in periods 1 and 3. Therefore the income variation by size is indifferent in period 1, increasing in period 2 and decreasing in period 3.

In the case of durum wheat in Italy there is a clear tendency of decreasing costs with farm size. However, in the 1st and 2nd period, the lower costs are matched by lower output values, and thus net value added is rather similar. In the last period, the net value added in large farms is almost twice that of small farms.

In the United Kingdom costs are decreasing considerably with the size of wheat area. Income in the largest farms is of about 500 EUR/ha higher than in the 1st size class. Income in small farms almost zero in the 1st period, became negative in the 2nd period and was still low in the 3rd period.

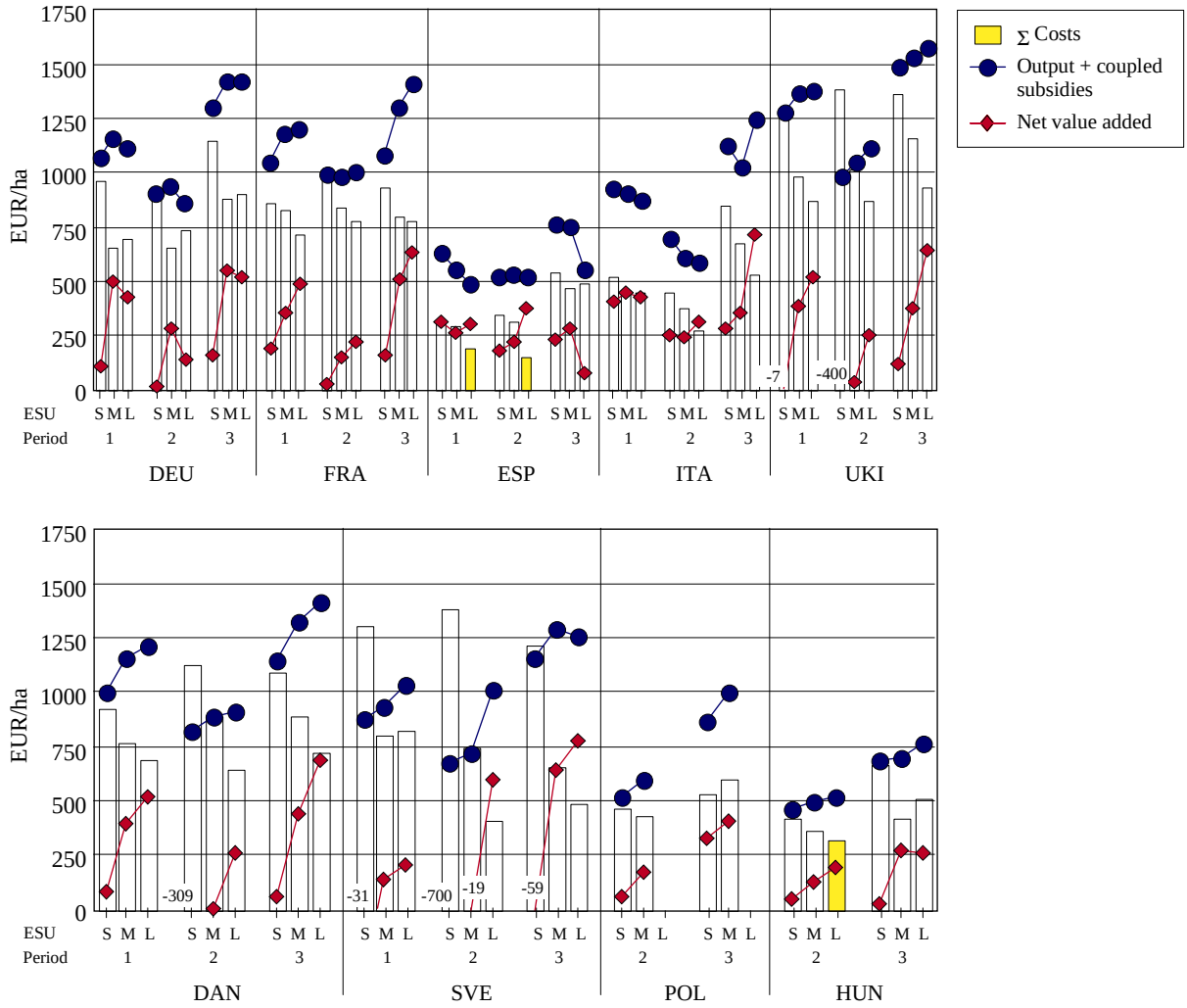
Scale effects as well as income levels and variation by farm size in Denmark are similar to the United Kingdom. Sweden shows very high costs in the smallest size class, resulting

in negative incomes in all periods. Large farms gain positive incomes, especially in the 3rd period under conditions of high wheat prices.[6]

In Poland costs don't differ much between small and medium sized farms. However, output and farm net value added is higher in larger farms.

In Hungary costs are decreasing with size (especially between small and medium size class). Output is higher in larger farms. While income is close to zero in small farms, larger farms reach net value added of about 150 to 250 EUR/ha

Figure 17: Cost, output and income of wheat production by farm size (Italy durum wheat)



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

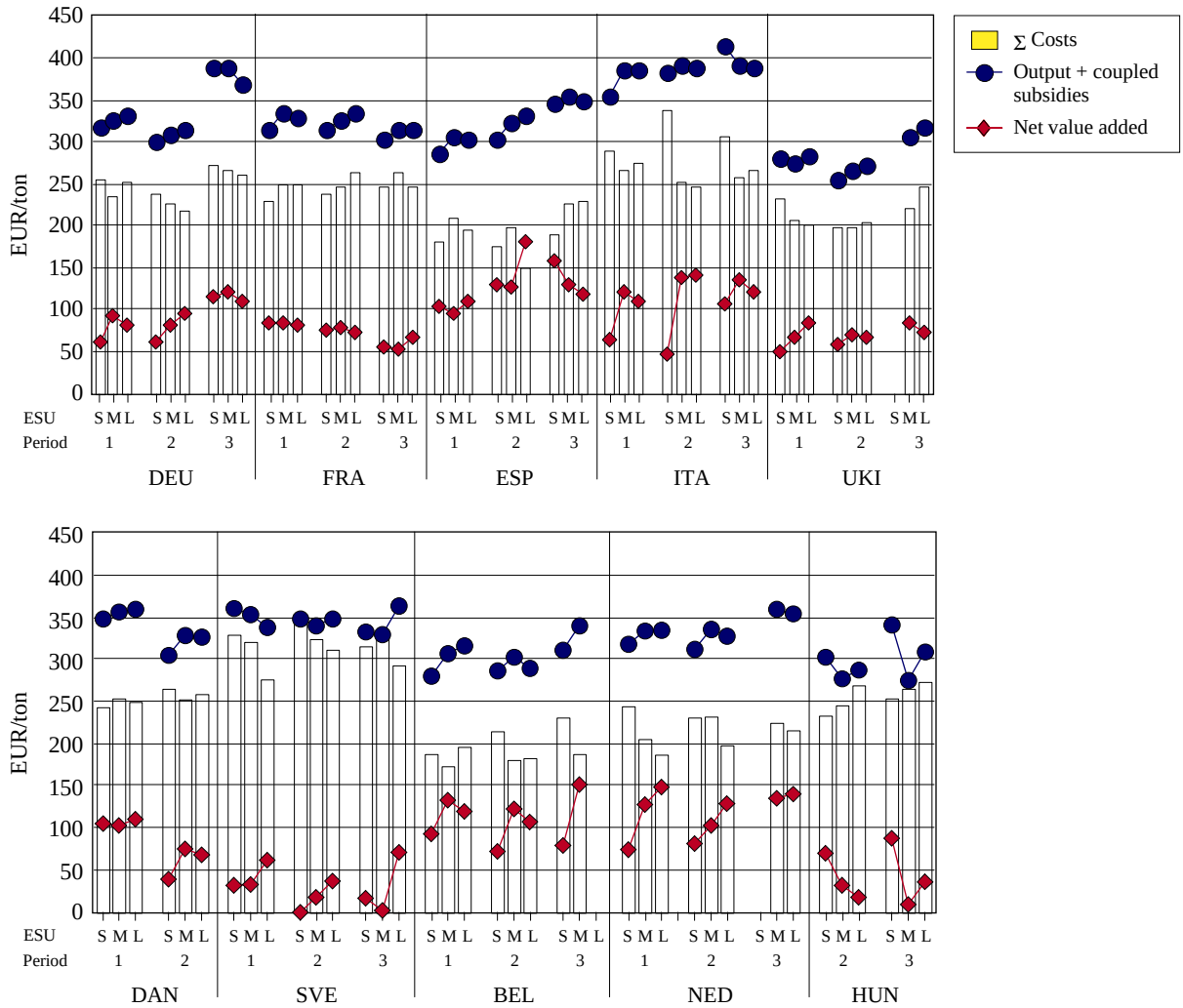
[6] Due to small sample size the cost estimates for Belgium and Netherlands are not reliable and are therefore not shown.

4.2.2 Production costs for milk by farm size

Results for milk are summarized in Figure 18. In Germany total costs are slightly decreasing in the 2nd and 3rd period, which is mainly due to lower other specific costs and depreciation. With the exception of the last period, the milk price is highest in larger farms. Medium sized farms realise higher margins than small farms, and, with the exception of the 2nd period, higher margins than large farms.

In France costs in small farms are lower (1st and 2nd period) or equal (3rd period) to that of large farms. This results in margins decreasing slightly with farm size, with the exception of period 3.

Figure 18: Cost, output and income of milk production by farm size



Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Compared to the small farms costs are higher in the medium sized farms in Spain. In the first two periods large farms show lower costs than the medium sized. Income in large farms is slightly or significantly higher in the 1st and 2nd period, but considerably lower in the 3rd period.

Small farms in Italy show the highest costs and lower milk prices, resulting in low incomes compared to larger farms.

In the United Kingdom significant scale effects – and rising income – can only be identified for the 1st period. Milk prices are lower than in Germany and France which leads to a rather low net value added. For Denmark, due to small sample sizes, results are only shown for the 1st and 2nd period. There are no clear scale effects on the cost side.

