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Szilvia Molnar

University of Debrecen, Hungary

PRODUCTION AND TRADE OF DUCK PRODUCTS IN GLOBAL VIEW[1]

PRODUKCJA I SPRZEDAŻ PRODUKTÓW Z KACZEK W UJĘCIU GLOBALNYM

Key words: duck products, international trade, revealed comparative advantage (RCA)

Słowa kluczowe: produkty z kaczek, handel międzynarodowy, ujawniona przewaga komparatywna

JEL codes: Q17, Q13

Abstract. Duck typically represents a smaller proportion in the poultry meat production of the world. However, certain European, as well as Eastern and South Asian countries produce a significant amount of duck meat. In the recent decades, production significantly increased both in these regions and worldwide. This study focuses on the international situation of the duck sector, as well as changes in production and trade trends. In addition, RCA indexes were used to examine the comparative advantages of duck meat and meat products in the world market of waterfowl products in the case of the most significant exporting countries of the world. It can be concluded that even though certain exporting countries have various trade and competitive advantages in the case of different products, other regions must face disadvantages.

Introduction

According to FAO [2017] data, the population of the world increased from 5.81 billion to 7.43 billion people between 1996 and 2016 which is a 1.4% increase per year on average. Based on related predictions, world population is expected to further increase in the upcoming decades and may exceed 9.7 billion people by 2050. Accordingly, providing enough food for the world's increasing population while sustainability aspects are also considered is a major challenge of the upcoming years. Animal husbandry will have a significant role in meeting this demand and the poultry sector has the biggest potential in contributing to feeding the population and providing complete animal proteins. This sector is capable of producing animal proteins the most inexpensive and effective way, also considering economic advantages and environmental load [Horn 2014].

The meat and egg of waterfowls (duck and goose) have high nutritional value and consumers mostly prefer them not only because of their taste, but their nutritional value and the fact that they contain optimum quantity of essential amino acids and fatty acids. In parallel with increasing living standards, consumers begin to seek duck products which conform to their dining traditions. In addition, the increasing demand for duck meat is potentially related to the fact that Asian restaurants became increasingly popular in Europe and North America in the recent years and they offer a wide variety of foods made from duck meat. Further increase is predicted in China and other Asian countries where intensive duck and egg production is expected to grow [Pingel 2011, Yan 2016].

On a world scale, significant duck meat and egg are produced and consumed mainly in East and South Asia. China has a key role in duck meat production [Pingel 2011]. The member states of the European Union provided around 11-15% of duck meat production in the world, with the most significant duck meat producing countries being France, Hungary and Germany.

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The aim of this study is to present the international situation of the duck sector, with special regard to the trade of the biggest exporting countries. Accordingly, the purpose of the author is to examine the comparative advantage or disadvantage and competitiveness of each duck meat product in the case of the biggest exporting countries.

Research material and methods

In order to realise the objectives of this study, secondary data collection was performed, during which Hungarian and international technical literature on the topic, as well as statistical data describing the situation of the sector were aggregated and processed. As a next step, data referring to the export of duck meat (quantity, value) was collected from the Comtrade database [2017]. The trade (export and import) data related to the typical products of the sector (meat and edible offal) have been referred to separately by the combined nomenclature since 2011. Previously, data referring to the waterfowl sector (duck and goose) and guinea-fowl belonged in the same category. This way, the detailed, product level data of duck products are available only from 2012 and they are marked by the nomenclature using codes HS 020741, 020742, 020743, 020744 and 020745[2].

In order to realise the objective of this study, the method of Revealed Comparative Advantage (*RCA*) was used in order to measure any expressed (revealed) comparative advantage or disadvantage and thereby describe the international specialisation of each country.

The original index of revealed comparative advantages was developed by Bella Balassa [1965] the following way:

$$B_{ij} = \left(\frac{x_{ij}}{x_{it}} \right) \Big/ \left(\frac{x_{nj}}{x_{nt}} \right)$$

where x = export, i = a given country, j = a specific product, t = a group of products and n = a given group of countries.

