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Changes in Self-Sufficiency in Beef and Pork in Selected Central and Eastern Europe Markets

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Food self-sufficiency is considered a priority for modern economies. The meat market is among the most developed food markets in the countries of Central and Eastern Europe. Their accession to the European Union opened up new markets to producers, while raising competition levels. The aim of the article is to assess the level of self-sufficiency in beef and pork in selected countries of Central and Eastern Europe in 2005-2017. Simplified indicators of food self-sufficiency were used, with focus on measures of technical and economic self-sufficiency. Technical self-sufficiency was measured on the basis of the volume of foreign trade; the amount of meat produced per capita and the ratio of meat consumption to production were also taken into account. Economic self-sufficiency was assessed on the basis the value of foreign trade. Considerable differences in terms of self-sufficiency have been found among the countries of Central and Eastern European. It turns out that Poland, Lithuania and Estonia have the safest beef policy, while Hungary and Estonia are leaders in terms of pork production policies. Domestic beef production satisfies the demand in the majority of countries of Central and Eastern Europe; when it comes to pork, only Poland is self-sufficient. The lowest degree of beef and pork self-sufficiency has been observed in Bulgaria and Slovakia; Slovenia is least self-sufficient in terms of pork production.

Keywords: meat market, production, consumption, international trade.

Zmiany samowystarczalności na rynku mięsa wołowego i wieprzowego w wybranych krajach Europy Środkowo-Wschodniej

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Samowystarczalność żywnościowa uznawana jest za jeden z podstawowych priorytetów funkcjonowania współczesnych gospodarek żywnościowych. Do jednego z najbardziej rozwiniętych rynków żywnościowych w krajach Europy Środkowo-Wschodniej należy zaliczyć rynek mięsa. Akcesja tych państw do Unii Europejskiej otworzyła przed producentami nowe rynki zbytu, jednocześnie wpływając na podniesienie poziomu konkurencji. Celem napisania artykułu była ocena poziomu samowystarczalności produkcji mięsa wołowego oraz wieprzowego w wybranych krajach Europy Środkowo-Wschodniej w latach 2005–2017. W badaniu posłużono się uproszczonymi wskaźnikami samowystarczalności żywnościowej, gdzie skupiono

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się na miarach samowystarczalności technicznej oraz ekonomicznej. Samowystarczalność techniczna objęła ujęcie wolumenowe bilansu handlu zagranicznego oraz przeliczenie wskaźników stanowiących relację wielkości produkcji w przeliczeniu na liczbę mieszkańców oraz wielkość spożycia mięsa w relacji do wielkości produkcji. Samowystarczalność ekonomiczna oparta została na badaniu bilansu handlu zagranicznego w ujęciu wartościowym. Na podstawie przeprowadzonych badań stwierdzono, iż kraje Europy Środkowo-Wschodniej charakteryzują się znacznym stopniem zróżnicowania pod względem samowystarczalności. Najbezpieczniejszą politykę żywnościową mięsa wołowego prowadzą takie kraje, jak: Polska, Litwa oraz Estonia, w przypadku mięsa wieprzowego: Węgry i Estonia. Poziom produkcji krajowej wołowiny jest w stanie zaspokoić zapotrzebowanie w większości krajów Europy Środkowo-Wschodniej, wieprzowiny – jedynie w Polsce. Najniższy stopień samowystarczalności produkcji mięsa wołowego oraz wieprzowego występuje w Bułgarii i na Słowacji, dodatkowo mięsa wieprzowego w Słowenii, gdzie odnotowano brak jakichkolwiek pożądanych wielkości wskaźników.

Słowa kluczowe: rynek mięsa, produkcja, konsumpcja, handel międzynarodowy.

JEL: Q13, Q17

1. Introduction

Food self-sufficiency is considered a priority for modern economies, in particular wake of the recent financial crisis (Grochowska, Łopaciuk, Rosiak & Szajner, 2013). The matter has been extensively discussed in Polish and foreign literature on agricultural economics. Numerous Polish researchers have investigated food self-sufficiency, *inter alia*, Baer-Nawrocka (2002; 2014), Kapusta (2012), Mikuła (2012), Kotyza and Slaboch (2014), Firlej and Kubala (2018). A wealth of research has also been provided by foreign researchers: Gebeltova (2012), Noleppa and Cartsburg (2013), Tiraspolsky (2016), Bureau and Swinnen (2018).

