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EVALUATION OF THE HUNGARIAN AND POLISH GOOSE MEAT PRODUCTION

OCENA PRODUKCJI MIĘSA GĘSI NA WĘGRZECH I W POLSCE

Key words: goose production, international review, revealed comparative advantage

Słowa kluczowe: produkcja gęsi, międzynarodowy przegląd, ujawniona przewaga komparatywna

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Abstract. In the recent years, goose meat had a constantly decreasing proportion of the world's poultry production. However, a significant amount of goose meat is produced mainly in Central Europe and Southeastern Asia. During the last decade, production greatly increased in these areas and also worldwide. China has a leading role in the world's goose meat production. In Europe, the most significant goose meat producers are Hungary and Poland, the latter of which could greatly improve the volume of production in the recent years, thereby representing an increasingly growing competitor for Hungary. This study illustrates the international circumstances of goose production, as well as the tendencies of production and trade. In addition, RCA indexes were used to examine the comparative advantages of goose meat and meat products in the world waterfowl market in the case of the most significant producers of Europe – Hungary and Poland. Consequently, it can be concluded that the two main exporting countries have different, but significant comparative advantages in terms of various meat products.

Introduction

According to FAO [2016] data, the world's population is constantly increasing. The population changed from 5.57 billion to 7.18 billion between 1993 and 2013, which is a 1.4% increase per year on average. Based on the forecast of OECD-FAO [2016], the world's population is expected to grow further in the upcoming decade and may even exceed 8 billion people by 2024. Accordingly, providing enough food for the world's population in a sustainable way is going to be one of the greatest global challenges in the near future. Therefore, livestock production will have a special role and the poultry sector is going to make the biggest contribution to feeding the population and providing full value animal protein, since this sector is capable of producing animal protein in the most efficient and most inexpensive way, also considering the economic advantages and environmental load [Horn 2014].

The poultry production of the world increased from 75.5 million to 108.7 million tons between 2003 and 2013. According to the forecasts of OECD-FAO [2016], the amount of poultry meat produced in the world is expected to be 114 million tons in 2016 which would exceed the production volume of 2015 by around 2.2%. This growth is expected to continue also in the future and the poultry meat production of the world can reach 134 million tons by 2024. Chicken represented 85-88% of the amount of poultry meat production during the last two decades, while the rest of poultry had a lower proportion. According to FAO [2016] data, turkey represented 5%, while the proportion of duck and goose meat was 4% and 2%, respectively. When examining the composition of the poultry meat production of the European Union, there is a certain difference, as nearly 82% of the poultry meat produced in 2013 was chicken, 14% was turkey, 4% was duck and less than 1% was goose meat. In Europe, goose meat production takes place mostly in Central and Eastern Europe, while the proportion of the produced amount within the whole poultry sectors is not higher than 4-7% even in these countries. The largest goose producers in the EU are Hungary and Poland and the main purposes of production are meat, liver and feather, depending on the given country and breeding technology [Rosiński 2002].

The purpose of this study is to illustrate the circumstances of goose production internationally and in the case of Hungary and Poland, the most significant goose producers of the European Union, with special emphasis on the trade of the sector's products. Accordingly, the comparative

advantages and disadvantages (if any), as well as the competitiveness of each goose meat products are also focused on in the case of Hungary and Poland.

Material and methodology

Secondary data collection was performed in order to implement the objective of this study. During the first step of this data collection, the related Hungarian and international technical literature sources and the statistical data describing the circumstances of the sector were processed, followed by the collection of the data related to the export of goose production (quantity, value) from the Comtrade [2016] database. The typical products of the sector (meat and edible offal) have been treated separately by combined nomenclature since September 2011. Previously, the products of the duck, goose and guinea fowl sector were treated as one. For this reason, detailed product level data is available only since 2012. The products of the goose sector are marked with the codes HS 020751, 020752, 020753, 020754 and 020755 [1] by the 2012 nomenclature.

Similarly to the work of Attila Jámbor [2008], Jeremiás Balogh [2016] and Viktória Kurmai [2016], the method of Revealed Comparative Advantage (RCA) was used to achieve the objectives of this study. This method is capable of describing the international specialisation of each country. The original index of revealed comparative advantages was first developed by Bela Balassa [1965], providing the following definition:

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

where: x – export, i – a given country, j – a certain product, t – a product group and n – a given group of countries.