This method compares the proportion of the export of a specific product to the share of this product in the total domestic export in the trade of a specific group of countries, thereby defining the comparative advantage or disadvantage index revealed in the product export towards reference countries. If $B > 1$, the given country has a revealed comparative advantage [Fertő 2006]. The classic Balassa index was often criticised in the recent years due to overlooking the impacts of different economic policies and its asymmetrical values [Fertő 2003]. In order to overcome these shortcomings, Thomas Lachlan Vollrath [1991] developed three different specifications (relative trade advantage, logarithm of relative export advantage (ln*RXA*) and revealed competitiveness) of revealed comparative advantages which were used to evaluate the international competitiveness of agriculture. Relative trade advantage (*RTA*) considers both the export and import side and can be calculated as the difference of relative export advantage (*RXA*) and relative import advantage (*RMA*):

$$RTA_{ij} = RXA_{ij} - RMA_{ij}$$

where: $RXA_{ij} = B_{ij}$ and $RMA_{ij} = (m_{ij}/m_{it})/(m_{nj}/m_{nt})$, and m = import [Fertő 2003].

If $RTA > 0$, the given country has a relative trade advantage, while if the index is negative, the country is at a disadvantage in comparison with the examined reference countries. The higher the value of the index is, the more competitive the given country is. The referred indexes (*RXA, RMA, RTA*) were used both by Imre Fertő and Lionel J. Hubbard [2001, 2002] in their research, which focused on analysing the competitiveness and comparative advantage of the Hungarian agricultural and food economy. The logarithm of relative export advantage (ln*RXA*) and revealed competitiveness (*RC*) can be defined as follows [Fertő 2006]:

[2] 0207: Meat and edible offal of the poultry of heading; 0105: fresh, chilled or frozen – Of duck: 020741: Not cut in pieces, fresh or chilled; 020742: Not cut in pieces, frozen; 020743: Fatty livers, fresh or chilled; 020744: Other, fresh or chilled; 020745: Other, frozen.

$RC = lnRXA - lnRMA$

In the case of positive values, the *RC* and ln*RXA* indexes represent competitive advantage, while negative values represent competitive disadvantage. The benefit of these latter indexes is that they include trade distortion both in terms of export and import, while they are also able to manage intrasectoral trade. However, this feature is also the disadvantage of the *RC* index, since if there is no imported quantity of the given good, the *RC* index cannot be interpreted. Also, if there is no exported quantity of the specific good, the value of the *RC* index is zero [Fertő 2003, 2006].

The other problem with the B index is its asymmetrical value, as if a certain country has comparative advantage in relation to a given product, the value of the index ranges from 1 to infinity, while in the case of comparative disadvantage, said value ranges between 0 and 1. In order to overcome this problem, Jeroen Hinloopen and Charles Marrewijk [2001] used the following classification: *class a*: $0<B\leq1$, *class b*: $1<B\leq2$, *class c*: $2<B\leq4$ and *class d*: $B<4$. There is no comparative advantage of products in class *a*, while the comparative advantage is weak in class *b*, average in class *c* and strong in class *d*.

In these analyses of the B, RTA, lnRXA and RC indexes, the different countries of the world represent the selected group of countries and the meat and edible offal of waterfowls (duck and goose) represent the group of products. The calculations related to the objectives of this study were performed in the case of all meat products characteristic of the duck sector for the period between 2012 and 2016.

International situation of the duck sector

According to FAO data [FAO 2017], the duck meat production of the world increased by 40% from 3.1 million tons to 4.3 million tons between 2004 and 2014 (tab. 1). In the case of countries producing the largest quantity of duck meat, the volume of production mostly increased in the given period, but to a various extent. China has a key role in duck meat production and it increased its output by 48% in the past decade. In 2014, 66.7% of the produced quantity originated from China, followed by France and Malaysia.

In 2014, the EU-28 provided 12% of the world's duck meat production. The produced quantity increased by around 24.6% in the examined period. 77% of duck meat in the EU was produced by France (54%), Hungary (14%) and Germany (9%) in 2014.

