Competitiveness of the EU egg sector

International comparison base year 2013

P.L.M. van Horne

LEI
WAGENINGEN UR

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This study was commissioned by EUWEP (European Union of wholesale eggs, egg products, poultry and game).

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Preface

Within the European Union the use of conventional cages was prohibited from 1 January 2012. Because of animal welfare concerns the minimum standard for the housing of laying hens is an enriched cage (Council Directive 1999/74/EC). The egg sector in the EU is also confronted with additional costs as a result of legislation on environmental protection and food safety. Countries outside the EU do not have the same extensive legislation. At the same time the EU is involved in multilateral (WTO) negotiations and bilateral (e.g. USA, Mercosur, India, Ukraine) negotiations, designed to further liberalise trade by either further reducing import tariffs or removing them altogether. This results in concerns for the competitiveness of the EU egg sector.

In this report, the independent research institute LEI Wageningen UR provides the results of a study on the competitiveness of the EU egg sector. The production costs for eggs and egg products are calculated for several EU and non-EU countries based on the data for 2013, a year after the implementation of Council Directive 1999/74/EC in the EU countries. With the 2013 situation several scenarios are described and the impact is calculated to illustrate the impact of the increase in production costs within the EU combined with different levels of import tariffs and a change in exchange rates.

The study has been initiated and funded by EUWEP, the EU trade association for Egg Packers, Traders and Processors. This report is an update of an earlier study first published in November 2012. LEI wants to thank EUWEP for providing the country data and for comments on the draft report.

Ir. L.C. van Staalduinen
Director General LEI Wageningen UR

Summary

S.1 Key findings

Egg producers in the EU have to comply with legislation dealing with environmental protection, animal welfare and food safety. From 1 January 2012 keeping hens in conventional cages was prohibited and egg producers had to change to either enriched cages or alternative housing systems. The result of all this legislation is an increase in the cost of producing eggs. At the same time the EU is negotiating with other countries or groups of countries to liberalise trade in agricultural products. These multi- or bilateral negotiations are designed to further liberalise trade by either further reducing import tariffs or removing them altogether. In this report the impact of reducing or removing import tariffs on the competitiveness of the EU egg sector is studied. The results show that the offer price of whole egg powder in 2013 of some third countries is close to the average EU price. Despite the current import tariffs on whole egg powder, the third countries can be competitive on the EU market. In a scenario with a 50% lower import tariff, all third countries have a lower offer price of whole egg powder compared to the EU egg sector. In a scenario with zero import tariffs, all third countries have a considerably lower offer price of whole egg powder compared to the EU egg sector.

The results for the situation in 2013 are presented in Figure S.1, Figure S.2 and Figure S.3. Figure S.1 provides the production costs of whole egg powder in the EU after implementation of the EU welfare Directive 1999/74/EC and the addition of transportation costs and the current import tariff compared to Ukraine, the US, Argentina and India. Figure S.1 shows that import tariffs protect the EU from large volumes of imports from third countries. However, even with the current import levies, the offer price of whole egg powder from Ukraine and India is below the offer price of EU producers.
Compared to the 2010 comparison (van Horne, 2012) the difference in offer price of all third countries (except Argentina) with the EU average did increase.

Figure S.2 illustrates the scenario with a 50% decrease in import tariff and a 10% devaluation of the exchange rates for the non-EU currency. In this situation all third countries have a lower offer price of whole egg powder compared to the EU egg sector. In this situation large volumes of whole egg powder will be imported from third countries. Figure S.3 illustrates the 'worst case scenario' with a zero import tariff and a 10% lower devaluation of the exchange rate for the non-EU currency.

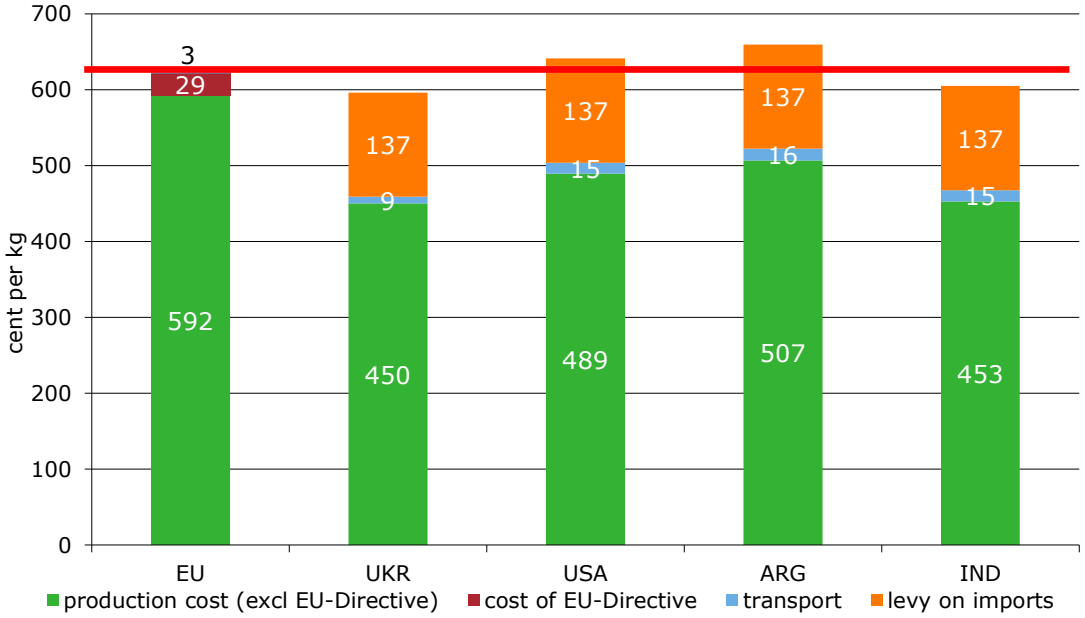


Figure S.1 *Offer price of whole egg powder in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram in 2013.*

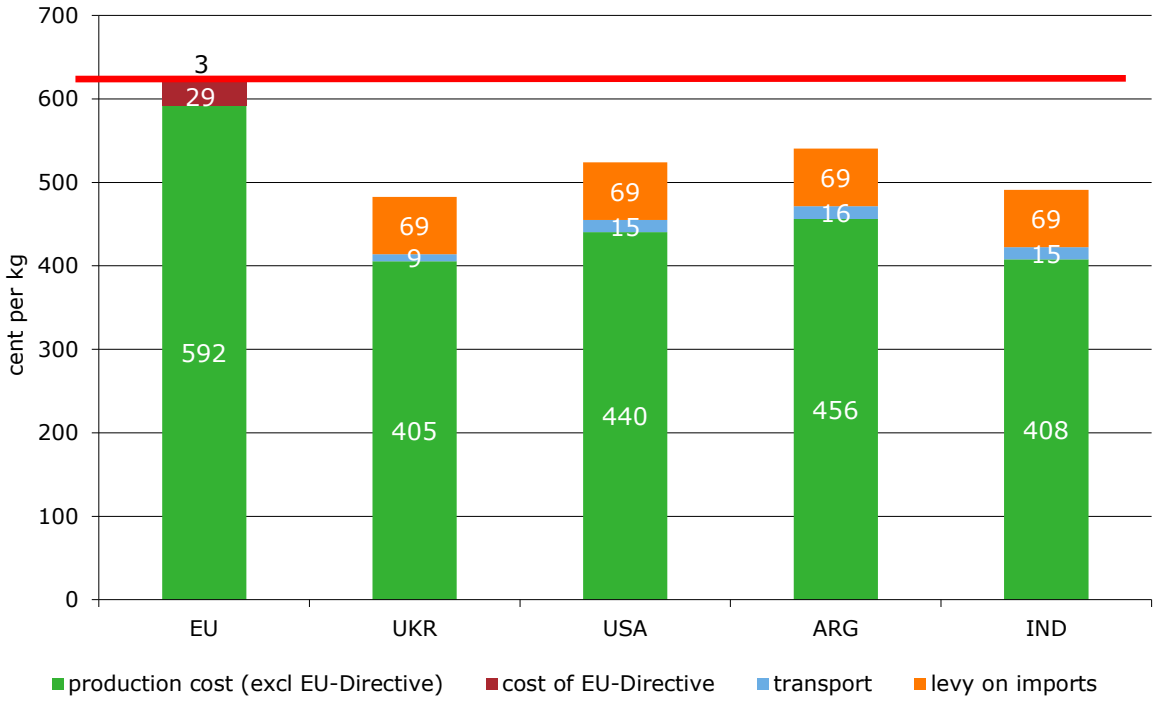


Figure S.2 *Offer price of whole egg powder in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram based on scenario 3: 50% lower import tariff and 10% lower exchange rate.*

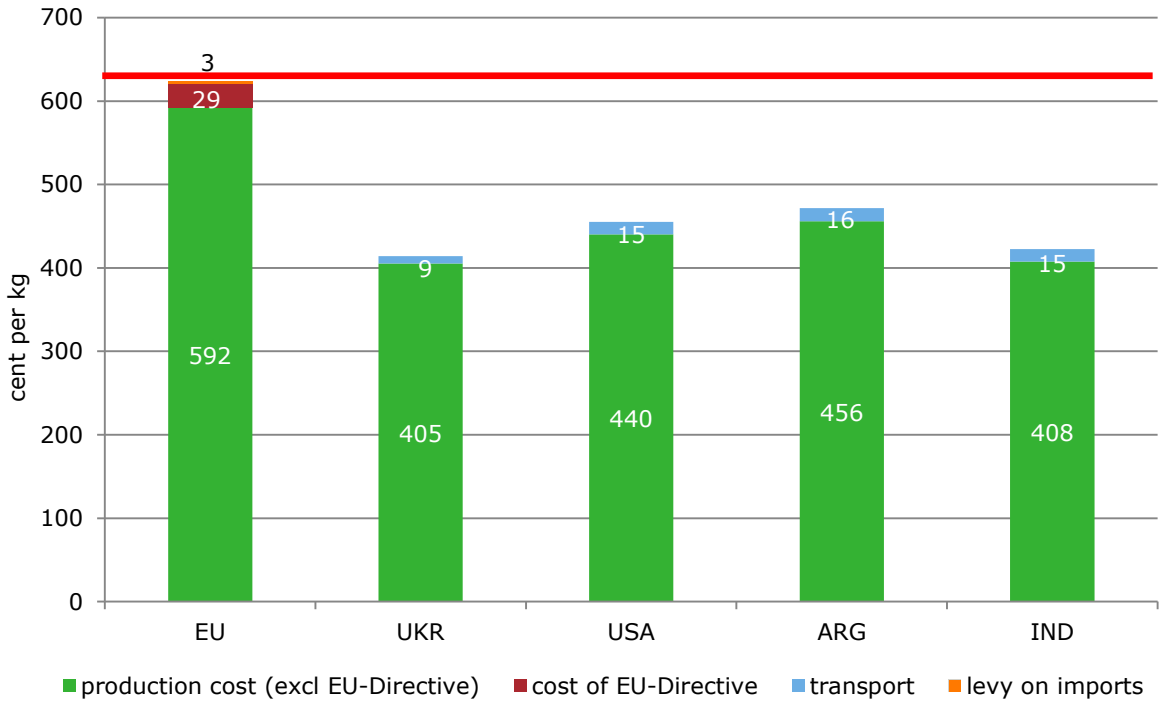


Figure S.3 *Offer price of whole egg powder in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram based on scenario 4: zero import tariff and 10% lower exchange rate.*

S.2 Complementary findings

The production costs of shell eggs produced in enriched cages in the EU in 2013 was on average 106 eurocents per kg of eggs. Between the main egg producing countries, the production costs of shell eggs in 2013 ranged from 112 eurocent per kg of eggs in the UK and 116 in Denmark to 98 in Spain and 99 eurocent per kg of eggs in Poland. Compared to the average level within the EU, the production costs for shell eggs in 2013 were lower in Ukraine (71%), USA (75%), Argentina (80%) and India (72%).