The very notion of food self-sufficiency is difficult to define, also due to the constant evolution of the concept, closely related to economic changes. As Obiedzińska (2012) points out, the first definition of self-sufficiency focused solely on supply; with time (Mikuła, 2012), the concept was extended to include also demand. Contemporary definitions focus on aspects related to globalization and its continual progress. As a result, the definition of self-sufficiency evolved from a concept related solely to closed economies, to one depicting the essence of open economies. As Hałasiewicz (2010) points out, food self-sufficiency in closed economies is the economy's ability to produce all or most of the food needed, which is measured as the ratio of the country's domestic production to consumption. However, at present, due to significant limitations resulting from greater openness of economies and, at the same time, rapidly developing trade between countries, this concept seems inadequate. In the case of open economies, food self-sufficiency is defined as the ability of the economy to meet national food demand, while taking into account the country's foreign trade potential (Szczepaniak, 2012).

One of the key European Union markets is the meat market. The high share of revenue generated by it in total revenue from agricultural makes its condition important for both producers and consumers. The meat market is highly susceptible to crises and the growing number of animal diseases (Choiński, 2014). An important problem of the meat sector is the emphasis on constant cost reduction, which can be accounted for by the growing openness of economies. The meat sector needs to adapt. As Pavłonka points out (2017), high production standards put meat factories located in the European Union at a disadvantage in relation to producers from Asia or South America, whose products are considerably cheaper.

The level and structure of meat consumption depends on several economic and non-economic factors. According to Kossakowska (2013), the availability of products on the internal market is conditioned by the level of domestic production, as well as the possibility of supplementing domestic production with imports; export profitability also needs to be taken into account. The most important economic factor affecting food demand and consumption is income, as it determines the extent to which the most important needs are satisfied (Jeżewska-Zychowicz, 2004). Income levels affect the purchasing power, as well as the level and structure of food consumption in individual countries. It should be noted that the level and structure of household income and consumption in the European Union is uneven. According to Grzega (2015), the share of food expenditure in total expenditure of households is higher than the EU average in the majority of countries that joined the European Union after 1 May 2004 (especially in Latvia and Estonia). In addition, demand is strongly impacted by product prices and the prices of available substitutes. Meat prices in the European Union have increased in recent years. They are subject to cyclical and seasonal fluctuations. It transpires that meat prices in Germany and the Netherlands have the greatest influence on meat prices in the EU (Stańko, 2016).

The development of the meat sector is also influenced by non-economic factors: demographic, cultural, social and psychological. Nutritional recommendations of such international organizations as the United Nations Food and Agriculture Organization or the World Health Organization (Policy..., 2009) have an increasing impact on the level and structure of meat consumption in the European Union. Let us recall the drop in beef consumption in the European Union in the years following 2001, when the first cases of BSE were reported (Verbeke, 2009).

Given the above, it is important to understand the evolution of levels of self-sufficiency in meat in individual Member States from Central and Eastern Europe. This question is of the essence, as the accession of these countries was one of the most important events in the history of the European Union. It opened up new markets for producers, while raising competition levels. At the same time, the matter seems particularly important from the

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point of view of the future development of the meat market. Therefore, the overriding aim of research presented in the article has been to assess the level of self-sufficiency of selected countries of Central and Eastern Europe in terms of beef and pork production. Fresh, chilled and frozen beef and pork have been taken into account in the study.

Research has covered eleven countries from Central and Eastern Europe: Bulgaria (BG), Croatia (HR), Czech Republic (CZ), Estonia (EE), Lithuania (LT), Latvia (LV), Poland (PL), Romania (RO), Slovakia (SK), Slovenia (SI) and Hungary (HU).

Simplified indicators of food self-sufficiency were used in the research, with measures proposed by Szybiga (2013) and Kapusta (2011). Research focused on technical and economic self-sufficiency. Technical self-sufficiency was measured on the basis of the volume of foreign trade; the amount of meat produced per capita and the ratio of meat consumption to production were also taken into account. Economic self-sufficiency was assessed on the basis the value of foreign trade.

The study covered the period between 2005 and 2017 in selected countries of Central and Eastern Europe. Due to a limited amount of statistical data, the consumption index referring to individual types of meat covered only the years 2005-2013. Source materials and publications of Eurostat, FAO and the International Trade Centre were used. Research results were presented in tables and graphs; research methods included descriptive analysis and comparative analysis.