The duck meat export of the world increased from 159.9 thousand tons to 265.9 thousand tons between 2003 and 2013 (tab. 1). Similarly to production, China has a significant role in

Table 1. Duck meat trade in the world and the EU-28 (2003-2013)
Table 1. Handel mięsem kaczym na świecie i w UE-27 w latach 2003-2013

Description/*Wyszczególnienie*	2003	2008	2013	Change/*Zmiana [%]*	
				2003-2008	2008-2013
World/*Świat*					
Export/*Eksport [t]*	159 937	123 404	265 911	-23	115
Export [thous. USD]/*Eksport [tys. USD]*	320 313	362 591	885 541	13	144
Import/*Import [t]*	135 896	156 258	186 826	15	20
Import [thous. USD]/*Import [tys. USD]*	279 079	454 614	755 006	63	66
EU-28/*UE-28*					
Export/*Eksport [t]*	79 764	68 475	148 731	-14	117
Export [thous. USD]/*Eksport [tys. USD]*	205 722	249 897	688 714	21	176
Import/*Import [t]*	48 215	51 468	103 546	7	101
Import [thous. USD]/*Import [tys. USD]*	113 546	199 163	498 019	75	150

Source/*Źródło:* [FAO 2017]

Table 2. Duck meat production and trade of the examined countries (2013)
Tabela 2. Produkcja i handel mięsem kaczym w badanych krajach w 2013 roku

Countries/*Kraje*	Production [thous. t]/ *Produkcja [tys. t]*	Share/ *Udział [%]*	Export [thous. t]/ *Eksport [tys. t]*	Share/ *Udział [%]*	Share of production/ *Udział produkcji [%]*	Import [thous. t]/ *Import [tys. t]*	Share/ *Udział [%]*
China/*Chiny*	2998.5	68.3	91.1	34.3	3.0	39.3	21.0
Hungary/*Węgry*	64.1	1.5	37.4	14.1	58.4	1.7	0.9
France/*Francja*	277.1	6.3	37.2	14.0	13.4	12.7	6.8
Netherlands/*Holandia*	13.7	0.3	26.1	9.8	191.2	2.7	1.4
Germany/*Niemcy*	102.5	2.3	17.8	6.7	17.4	31.5	16.9
Poland/*Polska*	28.3	0.6	7.9	3.0	27.9	0.6	0.3
Others/*Pozostałe*	903.8	20.6	48.4	18.2	-	98.3	52.6
World/Świat	4387.8	100.0	265.9	100.0	6.1	186.8	100.0

Source/*Źródło:* [FAO 2017]

export, as they exported 91.1 thousand tons of duck meat in 2013, which represented a 34% share of global export, but this quantity was only 3% of the total production in China (tab. 2). The duck meat export of China nearly doubled (+99%) in the examined period.

In 2013, Hungary and France had a similar share (14%) of the world's duck meat export (tab. 2). However, while Hungary sells 58% of its produced duck meat abroad, this proportion is 13% in France. The export of Hungary increased by 27% from 29.5 thousand tons to 37.4 thousand tons in the given period. The duck meat export of France showed a greater increase from 13.5 thousand tons to 37.2 thousand tons (+176%) in this examined decade [FAO 2017]. Between 2003 and 2013, the duck meat import of the world increased by around 37% from 135.9 thousand tons to 186.8 thousand tons. China is a significant market outlet as they imported 39.3 thousand tons of duck meat in 2013, which was nearly 30% less than their 2003 import (56.3 thousand tons). In the given period, Germany increased its duck meat import by more than 60% from 19.3 thousand tons to 31.5 thousand tons. In addition to the above mentioned countries, Saudi Arabia and France also imported a significant amount of duck meat. In the case of the former, the amount of imported duck meat increased from 1.5 thousand tons to 18.4 thousand tons in the given period, while the volume of import in France increased from 0.8 thousand tons (2003) to 12.7 thousand tons (2013). The biggest exporting countries represent nearly 80% of all exported duck meat [FAO 2017].