The revealed comparative advantage or disadvantage index of the product export to reference countries is defined by comparing the proportion of a specific product's total domestic export with the proportion of the same product of the given country group's trade. If $B > 1$, then the given country has a revealed comparative advantage [Fertő 2006]. In the past years, the classic Balassa index was criticised for several reasons, such as ignoring the impacts of various economic policies and asymmetrical values [Fertő 2003]. [Vollrath 1991] recommended three different specifications of revealed comparative advantages in order to eliminate the impact of policies which distort trade. These specifications were used to evaluate the international competitiveness of agriculture. The first index is called relative trade (*RTA*) advantage which considers both export and import and is the difference of relative export advantage (*RXA*) and relative import advantage (*RMA*):

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

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

The previously mentioned indexes (*RXA, RMA, RTA*) were used by Imre Fertő and Lionel Hubbard [2001, 2002] in their work focusing on the competitiveness and comparative advantage of the Hungarian agriculture and food economy. If $RTA > 0$, then the given country has trade advantage, otherwise it has disadvantage in comparison with the examined reference countries. The higher this index is, the more competitive the given country is. The other two indexes of Thomas Vollrath are the logarithm of relative export advantages (ln*RXA*) and revealed competitiveness (*RC*), which can be defined as follows [Fertő 2006]:

$$RC = lnRXA - lnRMA$$

In the case of positive values, the ln*RXA* and RC indexes represent comparative competitive advantages, while negative values represent comparative competitive disadvantage. The benefit of using these three indexes is that they include both the export and import side, while they also consider the possibility

[1] 0207 meat and edible offal, of the poultry of heading 0105, fresh, chilled or frozen – ff geese: 020751: not cut in pieces, fresh or chilled; 020752: not cut in pieces, frozen; 020753: fatty livers, fresh or chilled; 020754: other, fresh or chilled; 020755: other, frozen

of intersectoral trade in a given product group. However, this latter characteristic is also the disadvantage of the *RC* index, since if there is no import of a given product, the RC index cannot be interpreted. Also, if there is no export activity of a given product, then the RC index is zero [Fertő 2003, 2006].

The other problematic characteristic of the B index is its asymmetrical value, as if a certain country has a comparative advantage in terms of a given product, the index value could range between 1 and infinity, while in the case of comparative disadvantage, its value ranges between 0 and 1. In order to overcome this problem, Jeroen Hinloopen and Charles Marrewijk [2001] used the following classification: *class a*: $0< B \leq 1$, *class b*: $1< B \leq 2$, *class c*: $2< B \leq 4$ and *class d*: $4< B$. Class *a* involves all products without comparative advantages, class *b* involves products with weak comparative advantage, class *c* involves products with average comparative advantage, while class *d* includes the ones with strong comparative advantage.

In the analyses performed in this study, the *B, RTA*, ln*RXA* and *RC* indexes were based on all countries in the world as the selected group of countries and water fowl (duck and goose) meat and edible offal as the product group. According to the research objectives, these calculations were performed in relation to all products which are characteristic of the goose sector for the period between 2012 and 2015.

International overview

Goose is one the most ancient domesticated bird species which is currently bred for commercial purposes. In the recent years, goose meat represents a constantly decreasing proportion of the world's poultry production. However, there is still a significant amount of goose meat is produced in a few countries mainly in Central Europe and Southeastern Asia [Romanov 1999].

Based on [FAO 2016] data, the world's goose meat production increased from 1.9 to nearly 2.7 million tons between 2003 and 2013, increasing by around 4% per year on average. China is a major player in terms of goose meat production, as more than 95% of the goose meat produced in 2013 originated from this country. However, Hungary also has a significant position in the international market as Egypt and Hungary are the second biggest producers of goose meat after China. The volume of production showed different tendencies in each country. While Egypt increased its goose meat production by 74% from 18.9 thousand to 32.9 thousand tons during the last two decades, Hungary decreased its production by 14% from 30.7 thousand to 26.3 thousand tons, thereby representing 1% of the world's goose meat production. There was a significant increase in production in Poland during this period, as they doubled their goose meat production between 2003 and 2013, producing 18.4 thousand tons in 2013.