Sweden shows a high cost level and costs decreasing by farm size. Income is rather low compared to other countries. Costs are significantly lower in Belgium and the Netherlands and in most cases decreasing with size. In Belgium income is rising between the 1st and 2nd size class. This tendency is valid over all size classes in the Netherlands.

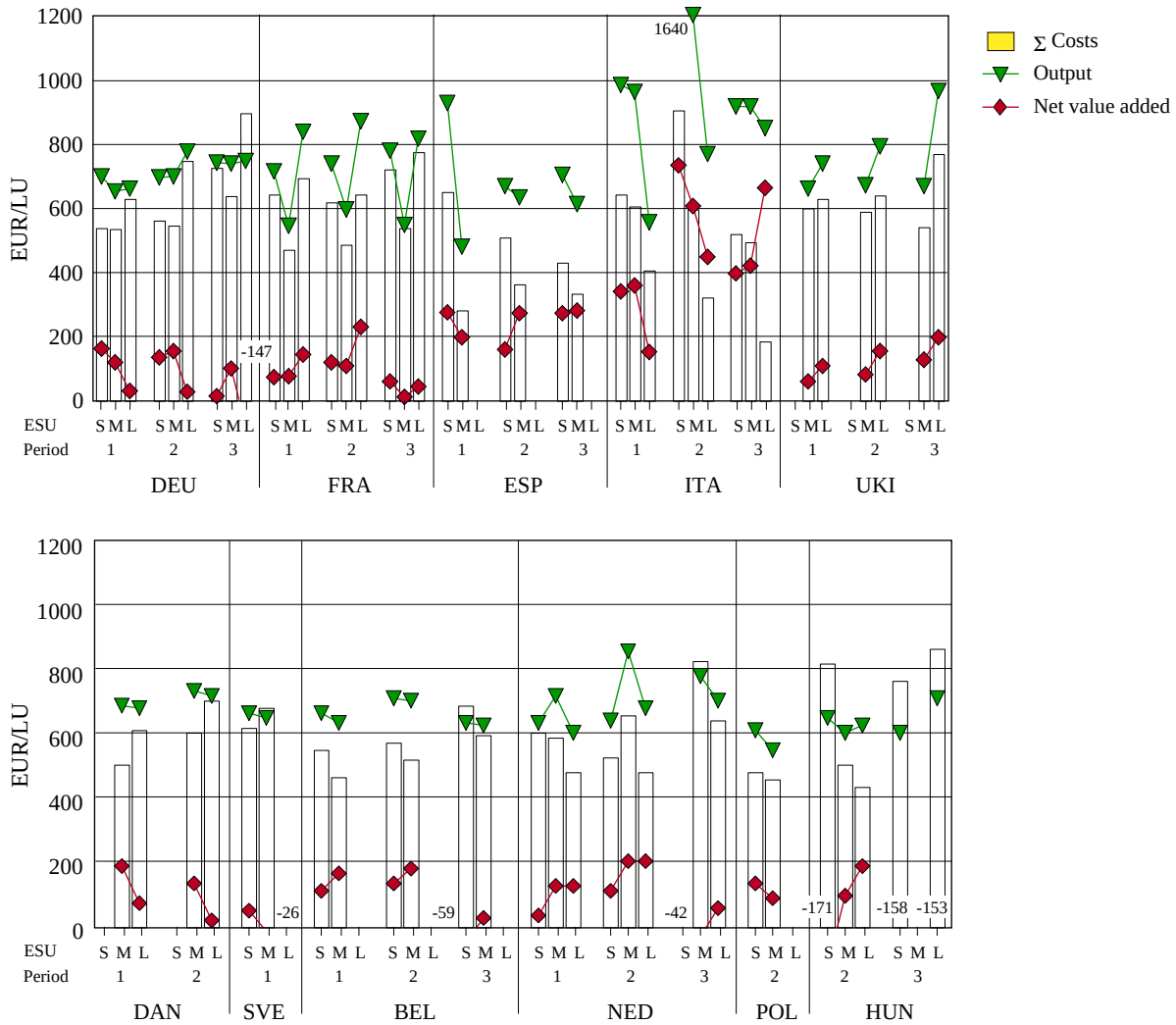
Compared to Poland, Hungary show high and costs rising with farm size (1st period), resulting in rather low incomes in medium and large sized farms.

4.2.3 Production costs for pigs by farm size

Results for **pigs** are shown in Figure 19. Cost levels, their development over time and size differ between countries. The structure of pig production is either specialised between piglets and fattening, or based on integrated production. In Germany, positive size effects on costs are only observed between small and medium sized farms, resulting in a slightly higher net value added in the latter group. Costs are higher in large farms, resulting in very low (1st and 2nd period) and negative income in the 3rd period. In France costs as well as output are considerably lower in medium sized farms. Together with higher output the income is higher in large farms, but only in the 1st and 2nd period. As in Germany, income is close to zero in the last period. In Spain costs and output are lower in medium compared to small sized farms. Only in two of 3 three periods is the income higher in medium sized farms. Italy shows a considerable cost digression especially between medium and large sized farms; this is also true for the output. Mainly influenced by the variation of output, the income is lower in large farms in the 1st and 2nd period; only in the last period it is considerably higher. In the United Kingdom costs are slightly higher in large compared medium sized farms. As output in the former is higher, income is slightly higher in the large farms.

In Denmark and Sweden costs are slightly higher in the larger size class; as output is lower, the income is lower in the larger farms. In Belgium and Netherlands costs are decreasing with size (with the exception of the 2nd period in the Netherlands). Highest incomes are realized in large farms, while smaller ones make losses in the last period. As in Sweden, in Poland reliable results could only be estimated for one period. The results for Hungary in period 2 show rather high costs in small farms, but considerably lower cost in larger ones, resulting in negative incomes in small farms and positive or rising income in larger ones. The economic deteriorated situation in the 3rd period, as costs were higher than output, resulting in a high negative figure for net value added.

Figure 19: Cost, output and income of pig production by farm size

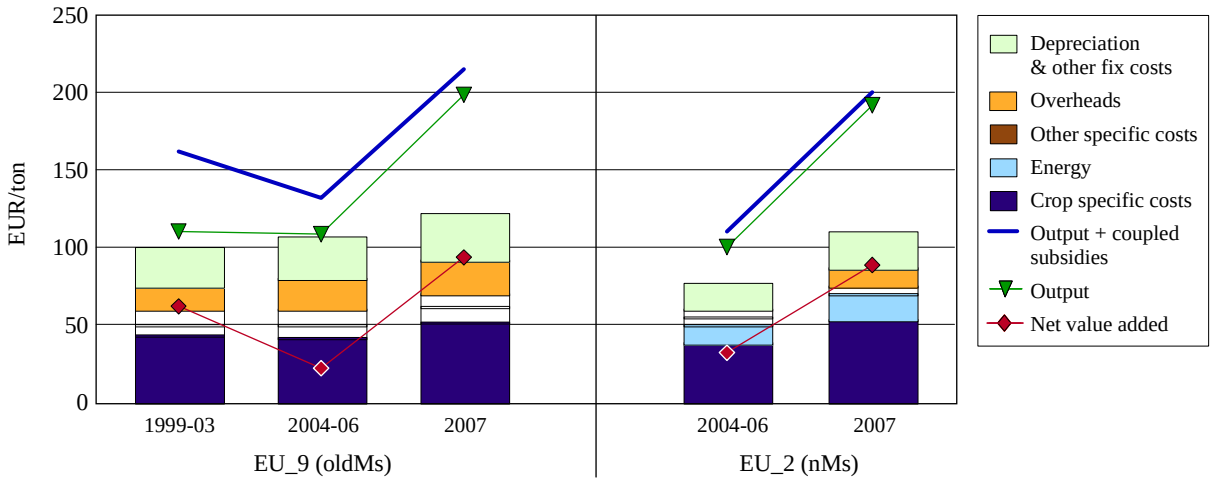


Periods: 1 = 1999-03; 2 = 2004-06; 3 = 2007.
Source: EU-FADN-DG AGRI L-3; FACEPA.

4.3 Aggregated results by old and new Member States of the EU

In a further step results are aggregated by old and new Member Sates considered, to test the potential of providing information on the development of costs shares for more aggregated agricultural sector models. A perfect match was not possible, because only 9 Member States (MS) of EU-15 and 2 of EU-12 are included in the study; however, these represent the main producer countries. Unit costs of the included Member States are weighted by the aggregated production quantities per Member states (tons for wheat and milk, pig LU for pigs). In contrast to previous chapters, we consider only soft wheat (also for Italy). Non-plausible estimates were excluded as discussed in chapter 4.1.

Figure 20: Production costs of soft wheat (EUR/t), aggregated by years and EU-15 and EU-12 Member States



Source: EU-FADN-DG AGRI L-3; FACEPA.

