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STRUCTURAL CHANGES ON MEAT MARKET IN THE EUROPEAN UNION IN 2008-2014

Agnieszka TŁUCZAK

Opole University, Faculty of Economics, 46 a, Ozimska Str., Opole, 45-058, Poland, Phone: +48 692921133, Email: atluczak@uni.opole.pl

Corresponding author: atluczak@uni.opole.pl

Abstract

The main aim of this paper is to classify EU countries regarding specialization and competitiveness of production of animal for slaughter in the sectors of pigs and cattle. The analysis was based on structural and geographical shift-share analysis which enabled a classification of EU countries regarding production changes and also an assessment of structures of production of animal for slaughter related to the reference space, i.e. regional area of the EU countries. The performed research also allowed the identification of animal production structures characterized by specialization and competitiveness of production of cattle and pigs.

Key words**:** *competitiveness, EU, animal production*

INTRODUCTION

The meat sector is one of the most important in European Union (EU) agriculture. Together the four main meat types: beef and veal, pig meat, poultry meat, and sheep meat/ goat meat, account for one quarter of the total value of agricultural production. Half of all EU farms have livestock. Some 90 % of farmers with ruminant animals (cattle, sheep and goats) are specialist livestock producers. Meat is a major source of protein and constitutes an important part of the European diet. EU policies in the meat sector are designed to encourage the production of safe, nutritious and affordable meats. Recent changes to the common agricultural policy (CAP) underline these aims. Policies are geared increasingly towards meeting the needs of consumers, livestock producers and the environment in a balanced way [13, 27, 32].

There have been unconsiderable structural changes in EU livestock farming since the 2008. The production of pig meat and bovine meat (based on available data for the EU-28 Member States) was lower in 2014 than in 2008: pig meat production for the EU-28 declined slightly by 1.56% to 22.2 million tonnes; bovine meat production declined by 9.8% compared to 2008.

Beef is mainly produced from cattle breeds grown specifically for their meat but can also come from dairy cattle. Male calves from dairy cows are of no use for producing milk and most of these are used for veal production. The largest producer of bovine meat are Germany, France and Italy; They produced respectively 12.1, 15.8 and 10 million tonnes in 2008 [1, 18, 19].

European beef production in the first quarter of 2015 showed an increase of 4.8% year-on-year. It was partly related to the continuing culling of dairy cows in Poland, Italy and Estonia. Beef production was likely to rise overall in 2015, boosted by cowherd developments and export opportunities. It predicted that in 2015 total EU production could further increase by 1.4% as EU production capacity has risen and the impact of longer production cycles kicks in [13, 16, 33].

Pig meat production is expected to increase further in 2015, driven by low feed prices and a higher numbers of breeding sows. Increased production, lower meat prices, a weaker euro and a strong demand from Asia provided an opportunity for pig exports [1, 32].

Despite depressed prices at the beginning of the year, slaughter were up 5.6% in the first quarter of 2015 compared to the same period in 2014. All main producing member state contributed to this, with the biggest growth

recorded in Spain (+11.7%) and in Poland (+6.6%). In the first four months of 2015, EU pig meat exports grew by around 4% because of increased shipments towards the Philippines, China, the US and Singapore [16, 18, 19, 32].

Today's economic conditions related to the operation and regional development within the European Union make it necessary to take on new diagnostic tests for the prospects of economic development of regions [20]. In this study, one of the spatial methods was used to diagnose spatial dynamics of changes: spatial and dynamic shift share analysis. The main aim of this article was to analyze changes in the volume of animal for slaughter production in the EU countries in the years 2008-2014 by species (bovine, pig) using the shift share method. The study assesses the pace of change in the size of the phenomenon.

MATERIALS AND METHODS

The subject of the research is agriculture production structure by two main types of meat: bovine and pigs. The adopted time range of conducted research covers the period 2008–2014. The analysis covers 27 EU countries. The necessary statistical information was obtained from Eurostat database.

Structural and geographic analysis of meat production was conducted in countries by using classical and dynamic shift-share analysis and the Esteban-Marquillas model using allocation effect [3, 5, 6, 10, 17, 20, 25, 26, 28, 29, 30]. Shift-share analysis represents a research tool that allows determining the rate of changes related to total meat production in each member countries at the background of reference area, i.e. the European Union area [2, 4, 7, 8, 9, 11, 30, 31, 33].