When examining the goose meat production of the European Union, it can be concluded that the amount of goose meat production decreased by 22% from 73.5 thousand to 57.1 thousand tons between 2003 and 2013 (Tab. 1). This tendency was partially caused by the fact that the players of the European poultry sector had to face several challenges during the last decade such as the appearance of new exporting countries and the constantly increasing consumer demand in terms of animal welfare and food security, as well as in relation to the environmental factors of production [Jez et al. 2011, FAO 2016].

When examining the world's goose meat trade, it can be concluded that 52.2 tons of goose meat was exported in 2013, which was 8% more than a decade before, but the amount of import was 50.3 tons (Tab. 1). The biggest exporters were Poland, Hungary and China this year. The export activity of these countries was nearly 95% of all transported goose meat. Europe also had a significant import activity in 2013, as 48% of all imported goose meat was sold to Germany and 7% to France. China is also an important market for imported goose meat, as 14.3 tons were sold to the country in the examined year, which represented 28% of the whole imported quantity.

The situation of goose production in Hungary and in Poland

Hungarian goose production is typically export-oriented as the sector produces internationally acknowledged, special and high added value products which are significant even from the aspect of national economy [Bogenfürst 2008, Kozák 2014].

Table 1. Goose meat production and trade in the world and in the EU28 (2003-2013)
Tabela 1. Produkcja i handel mięsem gęsi na świecie i w 28 krajach UE w latach 2003-2013

Specification/ *Wyszczególnienie*	Year/*Rok*			Yearly average growth/ *Średni roczny wzrost [%]*	
	2003	2008	2013	2003-2008	2008-2013
World/Świat					
Production/*Produkcja [t]*	1 894 973	2 275 622	2 698 322	4.0	3.7
Import/*Import [t]*	50 795	31 309	50 334	-7.7	12.2
Import/*Import [1000 USD]*	168 006	268 348	204 498	11.9	-4.8
Export/*Eksport [t]*	48 241	45 664	52 213	-1.1	2.9
Export/ *Eksport [1000 USD]*	131 250	281 293	240 360	22.9	-2.9
EU-28/*UE-28*					
Production/*Produkcja [t]*	73 484	58 407	57 071	-4.1	-0.5
Import/*Import [t]*	38 843	27 898	33 316	-5.6	3.9
Import/*Import [1000 USD]*	142 940	244 640	154 178	14.2	-7.4
Export/*Eksport [t]*	34 741	27 916	39 392	-3.9	8.2
Export/*Eksport [1000 USD]*	117 779	249 374	200 319	22.3	-3.9

Source/*Źródło*: [FAO 2016]

The amount of goose meat produced in Hungary decreased from 30.9 thousand tons to 47.9 tons between 1993 and 2003, increasing by 5.5% per year on average. However, there was a significant reduction in the period between 2003 and 2013 when the volume of production decreased by 45%, i.e., 4.5% per year (Tab. 2). In the latest period, 45-70% of the produced amount was exported.

The amount of goose meat exported by Hungary decreased from 20 thousand tons to 18.7 thousand tons between 2003 and 2013, which is a 7% decrease. On the contrary, the value of export increased by 43% during this time. The negative campaign of the animal rights group "Négy Mancs" (translated as "Four Paws") had a significant role in the reduction of both the export activities and the amount of produced goose meat. As a result of the campaign, the significant producers of the sector greatly decreased the volume of production.

The Hungarian goose sector can be divided to the following main purposes of use: geese raised for roasting, geese raised for meat, oat goose, fattened geese or fatty liver. The products of the various purposes of use, such as geese raised for roasting, geese raised for meat, oat goose, fattened geese, fatty liver and feather have been popular and sought after on the international markets for decades [Nábrádi, Szőllősi 2007, Bogenfürst 2008].

During the last year, Hungary's exported goose meat was sold mainly to Europe, with the most significant partner countries being Germany, Slovakia, the Czech Republic, Belgium and France. Japan, China and Israel has a significant outlets for fresh or cooled goose liver, as well as other products made from goose meat, frozen goose meat and edible offal.