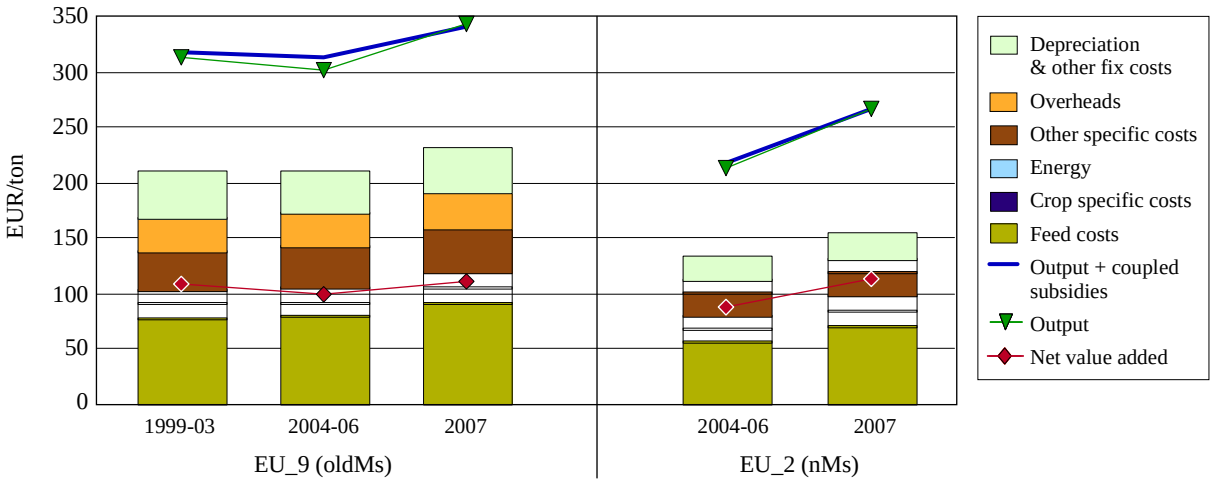
Aggregated results for **soft wheat** for the old and new EU Member states are given in Figure 20. In EU-9, crop specific costs, which constitute the main cost component, amount to 40 EUR/t in the first two periods. Due to rising costs for fertilizer and crop protection they increase to 55 EUR/t in 2007. Energy costs amount to 10 EUR/t in the 1st and 2nd and 15 EUR/t in the 3rd period. Other specific costs were almost at the same level of 15 EUR/t. Fixed costs items (overheads and depreciation,) amount to 40 EUR/t in the 1st, 50 EUR/t in the 2nd and 60 EUR/t in the 3rd period. The total of considered cost items of 100 EUR/t in the 1st period was a little less than crop output, equal to output in the 2nd period and 70 EUR/t less than output in the 3rd period. On top of output coupled subsidies have to be considered in the income calculation; they were rather high in the 1st period (full coupled premia) and significantly reduced due to full or partial decoupling in the following periods. Income (expressed by Net Value Added) was about 65 EUR/t; it fell by half in the 2nd period and increased to 90 EUR/t in the 3rd period due to high wheat prices.

In the new MS, the cost level was significantly lower in the 2nd period but approaching that of the old MS level in 2007. The output level was almost similar but the influence of coupled subsidies was rather insignificant. Income was similar to old MS for the respective periods.

Cost shares referring to output are given in Table 1; they were rather similar in the 1st and 2nd period but decreasing in 2007 due the high output level.

Cost estimates for **cow milk** are shown in Figure 21. Feed cost is the main cost item, which amounts to 80 EUR/t in the 1st and 2nd period and to 90 EUR/t in 2007 (old MS) due to rising prices of crops products. Crop specific costs representing implicit variable cost of roughage production amount to 10–15 EUR/t; a similar cost level is for energy. Other specific costs amount to 40 EUR/t, overheads to 30 EUR/t and depreciation and other fixed costs to 40 EUR/t. The latter 3 cost items were rather constant in time. The output level was slightly decreasing to the 2nd period due to lower intervention prices, but rising in 2007 due to increased milk prices. The income level was rather stable in time with 110 EUR/t the 1st and 3rd period and of 100 EUR/t in the 2nd.

Figure 21: Production costs of cow milk (EUR/t), aggregated by years and EU-15 and EU-12 Member States



Source: EU-FADN-DG AGRI L-3; FACEPA.

In the new Member States cost and price level was lower than in the old Member States but income reached the level of old Member States in 2007. Cost shares referring to output in both aggregates (Table 1) were rather constant over time.

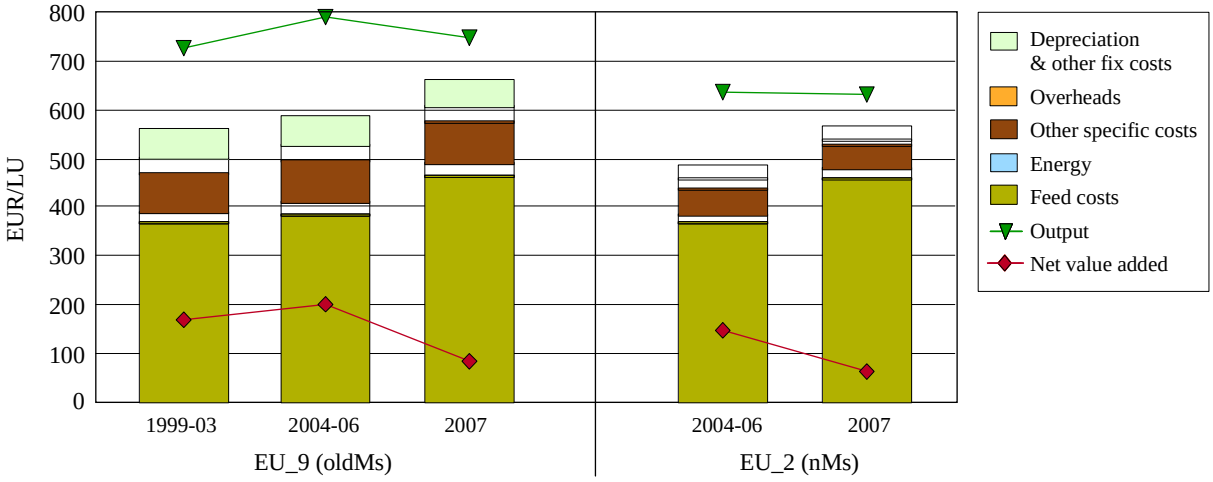
Table 1: Average output/unit and average cost shares, weighted by the aggregated output per country considered and periods

		EU_9 (oldMs)			EU2 (nMS)	
		1999-03	**04-06**	**2007**	**2004-06**	**2007**
Soft Wheat						
Output	*EUR/t*	*111,4*	*109,5*	*199,1*	*100,1*	*192,8*
Cost shares (% of output)						
CropSp	%	39,2	38,2	25,9	38,8	28,1
Energy	%	6,0	8,1	5,3	11,0	9,0
oSpecCo	%	8,3	9,3	4,5	5,3	2,3
Overheads	%	14,0	17,6	10,9	5,5	6,2
DeprFC	%	22,4	25,7	14,4	16,5	12,5
Cow Milk						
Output	*EUR/t*	*314,3*	*301,8*	*342,8*	*214,3*	*266,8*
Cost shares (% of output)						
LiStFeed	%	24,7	27,0	26,8	27,0	26,5
CropSp	%	4,1	3,8	3,8	4,8	4,9
Energy	%	3,7	4,5	4,4	5,9	5,5
oSpecCo	%	11,6	12,3	11,3	9,7	8,3
Overheads	%	9,6	10,1	9,7	4,4	4,1
DeprFC	%	13,2	12,7	11,3	9,8	9,2
Pigs						
Output	*EUR/LU*	*729,8*	*790,2*	*747,0*	*635,9*	*630,7*
Cost shares (% of output)						
LiStFeed		51,1	48,8	62,4	58,3	73,0
Energy		2,8	3,5	3,6	2,8	3,2
oSpecCo		10,6	10,4	11,5	8,2	7,9
Overheads		4,5	4,3	4,0	2,9	1,6
DeprFC		8,2	7,5	7,5	4,6	4,6

Source: EU_FADN-DG AGRI L-3; FACEPA.

Aggregated results for **pigs** are shown in Figure 22. Feed cost is the main cost item which was 380-390 EUR/LU in the 1st and 2nd periods. They increased to 470 EUR/t in 2007 due to booming arable crop prices. While feed costs and energy costs were similar in both regions other specific costs and especially overheads and depreciation and other fixed costs were considerably higher in the old MS. Output was considerably higher than cost levels in the 1st and 2nd periods resulting in incomes of 150 to 200 EUR/LU. Rising costs and decreasing output values induced rather low incomes of 60-80 EUR/LU in the 3rd period. Referring to cost shares shown in Table 1 it is worth mentioning the rising shares of feed costs in 2007 compared to the almost constant shares of other cost elements over time.

Figure 22: Production costs of pigs (EUR/pigLU), aggregated by years and EU-15 and EU-12 Member States



Source: EU-FADN-DG AGRI L-3; FACEPA.

5 Conclusions

FADN data are a useful information source for micro-level analysis. In the FACEPA project these data are used for the estimation and analysis of production costs for the main commodities. In the underlying study results are summarised for wheat, milk and pigs for the main producer countries. Estimates are undertaken using the GECOM model for the estimation of input-output coefficient and the calculation of unit costs. To avoid problems of inconsistent data an outlier procedure is applied for all considered countries and years. For this report, observations of several years were pooled for the estimation, which lead to more stable estimates especially in Member States with rather small FADN samples. In addition, statistical tests and plausibility checks of results were necessary, leading to the cancellation of a few results for wheat.

Due to variation in production conditions, intensity and cost structures, estimates should preferable be made at Member State level. Location and scale effects can be analysed with estimates based on respective sub-samples. In this study, scale effects are analysed and are shown to be rather significant in arable crop production. There is a considerable variation between Member States not only of production costs, but also of output, and output plus subsidies (due to the national implementations of full or partially decoupling schemes), especially for wheat and milk. To get a full picture on economic performance, cost analyses should be supplemented by income indicators.

Based on the results it can be concluded that in addition to costs, returns should be considered simultaneously to get a full picture on economic performance. Although most of the results look reasonable[7] there are still some ‘outstanding results.’ Some of these problems could be solved by a further check of the data and application of the method only for large sized samples.

[7] In general, the validation of the GECOM by comparing results to those of other studies as well as by a review of estimates by national experts highlighted that the quality of estimates differs by country (OFFERMANN and KLEINHANß, 2011). Overall, level and trend of total costs of the main products wheat, milk and pigs were judged to be plausible. Generally, estimated cost for crop products were less robust and in several cases implausibly variable over time.