For whole egg powder the illustrated non-EU countries were even more competitive. Compared to the average level within the EU, the production costs of whole egg powder in 2013 were lower in Ukraine (72%), USA (79%), Argentina (82%) and India (73%). Because the cost of transportation of powder is low, the offer price of whole egg powder from third countries is relatively low. However, current import tariffs protect the EU from large amounts of imports from the illustrated countries.

In the EU, egg producers have to comply with European legislation covering environmental protection, animal welfare and food safety. The total costs of European legislation based on the situation in 2012 is estimated to be more than 15% of the total production costs to produce eggs at farm level.

In Argentina, India and Ukraine there is no legislation on animal welfare and laying hens are housed in conventional cages with a space allowance of 300 to 400 cm^2 per hen. Between countries, regions and farms the density can change due to expected market prices. Literature shows that purely from an economic point of view 300 to 400 cm^2 per hen gives the highest income for the egg producer. In the USA the proposal for federal legislation on laying hen welfare was not passed into law.

S.3 Methodology

In this report, LEI researched the production costs of shell eggs and whole egg powder in seven EU egg producing countries: the Netherlands (NL), France (FR), Spain (ES), Italy (IT), United Kingdom (UK), Poland (PL) and Denmark (DK) and the non-EU countries: Ukraine (UKR), the USA, Argentina (ARG) and India (IND). In all countries data were collected on prices (feed, young hens), technical results (egg production, feed intake, mortality), investment (poultry house, cages) and other costs (interest rate, labour, manure disposal). For egg processing, data were collected on investment in buildings, equipment and labour cost. The base year for the data was 2013. The total costs were converted to euros with the average exchange rate in the year 2013. Account was taken of the implementation of enriched cages, being the minimum standard for egg production within the EU from 2012. Based on extensive calculations, it was concluded that the production costs of eggs produced in enriched cages, compared to conventional cages providing 550 cm^2 per hen (EU minimum standard from 2003), increased by 7%.

- Based on the 2013 situation four scenarios were developed:
- A change in import tariffs for eggs and whole egg powder. A reduction of 50% in the import tariff and a zero import tariff to illustrate the result of any multi- or bilateral agreement of the EU;
- Lower exchange rate for the currency of the non-eu countries. In the scenarios a 10% lower exchange rate was assumed. A comparison of the exchange rate in 2014 and 2013 showed that for some non-eu countries this was a realistic scenario;
- A combination of a 50% reduction of the import tariff and a 10% lower exchange rate.
- A combination of a zero import tariff and a 10% lower exchange rate.

1 Production costs of eggs in 2013 in selected countries

1.1 Production costs of eggs in some EU countries

The production costs of shell eggs produced by hens housed in conventional cages has been researched for the following countries: the Netherlands (NL), France (FR), Spain (ES), Italy (IT), the UK, Poland (PL) and Denmark (DK). These countries, with the exception of Denmark, are the main egg producing countries within the EU. Germany, one of the largest producers, is not included because this country already prohibited conventional cages in 2010, two years before the ban in other EU countries. The results presented in Figure 1.1 relate to the year 2013. All costs in this report are given in euros. Figure 1.1 also provides an insight into the build-up of primary production costs. The production costs can be divided into six components: hen (cost of young hen at 20 weeks, less the revenue from the spent hen), feed (feed costs during the laying period), other (all other variable costs e.g. electricity and animal health), labour (cost of the labour of the farmer or a farm worker), housing (depreciation, interest and maintenance cost on building and equipment) and general (bookkeeping, clothing, insurance and, if relevant, manure disposal costs).

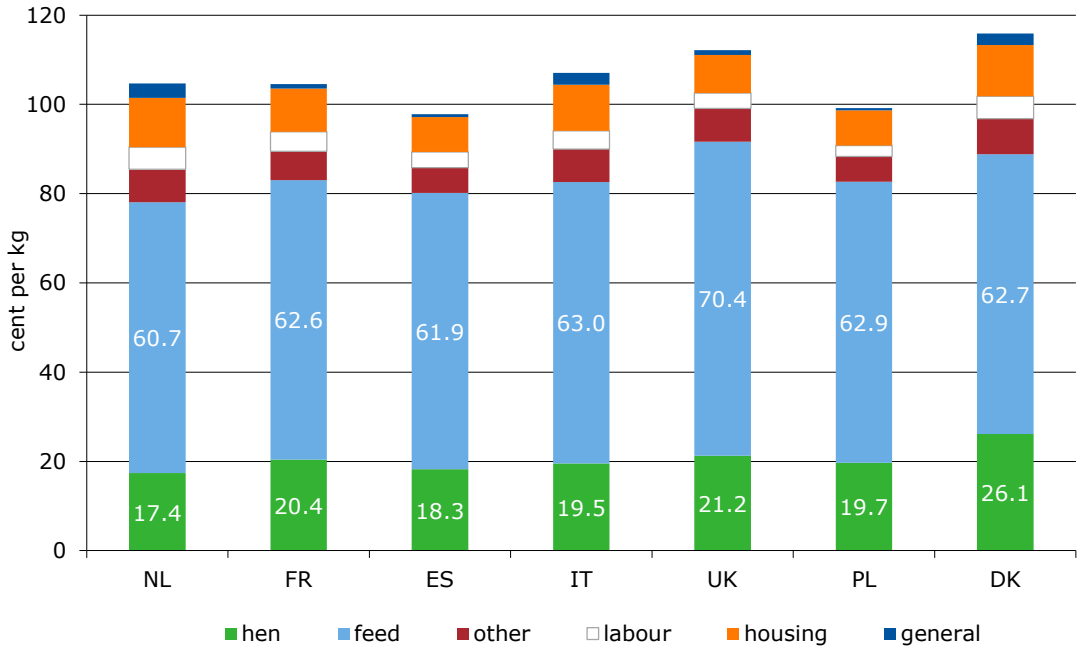


Figure 1.1 *Cost of primary production in enriched cages in some EU countries (cents per kilogram of eggs) in 2013.*

The costs of primary production (in cents per kilogram of eggs) are the highest in the United Kingdom and Denmark. The cost in the Netherlands, France and Italy are approximately the EU average of 106 cent per kg of eggs. In Spain and Poland the cost of production is at the lowest level of the selected EU countries.

In Table 1.1 the starting points are given which are used for the calculations. Table 1.2 indicates the results.

Table 1.1

Starting points for egg production in some EU countries in 2013.

	NL	FR	ES	IT	UK	PL	DK
Feed price (euro /100 kg)	30,2	29,4	29,9	31,2	32,7	29,7	31,5
Price / hen at 20 weeks (euro)	4,11	4,33	4,40	4,37	4,91	4,40	5,26
Laying period (days)	420	369	410	392	392	400	389
Eggs per hen	363	322	345	330	340	332	343
Egg weight (g)	61,4	62,3	64,0	63,0	62,5	63,0	61,6
Feed conversion	2,01	2,13	2,07	2,02	2,15	2,12	1,99
Mortality (%)	8,0	5,0	7,0	8,0	6,0	7,0	5,0

Table 1.2

Costs of primary production (in cents per kilogram of eggs) in some EU countries in 2013.

	NL	FR	ES	IT	UK	PL	DK
Total costs inclusive labour	104,7	104,5	97,8	107,0	112,2	99,1	115,9
Total costs exclusive labour	99,8	100,2	94,3	102,9	108,7	96,7	110,8
Hen cost at 20 weeks	18,4	21,6	19,9	21,0	23,1	21,0	24,9
Feed	60,7	62,6	61,9	63,0	70,4	62,9	62,7
Other	7,4	6,5	5,7	7,4	7,5	5,7	7,9
Labour	4,9	4,4	3,5	4,1	3,4	2,4	5,1
Housing	11,0	9,7	7,8	10,3	8,5	7,9	11,4
General	1,1	1,0	0,9	1,0	1,1	0,8	1,1
Manure disposal	2,2	0,0	-0,2	1,7	0,0	-0,3	1,5
Revenue spent hen	-1,1	-1,1	-1,7	-1,5	-1,9	-1,3	1,2

The differences in costs for the primary production are mainly caused by differences in feed costs, the price of young hens (pullets), housing costs and manure disposal costs. Within the EU countries the price of feed in the UK is the highest and the prices in France and Spain are the lowest. Young hens (pullets) are relatively cheap in the Netherlands and France (see Table 1.1). Poland has the advantage of low labour costs and the revenues for manure (see Table 1.2). While Dutch farms have good technical results, the production costs in an EU context are on an average level. This is caused by higher housing costs, but also particularly by high manure disposal costs. All countries have a revenue for spent hens, except for Denmark, where egg producers have to pay for rendering of spent hens. The average production costs in the EU, based on these seven countries, is 106 cent per kg of eggs.

1.2 Production costs of eggs in some non-EU countries

The production costs of shell eggs for consumption has been researched for the following non-EU countries: Ukraine (UKR), the USA, Argentina (ARG) and India (IND). The last three countries were the main exporters of eggs and egg products to the EU in 2013. Ukraine is selected based on the fact that this country has the potential of becoming an exporter to the EU and because of its geographic location close to Poland and Germany. Appendix 1 gives an overview of the main exporters of eggs and egg products (in egg equivalent) to the EU. These data illustrate that the USA, Argentina and India are important exporters to the EU. The production costs of the third countries in 2013 are presented in Figure 1.2. This figure also provides an insight into the make-up of primary production costs, and includes a comparison with the average EU level. The hen costs are defined as the hen cost at 20 weeks, less the revenue of the spent hen. General costs are the actual general costs plus the manure disposal costs, or less the revenue of manure (see Table 1.4 for the details).

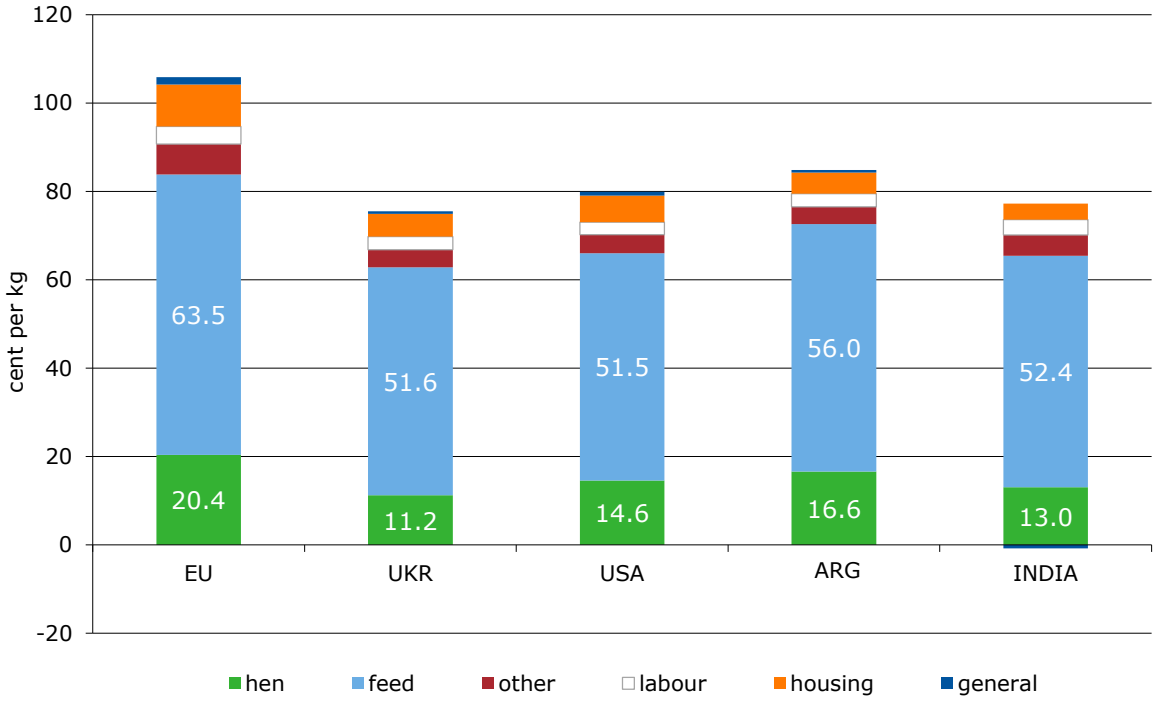


Figure 1.2 *Cost of primary production in enriched cages in the EU (average) and conventional cages in some non-EU countries (cents per kilogram egg) in 2013.*

The costs of primary production in all four third countries are clearly lower than in the EU. In Ukraine and India the costs are 24% lower than the EU level. The difference with the USA and Argentina is smaller; the production costs are 15 to 20% below the EU average of 106 cent per kg of eggs. Table 1.3 gives an overview of the starting points used for the calculation and Table 1.4 indicates the results.