Revealed comparative advantage and/or disadvantage in the case of various products

Table 3 summarises the revealed comparative advantage and disadvantage (if any) in the case of duck meat and edible offal of the main exporting countries. *B* values above 1 represent comparative export advantage, while values below 1 show comparative export disadvantage. *RTA*, ln*RXA* and *RC* indexes may be either positive (competitive advantage) or negative (competitive disadvantage).

Based on the examination of the obtained results, it can be concluded that China has strong comparative advantage ($B > 4$) in the case of fresh or chilled products not cut in pieces, while it has a weak comparative advantage and competitive advantage regarding other chilled products. As regards fresh or chilled products not cut in pieces, standard deviation is typically high, averaged over the examined period, which represents the great difference between each year. In China, the duck sector constitutes one of the main parts of the poultry industry, since it produces the cheapest animal protein in the country and it amounts to one third of all consumed poultry meat. The increase of demand for duck meat – both by institutional consumers and processors – led to the quick extension of output [Yan 2017].

Table 3. Revealed comparative advantage or disadvantage of each country regarding their trade of duck products (based on means between 2012-2016)
Tabela 3. Przewagi komparatywne lub ich brak w porównaniu z każdym krajem w odniesieniu do handlu produktami kaczymi (na podstawie średnich pomiędzy latami 2012-2016)

	Revealed comparative advantage, if/ *Przewaga komparatywne, jeśli:*	Mean/ *Średnia* 2012-2016				Standard deviation/*Odchylenie standardowe* 2012-2016			
		B	RTA	ln*RXA*	RC	B	RTA	ln*RXA*	RC
		>1	>0	>0	>0				
China/*Chiny*	020741	4.17	0.89	-0.18	-0.69	2.5	2.5	2.0	2.0
	020742	0.21	-0.11	-0.79	-0.28	0.1	0.1	0.4	0.4
	020743	0.00	-0.03	-3.91	-2.28	0.0	0.0	-	-
	020744	0.00	-0.01	-3.29	0.12	0.0	0.0	0.1	0.4
	020745	1.35	0.41	0.40	0.22	0.7	0.8	0.2	0.2
Hungary/*Węgry*	020741	0.43	-6.59	-0.48	-1.32	0.4	1.6	0.4	0.4
	020742	1.16	-0.65	0.06	-0.17	0.1	0.6	0.0	0.2
	020743	1.12	0.46	0.05	0.92	0.2	1.1	0.1	1.8
	020744	0.49	0.37	-0.31	0.78	0.1	0.2	0.1	0.5
	020745	0.61	0.53	-0.22	0.97	0.1	0.1	0.0	0.4
France/*Francja*	020741	0.70	0.15	-0.20	0.06	0.42	0.41	0.21	0.21
	020742	0.26	0.09	-0.60	0.20	0.07	0.09	0.11	0.18
	020743	1.74	-0.81	0.23	-0.17	0.28	0.37	0.08	0.09
	020744	2.30	0.79	0.36	0.18	0.09	0.22	0.02	0.06
	020745	1.48	0.02	0.17	0.00	0.14	0.15	0.04	0.05
Netherlands/*Holandia*	020741	0.48	-1.81	-0.40	-0.74	0.30	0.69	0.32	0.23
	020742	3.80	3.07	0.58	0.73	0.27	0.40	0.03	0.15
	020743	0.02	-1.44	-1.87	-2.03	0.02	0.46	0.53	0.48
	020744	0.21	-1.99	-0.69	-1.02	0.06	0.39	0.13	0.16
	020745	0.44	-0.19	-0.36	-0.15	0.04	0.10	0.04	0.06
Germany/*Niemcy*	020741	0.17	-0.44	-0.83	-0.60	0.12	0.28	0.24	0.36
	020742	3.51	2.63	0.54	0.61	0.19	0.05	0.02	0.09
	020743	0.04	0.00	-1.41	-0.03	0.02	0.01	0.21	0.14
	020744	0.26	-0.56	-0.60	-0.50	0.05	0.10	0.09	0.08
	020745	0.48	-0.28	-0.33	-0.20	0.09	0.12	0.08	0.09
Poland/*Polska*	020741	0.26	0.19	-0.65	0.91	0.13	0.12	0.27	0.81
	020742	0.57	-0.72	-0.40	-0.47	0.33	0.79	0.53	0.64
	020743	0.01	-0.38	-1.97	-1.23	0.01	0.44	0.25	1.00
	020744	0.16	-0.11	-0.80	-0.07	0.02	0.20	0.06	0.40
	020745	0.30	-0.28	-0.52	-0.27	0.02	0.18	0.03	0.13