2. Findings

The first stage of the self-sufficiency study was the assessment of the index of beef and pork production per capita in individual countries of Central and Eastern Europe.

Values of the index of beef and pork production per capita are characterized by significant disparities (Table 1). In the case of beef, average values of indicators in the period 2005-2017 oscillate between 6.75 kg/inhabitant in 2011 and 9.39 kg/inhabitant in 2005. Significantly higher index values have been recorded in the case of pork, with the lowest index in 2009 (19.5 kg/inhabitant), and the highest in 2005 (28.52 kg/inhabitant).

There are areas in the beef and pork market where varied levels of beef production per capita can be found. In 2017, in the case of beef, the first group includes countries with the highest index oscillating between 10.00 and 15.00 kg per capita: Slovenia, Poland, Lithuania and Croatia. High index values were also recorded in Latvia, Estonia and the Czech Republic (between 6.38 and 8.63 kg per inhabitant). The value of the index is low in other countries. In the case of pork, in 2017, the highest production level per capita was recorded in Poland, Hungary and Estonia (values ranging from 31.75 to 52,41 kg per inhabitant). The second group of countries with a high ratio of production to the number of inhabitants includes Lithuania, the Czech Republic, Romania, Croatia and Latvia (between 17.17 and 21.5 kg per capita).

Beef													
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Av.**
BG	3.89	2.99	2.88	1.95	0.63	no data	no data	0.73	0.78	0.66	0.74	0.93	1.05	1.57
CZ	7.94	7.79	7.7	7.71	7.38	7.09	6.87	6.25	6.17	6.23	6.48	6.81	6.39	6.99
EE	9.76	10.75	10.96	11.05	7.22	6.73	6.31	6.02	5.98	no data	7.31	7.17	6.84	8.01
HR	12.11	13.38	12.34	13.1	11.02	12.54	12.56	10.96	11.11	10.48	10.05	10.64	10.23	11.58
HU	3.22	3.33	3.43	3.22	2.96	2.71	2.61	2.49	2.29	2.34	2.68	2.86	2.78	2.84
LT	15.92	14.47	17.32	14.86	13.88	13.77	13.57	13.37	12.43	13.39	15.19	14.74	14.46	14.41
LV	9.13	9.32	10.34	9.85	8.86	8.4	8.32	8.05	7.79	8.53	8.78	9.03	8.63	8.85
PL	8.02	9.32	9.57	10.01	10.09	10.15	9.98	9.75	8.91	10.86	12.4	13.21	14.71	10.54
RO	9.71	9.18	10.11	9.27	1.23	1.4	1.44	1.44	1.47	1.47	2.24	2.92	3.02	4.22
SK	4.91	3.98	4.28	3.69	2.93	2.52	2.09	1.8	1.76	1.63	1.55	1.53	1.43	2.62
SL	18.69	18.89	17.94	18.28	17.29	17.46	17.33	16.09	15.58	15.31	16.27	17.27	17.32	17.21
Pork														
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Av.**
BG	9.73	9.87	10.11	6.32	5.14	5.05	6.56	6.69	7.17	7.43	8.45	9.21	10.08	7.83
CZ	37.24	35.01	34.99	32.4	27.25	26.34	25.05	22.81	22.28	22.42	21.59	20.85	19.92	26.78
EE	28.1	26.05	28.19	29.65	23.09	23.98	24.89	27.35	28	30.85	32.24	32.54	31.75	28.21
HR	30.49	30.84	35.17	33.35	17.68	20.03	20.6	20.06	18.75	16.21	17.37	19.14	17.31	22.85
HU	45	48.57	49.67	45.87	38.78	41.61	38.84	34.87	34.04	37.36	41.58	43.99	44.43	41.89
LT	31.79	32.48	30.73	23.72	13.1	17.7	19.45	19.7	22.66	22.75	22.78	21.04	21.52	23.03
LV	17.17	17.04	18.37	18.71	11.56	11.12	11.39	11.79	13.03	14.15	14.83	15.9	17.17	14.79
PL	50.46	54.31	54.84	49.52	42.15	45.78	47.57	44.54	44.28	48.37	50.18	51.7	52.41	48.93
RO	21.86	22.09	23.53	22.16	10.9	11.57	13.07	14.06	15.43	16.32	16.68	17.11	16.75	17.04
SK	26.05	22.75	21.18	19.04	13.02	12.72	10.54	10.02	9.68	6.23	8.34	8.9	9.09	13.66
SL	15.84	16.76	16.45	15.54	11.83	12.15	11.18	10.22	9.2	9.8	9.8	10.99	10.59	7.83

Tab. 1. Production index per capita in individual Central and Eastern European countries in 2005–2017. Source: own study based on Eurostat data.