Table 1.3

Starting points for egg production in some non-EU countries in 2013.

	EU	UKR	USA	ARG	IND
Feed price (euro /100 kg)	30,7	24,1	25,0	24,9	21,9
Price per hen at 20 weeks (euro)	4,54	3,25	3,08	3,71	2,87
Laying period (days)	396	395	420	418	364
Eggs per hen	339	311	352	335	300
Egg weight (g)	62,5	63,5	60,0	62,5	55,0
Feed conversion	2,07	2,14	2,06	2,25	2,39
Mortality (%)	6,6	8,7	8,0	8,4	8,0

Table 1.4

Costs of primary production (in cents per kilogram of eggs) in some non-EU countries in 2013.

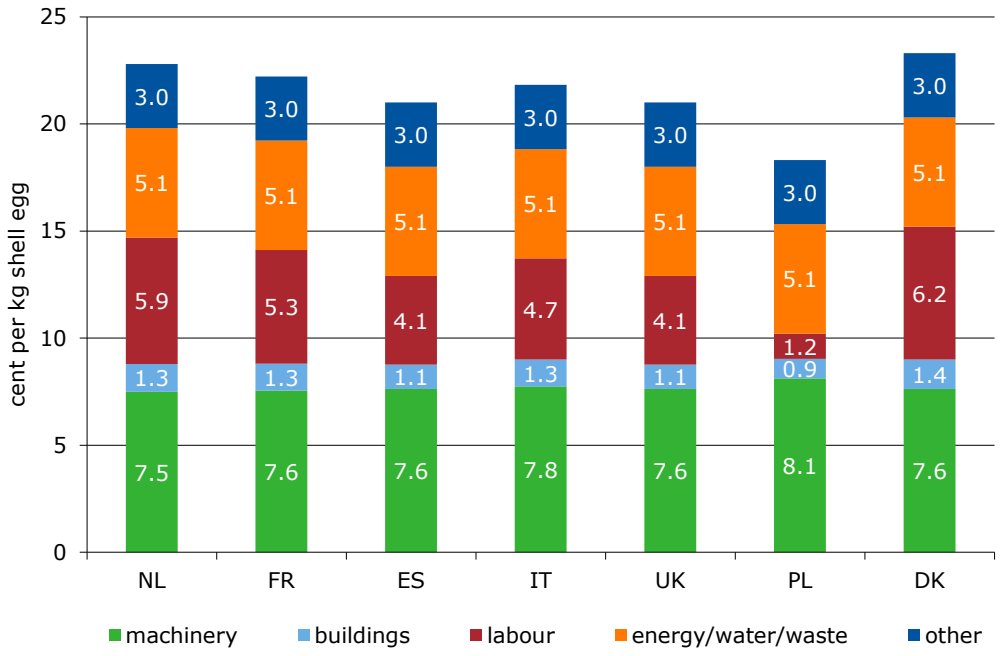
	EU	UKR	USA	ARG	IND
Total costs inclusive labour	105,9	75,5	79,9	84,9	76,5
Total costs exclusive labour	101,9	72,6	77,1	81,9	73,1
Hen cost at 20 weeks	21,4	16,5	14,6	17,7	17,4
Feed	63,5	51,6	51,5	56,0	52,4
Other	6,9	4,0	4,1	4,0	4,7
Labour	4,0	3,0	2,9	2,9	3,4
Housing	9,5	5,1	6,0	4,8	3,7
General	1,0	0,6	0,9	0,6	0,5
Manure disposal	0,7	0,0	0,0	0,0	-1,3
Revenue spent hen	-1,0	-5,2	0,0	-1,1	-4,4

The differences in costs for the primary production are mainly caused by differences in the costs of feed, young hens (pullets), labour and housing. For India, the revenues for manure disposal are also relevant. In Ukraine and India the extra value of the spent hens means a substantial reduction of the net production costs, compared to the EU.

1.3 Processing costs of whole egg powder in some EU countries

Besides the costs of primary production, the processing costs also play an important role in the international comparison of competitiveness. Figure 1.3 provides detailed information about the costs of production of whole egg powder, in cents per kg of shell egg (input). The processing costs amount to approximately 20 to 25% of the costs of primary production. As Figure 1.3 shows, the level of labour costs mainly determines the differences in processing costs between the selected EU countries. The difference between the cost levels of the most expensive country (Denmark) and the cheapest country (Poland) is 8% above and 15% below the EU average.

Figure 1.3 *Processing costs in some EU countries in cents per kilogram of shell egg in 2013.*



1.4 Processing costs of whole egg powder in some non-EU countries

With regard to the processing costs in the non-EU countries, Figure 1.4 shows that Ukraine and India are 22% and 24% cheaper than the average EU level, mainly because of low labour costs. The total processing costs in Argentina are 12% lower. The difference in processing costs in the EU and the USA is only 5%.

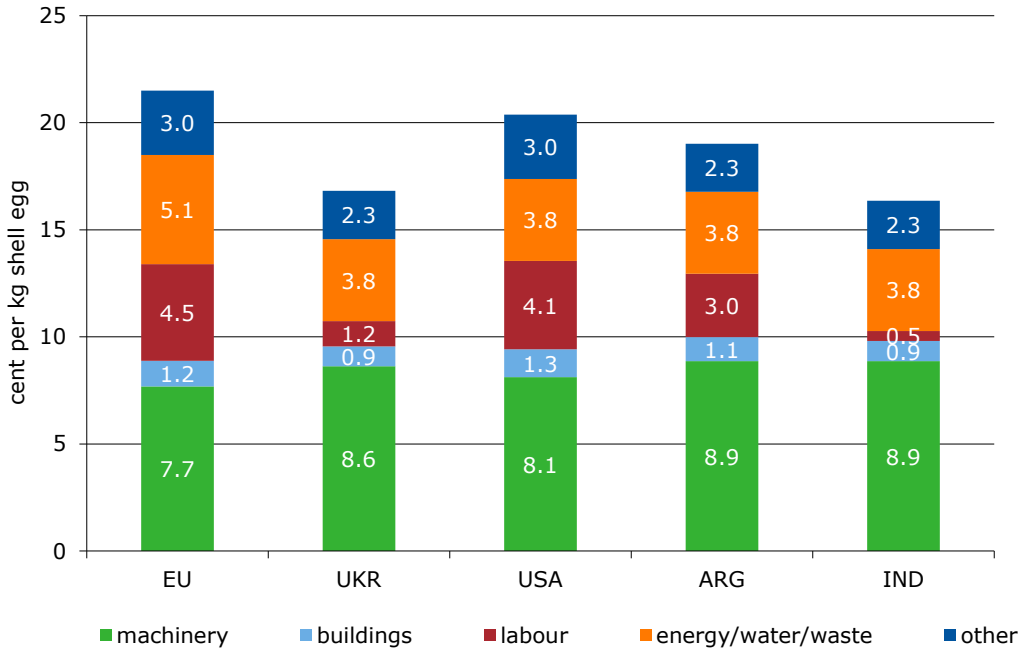


Figure 1.4 *Processing costs in EU (average) and some non-EU countries in cents per kilogram of shell egg in 2013.*

1.5 Total costs of production and transport of shell eggs

In order to form an idea of the transport costs from the major production area of a country to an EU market region, in this case Frankfurt am Main in Germany, the transport costs have been added to the production costs on the basis of a full load of shell eggs. For that purpose an offer price in Frankfurt am Main has been calculated. The results clearly indicate that it was not possible for the egg producers in the selected non-EU countries to compete in the supply of shell eggs to Germany in 2013. The horizontal line indicates the EU level of total costs, including the 3 cent/kg costs of transport to Frankfurt. Ukraine could be a threat for EU egg producers, but the current 30 cents/kg tariff on imports means that it is not cost effective for non-EU countries to export shell eggs to the EU market. Figure 1.5 also shows that imports from American, Indian and Argentine producers will be competitive in a situation if there were to be no import tariffs. However, a serious problem would be the quality of the eggs after being transported long distances.

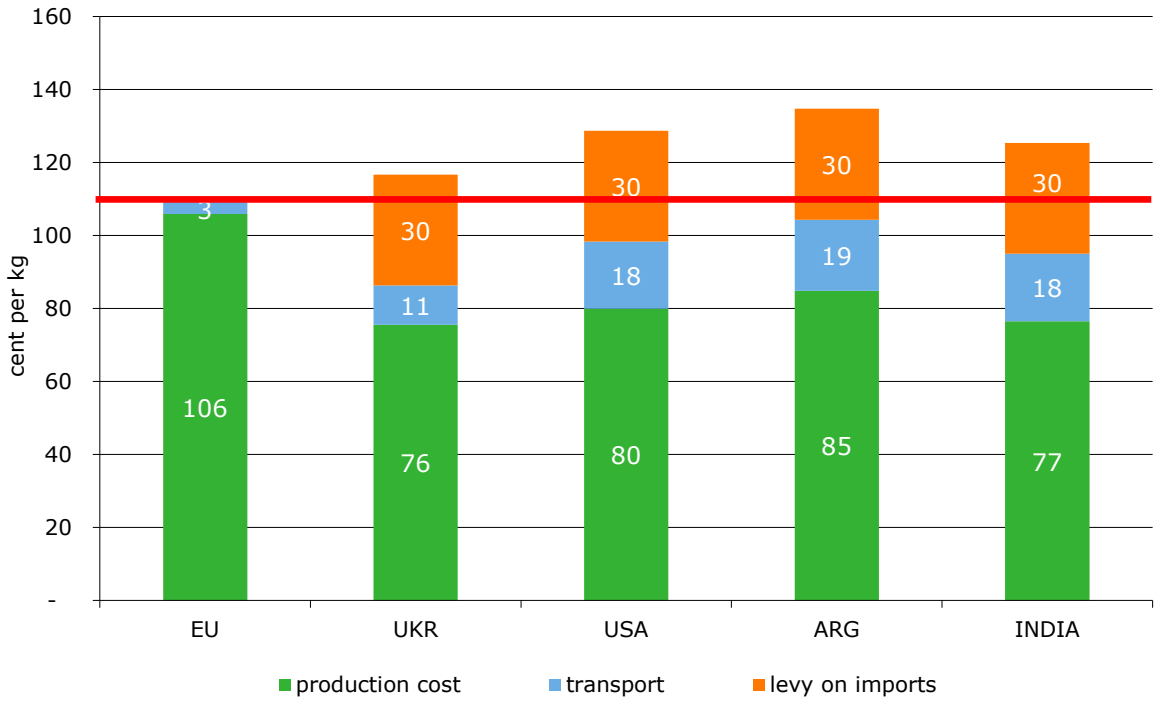


Figure 1.5 *Offer price of shell eggs in Germany from EU (average) and non-EU countries in cents per kilogram of shell egg in 2013.*

1.6 Total costs of production and transport of whole egg powder

For whole egg powder the calculated offer price in Frankfurt am Main in 2013 is shown in Figure 1.6. This figure shows that for whole egg powder the competition of non-EU countries, especially Ukraine and India, is a real threat. The tariff on imports provides not enough protection for whole egg powder entering the EU market. If there were to be no tariffs on imports, all suppliers of whole egg powder from the non-EU countries illustrated would have been very competitive on the EU market, in 2013. It has to be recognised that, in contrast to shell eggs, the product quality of egg powder is not affected after long distance transport.