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FACEPA Project Model Information. Detailed Information Available at: http://www2.ekon.slu.se/facepa/index.html

Annex 1

Table A1.1: Definition of model variables

	Model variables	FADN codes[1)] in (…)
/* Model outputs */		
Common wheat	WHEAT	sum(K120TP);
Durum wheat	DWHEA	sum(K121TP);
Barley	BARLE	sum(K123TP);
Grain maize	MAIS	sum(K126TP);
Other cereals	OTCER	sum(K122TP,K124TP,K125TP,K127TP,K128TP);
Dry pulses	DRYPU	sum(K129TP);
Potatoes	POTAT	sum(K130TP);
Sugar beet	SUGAR	sum(K131TP);
Rape	RAPE_	sum(K331TP);
Sunflower	SUNFL	sum(K332TP);
Soya	SOJA	sum(K333TP);
Fresh veg._op.field	OPENF	sum(K136TP);
Fresh veg._mkt gard	OPENG	sum(K137TP);
Fresh veg._und.glas	UGlas	sum(K138TP);
Flowers open_air + _protected	FLOWE	sum(K140TP,k141TP);
Pome fruit excl.table grapes	APPLE	sum(K349TP);
Fruit + berry_orchar - K349TP	OTHFR	sum(K152TP,-K349TP);
Grapes tabl._&oth.w + tbl.wine &_oth.wine	TWINE	sum(K287TP,K290TP);
Grapes qual._wine +quality_wine	QWINE	sum(K286TP,K289TP);
Sales/felled_timber + …	FORES	sum(K174TP,K175TP,K176TP);
	OCROP	sum(Crop_TP,-WHEAT,-DWHEA,-BARLE,-MAIS,-OTCER,-DRYPU,-POTAT,-SUGAR,-RAPE_,-SUNFL,-SOJA,-O -OPENG,-UGlas,-FLOWE,-APPLE,-OTHFR,-TWINE,-QWINE,-FORES)
Cattle	CATTL	sum(E52TO);
Sheep	SHEEP	sum(E54TO);
Pigs	PIG__	sum(E56TO);
Poultry	POULT	sum(E57TO);
Cows' milk + products	CMILK	sum(K162TP,K163TP);
Buffalo milk + sheep's milk + products	OMILK	sum(K164TP,K167TP);
Hens'eggs	EGG__	sum(K169TP);
Contract rearing	CONTR	sum(K171TP);
Occas.let_ting forag. …	OACTI	sum(K172TP,K177TP,K179TP,K313TP);
Other livestock activities	OLIST	sum(Livest_TP,-CATTL,-SHEEP,-PIG__,-POULT,-CMILK,-OMILK, -EGG__,-CONTR,-K172TP)
/* Model inputs, excl. Taxes and hired labour costs */		
Con.feed.purchased	FEEDPC	Sum(F64,F65,F66,F67);
Feed home-grown	FEEDHC	sum(SE315,F69,F70);
Other livestock specific costs	VETCOS	sum(SE330);
Seeds/seedlings purchased,..	SEED__	Sum(F72,SE290);
Fertilisers	FERTIL	sum(SE295);
Crop protection	CRPROT	sum(SE300);
Motor fuel and lubricants	MOTFUE	sum(F62);
Electricity + heating fuels	OENERG	Sum(F79,F80);
Contract work	CONWOR	sum(SE350);
Upkeep land improv. and build	BUILUK	sum(F78);
Upkeep of mach. + equipment	MACHUK	sum(F61);
Other specific costs	OTHSIC	sum(F63,SE305,SE331,F81,F82,F84,F87);
Rent paid,…	LANDCO	sum(SE375,F88);
Depreciation	DEPREC	sum(SE360);
Taxes and other dues	TAXES_	F83;
Coupled subsidies	SUBSID	-sum(SE605,-SE620,-SE630);
Income (Net Value Added)	Netval	sum(sum_outp, -sum_inpu, -subsid) ;

[1)] XyyyZ, wherby X: FADN Table; xxx: row; Z: column
TO Total output
TP Total production

Table A1.2: List of inputs and cost aggregation

Cost aggregates	Model variables	Cost aggregates (figures)
	Output (y)	Output
Output-Subsid	Cost equations	
	FEEDPC	LiStFeed
	FEEDHC	
	VETCOS	
	SEED__	CropSp
	FERTIL	
	CRPROT	
oSpecCo	MOTFUE	Energy
	OENERG	
	CONWOR	Overheads
	BUILUK	
	MACHUK	
	OTHSIC	
	LANDCO	
	INTERE	
	DEPREC	DeprFC
Netval	TAXES_	
	SUBSID	
	NETVAL	NetValAd

Source: FACEPA.

Table A1.3: Country codes

FADN Code	
DEU	Germany
FRA	France
ESP	Spain
ITA	Italy
UKI	United Kingdom
DAN	Denmark
SVE	Sweden
BEL	Belgium
NED	Netherlands
POL	Pologne
HUN	Hungary

Annex 2

Table A2.1: Input-Output coefficients (1)

	DEU			FRA			ESP			ITA			UKI		
Period 1)	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Product								***WHEAT***							
Output €/t	117	109	202	105	102	182	132	139	183		155	325	113	111	206
I-O-Coefficients															
SEED__	0,041	0,016	0,019	0,075	0,076	0,040	0,107	0,095	0,112		0,178	0,052	0,073	0,050	0,032
FERTIL	0,109	0,141	0,135	0,155	0,157	0,107	0,172	0,155	0,102		0,209	0,099	0,131	0,150	0,098
CRPROT	0,163	0,188	0,161	0,221	0,227	0,143	0,050	0,041	0,029		0,107	0,049	0,213	0,185	0,115
MOTFUE	0,057	0,096	0,050	0,045	0,057	0,039	0,063	0,080	0,069		0,270	0,119	0,051	0,068	0,038
OENERG	0,007	0,008	0,005	0,008	0,005	0,002	0,000	0,011	-0,001		-0,011	-0,007	0,015	0,019	0,016
CONWOR	0,050	0,072	0,030	0,054	0,082	0,034	0,070	0,088	0,071		0,120	0,062	0,047	0,057	0,027
BUILUK	0,016	0,020	0,046	0,011	0,016	0,007	0,008	0,006	0,005		0,005	0,002	0,036	0,036	0,040
MACHUK	0,047	0,057	0,039	0,066	0,062	0,055	0,047	0,045	0,039		0,065	0,030	0,095	0,077	0,043
OTHSIC	0,086	0,128	0,046	0,080	0,069	0,046	0,052	0,045	0,030		0,087	-0,005	0,095	0,116	0,072
LANDCO	0,237	0,264	0,155	0,197	0,209	0,117	0,174	0,110	0,073		0,050	0,034	0,123	0,121	0,046
INTERE	0,035	0,051	0,041	0,069	0,066	0,028	0,007	-0,003	0,004		0,004	0,002	0,054	0,034	0,017
DEPREC	0,162	0,177	0,106	0,256	0,310	0,160	0,132	0,105	0,139		0,336	0,147	0,220	0,180	0,117
TAXES_	0,007	0,011	0,006	0,020	0,020	0,011	0,001	0,000	0,000		0,032	0,013	0,000	0,002	0,001
SUBSID	-0,391	-0,092	-0,012	-0,500	-0,309	-0,075	-0,466	-0,405	-0,070		-0,296	-0,027	-0,473	-0,171	-0,001
NETVAL	0,373	-0,138	0,173	0,243	-0,046	0,286	0,582	0,628	0,397		-0,157	0,432	0,322	0,076	0,338
Product								***PIG__***							
Output €/LU	767	818	800	712	755	729	553	586	551	857	857	872	650	639	617
I-O-Coefficients															
FEEDPC	0,376	0,373	0,535	0,525	0,487	0,620	0,483	0,515	0,445	0,392	0,357	0,348	0,517	0,476	0,573
FEEDHC	0,103	0,091	0,115	0,036	0,034	0,041	0,000	0,001	0,001	0,040	0,034	0,047	0,014	0,021	0,013
VETCOS	0,082	0,071	0,087	0,067	0,061	0,063	0,053	0,049	0,038	0,053	0,039	0,035	0,108	0,117	0,133
MOTFUE	0,009	0,011	0,011	0,003	0,005	0,006	0,003	0,004	0,001	0,005	0,005	0,004	0,008	0,012	0,011
OENERG	0,041	0,050	0,051	0,018	0,018	0,019	0,006	0,009	0,009	0,011	0,008	0,004	0,016	0,012	0,009
CONWOR	0,030	0,027	0,029	0,044	0,048	0,053	0,001	0,008	0,002	0,003	0,000	0,001	0,016	0,023	0,014
BUILUK	0,015	0,013	0,010	0,007	0,007	0,005	0,002	0,004	0,003	0,002	0,001	0,001	0,012	0,017	0,012
MACHUK	0,023	0,026	0,018	0,016	0,019	0,016	0,002	0,002	0,002	0,003	0,001	0,001	0,020	0,022	0,021
OTHSIC	0,055	0,067	0,053	0,063	0,055	0,053	0,004	0,011	0,027	0,016	0,007	0,004	0,021	0,028	0,029
LANDCO	0,028	0,018	0,024	0,007	0,005	0,004	0,004	0,038	0,052	0,003	0,002	0,004	0,001	0,011	0,014
INTERE	0,030	0,026	0,026	0,041	0,032	0,033	0,002	0,007	0,016	0,001	0,000	0,000	0,029	0,016	0,016
DEPREC	0,097	0,095	0,087	0,090	0,089	0,097	0,011	0,018	0,016	0,023	0,016	0,012	0,054	0,040	0,034
TAXES_	0,004	0,003	0,002	0,005	0,004	0,003	0,000	0,001	0,000	0,003	0,001	0,001	0,000	0,001	0,000
NETVAL	0,109	0,130	-0,049	0,079	0,139	-0,014	0,430	0,333	0,387	0,445	0,529	0,538	0,183	0,204	0,120
Product								***MILK***							
Output €/t	314	292	380	315	295	313	300	305	242	384	380	395	278	264	315
I-O-Coefficients															
FEEDPC	0,011	0,188	0,183	0,151	0,159	0,178	0,319	0,309	0,324	0,283	0,282	0,247	0,222	0,247	0,267
FEEDHC	0,023	0,084	0,070	0,029	0,026	0,027	0,093	0,078	0,088	0,169	0,206	0,214	0,041	0,059	0,062
VETCOS	0,009	0,062	0,058	0,039	0,033	0,033	0,046	0,051	0,059	0,029	0,026	0,026	0,098	0,111	0,114
SEED__	0,049	0,011	0,009	0,028	0,027	0,025	0,004	0,004	0,004	-0,017	-0,033	-0,007	0,002	-0,005	-0,006
FERTIL	0,030	0,023	0,026	0,035	0,030	0,027	0,008	0,005	0,004	0,002	0,002	0,009	0,035	0,033	0,026
CRPROT	0,034	0,009	0,007	0,013	0,015	0,016	-0,001	-0,002	0,000	0,000	-0,001	0,006	0,004	0,005	0,006
MOTFUE	0,016	0,049	0,044	0,018	0,025	0,026	0,013	0,017	0,018	0,017	0,025	0,022	0,013	0,017	0,018
OENERG	0,048	0,030	0,025	0,019	0,016	0,015	0,011	0,012	0,010	0,010	0,009	0,011	0,013	0,015	0,017
CONWOR	0,126	0,034	0,035	0,096	0,106	0,099	0,009	0,014	0,013	0,006	0,005	0,005	0,046	0,051	0,050
BUILUK	0,042	0,016	0,020	0,008	0,007	0,007	0,006	0,003	0,004	0,001	0,002	0,002	0,018	0,020	0,019
MACHUK	0,026	0,048	0,048	0,043	0,048	0,044	0,020	0,021	0,022	0,006	0,007	0,006	0,033	0,032	0,028
OTHSIC	0,118	0,126	0,089	0,108	0,103	0,103	0,012	0,019	0,051	0,007	0,012	0,015	0,044	0,052	0,040
LANDCO	0,005	0,042	0,038	0,049	0,051	0,047	0,007	0,005	0,008	0,017	0,015	0,017	0,047	0,038	0,028
INTERE	-0,040	0,026	0,021	0,035	0,036	0,034	0,008	0,004	0,007	0,004	0,004	0,002	0,043	0,038	0,033
DEPREC	0,167	0,118	0,105	0,160	0,187	0,173	0,048	0,042	0,056	0,058	0,068	0,069	0,084	0,080	0,069
TAXES_	0,183	0,005	0,005	0,009	0,010	0,007	0,000	0,000	0,000	0,007	0,003	0,003	0,000	0,001	0,000
SUBSID	0,070	-0,040	-0,009	-0,013	-0,040	0,027	0,036	-0,027	0,002	0,004	-0,027	0,001	0,029	-0,006	0,000
NETVAL	0,058	0,167	0,227	0,172	0,161	0,113	0,361	0,444	0,329	0,398	0,395	0,353	0,227	0,212	0,226