Shift-share analysis of meat production in the EU countries allowed for specifying structural and competitiveness the size and type of meat production changes grouped according the types of meat by positive and negative change effects values, as well as by specialization and competitiveness – the components of allocation effects [12, 14, 15, 19, 23,24].

The assessment of regional specialization and competitiveness in economy sectors requires specifying a reference structure, i.e. the one constituting the required reference basis. In the discussed framework this role will be played by meat production in the space of 27 EU countries.

RESULTS AND DISCUSSIONS

The information provided in Table 1 indicates that in EU in the period 2008–2014, the largest average meat production share was definitely characteristic by pig meat, the other type of meat - bovine was three times smaller. The changes occurring in the course of analyzed years were insignificant, which seems natural, since economic structures are most frequently characterized by slow and evolutionary type of changes over time.

Table 1. Meat production structure in EU in the period 2008-2014 (in %).

Year	Beef	Pork
2008	26	74
2014	25	75

Source: author's own calculation based on Eurostat database.

Table 2 presents the effects of meat production structure changes which allow identifying the economy sectors exerting key impacts on the EU countries' economic growth in the period 2008–2014. Net structural effects were defined by means of decreasing gross effects in terms of agriculture production growth rate in European Union. The changes of pig meat production in 2014 resulted in higher meat production in all EU members countries, on average by +2.00%. The largest meat production rate occurred in bovine meat production sector (−6.00%). This large decrease it was due to increased slaughter of dairy cows in Poland, Italy and Estonia.

Table 3 and Figure 1 illustrate the classification of EU countries with regard to aggregated structural and competitive effects. The first class covered those countries in which sectoral meat production structure has a positive impact on agriculture production rate

growth and economic sectors are characterized by higher dynamics of meat production size fluctuations compared to other regions. This group includes five countries. In this class Germany stands out as characterized by very strong positive effects, both structural and competitive ones, definitely higher than in the other countries covered by this class.

Table 2. Results of classic shift-share analysis with regard to the effects of meat production changes in the sectors grouped according to types of meat.

Effects of meat production changes in EU countries (in %)		2014/2008
Total effect (growth rate of meat production in EU)		-3.73
Net structural effect	Pork	-6.00
	Beef	+2.00

Source: author's own calculation based on Eurostat database.

Table 3. Classification of EU countries by positive and negative aggregated effects values: structural and competitive (dynamic shift-share analysis 2014/2008).

Criterion of division	Countries	Number of countries
effects: structural (+) competitive (+)	Belgium, Germany, Spain, Netherland, Portugal	5
effects: structural (+) competitive (-)	Bulgaria, Czech Republic, Denmark, Cyprus, Hungary, Malta, Poland, Slovakia	8
effects: structural (-) competitive (+)	Ireland, Austria, United Kindgtom	4
effects: structural (-) competitive (-)	Estonia, Greece, France, Italy, Latvia, Lithuania, Luxembourg, Romania, Slovenia, Finland, Sweden	11

Source: author's own calculation based on Eurostat database.

The second class characterized by a positive value only of the structural factor lists eight countries. The most favorable changes in meat production structure observed in this class in the analyzed period occurred in Hungary. This region was characterized by the highest structural effects and the lowest competitive effects.

The third class, featuring positive influence of only the competitive factor, covered four countries. In this class Ireland was characterized by definitely the least favorable changes in structure of meat production. The fourth class covers the countries in which both meat production structure and internal competitive development determinants exerted negative impacts. This is the most numerous class including eleven countries. The most unfavorable competitive effects of meat production changes were observed in this class with reference to Romania, whereas the least favorable structural changes were recorded in Slovakia too.

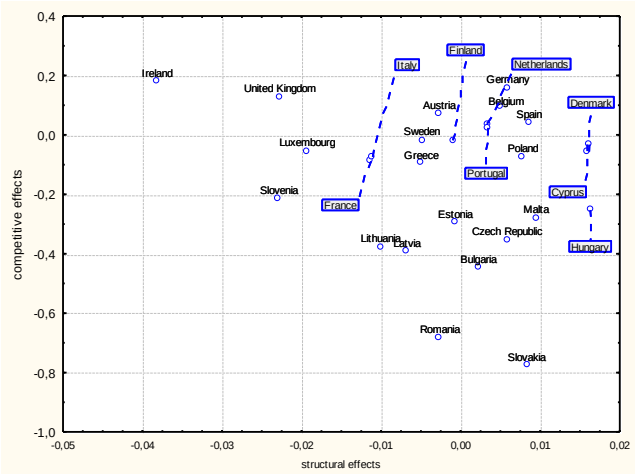

Fig. 1. Aggregated structural effects vs. aggregated competitive effects.
Source: author's own calculation based on Eurostat database.