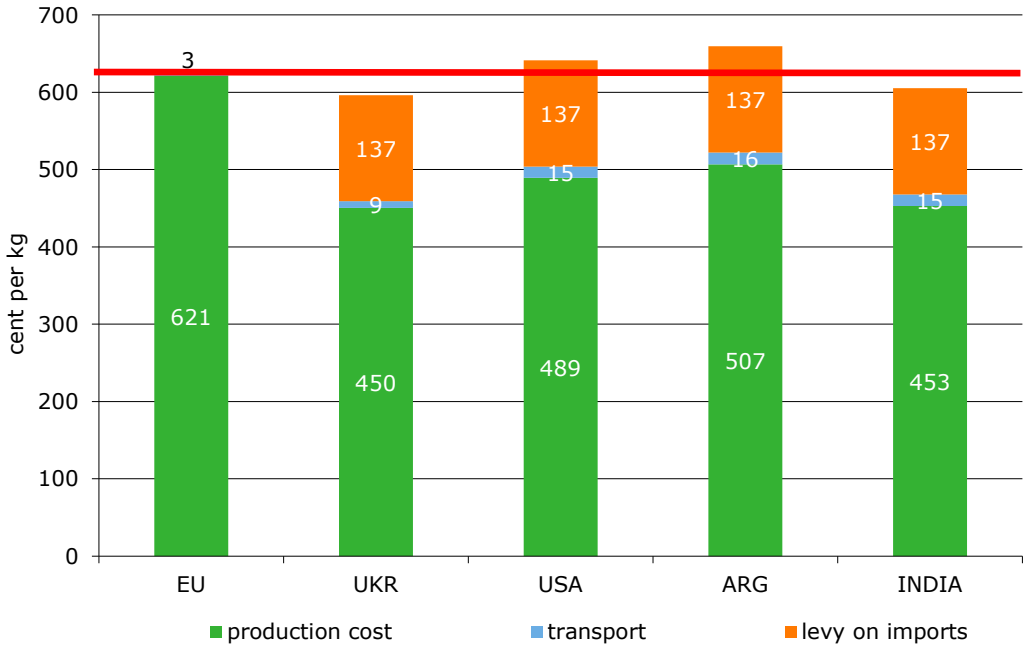


Figure 1.6 *Offer price of whole egg powder in Germany from EU (average) and non-EU countries (cents per kilogram) in 2013*

2 EU legislation

This chapter provides an overview of legislation in the EU, and the impact on the production costs of eggs is presented. Special attention is given to Directive 99/74/EC, in which the housing systems for layers, implemented from January 2012, are described.

2.1 EU legislation

Egg producers in the EU have to comply with a set of European legislation. This legislation is the translation of societal choices made in the EU and especially relates to environmental protection, animal welfare and food safety. In this section, EU legislation directly relevant to the egg sector is briefly presented. It should be noted that some countries choose to go beyond EU standards by implementing more stringent national or regional legislation. This national legislation is not, or just briefly, discussed in this chapter. In a report of the European Parliament, written by a group of research institutes, an overview is given of EU legislation related to the livestock sector (Chotteau et al., 2009).

Environmental protection
In the EU measures are taken to limit the pollution of land, water and air. Directive 91/676/EC protects land and water from high concentrates of nitrate mainly by specifying a maximum amount of nitrogen per hectare that can be applied. Different countries have additional national legislation to limit manure spreading to certain periods or special soil types. This is especially relevant in areas with a high concentration of pigs and poultry. Examples are the south and east of the Netherlands, Flanders in Belgium, Bretagne in France, Catalonia in Spain and the Po Valley in the north of Italy. As a result egg producers in these areas have to pay manure disposal costs.

Directive 2001/81/EC gives National Emission Ceilings to ammonia emissions for every member state. Some countries, for example the Netherlands and Germany, have additional national regulations to reduce ammonia emissions from poultry houses. To protect air quality, agricultural activities with a high pollution potential are subject to authorisation under the IPPC Directive (2008/1/EC).

Food safety
Foodstuffs of animal origin may present microbiological and chemical risks. Such risks require the adoption of rules of hygiene, traceability and labelling. For the egg sector the Zoonoses Directive is especially relevant. Zoonoses Directive 2003/99/EC and Regulation 2160/2003 regulate sampling, monitoring and control measures. Between member states, there is a large variation in Salmonella prevalence. In response to the European Food Safety Authority (EFSA) baseline study, each member state had to make a plan to reduce the salmonella prevalence in laying flocks.

A large proportion of protein sources for poultry feed is imported from outside the EU. An increasing share of world production of soya crops is from genetically modified hybrids. As a result of asynchronous EU approval of GM crops, coupled with the operation of near zero tolerance, this is negatively affecting the EU supply of feed ingredients (Backus et al., 2008), resulting in higher feed costs.

In the EU the use of meat-and-bone meal is prohibited. The consequence is higher disposal costs for slaughterhouses and higher costs for poultry feed.

Animal welfare
All member states have ratified the European Convention for animal protection with principles relating to animal housing, feed and care appropriate to their needs (98/58/EC). The aim is to spare animals all unnecessary suffering in three main areas: farming, transport and slaughter. Minimum standards

are established to protect and to avoid competition distortions between producers in various member states.

Especially relevant for the egg sector is Directive 99/74/EC, laying down minimum standards for the protection of laying hens. The welfare Directive required that from 1 January 2003 the space allowance per hen in conventional cages increased from 450 cm^2 to 550 cm^2 per hen. In 2012, laying hens can only be kept in enriched cages or alternative (non-cage) systems. The enriched cage gives each hen 750 cm^2 surface area, increased cage height, a perch, a nest box and litter. Since this change towards enriched cages has large consequences for the sector, resulting in high additional costs, the impact of this Directive is discussed in a separate section (see Section 2.2).

In the EU all mutilation is prohibited (annex of Directive 99/74/EC). However, in order to prevent feather pecking and cannibalism, the member states may authorise beak trimming provided it is carried out by qualified staff on chickens that are less than 10 days old.

In general it can be stated that in non-EU countries the level of legislation on environmental protection, food safety and animal welfare is non-existent or at a very low level. Some countries, especially in the USA, have legislation on food safety, and animal welfare issues are receiving more attention. Appendix 2 provides a short overview on the actual situation in the USA, Ukraine, Argentina and India.

2.2 Increase in production costs of enriched cages as a result of Council Directive 1999/74/EC

In June 1999 the European Agricultural Council decided that, after a transition period, laying hens would be housed exclusively in so-called enriched cages or in alternative (non-cage) systems. The enriched cage gives each hen 750 cm^2 surface area, increased height, a perch, a nest box and litter. The alternative system described in the EU Directive most resembles the aviary system. Each hen has 1,100 cm^2 living space, the surface area or part of the surface area of the house is covered with litter and in the house there are enough nest boxes and perches for the hens. In 2012 two different housing systems can be distinguished:

- *Enriched cages*
  In comparison to conventional battery cages the group size is enlarged. The cage is complete with a nest box, perch and litter according to EU standards;
- *Aviary systems*
  This system is based on floor accommodation (comparable to barn housing) whereby via levels, the hens can also use the vertical space in the house.

The welfare Directive required that from 1 January 2003 the space allowance per hen in conventional cages be increased from 450 cm^2 to 550 cm^2 per hen.
Taking the 2003 situation as a starting point for 3 different situations, the production costs of eggs were calculated: a conventional cage with 550 cm^2 per hen (situation after 2003), an enriched cage (situation from 2012). Also the non-cage system, based on the aviary, is included in the comparison.

The production costs of eggs have been calculated for all systems mentioned. Based on results at research stations, field data and expert opinions, assumptions were made on labour input and investments for enriched cages and aviary systems. It is evident that increasing the space allowance per bird will lower the bird density per m^2 of poultry house. As a result the investment for housing and equipment will increase. For the enriched cage and the aviary, the labour needs and investments for house and equipment per hen place are increasing. Table A3.1 in Appendix 3 provides the details.

The basic assumptions for the technical results are egg production, mortality and daily feed intake. Based on the experience on farms, it can be concluded that there are no major differences between the conventional and the enriched cage. In aviary systems the laying period is shorter. At the same

time egg production is slightly lower and feed intake and mortality are higher than in the cage system. Table A3.2 in Appendix 3 gives the details.

On the basis of the accepted debit terms the costs for housing and equipment are calculated for all housing systems. All variable costs are also calculated for each system (electricity, litter, etcetera). Table 2.1 provides the results. In the enriched cage, the production costs in relation to the situation before 2012 (conventional cage accommodation with 550 cm^2 per hen) are 7% higher. In the aviary system this is +22%.

Table 2.1
Production costs (in euro) for various housing systems for laying hens (price level 2010)

	Conventional cage	Enriched cage	Aviary
Cost (in euro) per hen housed			
Hen (pullet at 17 weeks)	3.30	3.30	3.70
Feed	10.29	10.29	11.07
Other variable costs	1.29	1.51	1.39
Housing	1.91	2.75	3.08
Labour	0.99	1.10	1.51
General costs	0.37	0.41	0.51
Revenue spent hen	0.27	0.27	0.26
Total cost	17.89	19.10	20.99
Total cost per egg (eurocent)	5.26	5.62	6.44
Total cost per kg eggs (euro)	0.85	0.91	1.04
Increase (base 550cm^2)		7	22

The conclusion is that after implementation of EU Directive 99/74/EC, the housing system with enriched cages produces eggs at the lowest cost. Compared to the situation before 2012 (with conventional cages), the production costs of eggs have increased by 7%. The production costs in aviaries are higher compared to enriched cages. This means the market price should be higher to keep the income for the egg producer at a constant level. In this context it has to be mentioned that other alternative housing systems, like free range and organic, have higher production costs than enriched cages and aviaries. Eggs produced in these systems need an even higher premium from the market to compensate the egg producer for the additional costs.

2.3 Costs of EU legislation in 2012

The poultry sector is governed by EU legislation and its implementation almost always results in additional costs. The layer sector especially is dealing with additional costs related to environmental protection, animal welfare and food safety legislation. For the following aspects, an estimate was made of the additional costs:

Environmental protection
- Manure disposal costs (as result of the N directive).
- Reduction of ammonia emissions (at manure application, manure storage and in the poultry house).

Food safety
- Salmonella control. Cost of hygiene measures, collection of samples and testing, and vaccination.
- Meat-and-bone meal (MBM). The ban on the use of meat-and-bone meal in the EU results in higher feed costs.
- Genetic Modified Organisms (GMO). The strict rules in the EU on the use of GMO crops results in higher feed costs.

Animal Welfare

- Beak trimming. Beak trimming of layers in the EU is only permitted up to 10 days of age. Compared to the situation without any legislation there will be additional feed costs (higher feed intake during rearing) and higher mortality rates.
- Density. Additional housing costs for increasing the space allowance per hen from 450 cm^2 to 550 cm^2.
- Enriched cages. Costs of conversion from conventional to enriched cages.

For all these measures the additional costs are estimated. This estimate is based on the research done in the Netherlands (Van Horne, 2008). Based on this method the data are updated for the situation in 2012. For all measures the average situation for all EU countries is given. However, it should be stated that there can be a difference in the actual situation per country or per region. Manure disposal costs are an example for this with high costs in certain high poultry concentration areas and just low or no costs at all in other regions with a small number of poultry farms. Figure 2.1 provides all the cost components of the specific legislation. The additional costs directly related to EU legislation are 15.1% of the total production costs of eggs in the situation in 2012.