non plausible negative I-O coefficients

1) Periods 1: 1999 - 2003; 2: 2004 - 2006; 3: 2007

Source: EU-FADN-DG AGRI L-3; FACEPA.

Table A2.1: Input-Output coefficients (2)

	DAN			SVE			BEL			NED			POL		HUN	
Period 1)	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**2**	**3**	**2**	**3**
Product								***WHEAT***								
Output €/t	112	111	208	108	98	207		113	226	125	125		104	196	90	184
I-O-Coefficients																
SEED__	0,040	0,053	0,034	0,084	0,048	0,033		0,003	-0,009	-0,075	-0,028		0,060	0,038	0,000	0,000
FERTIL	0,097	0,107	0,062	0,225	0,243	0,136		0,139	0,084	0,079	0,113		0,236	0,144	0,000	0,000
CRPROT	0,118	0,123	0,069	0,114	0,085	0,051		0,156	0,106	0,119	0,091		0,140	0,083	0,000	0,000
MOTFUE	0,038	0,047	0,032	0,051	0,049	0,056		0,061	0,038	0,032	0,037		0,098	0,072	0,034	0,088
OENERG	0,004	0,004	0,005	0,082	0,121	0,050		0,009	0,013	0,016	0,031		0,003	0,007	0,106	0,148
CONWOR	0,049	0,048	0,028	0,142	0,158	0,081		0,182	0,060	0,026	0,042		0,027	0,016	0,103	0,096
BUILUK	0,043	0,043	0,024	0,021	0,010	0,029		0,004	0,009	0,023	-0,011		0,005	0,007	0,102	0,127
MACHUK	0,064	0,067	0,043	0,052	0,068	0,019		0,059	0,047	0,125	0,134		0,026	0,031	0,036	0,000
OTHSIC	0,093	0,102	0,080	0,056	0,036	0,057		0,073	0,026	0,215	0,245		0,023	0,021	-0,003	0,035
LANDCO	0,218	0,231	0,178	0,278	0,317	0,128		0,237	0,120	0,152	0,004		0,060	0,043	0,004	0,004
INTERE	0,342	0,386	0,295	0,080	0,011	0,004		0,126	0,097	-0,064	-0,049		0,016	0,010	0,045	0,050
DEPREC	0,209	0,232	0,148	0,189	0,180	0,093		0,305	0,152	0,215	0,206		0,192	0,125	0,147	0,032
TAXES_	0,005	0,005	0,003	0,000	0,000	0,000		0,002	-0,004	0,017	0,003		0,000	0,000	0,064	0,103
SUBSID	-0,381	-0,093	-0,003	-0,443	-0,278	0,001		-0,159	-0,240	-0,476	-0,249		-0,073	-0,010	0,105	0,027
NETVAL	0,060	-0,356	0,002	0,070	-0,050	0,261		-0,197	0,501	0,598	0,431		0,188	0,415	0,069	0,120
Product								***PIG__***								
Output €/LU	829	891	808	757	827	864	692	783	703	786	884	790	626	628	700	659
I-O-Coefficients																
FEEDPC	0,406	0,408	0,535	0,436	0,432	0,501	0,552	0,528	0,705	0,507	0,474	0,665	0,430	0,512	0,000	0,012
FEEDHC	0,076	0,066	0,126	0,091	0,057	0,074	0,010	0,010	0,012	0,002	0,001	0,002	0,162	0,199	0,000	0,000
VETCOS	0,060	0,075	0,082	0,056	0,060	0,062	0,055	0,069	0,078	0,096	0,103	0,157	0,050	0,054	0,000	0,149
MOTFUE	0,008	0,007	0,006	0,007	0,006	0,007	0,001	0,001	0,002	0,001	0,001	0,001	0,012	0,010	0,000	0,000
OENERG	0,017	0,033	0,036	0,028	0,040	0,045	0,012	0,026	0,029	0,037	0,033	0,037	0,016	0,018	0,000	0,000
CONWOR	0,018	0,017	0,021	0,038	0,037	0,043	0,022	0,014	0,014	0,007	0,005	0,007	0,007	0,003	0,000	0,000
BUILUK	0,006	0,004	0,005	0,007	0,008	0,006	0,004	0,004	0,004	0,008	0,005	0,009	0,013	0,006	0,002	0,013
MACHUK	0,028	0,027	0,026	0,025	0,013	0,007	0,004	0,010	0,013	0,015	0,021	0,016	0,009	0,008	0,029	0,050
OTHSIC	0,022	0,021	0,027	0,024	0,031	0,021	0,010	0,011	0,016	0,067	0,042	0,053	0,014	0,013	0,017	0,001
LANDCO	0,007	0,023	0,029	0,031	0,070	0,082	0,004	0,004	0,005	0,012	0,013	0,019	-0,001	0,000	0,003	0,003
INTERE	0,089	0,080	0,127	0,063	0,047	0,058	0,031	0,024	0,028	0,077	0,052	0,068	0,009	0,006	0,009	0,012
DEPREC	0,096	0,103	0,112	0,143	0,113	0,080	0,070	0,062	0,072	0,107	0,077	0,092	0,048	0,046	0,123	0,114
TAXES_	0,004	0,004	0,005	0,000	0,000	0,000	0,003	0,001	0,001	0,002	0,002	0,002	0,000	0,000	0,006	0,015
NETVAL	0,163	0,132	-0,137	0,051	0,086	0,014	0,222	0,236	0,019	0,061	0,170	-0,127	0,231	0,124	0,020	0,027
Product								***MILK***								
Output €/t	336	312	339	329	317	323	294	287	341	327	307	357	210	265	254	294
I-O-Coefficients																
FEEDPC	0,209	0,210	0,211	0,273	0,281	0,301	0,131	0,129	0,138	0,150	0,162	0,158	0,150	0,171	0,000	0,014
FEEDHC	0,016	0,085	0,248	0,081	0,116	0,161	0,034	0,037	0,041	0,007	0,004	0,004	0,075	0,068	0,000	-0,151
VETCOS	0,073	0,088	0,091	0,042	0,053	0,049	0,045	0,065	0,054	0,055	0,065	0,058	0,054	0,049	0,000	0,063
SEED__	0,017	0,007	-0,029	0,003	0,004	0,003	0,016	0,019	0,015	0,001	0,008	0,005	0,011	0,004	0,347	0,350
FERTIL	0,012	0,009	0,004	0,014	0,018	0,016	0,033	0,031	0,025	0,021	0,022	0,020	0,037	0,042	0,247	0,197
CRPROT	0,008	0,006	0,003	0,000	0,004	0,006	0,009	0,014	0,010	0,003	0,005	0,004	0,004	0,004	0,087	0,067
MOTFUE	0,009	0,014	0,012	0,021	0,017	0,018	0,011	0,017	0,017	0,012	0,017	0,015	0,036	0,038	-0,018	0,016
OENERG	0,014	0,017	0,019	0,022	0,024	0,023	0,019	0,023	0,020	0,018	0,023	0,023	0,016	0,013	0,019	0,005
CONWOR	0,073	0,081	0,077	0,081	0,096	0,119	0,051	0,063	0,054	0,054	0,063	0,052	0,012	0,010	0,017	0,015
BUILUK	0,008	0,005	0,006	0,011	0,010	0,027	0,005	0,003	0,002	0,006	0,006	0,014	0,009	0,008	0,076	0,065
MACHUK	0,052	0,051	0,051	0,041	0,031	0,029	0,035	0,035	0,028	0,050	0,058	0,045	0,021	0,023	0,030	0,038
OTHSIC	0,044	0,034	0,011	0,033	0,030	0,015	0,027	0,034	0,026	0,067	0,073	0,065	0,033	0,029	0,009	0,009
LANDCO	0,034	0,048	0,041	0,047	0,043	0,067	0,044	0,054	0,033	0,056	0,053	0,048	0,008	0,008	0,005	0,002
INTERE	0,189	0,172	0,204	0,053	0,031	0,028	0,073	0,060	0,048	0,118	0,135	0,134	0,010	0,009	0,044	0,034
DEPREC	0,118	0,122	0,111	0,148	0,119	0,085	0,179	0,143	0,115	0,126	0,136	0,117	0,100	0,096	0,084	0,082
TAXES_	0,004	0,004	0,007	0,000	0,000	0,000	0,003	0,003	0,002	0,003	0,002	0,000	0,000	0,000	0,020	0,037
SUBSID	-0,005	-0,005	0,012	0,003	-0,059	-0,003	-0,021	-0,040	0,005	-0,010	-0,071	0,006	-0,006	-0,003	0,042	0,036
NETVAL	0,125	0,052	-0,081	0,127	0,181	0,055	0,308	0,310	0,367	0,262	0,236	0,233	0,428	0,431	0,065	0,026

non plausible negative I-O coefficients

1) Periods 1: 1999 - 2003; 2: 2004 - 2006; 3: 2007

Source: EU-FADN-DG AGRI L-3; FACEPA.