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Between 2005 and 2017, a decrease in beef and pork production per capita was observed in the majority of countries. In the case of beef, a decrease was recorded in 10 countries (i.e. all with the exception of Poland, where beef production per capita increased by 83.42%); a decrease in pork production was observed in 8 countries (with the exception of Bulgaria, Estonia and Poland). The greatest decrease in beef production per capita between 2005 and 2017 was recorded in Bulgaria, as well as Slovakia and Romania (a drop in the value of the index by 73.01%, 70.88% and 68.90% respectively); a decrease in pork production was observed in Slovakia (by 65.11%). A significant drop in pork production per capita between 2005 and 2017 was also observed in the Czech Republic, Croatia, Slovenia, Lithuania and Romania. It was due mainly to the structure of meat production and the production cycle of particular types of meat. Poultry has an incomparably greater potential for development. A shorter production period and relatively high purchase prices, as well as relatively low retail prices of poultry drive consumption and, as a result, also large-scale production of this type of meat (Bąk-Filipek, 2014). It should be emphasized that low self-sufficiency in this case does not necessarily have to be assessed negatively. This interpretation will be justified in a situation where the amount of protein supplied from other sources (e.g. poultry, fish, legumes) increases at the same time.

Another important aspect linked to the assessment of self-sufficiency in beef and pork is the foreign trade balance in terms of value (economic self-sufficiency) and production volume (technical self-sufficiency). Since the accession of Central and Eastern European countries to the European Union, meat prices in individual countries are contingent not only on levels of domestic demand and supply, but also on prices throughout the European Union and on exchange rates, which means that price changes do not always adequately reflect changes in production levels.

Countries included in the study are both exporters and importers of beef and pork. In the case of beef, the majority of countries of Central and Eastern Europe import rather than export meat (Table 2). In terms of value, the surplus in the balance of trade in 2005–2017 was recorded only by Poland, Lithuania and Latvia (except in 2005). Poland had the highest surplus in 2017 (EUR 1,271,459,000); the surplus of Lithuania, which ranked second, was over 16 times smaller. Until 2013, Hungary used to have positive trade balance when it comes to beef in most years; however, in the case of other countries of the region, a positive trade balance was observed only in one year (Slovakia, Estonia), or not at all.

The upward trend in the balance of trade (beef) between 2005 and 2017 was observed by 6 countries: Latvia (1027.27%), Poland (388.53%), the Czech Republic (253.84%), Croatia (250.87%), Lithuania (96.06%) and Romania (87.58%). The greatest decline in value in this period was recorded in Slovenia, Slovakia and Hungary (decrease in value by 1168.91%, 861.77% and 696.97% respectively).

Similar trends have been observed in the balance of trade when we take into account production volume. The surplus of exports over imports has been recorded in Poland, Lithuania and Hungary. Other countries – with a few exceptions – have a negative balance of trade in beef. Positive trends in trade between 2017 and 2005 have been observed in Poland, Hungary, Romania, Estonia and Lithuania.