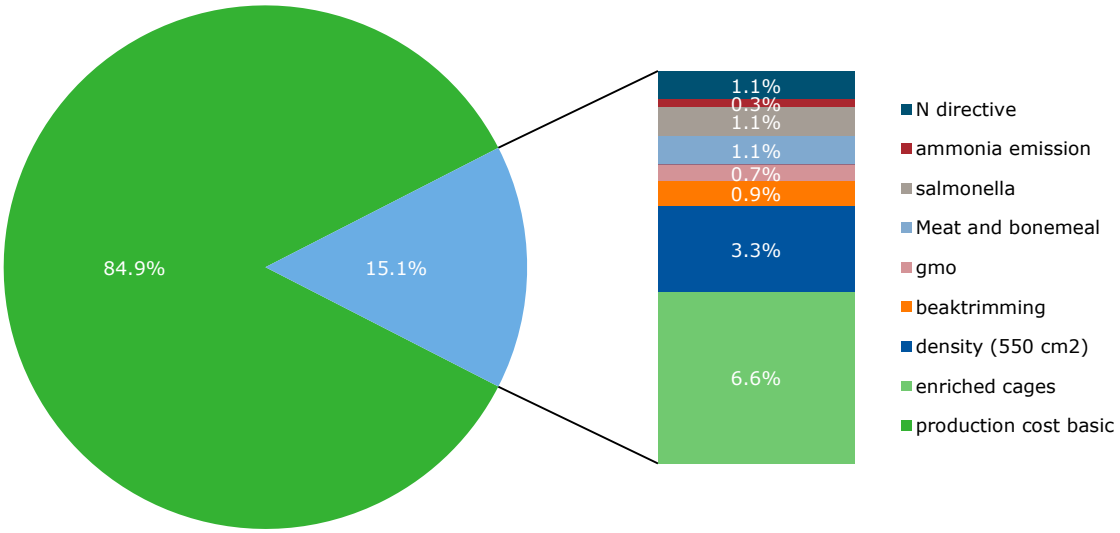


Figure 2.1 *Production costs directly related to EU legislation in 2012*

In 2012 there are additional costs for housing hens in enriched cages.
Other important legislation causing an increase in costs are environmental protection, ban on meat and bone meal, Salmonella control and enlargement of the space allowance. In recent years, there also were additional costs, for example, for the reduction of ammonia emissions and extra costs for feed as a result of a growing shortage of EU-approved GMO feed ingredients.

3 Results of different scenarios

3.1 Description of the scenarios

To show the impact of a possible change in import tariffs and a change in the exchange rate on the competitiveness of EU egg producers and egg processors, four scenarios for the future have been developed:

1. A change in the EU import tariff on egg and egg products, as a possible result of a new multilateral (WTO) agreement or bilateral agreement; in this scenario either a reduction in the import tariff of 50% or removal of the import tariff is taken as an example to illustrate the impact;
2. A change in exchange rates of the US dollar, Argentine peso, Ukrainian hryvnia and Indian rupee. In this scenario a 10% lower exchange rate for the currencies of the non-EU-countries is assumed. The average exchange rate in 2013 was used to convert the production costs of all countries to euros. In Appendix 4 the development of the exchange rate of some non-EU countries is given. The graph in Appendix 4 illustrates that a 10% lower exchange rate is a realistic scenario;
3. A combination of a 50% lower import tariff and a lower exchange rate of the third countries' currencies illustrated.
4. A combination of a zero import tariff and a lower exchange rate of the third countries' currencies illustrated. This is the 'worst-case' scenario.

In this chapter these four scenarios have been examined for shell eggs (Section 3.2) and for whole egg powder (Section 3.3). In all figures, the EU level is an average of the seven EU countries shown in Chapter 1.

3.2 Shell eggs

3.2.1 Scenario 1 - Lower EU import tariff

In the first scenario the impact of a 50% lower tariff on imports into the EU has been examined.

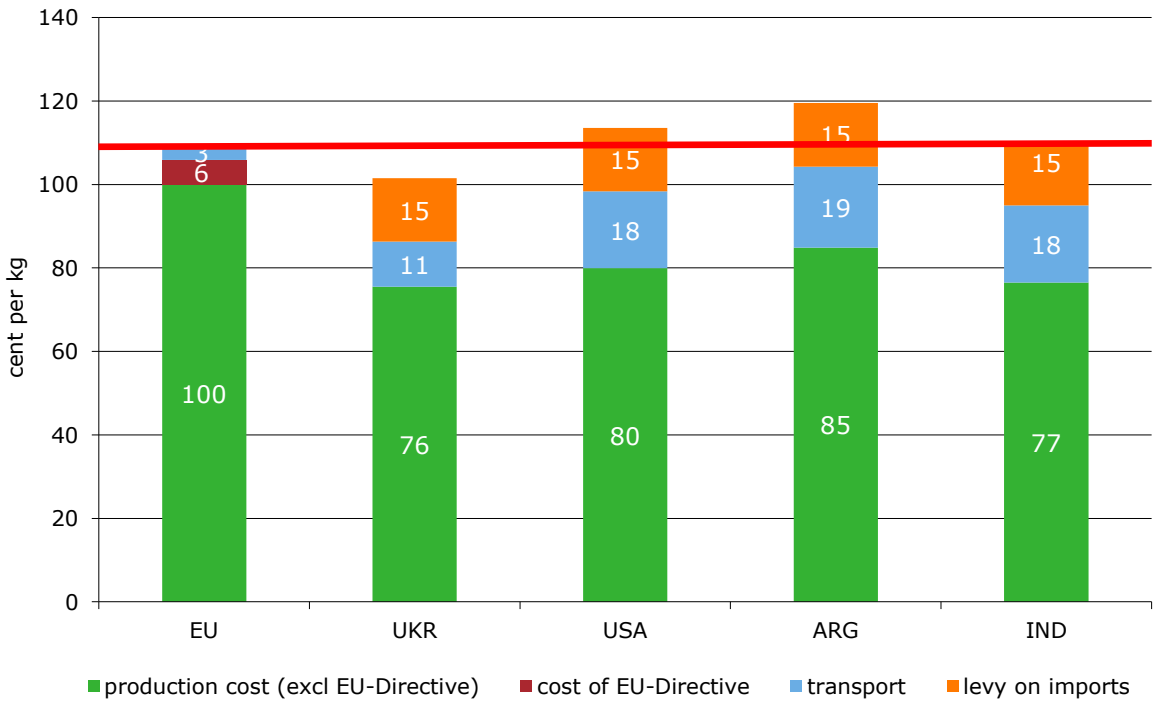


Figure 3.1 *Offer price of shell eggs in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram of egg (scenario 1: 50% lower import tariff).*

As Figure 3.1 illustrates, in this scenario Ukraine would be the most competitive supplier of shell eggs to Frankfurt in 2013. The result of the lowering of the import tariff is that Ukraine can compete on the EU market. Also India would be competitive after lowering the import tariff. Other non-EU countries would not be competitive on the EU market.

3.2.2 Scenario 2 - Change in exchange rates

This second scenario evaluates the consequences of 10% lower exchange rates of the currencies of all non-EU countries.

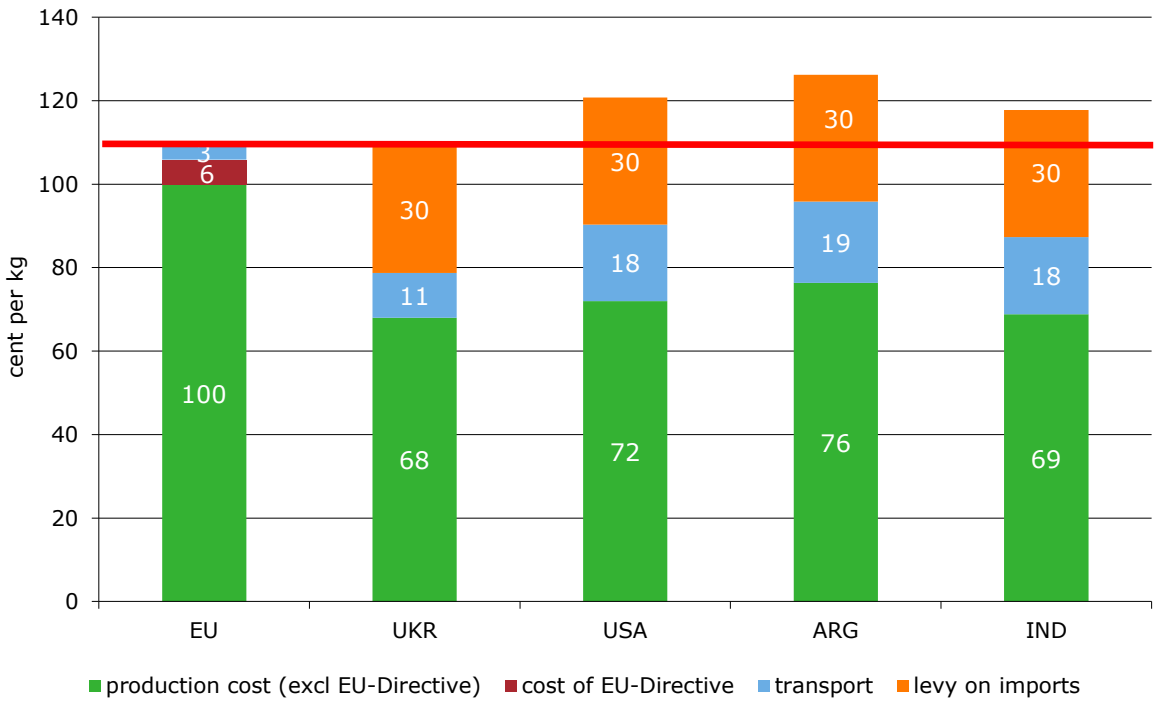


Figure 3.2 *Offer price of shell eggs in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram of egg (scenario 2: 10% lower exchange rates)*

Lower exchange rates have less impact than the lower import tariffs of scenario 1. Figure 3.2 shows that in the case of 10% lower exchange rates Ukraine would have a lower offer price than the EU countries. The other non-EU countries would be no real competition on the EU market.

3.2.3 Scenario 3 - Combination of lower import tariffs and change in exchange rates

The third scenario is a combination of the previous scenarios: 50% lower import tariffs and also 10% lower exchange rates of all non-EU currencies.