Figure 2 presents the values of aggregated structural and competitive effects arranged according to the decreasing values calculated for 2008–2014. As it can be observed, in the analyzed period competitive factors exerted a much larger impact on meat production changes than the structural ones. The most favorable structural effects of changes occurred definitely in Denmark, Cyprus and Hungary. The largest negative influence on structure in meat production changes was observed in Ireland, Slovenia and United Kingdom.

The most favorable internal competitive factors responsible for changes in meat production occurred in Germany and Ireland. The least favorable situation was observed in Romania, Slovakia, Bulgaria and Czech Republic. Table 4 presents the classification of EU countries with regard to allocation component effects: specialization or its absence as well as the advantage or disadvantage of competitiveness.

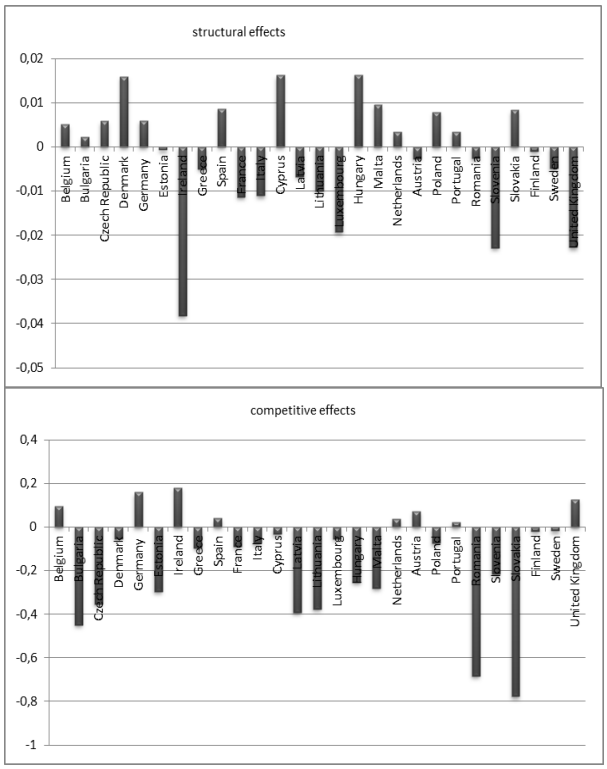

Fig. 2. Aggregated structural and competitive effects for EU countries in the period 2008-2014.
Source: author's own calculation based on Eurostat database.

In case of wheat in regard to all voivodships it can be concluded specialization and competitive advantage (tab. 4). The division of countries due to the advantages and disadvantages in specialization and competitiveness is varied.

Table 4. Classification of EU countries with regard to allocation component effects in meat production in 2014

	bovine meat	**pig meat**
Specialization and competitive advantage	Czech Republic, Denmark, France, Cyprus, Latvia, Lithuania, Malta, Poland, Slovenia, Slovakia, Finland, Sweden	Belgium, Bulgaria, Germany, Estonia, Ireland, Greece, Spain, Italy, Luxembourg, Hungary, Netherlands, Austria, Portuga, Romania, United Kingdom
Specialization and competitive disadvantage	Belgium, Bulgaria, Germany, Estonia, Ireland, Greece, Spain, Italy, Luxembourg, Hungary, Netherlands, Austria, Portugal, Romania, United Kingdom	Czech Republic, Denmark, France, Cyprus, Latvia, Lithuania, Malta, Poland, Slovenia, Slovakia, Finland, Sweden

Source: author's own compilation based on Eurostat database

All the groups of countries are numerous, the classification of the country to the group depends on the type of meat (bovine or pig) and the current weather conditions in the country. Analyzing the meat market the cyclical nature of meat production should be taken under consideration.