Source: own calculation based on [Comtrade 2017] data

Źródło: obliczenia własne na podstawie danych [Comtrade 2017]

Hungary is one of the biggest exporting countries in the EU28 and has revealed comparative advantage mainly in the case of chilled duck products and foie gras (fresh or chilled), while the obtained results show significant competitive disadvantage in the case of fresh or chilled products not cut in pieces (RTA=-6,59). In 2016, the biggest outlet markets for Hungary were Germany, the Czech Republic, Slovakia, the United Kingdom, Austria, France, Belgium and China [Comtrade 2017].

In the case of France, fresh or chilled foie gras and other chilled products, as well as other fresh or chilled products have medium comparative advantage and competitive advantage. Based on the four RCA indexes, it can be concluded that the Netherlands and Germany had revealed comparative and competitive disadvantage in the case of the examined products in the given group of countries averaged over the years between 2012-2016, with the only exclusion of chilled products not cut in pieces (tab. 3).

Based on the obtained *RCA* indexes, none of the examined products have revealed comparative advantage ($B < 1$) in the case of Poland, which exports a significant proportion of its duck meat production to Western Europe, mostly Germany. The Polish poultry sector is greatly integrated and export-oriented. However, the EU Member States represent the biggest outlet market, but the Polish government is constantly seeking to open new markets [Ruciński 2015].

Summary and conclusion

The world's duck meat production increased by around 40% in the past decade and Asian countries (mostly China) had a key role in this extension, followed by France and Malaysia. In the EU, Hungary and Germany also produce a significant amount of duck meat. Based on the world's duck meat trade, it can be concluded that the volume of export also significantly extended and the biggest exporting countries represent nearly 80% of the whole exported quantity. Based on the RCA indexes, it can be concluded that the biggest exporting countries have different levels of revealed comparative and competitive advantages in the case of various duck meat products, while other countries have to face disadvantages concerning certain products. China has a strong export advantage in the case of fresh or chilled products not cut in pieces, while other countries struggle with disadvantage. On the contrary, Hungary and France have a revealed comparative advantage in the case of foie gras, while Germany and the Netherlands have revealed comparative export and competitive advantage in terms of chilled products not cut in pieces.

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Streszczenie

W artykule przedstawiono międzynarodową sytuację sektora produktów kaczych, a także zmian w trendach produkcyjnych i handlowych mięsem kaczym. Mimo że kaczki stanowią nieduży udział w produkcji mięsa drobiowego na świecie, w ostatnich dziesięcioleciach produkcja tego mięsa znacznie wzrosła. Tendencję wzrostową produkcji mięsa kaczego odnotowano zarówno na świecie, jak i w krajach wschodniej Europy i w krajach południowoazjatyckich. W celu porównania zalet mięsa kaczego i innych produktów mięsnych z ptactwa wodnego na światowym rynku produktów w przypadku najbardziej znaczących krajów eksportujących wykorzystano wskaźniki RCA.

Correspondence address
Szilvia Molnár, PhD Student (orcid.org/000-0002-9967-3146)
University of Debrecen
Faculty of Economics and Business
Böszörményi Str., H-4032 Debrecen 138, Hungary
phone: +36 525 269 04
e-mail: molnar.szilvia@econ.unideb.hu