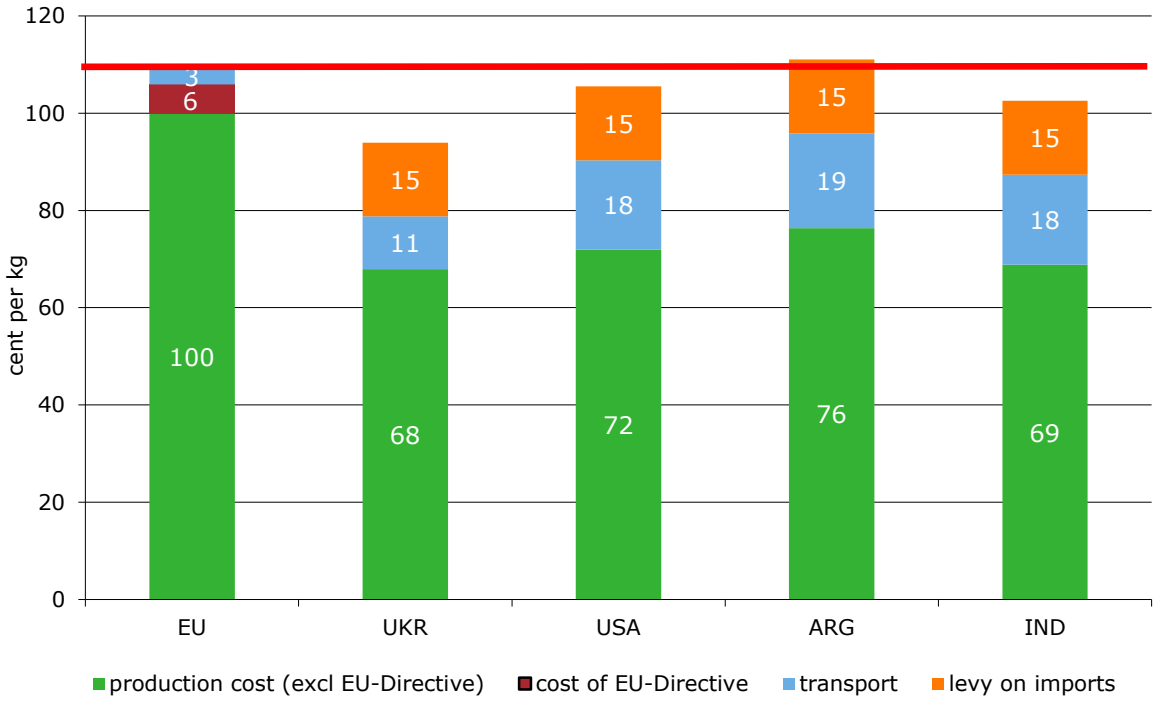


Figure 3.3 *Offer price of shell eggs in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram egg (scenario 3: 50% lower import tariff and 10% lower exchange rate).*

The consequences of the combination of a 50% lower tariff on imports and 10% lower exchange rates are indicated in Figure 3.3. In this scenario, Ukraine and also India obtain a very competitive position on the EU market for shell eggs. Also the USA is competitive. The remaining import tariff would give Argentina an equal offer price than the EU average.

3.2.4 Scenario 4 - Combination of zero import tariffs and change in exchange rates

This scenario is a combination of a zero import tariff and 10% lower exchange rates of all non-EU currencies. In fact this is a 'worst case scenario'.

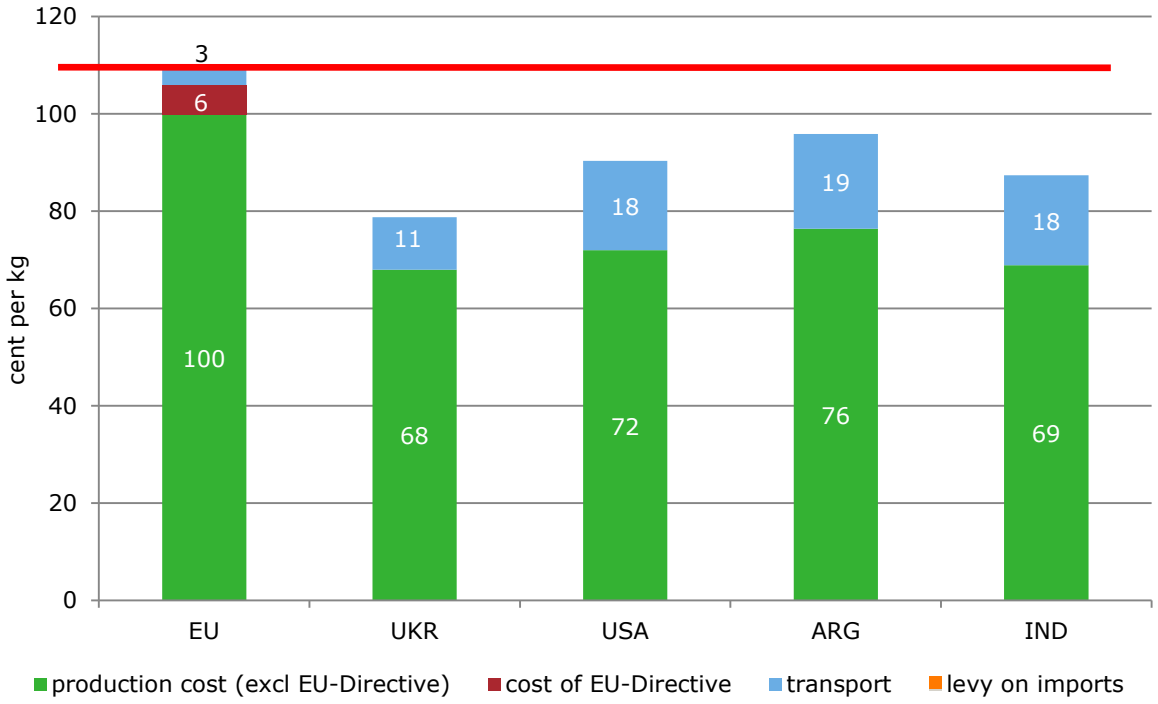


Figure 3.4 *Offer price of shell eggs in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram egg (scenario 4: zero import tariff and 10% lower exchange rates).*

The consequences of the combination of zero import tariffs and 10% lower exchange rates are indicated in Figure 3.4. In this scenario all third countries obtain a very competitive position on the EU market for shell eggs.

3.3 Whole egg powder

Egg powder is more suitable for long distance transport than shell eggs because there is no decrease in product quality after months of storage. Another advantage of egg powder is the relatively low cost of transport as the product is dried.

3.3.1 Scenario 1 - Lower EU import tariff

In the first scenario a 50% lower import tariff on imports into the EU has been examined. Figure 3.5 shows that a 50% lower import tariff will mean that all the non-EU-countries can be relatively cheap suppliers of egg powder to Frankfurt. The total costs of production, transport and import tariffs of all third countries are clearly below the average EU level.

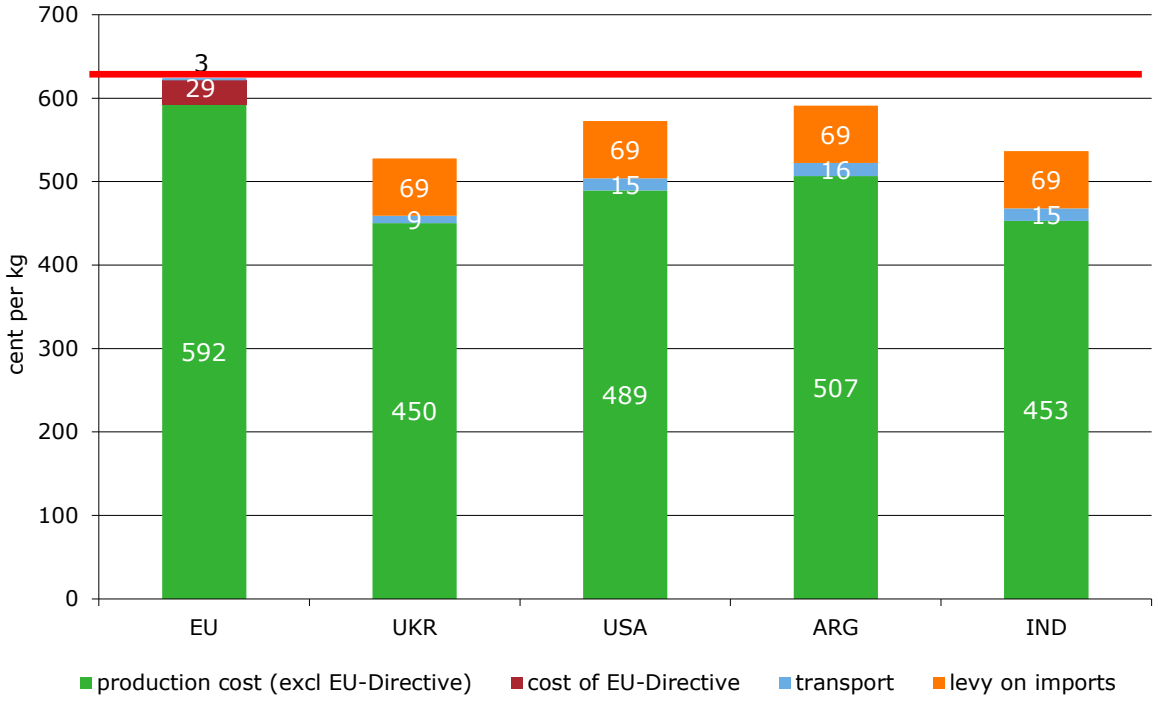


Figure 3.5 *Offer price of whole egg powder in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram (scenario 1: 50% lower import tariff).*

3.3.2 Scenario 2 - Change in exchange rates

This second scenario evaluates the consequences of 10% lower exchange rates of all non-EU currencies. In Figure 3.6 the impact of lower exchange rates is shown. Also in this scenario all non-EU countries can be relatively cheap suppliers of whole egg powder in Frankfurt. The total costs of production, transport and tariffs would be below the average EU level. However, this scenario has less impact than the previous scenario with the lower import tariff.

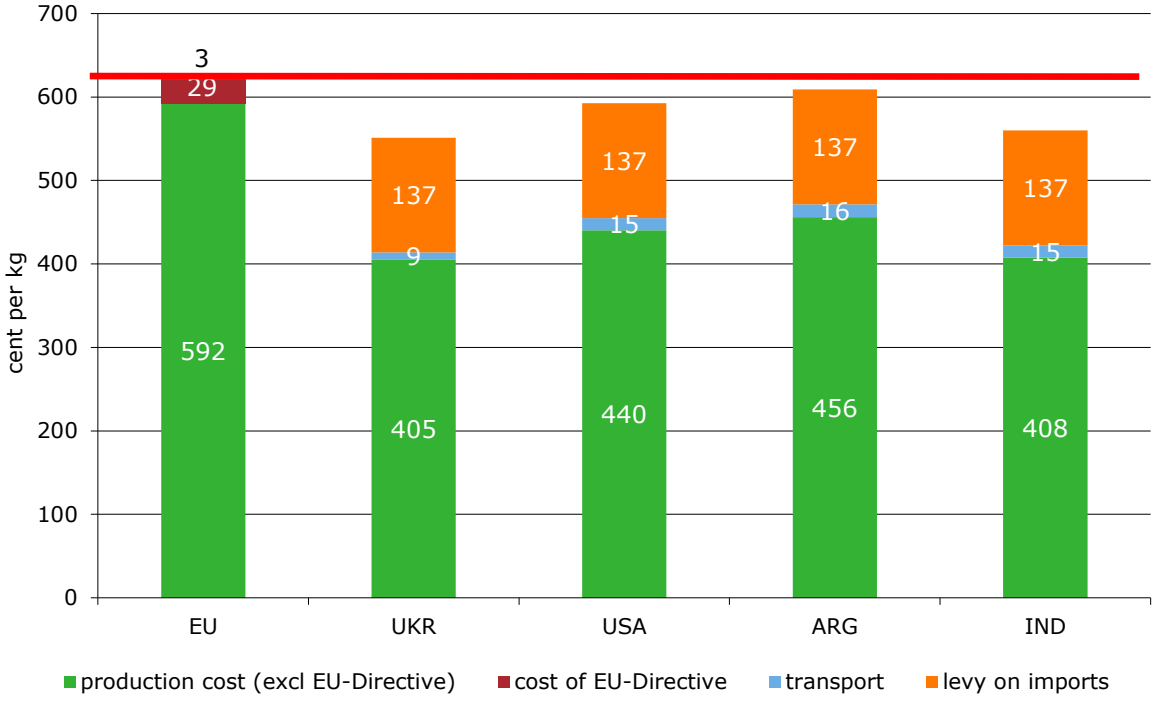


Figure 3.6 *Offer price of whole egg powder in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram (scenario 2: 10% lower exchange rate).*

3.3.3 Scenario 3 - Combination of lower import tariffs and change in exchange rates

This scenario is a combination of the previous two scenarios: 50% lower import tariffs (scenario 1) and also 10% lower exchange rates of all non-EU currencies (scenario 2). The consequences of this combination are illustrated in Figure 3.7. In this scenario all non-EU countries would be very cheap suppliers of whole egg powder to the EU market. Offer prices in Frankfurt could be 16% (USA) to even 23% (Ukraine) below the average EU level.