Table A2.2: T-Values of coefficients (1)

	DEU			FRA			ESP			ITA			UKI		
Period	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Product								***WHEAT***							
SEED__	8,4	2,8	2,9	18,9	13,8	6,5	22,9	14,0	19,9		10,2	3,4	8,7	5,0	3,1
FERTIL	51,8	54,3	41,1	65,6	51,3	30,7	47,9	24,9	16,4		50,5	35,4	49,4	57,0	30,2
CRPROT	99,8	89,6	70,4	96,3	77,7	40,1	14,2	7,4	5,4		14,7	14,2	116,9	86,2	53,9
MOTFUE	38,4	46,4	23,7	48,8	37,1	22,2	34,5	20,9	17,9		63,6	32,3	36,9	29,2	17,1
OENERG	3,6	3,2	2,1	3,2	1,1	0,4	0,1	2,7	-0,3		-2,4	-1,7	7,9	5,7	4,6
CONWOR	16,9	16,2	8,4	12,5	14,3	4,8	21,1	16,0	13,6		41,0	16,5	13,7	9,9	4,5
BUILUK	7,5	8,9	18,5	8,4	9,0	4,5	8,5	2,6	1,8		4,3	1,8	20,9	14,7	12,1
MACHUK	19,3	20,4	14,3	31,2	21,1	13,7	25,3	13,5	11,7		23,4	16,7	45,8	28,9	11,8
OTHSIC	9,5	13,0	4,7	8,8	6,1	3,3	11,5	5,6	3,5		3,8	-0,3	17,4	14,3	8,6
LANDCO	56,0	53,7	36,9	43,0	36,5	18,0	31,8	13,1	8,6		8,9	9,5	25,5	22,2	8,7
INTERE	11,3	15,8	14,8	26,3	19,9	8,4	3,9	-1,0	1,3		1,9	0,9	14,2	8,0	3,2
DEPREC	27,7	27,9	16,7	39,5	32,3	14,6	23,7	12,3	16,2		30,3	16,3	37,7	27,9	16,9
TAXES_	8,0	11,5	7,8	18,9	13,9	6,5	1,6	-0,3	0,0		21,6	9,3	-4,4	11,8	8,4
SUBSID	-74,3	-9,8	-7,7	-105,1	-34,9	-22,1	-38,7	-24,0	-10,7		-27,2	-5,9	-105,3	-18,7	-3,3
NETVAL	25,0	-6,6	10,0	15,5	-2,2	11,1	30,7	19,8	13,6		-3,8	13,8	21,3	4,1	16,6
Product								***PIG***							
FEEDPC	258,1	264,2	179,5	610,8	451,4	304,6	620,5	311,6	209,2	375,3	227,4	175,0	243,4	197,0	117,7
FEEDHC	99,1	87,9	52,0	95,6	71,3	41,3	1,6	2,0	1,8	76,7	64,6	62,6	17,1	14,5	4,3
VETCOS	84,6	79,2	51,1	287,0	235,2	133,1	399,2	150,2	118,7	184,5	195,5	105,4	152,7	102,3	61,2
MOTFUE	33,8	29,7	15,2	21,1	21,0	14,5	29,3	21,0	5,2	27,5	21,1	11,3	18,1	15,6	9,7
OENERG	110,5	99,6	60,3	43,6	29,0	19,2	65,3	52,9	33,6	52,2	31,1	10,3	28,1	10,8	5,1
CONWOR	51,1	31,6	22,4	60,5	53,0	31,5	6,6	29,7	4,8	18,9	3,1	2,8	15,4	11,2	4,7
BUILUK	34,3	28,8	10,9	29,4	24,5	11,5	29,8	39,5	14,4	24,5	16,5	8,5	22,4	20,0	7,2
MACHUK	48,4	48,9	18,8	47,4	40,8	16,4	23,0	15,7	6,5	26,2	8,6	6,8	32,6	23,4	11,2
OTHSIC	30,4	33,7	14,8	41,3	30,5	16,0	17,6	30,1	44,0	14,1	5,6	2,7	12,5	9,9	6,6
LANDCO	33,1	19,5	15,7	8,6	5,6	2,8	15,2	88,3	77,9	11,3	6,5	12,2	0,7	5,9	5,0
INTERE	48,2	41,9	26,3	92,9	60,6	41,4	20,6	46,1	56,5	9,5	-0,2	2,1	24,6	10,5	5,9
DEPREC	84,4	77,3	38,1	83,8	59,6	37,2	36,7	45,0	24,1	36,2	25,5	13,8	29,5	18,2	9,4
TAXES_	21,9	14,4	9,2	26,6	18,1	7,8	2,6	44,8	6,6	23,2	9,1	8,4	0,7	12,0	4,7
NETVAL	36,3	37,3	-7,8	30,8	44,0	-2,5	369,3	140,6	137,9	221,9	207,9	159,7	42,4	30,4	11,0
Product								***MILK***							
FEEDPC	10,1	127,1	75,3	131,9	103,0	67,0	97,2	63,1	60,1	263,9	114,3	64,6	124,7	141,4	86,6
FEEDHC	44,2	77,8	38,3	57,4	38,4	20,5	109,6	79,3	59,8	313,4	244,4	147,4	58,5	54,5	32,5
VETCOS	22,8	66,6	41,5	124,8	88,9	53,5	81,7	53,7	72,4	97,5	82,8	40,7	162,8	133,9	83,1
SEED__	120,4	10,1	4,6	30,2	20,9	12,6	3,8	4,5	3,5	-19,9	-22,3	-2,6	0,9	-1,8	-1,8
FERTIL	57,8	44,2	27,3	64,5	41,5	23,3	10,2	6,1	3,4	9,2	6,8	19,2	49,7	48,5	24,6
CRPROT	39,5	22,8	10,5	24,1	21,1	13,3	-1,5	-2,5	0,1	1,5	-2,3	9,3	9,1	9,2	8,7
MOTFUE	35,1	120,4	71,8	84,8	69,1	43,8	31,8	31,3	24,0	90,0	70,7	33,8	36,1	29,2	24,2
OENERG	88,4	57,8	37,3	30,8	16,7	10,6	29,0	22,1	13,8	47,6	23,4	14,7	28,0	17,8	15,1
CONWOR	62,6	39,5	33,0	95,1	78,0	42,9	12,4	17,3	13,0	41,0	20,3	8,2	51,7	35,0	25,3
BUILUK	43,8	35,1	27,7	24,0	16,9	13,0	28,9	10,1	6,4	15,1	21,4	11,2	40,3	31,5	17,0
MACHUK	41,3	88,4	59,6	88,1	68,2	32,7	47,8	44,1	34,6	51,6	29,6	17,8	59,8	47,3	23,3
OTHSIC	94,3	62,6	30,6	51,4	38,6	22,4	12,1	16,2	30,6	6,2	6,2	5,2	30,8	25,1	14,4
LANDCO	28,9	43,8	30,9	46,7	37,8	22,1	5,5	3,7	4,7	56,5	32,7	27,5	36,8	27,1	16,2
INTERE	-19,2	41,3	26,3	57,6	45,9	30,5	20,2	9,6	9,9	27,0	20,9	5,3	43,3	35,1	18,7
DEPREC	38,5	94,3	56,4	106,6	82,2	47,8	38,6	34,9	32,7	86,3	73,7	43,9	54,6	48,9	30,1
TAXES_	75,3	28,9	21,9	37,6	29,0	13,4	-0,3	0,6	-2,3	53,1	23,3	13,6	2,6	21,1	10,7
SUBSID	38,3	-19,2	-19,0	-9,7	-16,5	21,4	13,7	-11,2	1,8	5,2	-29,5	1,0	21,5	-2,6	0,1
NETVAL	41,5	38,5	42,5	45,8	30,6	12,8	62,3	58,0	41,0	174,6	89,0	48,9	52,3	39,2	29,8

not significant; '-1,95 < T-value <1.95

Source: EU-FADN-DG AGRI L-3; FACEPA.