Value (EUR K)											
	BG	**CZ**	**EE**	**HR**	**HU**	**LT**	**LV**	**PL**	**RO**	**SI**	**SK**
2005	-43538	-34460	-6238	-16341	3297	39080	-1618	260264	-40795	-1533	6753
2006	-68030	-39004	-5961	-3640	-3108	48621	3562	366540	-57997	-2868	726
2007	-12053	-46180	-6420	-5909	-88	63247	4611	386474	-9898	-10129	-3052
2008	-27883	-37043	-8403	-14363	11598	64003	7596	521668	-26764	-14385	-6846
2009	-22064	-49579	-4842	-18906	2624	64891	8495	545278	-35696	-16666	-6164
2010	-24714	-53710	-4678	-8776	2819	71302	11250	671291	-25194	-13550	-12705
2011	-21752	-62101	-8720	-13856	-4080	86093	17092	761326	-11501	-13866	-15568
2012	-17462	-57264	-7489	-29256	8575	91875	18962	806917	-5527	-16861	-21031
2013	-19157	-63247	-1691	-23537	8232	69879	15178	904497	-15853	-22062	-26646
2014	-24150	-73655	823	-33501	-6652	73295	9549	846196	-32429	-18308	-25283
2015	-23857	-78254	-131	-42327	-7406	80251	10484	1120050	-45869	-19282	-35621
2016	-23656	-95945	-3858	-45786	-10987	75122	12508	1062392	-42942	-22718	-42734
2017	-22911	-121934	-6217	-57335	-19682	76619	15165	1271459	-5066	-19437	-51442
Volume (tons)											
	BG	**CZ**	**EE**	**HR**	**HU**	**LT**	**LV**	**PL**	**RO**	**SI**	**SK**
2005	-50531	-15679	-2956	-8548	1567	20103	-7750	114034	-24023	-1670	2157
2006	-63619	-14259	-3269	-3059	-501	21121	-10432	156813	-41262	-3117	2233
2007	-12229	-13707	-2897	-4915	586	28172	-10634	164323	-4909	-2607	953
2008	-13552	-8907	-3198	-7041	5445	22738	-11944	189803	-11976	-2324	-179
2009	-10546	-13477	-2005	-8685	5352	24240	-11389	219227	-14206	-1993	-3922
2010	-11965	-14907	-2308	-2777	4512	24854	-10646	258814	-16355	-1916	-1624
2011	-8488	-14738	-3256	-3648	1777	22921	-11302	258824	-9481	-1791	-2833
2012	-5849	-11601	-2243	-8005	5819	23264	-10142	254392	-7737	-5195	no data
2013	-6271	-14087	-364	-6870	6438	18716	-7082	283688	-11381	-9226	-2451
2014	-10624	-17331	547	-10324	1949	21475	-9516	280114	-20831	-4676	-6836
2015	-8795	-17559	170	-13050	2261	22208	-9496	354239	-30373	-5475	-5260
2016	-9277	-22910	-918	-13444	2618	23074	-8535	343118	-30587	-6836	-2148
2017	-7671	-29207	-1444	-14012	no data	22832	-13938	383989	-8566	-7996	-3962

Tab. 2. Balance of trade (beef) in individual Central and Eastern European countries taking into account the value and volume of production in 2005-2017. Source: own study based on International Trade Centre data.

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The only country that recorded a positive balance of trade in pork, both in terms of value (2005–2017) and quantity (2006-2016), is Hungary (Table 3). During this period, a positive balance of trade was also recorded in Poland, yet only in one year, i.e. 2006. In other Central and Eastern European countries, the balance of trade in pork was negative, and highest in terms of value in the Czech Republic, Romania and Poland (2017). The same situation is true when it comes to the quantity. In addition, in all studied countries – with the exception of Hungary – a negative trend in foreign trade in pork was observed between 2005 and 2017. In terms of value and quantity, the greatest increase in the negative balance in this period was recorded in Poland (in terms of value, a decrease by 1,211.73%, in terms of volume – by 1,746.88%), Bulgaria and the Czech Republic. The negative balance of trade in the majority of Central and Eastern European countries resulted from a drop in the profitability of live beef and pork production, exchange rate fluctuations, as well as decreased domestic production. High levels of domestic demand (in the case of Poland) and increased production by the main suppliers of meat were other important factors (Kossakowska, 2013).