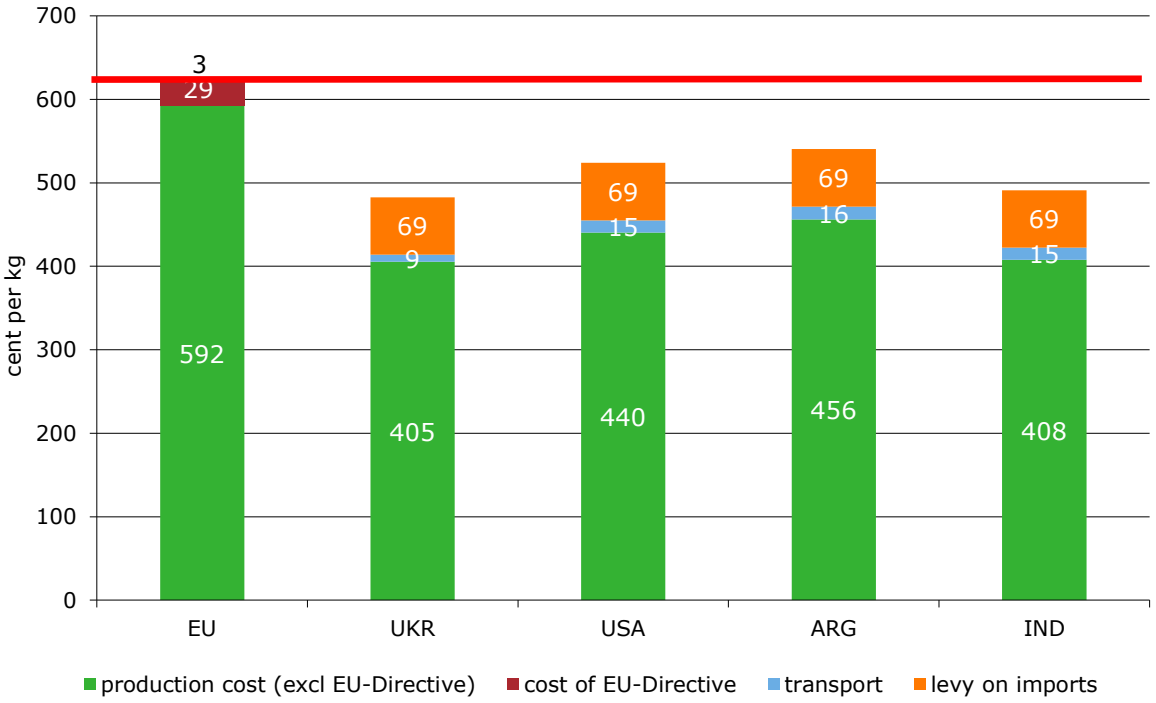


Figure 3.7 *Offer price of whole egg powder in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram (scenario 3: 50% lower import tariff and 10% lower exchange rate)*

3.3.4 Scenario 4 - Combination of zero import tariffs and change in exchange rates

This scenario is a combination of zero import tariffs and also 10% lower exchange rates of all non-EU currencies. The consequences of this combination are illustrated in Figure 3.8.

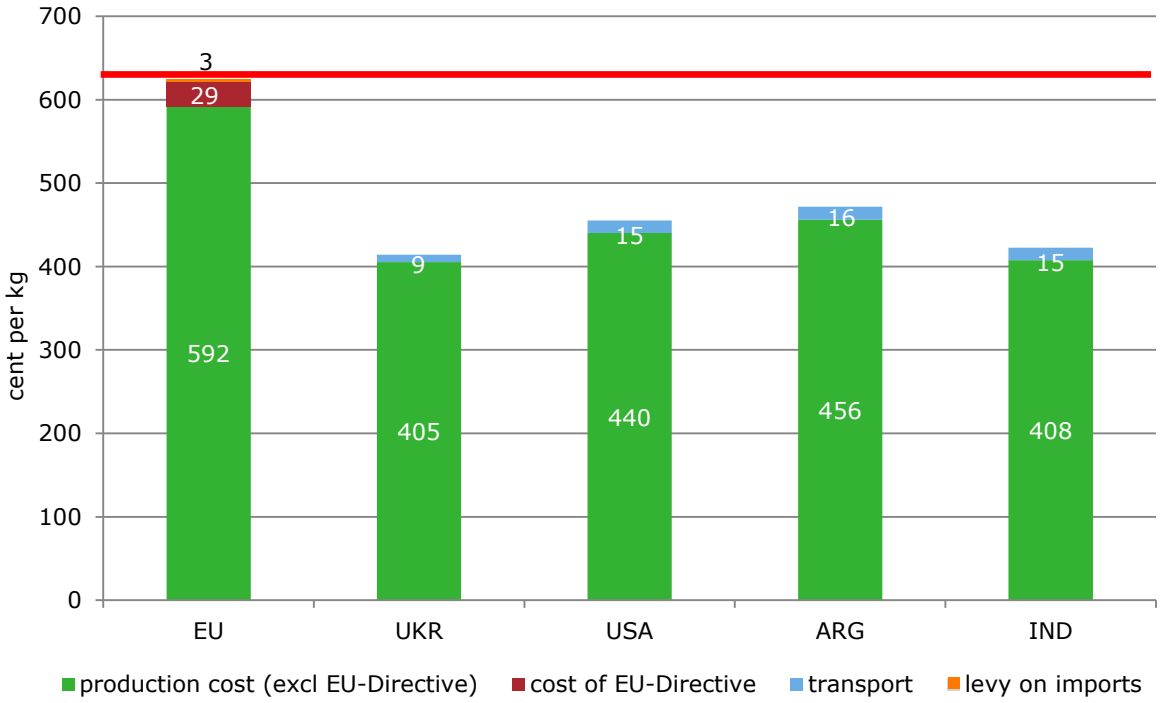


Figure 3.8 *Offer price of whole egg powder in Germany from EU average (horizontal line) and non-EU countries in cents per kilogram (scenario 4: zero import tariff and 10% lower exchange rate)*

In this worst-case scenario all non-EU countries would be very cheap suppliers of whole egg powder to the EU market. Offer prices in Frankfurt could be 32% (India) to 34% (Ukraine) below the average EU level.

4 Conclusions

Production costs in 2013 within the EU
The production costs of shell eggs produced in conventional cages have been calculated for seven EU countries: the Netherlands (NL), France (FR), Spain (ES), Italy (IT), the UK, Poland (PL) and Denmark (DK). Between these main egg producing countries, the production costs of shell eggs in 2013 ranged from 115.9 eurocents per kg of eggs in Denmark and 112.2 eurocents in the UK to 97.8 in Spain and 99.1 eurocents per kg of eggs in Poland. The average for those seven countries is 106 eurocents per kg. The processing costs for whole egg powder also differ within the EU countries from 23.3 eurocents per kg of shell eggs (input) in Denmark to 18.3 eurocents per kg of shell eggs (input) in Poland.

Production costs in 2013 in non-EU countries
Compared to the average level within the EU, the cost of production for shell eggs in 2013 was lower in Ukraine (71%), USA (75%), Argentina (80%) and India (72%). As a result of the costs of transportation, import tariffs and also the effects on product quality (from the USA, Argentina and India) there are barely any imports of shell eggs from those countries to the EU. For whole egg powder the illustrated non-EU countries are more competitive. Compared to the average level within the EU, the production costs of whole egg powder in 2013 were lower in Ukraine (72%), USA (79%), Argentina (82%) and India (73%). Because the costs of transportation of powder are low, the offer price of whole egg powder from third countries is relatively low. However, current import tariffs protect the EU from large quantities of imports from the illustrated countries.
Compared to the 2010 comparison (van Horne, 2012) the difference in offer price of all third countries (except Argentina) with the EU average did increase.

EU legislation
In the EU, egg producers have to comply with European legislation. This legislation deals with environmental protection, animal welfare and food safety. In 2010 the additional costs of EU legislation were estimated to be almost 9% of the total production costs of eggs at farm level. In these calculations the following legislation was taken into account:

- *Environmental protection*
  N directive to protect land and water and the reduction of ammonia emissions to protect air.
- *Food safety*
  Reduction of Salmonella prevalence, ban on meat-and-bone meal in poultry feed and regulations on GMO feed ingredients.
- *Animal welfare*
  Minimum standards on space allowance and legislation on beak trimming.

In January 2012 EU Council Directive 1999/74/EC 'welfare of laying hens' was fully implemented on EU egg laying farms. There has been a 7% increase in the costs of production as the sector moved from conventional cages to enriched cages. The total costs of European legislation based on the situation in 2012 is estimated to be more than 15% of the total production costs to produce eggs at farm level.

Scenarios
To show the impact of a possible change in import tariffs and a change in exchange rate on the competitiveness of the EU egg sector, some scenarios for the future have been developed. In the first scenario a 50% lower import tariff on eggs and egg products was taken as an example to illustrate the impact of any multi- or bilateral agreement with lower import tariffs. The results show that in this scenario all third countries have a lower offer price of whole egg powder compared to the EU egg sector. The same conclusion is valid in the second scenario with a 10% lower exchange rate, and for the third scenario with a combination of a 50% lower import tariff and a 10% lower exchange rate. However, the 'worst case' scenario is where the import tariff is totally removed and there is a 10% lower exchange rate of all non-EU countries.

Welfare legislation in non-EU countries

In the countries outside the EU illustrated in this report there is only the USA where there is a voluntary programme to increase the space allowance per hen towards 432 cm^2. However, the most common system of egg production in use in the USA at this time is the conventional cage system which was banned in the EU from 1 January 2012. In Argentina, India and Ukraine there is no legislation on laying hen welfare and hens are kept in conventional cages with a space allowance of 300 to 400 cm^2 per hen. Between countries, regions and farms, the density can change due to expected market prices (high density when high egg prices are expected), climate (lower density in hot areas) and housing systems (open or climate controlled houses). American literature shows that purely from an economic point of view, 300 to 400 cm^2 per hen gives the highest income for the egg producer (Bell, 2000).