Table A2.2: T-Values of coefficients (2)

	DAN			SVE			BEL			NED			POL		HUN	
Period	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**2**	**3**	**2**	**3**
Product								***WHEAT***								
SEED__	5,3	4,0	3,6	22,7	7,9	4,8		0,1	-0,2	-0,6	-0,2		11,5	5,7	8,3	12,6
FERTIL	38,4	34,7	17,2	39,9	29,2	15,9		10,6	6,5	2,4	8,2		88,2	47,9	26,5	18,8
CRPROT	79,0	58,1	29,8	31,2	20,9	11,6		15,2	10,9	5,6	3,5		89,0	50,1	27,6	15,3
MOTFUE	32,5	23,1	15,2	11,5	7,6	10,7		8,3	5,5	6,0	4,5		60,9	39,3	15,9	15,2
OENERG	0,4	0,4	0,5	18,9	9,7	4,5		0,3	0,4	0,2	0,2		1,0	1,9	6,9	0,0
CONWOR	9,0	6,6	3,4	11,7	8,1	4,1		10,6	2,6	0,4	0,5		17,1	8,7	-0,4	3,5
BUILUK	18,3	15,6	8,6	5,9	2,3	5,1		0,5	1,1	2,0	-0,5		3,6	5,1	2,7	2,6
MACHUK	14,2	12,7	9,1	6,5	7,3	2,3		5,4	3,9	6,7	4,6		20,3	19,7	15,0	11,2
OTHSIC	16,6	12,0	11,5	6,8	2,0	2,2		2,8	0,7	2,6	1,7		4,7	4,3	8,4	2,2
LANDCO	27,7	17,1	10,1	20,8	15,9	7,2		14,6	7,1	4,1	0,1		66,3	36,6	13,3	11,3
INTERE	28,4	25,4	12,5	5,8	0,7	0,3		7,2	4,7	-1,5	-0,9		18,4	9,4	15,4	4,3
DEPREC	26,7	23,2	12,2	7,1	5,6	4,2		8,9	3,6	3,2	1,9		37,7	23,0	6,1	7,4
TAXES_	8,4	8,6	3,2	-0,9	-1,1	0,0		1,9	-2,2	2,6	0,4		1,9	1,8	3,8	1,8
SUBSID	-61,5	-8,6	-0,9	-29,6	-11,2	0,1		-10,3	-15,4	-17,9	-10,7		-31,8	-6,6	-22,7	-13,2
NETVAL	2,5	-11,3	0,1	1,7	-0,9	5,3		-2,5	5,3	3,6	1,7		18,2	32,7	11,3	8,0
Product								***PIG***								
FEEDPC	277,4	230,1	129,6	128,3	133,2	74,0	337,2	283,4	188,5	260,9	251,9	237,8	329,4	237,1	170,7	102,9
FEEDHC	89,4	53,0	38,7	35,0	20,6	12,3	18,7	15,1	7,4	11,7	9,5	6,8	177,9	104,2	20,6	21,1
VETCOS	159,8	156,7	80,4	30,8	32,9	25,1	125,9	111,3	60,9	112,6	117,8	94,9	151,5	132,4	79,6	58,8
MOTFUE	54,5	31,0	14,2	8,6	6,9	4,9	6,1	1,9	3,7	6,9	5,8	2,4	31,3	16,5	1,8	6,3
OENERG	16,8	26,6	20,7	35,9	24,1	15,8	13,6	17,9	9,7	15,6	8,5	4,3	23,1	15,3	38,8	34,4
CONWOR	27,2	19,9	12,1	16,8	13,5	8,4	26,8	15,4	7,5	3,1	2,0	1,3	19,5	4,6	15,7	0,3
BUILUK	21,5	12,3	8,6	10,6	11,9	4,2	17,8	10,0	5,9	18,1	7,1	8,2	42,5	12,3	11,0	9,5
MACHUK	50,8	44,9	26,2	16,8	10,5	3,3	11,2	17,2	13,0	20,9	22,4	10,9	29,8	14,4	20,7	10,7
OTHSIC	31,4	21,1	18,7	16,4	12,8	3,5	6,9	7,9	5,2	22,1	9,6	7,4	15,2	8,5	49,3	28,8
LANDCO	7,0	14,4	7,9	12,3	24,9	17,4	6,3	5,1	4,0	8,8	6,9	4,3	-3,3	0,5	8,3	6,5
INTERE	60,9	43,6	24,9	24,4	21,6	16,1	32,3	26,2	16,3	47,7	28,6	17,7	45,4	16,3	36,0	6,8
DEPREC	101,7	90,0	44,8	29,9	25,6	13,6	57,4	35,1	21,1	42,8	22,1	13,8	40,5	24,0	12,7	6,6
TAXES_	66,6	63,2	25,4	6,4	2,7	0,6	51,2	17,1	10,6	7,6	8,3	0,8	1,5	4,7	30,1	28,5
NETVAL	49,4	34,1	-15,2	6,3	10,6	1,0	63,3	56,6	2,4	9,7	21,9	-7,9	97,3	29,8	31,4	-19,3
Product								***MILK***								
FEEDPC	62,8	49,5	26,8	109,2	79,9	42,4	36,6	25,4	18,8	49,0	43,4	33,6	59,3	48,5	48,2	27,5
FEEDHC	8,4	28,1	39,8	41,2	38,4	25,8	27,8	20,5	12,4	24,7	16,2	10,6	42,7	21,9	59,1	23,9
VETCOS	86,9	76,5	46,4	31,4	27,4	18,9	46,7	38,3	21,0	40,5	37,3	21,0	84,5	72,6	42,4	38,1
SEED__	9,9	2,2	-8,7	4,7	4,3	1,6	5,5	3,7	1,9	0,2	0,7	0,3	5,3	1,2	-11,6	5,5
FERTIL	20,3	12,9	3,5	17,6	12,6	5,7	13,6	18,0	12,6	11,0	26,1	8,4	35,2	27,0	12,6	1,4
CRPROT	23,2	13,3	3,8	-0,2	6,3	3,9	13,0	10,5	6,9	2,7	3,2	1,4	7,2	4,3	12,0	5,5
MOTFUE	36,5	31,6	17,3	32,2	16,2	10,3	39,2	17,6	16,6	36,5	32,0	18,3	55,4	39,6	30,6	18,5
OENERG	7,5	6,9	6,1	35,0	11,6	6,4	10,9	6,5	3,6	4,7	3,0	1,5	13,5	7,2	14,7	16,0
CONWOR	62,3	49,9	28,1	45,4	29,8	18,5	31,0	27,6	16,1	13,0	11,9	6,0	18,7	10,7	3,1	2,2
BUILUK	16,1	8,7	6,7	21,2	12,9	14,4	12,0	3,6	1,9	9,4	4,8	7,5	17,8	12,2	7,2	4,1
MACHUK	52,8	43,6	32,3	35,5	20,1	10,7	49,4	23,9	15,5	44,4	31,7	17,2	41,6	27,8	38,1	18,1
OTHSIC	35,8	17,7	4,7	27,7	10,2	1,9	8,4	10,0	4,7	13,5	7,8	5,2	17,6	11,6	12,6	12,8
LANDCO	20,4	16,2	7,1	24,2	13,0	11,5	33,6	25,1	13,2	25,4	13,7	6,5	21,9	13,6	10,9	9,4
INTERE	71,7	50,7	25,2	26,3	11,4	6,3	37,2	25,2	15,2	46,4	37,9	21,3	27,6	16,4	15,9	13,3
DEPREC	69,8	55,2	27,7	38,7	22,5	11,7	71,6	31,9	18,3	31,2	19,8	10,4	49,3	33,9	15,2	3,8
TAXES_	31,5	29,4	23,8	0,0	-0,5	-1,8	27,9	15,3	8,8	8,9	5,2	0,1	4,9	2,1	13,0	20,7
SUBSID	-3,2	-2,1	9,8	1,2	-13,5	-0,9	-10,2	-12,1	1,3	-5,1	-36,0	3,7	-6,5	-3,6	-45,5	-7,7
NETVAL	19,7	6,5	-5,3	19,9	17,7	3,1	39,9	26,1	22,7	24,6	14,1	7,9	90,4	58,1	4,6	2,0

not significant; '-1,95 < T-value <1.95

Source: EU-FADN-DG AGRI L-3; FACEPA.

Table A2.3: R-Square adjusted of equations

	DEU			FRA			ESP			ITA			UKI		
Period	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Observations	29,250	19,344	6,952	34,306	19,721	6,626	37,035	23,094	7,981	71,689	38,645	13,351	13,765	8,020	2,527
FEEDPC	0.85	0.88	0.90	0.95	0.95	0.96	0.92	0.83	0.87	0.83	0.76	0.78	0.91	0.94	0.94
FEEDHC	0.47	0.54	0.50	0.41	0.39	0.38	0.35	0.32	0.42	0.69	0.67	0.69	0.41	0.47	0.52
VETCOS	0.42	0.49	0.50	0.83	0.85	0.85	0.83	0.55	0.74	0.43	0.58	0.50	0.87	0.86	0.86
SEED__	0.69	0.69	0.67	0.70	0.76	0.77	0.54	0.68	0.72	0.58	0.62	0.44	0.87	0.75	0.78
FERTIL	0.85	0.88	0.87	0.86	0.88	0.89	0.69	0.60	0.68	0.64	0.63	0.68	0.79	0.86	0.83
CRPROT	0.91	0.91	0.90	0.88	0.89	0.87	0.62	0.59	0.63	0.60	0.36	0.53	0.91	0.91	0.91
MOTFUE	0.91	0.92	0.92	0.81	0.84	0.86	0.54	0.50	0.55	0.58	0.55	0.51	0.78	0.78	0.82
OENERG	0.78	0.79	0.76	0.59	0.65	0.70	0.32	0.36	0.50	0.33	0.45	0.47	0.92	0.69	0.70
CONWOR	0.62	0.55	0.62	0.62	0.66	0.64	0.37	0.37	0.54	0.40	0.33	0.16	0.51	0.45	0.51
BUILUK	0.35	0.38	0.45	0.35	0.31	0.35	0.15	0.16	0.30	0.20	0.17	0.14	0.62	0.52	0.56
MACHUK	0.80	0.81	0.81	0.77	0.78	0.73	0.39	0.39	0.50	0.49	0.31	0.48	0.83	0.80	0.69
OTHSIC	0.76	0.78	0.74	0.75	0.81	0.80	0.67	0.60	0.63	0.69	0.60	0.57	0.94	0.86	0.86
LANDCO	0.79	0.80	0.82	0.77	0.79	0.77	0.27	0.36	0.56	0.45	0.79	0.42	0.53	0.54	0.55
INTERE	0.54	0.56	0.60	0.65	0.64	0.69	0.21	0.22	0.34	0.20	0.11	0.07	0.42	0.42	0.39
DEPREC	0.87	0.87	0.84	0.84	0.84	0.83	0.40	0.44	0.55	0.57	0.56	0.59	0.77	0.78	0.77
TAXES_	0.48	0.49	0.53	0.55	0.55	0.52	0.11	0.20	0.41	0.32	0.31	0.34	0.19	0.56	0.52
SUBSID	0.90	0.41	0.34	0.89	0.73	0.77	0.64	0.54	0.64	0.47	0.16	0.09	0.89	0.29	0.34
NETVAL	0.65	0.37	0.57	0.80	0.76	0.76	0.90	0.83	0.92	0.86	0.96	0.90	0.85	0.72	0.80