Table 2. Goose meat production and trade in Hungary (2003-2013)
Tabela 2. Produkcja I handel mięsem gęsi na Węgrzech w latach 2003-2013

Specification/ *Wyszczególnienie*	Year/*Rok*			Yearly average growth/*Średni roczny wzrost [%]*	
	2003	2008	2013	2003-2008	2008-2013
Production/*Produkcja [t]*	47 897	25 876	26 441	-9.2	0.4
Import/*Import [t]*	0	70	65	-	-1.4
Import/*Import [1000 USD]*	0	612	132	-	-15.7
Export/*Eksport [t]*	20 058	10 495	18 656	-9.5	15.6
Export/*Eksport [1000 USD]*	73 373	92 273	105 089	5.2	2.8

Source/*Źródło*: [FAO 2016]

Table 3. Goose meat production and trade in Poland (2003-2013)
Tabela 3. Produkcja i handel mięsem gęsi w Polsce w latach 2003-2013

Specification/ *Wyszczególnienie*	Year/*Rok*			Yearly average growth/*Średni roczny wzrost [%]*	
	2003	2008	2013	2003-2008	2008-2013
Production/*Produkcja [t]*	9 200	18 340	18 405	19.9	0.1
Import/*Import [t]*	0	318	195	-	-7.7
Import/*Import [1000 USD]*	0	509	1 044	-	21.0
Export/*Eksport [t]*	8 792	15 714	18 763	15.7	3.9
Export/*Eksport [1000 USD]*	22 632	143 540	80 241	106.8	-8.8

Source/*Źródło:* [FAO 2016]

During the last 10 years, Poland increased its poultry meat production from 919 thousand tons to 2011 tons, thereby becoming one of the greatest poultry meat producers of the European Union. This tendency is partly due to the increase of consumption, since poultry meat is the cheapest on the Polish market, which increases consumption. Also, consumers tend to choose the healthier and cheaper poultry meat as an alternative. The other reason for this development was the increasing export activity directed mainly towards EU states. 81% of Polish poultry meat production is represented by chicken, 14% by turkey, while the other sectors (duck, goose) have even lower proportion [Ruciński 2015, EUROSTAT 2016].

Poland doubled its goose meat production during the last decade, producing 18.4 tons in 2013 (Tab. 3). Consequently, Poland became one of the biggest goose meat producers of Europe. When examining the goose meat trade of Poland, it can be concluded that their 2013 export is nearly the same as that of Hungary. The main export partners of Poland were Germany, Franca, Lithuania, Denmark, the Czech Republic and China between 2012 and 2015.

Similarly to Hungary, Poland also has several century old traditions in goose meat production which peaked in the 17-18th centuries. The Polish goose meat is also internationally acknowledged due to its flavour and nutritional value. The most typical purpose of raising geese in Poland is oat goose. Poland has different climatic endowments than Hungary; therefore, geese can be fed with more green fodder in Poland. According to estimations, Polish consumers eat nearly 700 tons of goose meat per year, which is less than 5% of the Polish goose meat production. The reason why geese became widespread in the countryside is that they adapt well to environmental changes [Rosiński 2002, Buzała et al. 2014, https://egypt.trade.gov.pl/pl/f/view/fobject_id:281276, http://www.warsawvoice.pl/WVpage/pages/articlePrint.php/26954/article].

Table 4 summarises the revealed comparative advantage or comparative disadvantage of Hungary and Poland in the case of goose meat and edible offal. If the value of B is above 1, it represents comparative export advantage, while values below 1 represent comparative export disadvantage. *RTA*, ln*RXA* and *RC* indexes may be either positive or negative. Positive values represent comparative advantage, while negative values represent comparative disadvantage.

Based on the four *RCA* indexes, it can be concluded that Hungary had a revealed comparative advantage in the designated group of companies in relation to the examined products, averaged over the period between 2012-2015, with the exception of non-chopped fresh or cooled products. The values of the *RC* index (Tab. 3) show the previously mentioned problem of this index. Since Hungary did not have import activity of the various goose meat products in each year, the index cannot be interpreted in the average of the examined period. However, if each year is evaluated differently, it can be concluded that the index value is higher than 0 if there was import activity in relation to the given product. The standard deviation values are average without any especially high peak; therefore, there was no big difference between the values of each year. Hungary has the greatest comparative advantage concerning fatty liver and the values of both the RTA and lnRXA indexes are positive.