Value (EUR K)											
	BG	CZ	EE	HR	HU	LT	LV	PL	RO	SI	SK
2005	-18671	-145131	-9923	-74059	55961	-34339	-36963	-31531	-310868	-64773	-79676
2006	-24639	-173273	-16585	-69981	92743	-43520	-41138	55690	-327493	-71604	-77411
2007	-84949	-188357	-15163	-66905	110577	-70280	-40613	-121395	-321014	-67432	-80276
2008	-123611	-240362	-16772	-74546	85901	-122805	-60938	-526491	-446778	-78040	-129310
2009	-147542	-288541	-19924	-85080	73955	-109460	-53486	-696422	-379127	-83020	-168944
2010	-147317	-308367	-22891	-77755	139159	-81042	-47622	-538008	-296945	-87095	-140980
2011	-169970	-360723	-27740	-89829	95265	-85439	-62675	-533818	-248595	-90953	-163540
2012	-182520	-426526	-23496	-110732	22099	-97870	-62256	-424719	-227955	-101442	-157898
2013	-171500	-423941	-26722	-135086	56286	-86059	-49757	-377022	-237503	-103232	-178996
2014	-190232	-427407	-25494	-150153	91342	-86039	-43419	-534527	-245685	-101442	-163675
2015	-165973	-438446	-21636	-141257	103113	-81241	-45380	-523663	-260634	-100557	-162234
2016	-167103	-455225	-23203	-138349	69818	-92563	-48690	-431911	-294554	-113146	-231000
2017	-200666	-519983	-27535	-178545	29271	-105150	-51980	-413602	-424612	-97926	-266954
Volume (tons)											
	BG	CZ	EE	HR	HU	LT	LV	PL	RO	SI	SK
2005	-14495	-90723	-9436	-37959	-52	-22044	-23937	-10184	-192104	-31930	-53042
2006	-18262	-94284	-12953	-32289	16494	-28545	-26876	65949	-201802	-33831	-51705
2007	-54883	-101583	-11401	-32147	27410	-45784	-27110	-31638	-191796	-32997	-52738
2008	-69565	-115995	-11344	-37393	18211	-67945	-33576	-207304	-244391	-34856	-65401
2009	-84941	-144159	-13504	-41862	15824	-66589	-31535	-370910	-227478	-38386	-85391
2010	-93048	-160259	-15430	-38842	43665	-53131	-30307	-253712	-195039	-40657	-67045
2011	-97493	-174618	-16370	-41474	24111	-51269	-36849	-267509	-152011	-40534	-78100
2012	-91799	-187697	-11538	-46765	1071	-50916	-33032	-212252	-138117	-41833	-56006
2013	-89770	-186834	-13081	-59089	11913	-45438	-24955	-159427	-135578	-42149	-91122
2014	-105592	-204178	-12759	-72613	15473	-48450	-23139	-227911	-145650	-43911	-75777
2015	-107419	-225397	-12557	-79097	22940	-52754	-26884	-264541	-170799	-47234	-84657
2016	-103753	-224893	-13888	-71937	1531	-53525	-27795	-208985	-167544	-51643	-115257
2017	-107564	-229864	-13262	-71951	no data	-54343	-27446	-188086	-199783	-40445	-117645

Tab. 3. Balance of trade in pork in Central and Eastern European countries in terms of production value and volume in 2005–2017. Source: own study based on International Trade Centre data.

Beef									
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
BG	323.8	462.1	176.7	263.2	785.6	no data	no data	531.5	491.2
CZ	123.5	119.1	125.1	121.2	131.2	135.3	132.6	130	132.2
EE	129.7	128.3	128.5	128.6	178.9	187.7	215.2	178.1	120.3
HR	60.8	66	70.9	74.3	94.2	73.3	72.2	114.9	111.7
HU	196.1	235	196	179.2	191.3	196	230.7	222.4	216.7
LT	81.2	54.9	45.1	43.8	36	29.1	26.9	27.4	36.1
LV	100.8	82.2	85.4	78.1	75.4	64.6	58.1	60.5	65.6
PO	56.1	55	48.2	43.7	41.1	27.2	24.3	24.7	26
RO	101.5	105.2	74.5	77.9	611.2	525.5	451.9	363.3	326.2
SI	125.8	110.2	118.9	116.4	119	114	113.5	116.8	118.3
SK	131.8	152.8	142.6	153.6	170.2	200.8	220.1	279.2	294.8
Pork									
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
BG	183.3	132.2	195.3	349.6	492.1	521	427.6	386.8	366.5
CZ	131.5	132.3	134.9	142	165.9	174.4	180.5	185.4	184.8
EE	102.2	133.6	134.1	116.1	150.4	160.6	147.8	108.1	106
HR	103.6	123	118.2	121.8	253	209.6	206.8	222.9	228.2
HU	96.8	95.2	96.2	99.3	114.8	97.3	106.7	111.8	102.6
LT	122.7	140.6	161.9	215.4	359.5	260	231.7	227.8	201.6
LV	177	183.8	184.2	202.7	323.2	336.4	372.5	321.7	268.4
PO	94.8	92.9	92.8	102.1	115.6	109.7	107.7	105.6	104.3
RO	134.7	139.4	133.3	147.9	307.5	255.7	217.3	194.7	164
SI	276.6	265.7	252.3	264.6	331.7	325.4	331.1	326.7	306.4
SK	145.9	152.9	160.8	186.5	277.6	279.1	352.8	302.1	328.3

Tab. 4. Consumption and production index in individual Central and Eastern European countries in 2005–2013. Source: own study based on FAO data.