	DAN			SVE			BEL			NED			POL		HUN	
Period	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**2**	**3**	**2**	**3**
Observations	8,761	5,534	1,849	4,182	2,514	883	5,314	3,176	1,032	5,993	3,815	1,328	32,948	11,116	5,093	1,703
FEEDPC	0.94	0.93	0.92	0.91	0.92	0.91	0.97	0.97	0.98	0.96	0.97	0.99	0.88	0.89	0.94	0.94
FEEDHC	0.51	0.46	0.69	0.51	0.66	0.67	0.41	0.42	0.39	0.27	0.18	0.18	0.58	0.54	0.69	0.62
VETCOS	0.83	0.87	0.86	0.43	0.55	0.62	0.88	0.89	0.88	0.77	0.85	0.90	0.62	0.75	0.76	0.85
SEED__	0.72	0.58	0.81	0.83	0.82	0.78	0.66	0.78	0.78	0.62	0.61	0.63	0.56	0.48	0.82	0.86
FERTIL	0.82	0.82	0.80	0.84	0.84	0.85	0.58	0.77	0.83	0.26	0.75	0.49	0.83	0.84	0.85	0.86
CRPROT	0.88	0.86	0.86	0.77	0.82	0.80	0.89	0.87	0.93	0.67	0.68	0.72	0.79	0.82	0.86	0.86
MOTFUE	0.81	0.80	0.84	0.83	0.85	0.89	0.79	0.63	0.78	0.69	0.71	0.70	0.81	0.83	0.88	0.90
OENERG	0.87	0.87	0.90	0.79	0.81	0.89	0.87	0.87	0.81	0.79	0.81	0.86	0.90	0.88	0.76	0.79
CONWOR	0.62	0.64	0.69	0.69	0.69	0.69	0.72	0.73	0.70	0.32	0.34	0.54	0.36	0.38	0.32	0.32
BUILUK	0.57	0.59	0.61	0.53	0.58	0.59	0.62	0.54	0.49	0.27	0.17	0.47	0.21	0.28	0.61	0.25
MACHUK	0.81	0.82	0.86	0.77	0.77	0.78	0.74	0.75	0.78	0.75	0.75	0.78	0.56	0.60	0.87	0.83
OTHSIC	0.92	0.90	0.92	0.77	0.92	0.91	0.72	0.82	0.81	0.79	0.76	0.81	0.62	0.70	0.72	0.89
LANDCO	0.57	0.56	0.58	0.58	0.64	0.66	0.81	0.81	0.83	0.55	0.43	0.44	0.63	0.62	0.77	0.80
INTERE	0.82	0.79	0.79	0.63	0.61	0.65	0.72	0.69	0.69	0.72	0.74	0.76	0.51	0.47	0.72	0.66
DEPREC	0.90	0.90	0.89	0.79	0.81	0.82	0.87	0.85	0.85	0.80	0.80	0.83	0.74	0.75	0.74	0.70
TAXES_	0.79	0.82	0.71	0.05	0.03	0.42	0.64	0.60	0.64	0.27	0.59	0.56	0.58	0.71	0.50	0.84
SUBSID	0.86	0.35	0.40	0.81	0.51	0.27	0.83	0.66	0.60	0.18	0.59	0.16	0.21	0.05	0.72	0.71
NETVAL	0.71	0.72	0.47	0.25	0.68	0.82	0.87	0.86	0.88	0.76	0.70	0.56	0.81	0.82	0.65	0.69

Source: EU-FADN-DG AGRI L-3; FACEPA.

Annex 3

Table A3.1: Cost shares of wheat

Product	Country	Period	Total output €/t	Total output €/ha t	in % of outputs % [1)] CropSp	Energy	oSpecCo	Overheads	DeprFC	Subs_c	NetValAd
WHEAT	DEU	1st	117	810	31	6	9	11	17	39	65
		2nd	109	795	35	10	13	15	19	9	18
		3rd	202	1358	32	5	5	12	11	1	37
WHEAT	FRA	1st	105	743	45	5	8	13	28	50	51
		2nd	102	736	46	6	7	16	33	31	23
		3rd	182	1162	29	4	5	10	17	8	43
WHEAT	ESP	1st	132	398	33	6	5	13	13	47	76
		2nd	139	393	29	9	5	14	11	41	73
		3rd	183	718	24	7	3	12	14	7	47
DurumWheat	ITA	2nd	155	495	49	26	9	19	37	30	-10
		3rd	325	1074	20	11	-1	9	16	3	47
WHEAT	UKI	1st	113	908	42	7	9	18	22	47	50
		2nd	111	908	39	9	12	17	18	17	23
		3rd	206	1545	24	5	7	11	12	0	40
WHEAT	DAN	1st	112	798	26	4	9	16	21	38	62
		2nd	111	773	28	5	10	16	24	9	26
		3rd	208	1320	17	4	8	10	15	0	48
WHEAT	SVE	1st	108	626	42	13	6	21	19	44	43
		2nd	98	586	38	17	4	24	18	28	28
		3rd	207	1251	22	11	6	13	9	0	39
WHEAT	BEL	2nd	113	933	30	7	7	24	31	16	17
		3rd	226	1658	18	5	3	12	15	24	72
WHEAT	NED	1st	125	996	12	5	21	17	23	48	69
		2nd	125	977	18	7	25	17	21	25	39
WHEAT	POL	2nd	104	493	44	10	2	6	19	7	26
		3rd	196	895	26	8	2	5	13	1	47
WHEAT	HUN	2nd	90	417	24	14	15	5	8	20	54
		3rd	184	653	33	13	3	9	12	13	43

1) % of total output.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Table A3.2: Cost shares of milk

Product	Country	Period	Output €/t	in % of outputs [1] LiStFeed	CropSp	Energy	oSpecCo	Overheads	DeprFC	Subs-c	NetValAd
MILK	DEU	1st	314	27	4	6	17	9	13	6	30
		2nd	292	27	4	8	19	10	12	4	24
		3rd	380	25	4	7	15	10	11	1	29
MILK	FRA	1st	315	18	8	4	15	15	17	1	26
		2nd	295	19	7	4	14	16	20	4	25
		3rd	313	20	7	4	14	15	18	-3	19
MILK	ESP	1st	300	41	1	2	6	4	5	-4	38
		2nd	305	39	1	3	7	4	4	3	45
		3rd	242	41	1	3	11	4	6	0	34
MILK	ITA	1st	384	45	-2	3	4	1	6	0	42
		2nd	380	49	-3	3	4	1	7	3	41
		3rd	395	46	1	3	4	1	7	0	37
MILK	UKI	1st	278	26	4	3	14	10	8	-3	32
		2nd	264	31	3	3	16	10	8	1	29
		3rd	315	33	3	4	15	10	7	0	29
MILK	DAN	1st	336	22	4	2	12	13	12	0	35
		2nd	312	29	2	3	12	14	13	1	27
		3rd	339	46	-2	3	10	13	12	-1	16
MILK	SVE	1st	329	35	2	4	8	13	15	0	23
		2nd	317	40	3	4	8	14	12	6	25
		3rd	323	46	3	4	6	18	9	0	15
MILK	BEL	1st	294	16	6	3	7	9	18	2	42
		2nd	287	17	6	4	10	10	15	4	42
		3rd	341	18	5	4	8	8	12	-1	45
MILK	NED	1st	327	16	3	3	12	11	13	1	44
		2nd	307	17	4	4	14	13	14	7	43
		3rd	357	16	3	4	12	11	12	-1	41
MILK	POL	2nd	210	22	5	5	9	4	10	1	45
		3rd	265	24	5	5	8	4	10	0	45
MILK	HUN	2nd	254	59	2	11	17	6	8	15	12
		3rd	294	55	4	10	15	5	4	3	11

1) % of total output.
Source: EU-FADN-DG AGRI L-3; FACEPA.

Table A3.3: Cost shares of pigs

Product	Country	Period	Output	in % of outputs % [1)]					
			€/LU	LiStFeed	Energy	oSpecCo	Overheads	DeprFC	NetValAd
PIG	DEU	1st	767	48	5	14	7	10	17
		2nd	818	46	6	14	7	10	17
		3rd	800	65	6	14	6	9	0
PIG	FRA	1st	712	56	2	13	7	9	13
		2nd	755	52	2	12	7	9	18
		3rd	729	66	2	12	7	10	2
PIG	ESP	1st	553	48	1	6	0	1	44
		2nd	586	52	1	6	1	2	38
		3rd	551	45	1	7	1	2	46
PIG	ITA	1st	857	43	2	7	1	3	45
		2nd	857	39	1	5	0	2	53
		3rd	872	39	1	4	0	1	54
PIG	UKI	1st	650	53	2	13	5	5	21
		2nd	639	50	2	15	6	4	23
		3rd	617	59	2	16	5	3	15
PIG	DAN	1st	829	48	3	8	5	10	26
		2nd	891	47	4	10	5	11	23
		3rd	808	66	4	11	5	12	2
PIG	SVE	1st	757	53	3	8	7	14	15
		2nd	827	49	5	9	6	11	20
		3rd	864	57	5	8	6	8	15
PIG	BEL	1st	692	56	1	7	3	7	26
		2nd	783	54	3	8	3	6	26
		3rd	703	72	3	9	3	7	5
PIG	NED	1st	786	51	4	16	3	11	15
		2nd	884	48	3	15	3	8	24
		3rd	790	67	4	21	3	9	-4
PIG	POL	2nd	626	59	3	6	3	5	24
		3rd	628	71	3	7	2	5	13
PIG	HUN	2nd	700	53	3	19	3	3	19
		3rd	659	90	6	18	2	4	-19

1) % of total output.
Source: EU-FADN-DG AGRI L-3; FACEPA.

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