CONCLUSIONS

(1)Since 2008 EU countries recorded a decrease in meat production by 3.73%. However, the changes in pig production resulted in an average production rate decrease by 6.0%. That sector turned out to be the key to responsible for economic decrease of meat production.
(2)The most favorable structural effects of changes in meat production occurred in Denmark and Hungary, in this countries characterized by a high share of pig meat production sector presenting the level of respectively about 93% and 94% in 2014. Definitely the least favorable structural effects were observed in Ireland, where pig meat production amounted to about % in 2014.
(3)The most favorable competitive effects took place in Germany and Ireland, whereas the least favorable ones in Slovakia, Bulgaria and Latvia.
(4)Production as well as consumption of meat in the EU, continues the downward trend, which is mainly due to the lower supply of pork and beef. In 2014 due to the improvement of the economic situation in most EU countries, as well as due to a decrease in grain prices, the outlook for the meat sector seem to be better. It can be observed lower profitability and the continuation of the downward trend of pig meat production and a decline in the EU. The first effects of the tense situation on the supply side was already evident in the second half of 2014 when prices on the EU market strongly rebounded. Commission experts estimate that could translate into a slowdown in exports of meat, as well as have a negative impact on consumption of pork in the EU.
(5) With regard to the beef market saw an increase in cattle numbers in 2014. Mainly due to an increase in population of dairy

cows. This implies an increase in production and a decline in beef meat imports from outside the EU. However, high prices may, as in other types of meat, limit the growth of consumption.

(4) Finally shift-share analysis proved to be a useful method in identifying changes related to structure and dynamics of size of meat production in EU countries.

REFERENCES

[1] Agricultural Production-Animals, http://ec.europa.eu/eurostat/statistics-explained /index .php/agricultural_production_-_animals

[2]Antczak, E., 2014, Analiza zanieczyszczenia powietrz w Polsce z wykorzystaniem przestrzennej dynamicznej metody przesunięć udziałów, Ekonomia i Środowisko, 2(49), s. 191-209

[3]Barff, R.A., Knight III P.L., 1988, Dynamic shift-share analysis, Growth and Change, no. 19/2

[4]Cliff, A.D., Ord, J.K., 1981, Spatial processes. Models & Applications, Pion, London

Opole 2008

[5]Dunn, E. S., 1960, A Statistical and Analytical Technique for Regional Analysis, Papers and Proceedings of the Regional Science Association, vol. 6, p. 98-112

[6]Esteban-Marquillas, J.M., 1972, Shift and Share analysis revisited, Regional and Urban Economics, vol. 2, no. 3

[7]Evans Garen K., 2008. Spatial Shift-Share Analysis of the Leisure and Hospitality Sector on the Gulf Coast following Hurricane Katrina, 2008 Annual Meeting, February 2-6, 2008, Dallas, Texas 6744, Southern Agricultural Economics Association

[8]Grzybowska, B., 2013, Przestrzenna koncentracja potencjału innowacyjnego w przemyśle spożywczym, Roczniki Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich Tom 100, zeszyt 2, s. 53-64

[9]Houston, D. B., 1967, The Shift and Share Analysis of region al growth: a critique, Southern Economic Journal, vol. 33, no. 4, s. 577-581

[10]Malarska A., Nowakowska B., 1992, Metoda przesunięć udziałów w analizie dynamiki zmian strukturalnych [Shift-share method in the analysis of structural changes dynamics], 'Przegląd Statystyczny' ['Statistical Review'] no. 1

[11]Marquez, M. A., Ramajo, J., 2007, Shift-share Analysis: Global and local spatial dimensions, Unversity of Extramadura

[12]Mayor, M., Lopez, A. J., 2008, Spatial shift-share analysis versus spatial filtering: an application to Spanish employment data, Empirical Economics, vol.34, is. 1, s. 123-142

[13]Meat & Livestock Market Outlook, Autumn 2014, http://www.bordbia.ie/industry/manufacturers/insight/publications/MarketReviews/MeatLivestockOutlook/Meat-and-Livestock-Outlook-2014.pdf

[14]Metodyka szacowania fizycznych rozmiarów produkcji zwierzęcej (2008), Główny Urząd Statystyczny, Warszawa,

[15]Nazara, S., Hewings, G.J.D., 2004, Spatial structure and taxonomy of decomposition in shift-share analysis, Growth & Change, 35(4), 476-490

[16]Perrett Michelle, EU meat production set to increase, http://www.globalmeatnews.com/ Industry-Markets/EU-meat-production-to-grow-despite-Russian-ban?utm_source=copyright&utm_medium/OnSite & autm_ campaigncopy right