Differences in the consumption of beef and pork in relation to production volumes in 2005–2013 are summarized in Table 4. Poland, Lithuania and Latvia had the largest surplus of beef production in relation to the needs

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of local markets. Until 2011, beef production fully met the needs of the Croatian meat market, but since 2012, the index has exceeded recommended limits (100%) as a result of beef consumption growing at a faster pace than production. High self-sufficiency levels in 2005–2013 were also observed in Slovenia, Estonia and the Czech Republic. Hungary, Slovakia, Romania and Bulgaria were least capable of meeting their domestic needs. A negative tendency in the evolution of the index has also been observed in these countries, which is the result of significantly reduced beef production. The risk of BSE has had a negative impact on the level of consumption and production of beef in the majority of Member States. The greatest improvement in beef self-sufficiency has been observed in Lithuania, Poland and Latvia (increase by 30–45 percentage points). In turn, between 2005 and 2013, the index decreased most significantly in Romania and Slovakia.

The largest surplus of pork production in relation to the domestic need was recorded in Hungary, Poland and Estonia. Hungary (since 2011), Poland (since 2008) and Estonia (throughout the studied period) have not been able to satisfy the demand for pork with domestic production. Significant deviations of the index value from the recommended level were recorded in 2013 in the remaining countries. In addition, indexes decreased in all CEE countries in the period between 2005 and 2013. The greatest drop in beef consumption in relation to the production volume was recorded in Bulgaria and Slovakia (a decrease by over 180 percentage points). This is due to a fast increase in pork consumption coupled with a reduction in pork production in all countries concerned.

3. Summary

The meat market is one of the most developed food markets not only in the countries of Central and Eastern Europe, but also throughout the European Union. Nevertheless, it will be necessary to develop and implement solutions that will contribute to the development of the industry, in particular through focusing on the quality of meat products. In terms of self-sufficiency, countries of Central and Eastern Europe vary considerably. The following conclusions have been drawn from the study:

1. In Central and Eastern Europe, levels of production and consumption of pork are greater compared to beef. However, a decline in observed in the vast majority of countries.
2. Poland, Lithuania and Estonia have the safest food policy when it comes to beef production. A high level of self-sufficiency is also observed in Latvia. However, only in Poland an upward trend in beef production per capita has been observed. In the case of pork, a favourable tendency has been recorded in Hungary and Estonia.
3. Domestic beef production meets the demand in the majority of countries of Central and Eastern Europe, e.g. in Croatia, the Czech Republic

and Slovenia, that is, countries with a high level of beef production per capita. When it comes to pork, this situation is only observed in Poland.
4. The pork market of the majority of Central and Eastern European countries, i.e. Croatia, the Czech Republic, Lithuania, Latvia and Romania, is characterised by a positive index of production volume per capita. However, these countries are not able to satisfy their food needs through domestic production and, therefore, they need to import primary products.
5. The lowest degree of self-sufficiency in terms of beef and pork production has been observed in Bulgaria and Slovakia, and of pork in Slovenia. The situation on the beef market seems slightly better in Hungary and Romania.