Based on the four RCA indexes, it can be concluded that Poland typically has comparative advantages on the world markets of goose meat and edible offal. Also, while the country had strong comparative advantage in frozen, non-chopped products and other, fresh or cooled goose

Table 4. Comparative advantages or disadvantages of Hungary and Poland resulting from the trade of goose meat products (based on means between 2012-2015)
Tabela 4. Komparatywne przewagi I ograniczenia Węgier I Polski wynikające z handle mięsem gęsi (na podstawie średnich w latach 2012-2015)

Specification/*Wyszczególnienie*		Mean/*Średnia* 2012-2015				Standard deviation/ *Odchylenie standardowe 2012-2015*			
		B	RTA	lnRXA	RC	B	RTA	lnRXA	RC
It is a revealed comparative advantage if/*Jest przewagą komparatywną jeśli:*		>1	>0	>0	>0	-	-	-	-
Hungary/*Węgry*	020751: Not cut in pieces, fresh or chilled/ *Tuszka świerza lub schłodzona*	0.29	0.29	-0.55	-	0.06	0.06	0.11	-
	020752: Not cut in pieces, frozen/*Tuszka zamrożona*	1.68	1.59	0.22	-	0.05	0.12	0.01	-
	020753: Fatty livers, fresh or chilled/ *Wątróbki otłuszczone świerze lub schłodzone*	2.97	2.93	0.47	-	0.15	0.25	0.02	-
	020754: Other products, fresh or chilled/ *Inne produkty* świerze lub schłodzone	1.77	1.76	0.24	-	0.41	0.41	0.10	-
	020755: Other products, frozen/*Inne produkty zamrożone*	2.43	2.35	0.38	1.55	0.26	0.26	0.10	0.27
Poland/*Polska*	020751: Not cut in pieces, fresh or chilled/ *Tuszka świerza lub schłodzona*	1.03	1.03	-0.01	-	0.33	0.33	0.17	-
	020752: Not cut in pieces, frozen/*Tuszka zamrożona*	5.30	0.01	0.72	0.10	0.25	3.31	0.02	0.37
	020753: Fatty livers, fresh or chilled/ *Wątróbki otłuszczone świerze lub schłodzone*	0.03	0.02	-1.79	-	0.04	0.05	0.64	-
	020754: Other products, fresh or chilled/ *Inne produkty* świerze lub schłodzone	4.40	2.53	0.64	-	9.05	3.39	0.04	-
	020755: Other products, frozen/*Inne produkty zamrożone*	3.92	2.33	0.59	0.47	0.24	1.09	0.03	0.31

Source: own calculation based on the Comtrade [2016] data
Źródło: opracowanie własne na podstawie danych Comtrade [2016]

meat products in the examined period, comparative disadvantage was observed in the case of fatty liver. The value of standard deviation is average, especially high values were observed only in a few cases, which reflect the great differences between each year.

Summary and conclusions

China has a significant role in the world's goose meat production, while the biggest European producers are Hungary and Poland. Both examined countries have several century old traditions in goose production and they are currently export-oriented, which makes the sector significant also from the aspect of the national economy. Both countries' goose meat products are internationally acknowledged and have comparative advantages on the examined markets. It can be concluded that Hungary has the highest comparative export advantage in fatty liver, while Poland has the greatest comparative export advantage in frozen, non-chopped and other, fresh or cooled goose meat products internationally. On the contrary, the RTA indexes of the examined products are positive in the case of both countries, but those of Hungary are higher in relation to non-chopped and other frozen products and fatty liver, which represents an internationally greater comparative advantage than Poland. The reason for this degree of competitiveness and comparative advantage is that these two countries produce a significant amount of goose meat and Germany can be considered to be a stable outlet as a significant export partner for the examined countries.

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Streszczenie

Przedstawiono międzynarodowe uwarunkowania produkcji mięsa gęsi, a także tendencje w jego produkcji i handlu. Stwierdzono, że w Europie najbardziej znaczącymi producentami mięsa gęsi są Węgry i Polska. W ostatnim czasie Polska znacząco zwiększyła wielkość produkcji, co stanowi coraz większą konkurencję dla Węgier.

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