[17] Perloff, H. S., Dunn, E. S., Lampard, E. E., Muth, R. F., 1960, Regions, resources and economic growth, Johns Hopkins Press, Baltimore

[18]Pig Market Trends, November 2014, Issue 114, http://pork.ahdb.org.uk/media/72648/ pig_market_trends_-_november_2014.pdf

[19]Polko, D., 2013, Analiza przestrzenna zmian struktury na rynku pracy absolwentów, Logistyka, 4/2013, s. 452-466

[20]Rozpędowska-Matrasek, D., 2010, Badania empiryczne wzrostu ekonomicznego regionów, http://www.ie.uni.lodz.pl/pictures/files/ konfdydak175-192.pdf (30.06.2015)

[21]Short Term Outlook for EU arable crops, dairy and meat markets in 2014 and 2015, http://ec.europa.eu/agriculture/markets-and-prices/short-term-outlook/pdf/2014-10_en.pdf

[22]Suchecki, B., (ed.) 2010, Ekonometria przestrzenna. Metody i modele analizy danych przestrzennych (2010), C. H. Beck, Warszawa

[23]Szewczyk, M., Tłuczak, A., Ruszczak, B., 2011, Potencjał województwa opolskiego w kontekście analizy zmian udziałów branż, w: Projekcja rozwoju inicjatyw klastrowych w województwie opolskim, red. W. Duczmal, W. Potwora, Wydawnictwo Instytut Śląski Sp. z o.o., WSZiA w Opolu, Opole 2011,s.105-119

[24]Szewczyk, M., Zygmunt, A., 2011a, Prospects of food products manufacture sector in Opolskie region [in:] Regional and local development: Capitals and drivers, Krzysztof Malik (EDIT.), Faculty Economy and Management of the Opole University of Technology, Self-Government of the Opole Voivodeship, Committee of Spatial Economy and Regional Planning of the Polish Academy of Sciences, Committee Organization and Management Sciences of the Polish Academy of Sciences – Katowice, Opole 2011, s.135-156

[25]Szewczyk, M., Zygmunt, A., 2011b, Opolskie Voivodship: perspectives of the mining and quarrying sector [in:] Regional and local development: Capitals and drivers, Krzysztof Malik (EDIT.), Faculty Economy and Management of the Opole University of Technology, Self-Government of the Opole Voivodeship, Committee of Spatial Economy and Regional Planning of the Polish Academy of Sciences, Committee Organization and Management Sciences of

the Polish Academy of Sciences – Katowice, Opole 2011, s. 199-218

[26]Szewczyk, M., Łobos, K., 2011, A Comparative Study of the Economic Performance of Chemical Branch Enterprises from Opolskie and Dolnosląskie Voivodships [in:] Regional and local development: Capitals and drivers, Krzysztof Malik (EDIT.), Faculty Economy and Management of the Opole University of Technology, Self-Government of the Opole Voivodeship, Committee of Spatial Economy and Regional Planning of the Polish Academy of Sciences, Committee Organization and Management Sciences of the Polish Academy of Sciences – Katowice, Opole 2011, s. 109-134

[27] The meat sector in the European Union, 2004, http://ec.europa.eu/agriculture/publi/fact/meat/2004_en.pdf

[28]Tłuczak, A., 2014a, Zastosowanie modelu potencjału w analizie zróżnicowania regionalnego rolnictwa w krajach unii europejskiej, Metody Ilościowe w Badaniach Ekonomicznych Tom XV/4, str. 218 – 228

[29]Tłuczak, A., 2014b, Model potencjału w analizie zróżnicowania regionalnego rolnictwa w Polsce, Acta Universitatis Lodziensis Folia Oeconomica, 6 (308), s. 171-181

[30]Tobler, W., 1970, A computer movie simulating urban growth in the Detroit region, Economic Geography, 46(2), s. 234-240

[31]Trzpiot, G., Ojrzyńska, A., Szołtysek, J., Twaróg, S., 2013, Wykorzystanie shift share analysis w opisie zmian struktury honorowych dawców krwi w Polsce, Wielowymiarowe modelowanie i analiza ryzyka, UE Katowice, Katowice, s. 84-98

[32]UK Pig Meat Market update http://pork.ahdb.org.uk/pricestats/published - reports/uk-pig-meat-market-update/

[33]Zaccomer, G.P., 2006, Shift-share analysis with spatial structure: an application to Italian industrial districts, Transition Studies Review, 13(1), 213-227