References

Baer, A. (2002). Wpływ rozszerzenia Unii Europejskiej na samowystarczalność żywnościową na tle poziomu konsumpcji. *Roczniki Naukowe SERiA*, *IV*(2), 12–17.
Baer-Nawrocka, A. (2014). Zmiany w spożyciu i stopniu samowystarczalności żywnościowej w Unii Europejskiej. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 360, 19–27. https://doi.org/10.15611/pn.2014.360.02.
Bąk-Filipek, E. (2014). Przemiany na rynku mięsa w Polsce. *Zeszyty Naukowe SGGW w Warszawie. Polityki Europejskie, Finanse i Marketing*, *12*(61), 7–16.
Bureau, J.C. & Swinnen, J. (2018). EU policies and global food security. *Global Food Security*, 16, 106–115. https://doi.org/10.1016/j.gfs.2017.12.001.
Choiński, W. (2014). Sytuacja w branży mięsnej w aspekcie zakazów wynikających z wystąpienia na terytorium Polski ASF u dzików. *Polskie Mięso, Informator Masarski*, 5, 20–26.
Gebeltova, Z. (2012) Czech Republic's self-sufficiency in case of pork meat and its impact on trade balance development. *AGRIS on-line Papers in Economics and Informatics*, *4*(2), 1–12.
Grochowska, R., Łopaciuk, W., Rosiak, E. & Szajner, P. (2013). *Światowa produkcja biopaliw w kontekście bezpieczeństwa żywnościowego*. Warszawa: IERiGŻ-PIB.
https://ec.europa.eu/eurostat/web/agriculture/data/database (01.09.2018).
https://www.fao.org/faostat/en/#data/FBS (01.09.2018).
https://www.trademap.org/Index.aspx (01.09.2018).
Firlej, K. & Kubala, S. (2018). Asymetria samowystarczalności produkcji ziemniaków w krajach Unii Europejskiej. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, *20*(2), 37–45. https://doi.org/105604/01.3001.0011.8113.
Grzega, U. (2015). Dochód i konsumpcja gospodarstw domowych w Polsce i Unii Europejskiej w latach 2004 i 2012. *Handel Wewnętrzny*, *4*(357), 124–134.
Hałasiewicz, A. (2010). *Rozwój obszarów wiejskich w kontekście zróżnicowań przestrzennych w Polsce i budowania spójności terytorialnej kraju*. Warszawa: MRR.
Jeżewska-Zychowicz, M. (2004). *Zachowania żywieniowe i ich uwarunkowania*. Warszawa: Wydawnictwo SGGW.
Kapusta, F. (2011). Zboża w rolnictwie i gospodarce Polski. *Wieś Jutra*, 3–4, 4–5.
Kapusta, F. (2012). *Agrobiznes*. Warszawa: Difin.
Kossakowska, J. (2013). Wybrane czynniki wpływające na poziom konsumpcji wieprzowiny w Polsce (1990–2012). *Biuletyn Informacyjny ARR*, 2, 2–13.
Kotyza, P. & Slaboch, J. (2014). Food self sufficiency in selected crops in the Czech Republic and Poland. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *62*(6), 1329–1341.

 DOI 10.7172/1644-9584.79.4

Mikuła, A. (2012). Bezpieczeństwo żywnościowe Polski. *Roczniki Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich*, *99*(4), 38–48.

Noleppa, S. & Cartsburg, M. (2013). Agricultural self-sufficiency of the European Union. *Statistical Evidence, Argipol*, 2, 1–19.

Obiedzińska, A. (2012). Bezpieczeństwo żywnościowe. In: M. Kwasek (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (17) Ocena stanu wyżywienia ludności w Polsce w aspekcie bezpieczeństwa żywnościowego*. Warszawa: IERiGŻ-PIB.

Pawlonka, T. (2017). Specyfika sektora przetwórstwa mięsnego w Unii Europejskiej: stan i perspektywy. *Zagadnienia Ekonomiki Rolnej*, 1, 179–197. https://doi.org/10.5604/00441600.1233010.

Policy and Action for Cancer Prevention. (2009). *Food, Nutrition and Physical Activity. A Global Perspective, World Cancer Research Fund*. Washington DC: AICR.

Stańko, S. (2016). *Sytuacja na światowych rynkach mięsa i produktów mleczarskich oraz jej wpływ na rynek krajowy i możliwości jego rozwoju*. Warszawa: IERiGŻ-PIB.

Szczepaniak, I. (2012). Samowystarczalność żywnościowa Polski. *Przemysł Spożywczy*, *66*(2), 2–5.

Szybiga, K. (2013). Asymetria spożycia i produkcji wybranych artykułów żywnościowych w ujęciu przestrzennym. *Zagadnienia Ekonomiki Rolnej*, 1, 104–117.

Tiraspolsky, A. (2016). Food Self-Sufficiency in Eastern Europe. *Eastern European Economics*, *19*(1), 3–27. https://doi.org/10.1080/00128775.1980.11648217.

Verbeke, W. (2009). Market differentiation potential of country-of-origin, quality and traceability labelling. *The Estey Centre Journal of International Law and Trade Policy*, *10*(1), 20–35.