Literature and data sources

Literature

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Data sources

The basic data for calculating the production costs were obtained from several organisations, institutes and companies in the countries. The following are the main sources per country:

Netherlands	Agricultural Economics Research Institute (LEI)
France	Institut Technique de l'Aviculture (ITAVI)
Spain	Asociacion Espanola de Productores de Huevos (ASEPHRU)
Italy	Unione Nazionale dell'Avicoltura (UNA)
	Vito Mastrangelo, consultant
UK	British Egg Industry Council (BEIC)
Poland	LEI: personal communication, study tour, agricultural counselor
Denmark	Dansk Landsbrug
Ukraine	Hendrix Poultry Breeders
	LEI: personal communication, study tour
USA	Egg Industry Center at Iowa State University
	International Egg Commission, annual review
Argentina	School of Agronomy of the University of Buenos Aires (UBA)
	LEI report 2010-005 The poultry and pig sector in Argentina.
	Agrivalue S.A. Egg production in Argentina, summer 2011
	International Egg Commission, annual review
India	National Egg Co-ordination Committee (NECC)
	International Egg Commission, annual review

Annex 1 EU imports of eggs and egg products (tonnes of egg equivalent) 2007-2013

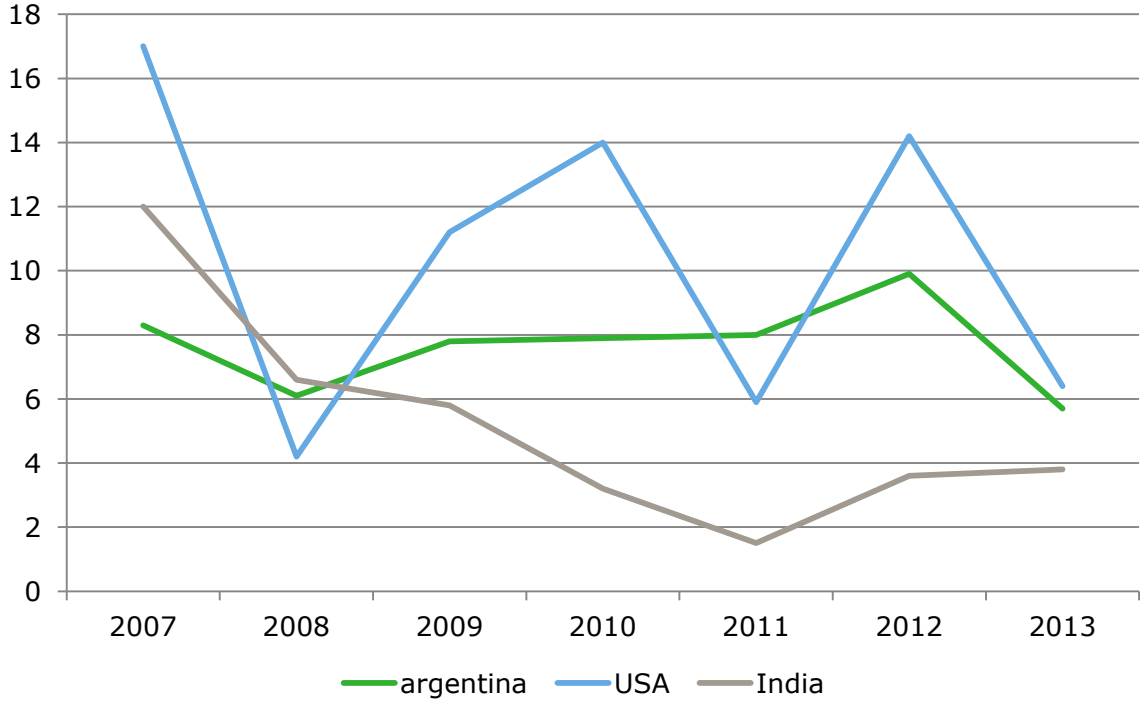

Figure A1.1 *Overview of the main exporters of eggs and egg products (in egg equivalent) to the EU. Source: EU market situation for eggs and poultry, management committee (February 2014).*

Annex 2 Egg layer industry in the USA, Ukraine, Argentina and India

USA

Egg production in the USA is mainly concentrated in the Mid-West of the country. In the commercial egg industry numerous independent producers are marketing on a local basis, applying price competition as a major component of their marketing strategy. It is estimated that the top 10 egg producers, each with more than 5 million layers, represent 44% of the industry. These companies have the 'economies of scale' and have a high efficiency in production, marketing and distribution (Shane, 2003). The USA is a large exporter of eggs and egg products.

The issue of animal welfare has become a more significant consumer concern in the USA in recent years. Although there is hardly any legislation with regard to poultry welfare, the producers' organisation United Egg Producers (UEP) has established voluntary guidelines to gradually improve the welfare of laying hens. The guidelines include provisions for more space for layers in cages, conditions for moulting and standards for beak trimming. Within the UEP programme the birds have more space in the cage. The space per bird is supposed to increase year on year and was 432 cm^2 from January 2009 for white layers. White layers constitute 93% of the total layer population. Participating producers will be audited annually through an independent certification programme. At this point the market for alternative eggs in the USA is still very low - around 5% - compared to countries in North-West Europe (Bracke et al., 2009).

Proposed federal legislation (2011 proposal) that would set national standards for egg production in the USA was not accepted by the government. The proposal was to replace conventional cages by enriched cages (similar to EU standards), after a transition period of 15 to 18 years. Only the state of California has additional legislation for the housing of layers to be implemented from 2015.

Ukraine

Ukraine is one of the new eastern neighbours of the EU. After Ukraine became independent in 1991 the principles of the free market economy were introduced. Since the poultry sector was privatised in 1998, it has shown remarkable progress.

Although all major poultry breeds can be found in the country, bird performance often lags behind their capabilities. However, in recent years performance has improved as a result of better management, improved feed quality and modern health service. With good production results Ukraine could become a competitive producer of shell eggs and egg products on the markets in the neighbouring EU countries.

In Ukraine there is no governmental legislation for a minimum space allowance for laying hens. It is estimated that on the farms the hens have between 300 and 400 cm^2 per bird. In modern equipment the stocking density is higher than in the old locally produced cages. Some farms with imported equipment put 7 hens in a 50 by 50 cm cage, which is 357 cm^2 per hen. The stocking density also depends on the expected price level. When egg prices are expected to be high, farmers tend to put an extra hen in a cage.

Argentina

The egg industry in Argentina is growing steadily in terms of production, value and exports. Egg processing has also been growing, currently accounting for 11% of total production. It is one of the most dynamic sub-sectors in terms of foreign markets and has contributed to reversing the country's situation from being an importer of egg products to being an emergent exporter.

No legislation regulating specific animal welfare practices for laying hens exists in Argentina. In 2009 a survey was conducted and interviews with producers and businessmen in the egg sector were held. The survey was undertaken by the University of Buenos Aires and included 30 operations (UBA, 2009).

Factors directly related to layer welfare include space allowances and methods of beak trimming. All farms in the survey kept layers in cages. The type of cage differed between farms. The average space allowance was 372 cm^2 per hen. However, there was a wide range from 278 cm^2 (8 companies) to 500 cm^2 per hen (1 company). All surveyed farms used pullets that had their beaks trimmed. The average age at which this was performed was 12 days with a range of 6 to 28 days. The beak trimming also differed in how much of the beak was trimmed, with the majority of farms trimming between one quarter and one third of the beak.

India

India is a large egg producer and exports shell eggs and dried egg products. A number of egg powder plants have been developed for export. There are 20,000 farms around the country. The farm size varies from 5,000 birds per farm to a maximum of 500,000 birds. Most of the farms keep the laying hens until 76 weeks and forced moulting is not practiced in India. Although western breeds are used in India, the local breed BV-300 has a high market share. This breed is completely acclimatised to the Indian agro climatic and feed conditions, resulting in high egg production.

All commercial layers kept on modern farms have open sided houses where birds are housed in 3 to 4 rows and three-tier conventional cages. The standard cage size for 3 birds is 37.5 cm by 30 cm. The space allowance is 375 cm^2 per bird. This is much lower than the current EU standard of 750 cm^2 per bird. Animal welfare standards do not exist. Animal welfare is not an issue for the government in India and in real life improving animal welfare is limited by the poverty of a great part of the population and the life philosophy within the Hindu culture (Bracke, 2009). The growing population in India will increase the local market for poultry products, making export efforts unnecessary for Indian producers. However, some of the larger companies are exporting egg powder to the EU and Japan. This can be achieved as a result of the low production costs.

Annex 3 Main assumptions to calculate the production costs for producing eggs

Table A3.1

Main assumptions for labour and investments in the various housing systems for laying hens.

	Conventional cage	Enriched cage	Aviary
Labour			
Number of hens per worker	60,000	55,000	40,000
Buildings			
Density (hen per m^2)	35	27	18
Surface area per house (gross m^2)	1,909	2,237	2,414
Investment			
Housing (Euro per hen housed)	6.05	7.73	11.47
Inventory (Euro per hen housed)	6.50	10.60	9.00
Other inventory (Euro per hen housed)	2.70	2.95	4.50

Table A3.2

Main assumptions for the production results in the various housing systems for laying hens

	Conventional cage	Enriched cage	Aviary
Laying period (days)	400	400	392
Eggs per hen housed	340	340	326
Mortality (%)	7	7	9
Feed consumption/hen/day (gram)	111	111	123

Annex 4 Development of the currency exchange rate

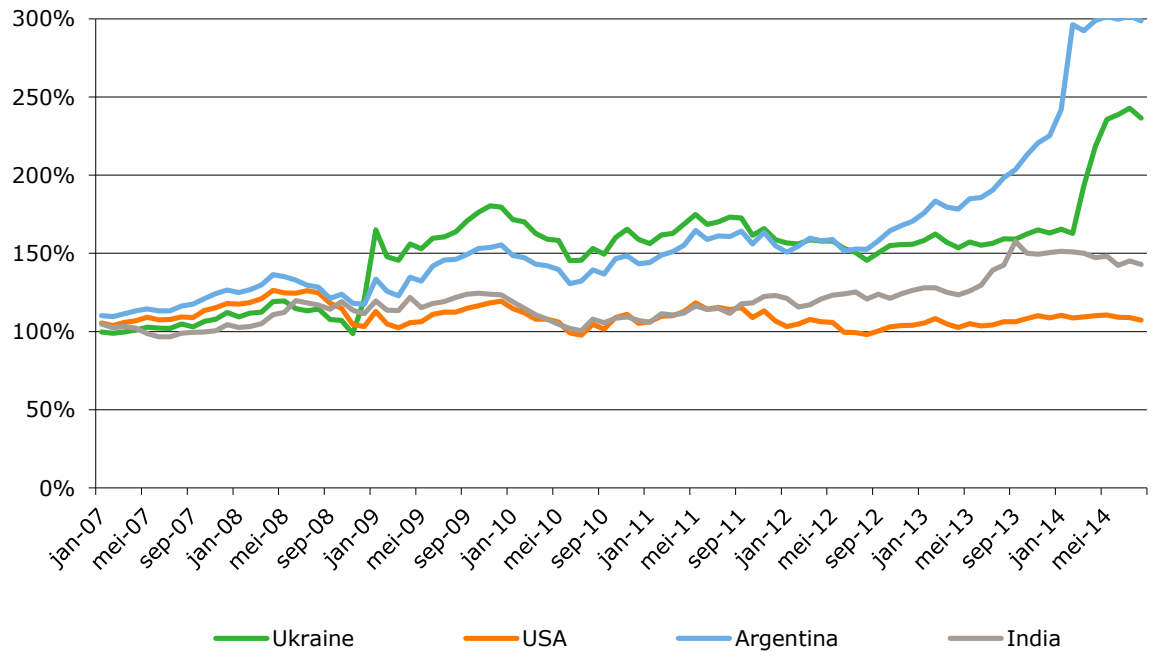

Figure A4.1 *Development of the currency exchange rate of Ukraine, USA, Argentina and India compared to the euro (2004=100%).*

The exchange rate development of Argentina and Ukraine is especially relevant. Between 2013 (the base year of this study) and the first half of 2014 the exchange rate increased compared to the euro. As stated in this report, a change in exchange rate (scenario 2) is a realistic scenario.

The following, average exchange rate to the euro was used to calculate production costs for 2013:

Ukraine	0.0943	Argentina	0.1398
USA	0.7541	India	0.0129

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The mission of Wageningen UR (University & Research centre) is 'To explore the potential of nature to improve the quality of life'. Within Wageningen UR, nine specialised research institutes of the DLO Foundation have joined forces with Wageningen University to help answer the most important questions in the domain of healthy food and living environment. With approximately 30 locations, 6,000 members of staff and 9,000 students, Wageningen UR is one of the leading organisations in its domain worldwide. The integral approach to problems and the cooperation between the various disciplines are at the heart of the unique Wageningen Approach.

To explore the potential of nature to improve the quality of life

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De missie van Wageningen UR (University & Research centre) is 'To explore the potential of nature to improve the quality of life'. Binnen Wageningen UR bundelen 9 gespecialiseerde onderzoeksinstituten van stichting DLO en Wageningen University hun krachten om bij te dragen aan de oplossing van belangrijke vragen in het domein van gezonde voeding en leefomgeving. Met ongeveer 30 vestigingen, 6.500 medewerkers en 10.000 studenten behoort Wageningen UR wereldwijd tot de aansprekende kennisinstellingen binnen haar domein. De integrale benadering van de vraagstukken en de samenwerking tussen verschillende disciplines vormen het hart van de unieke Wageningen aanpak.