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The significance of imports in the supply of material for food economy in Poland and Germany[2]

Abstract. The main aim of the article was an analysis of the significance of imports in the supply of material for the Polish and German agri-food sectors. The results of the analysis point to the fact that foreign trade is an important factor stabilising the development of the food sector in Poland and in Germany. However, in Germany imports are a much stronger stimulator of the development of agriculture and food industry than in Poland. A comparison reveals the desirable direction of changes in Poland, where the role of imports in the supply of materials to agriculture and the food industry should increase. Thanks to this, the imported products and global processes will have a significant influence on further development and modernisation of the Polish agribusiness.

Key words: input-output analysis, agriculture, food industry, supply of materials, imports.

Introduction

One of the methods of formulating visions of transformations in agribusiness in Poland is the analysis and interpretation of global experience. The understanding and making use of the experience of other countries, which occupy higher positions in the socioeconomic development than Poland, is related with the development pathways of contemporary world and may be an important signpost for the development of the Polish agribusiness. The regularities present in the complex of food economy of West European countries are of particular importance. One of the reasons for this is the conviction that the experience of those countries may be of a direct practical importance for solving problems occurring in the Polish food economy [Tomczak 1994a & b]. The experience of strongly developed countries determines the general model of agribusiness development and the directions of changes. Studies of development of rural areas, agriculture and food economy pay particular attention to the world experience and to international comparisons and analyses. A need to make use of the world experience is forced by the debate on the management strategy and basic problems of the agricultural and food policy, which has been going on for many years [Tomczak 1997]. The conclusions resulting from this analysis give a possibility to make a definite statement that the development pathways of the agribusiness of individual countries are and will be more and more visibly identical with the pathways of contemporary world. This conclusion gives a possibility not only to learn about the development tendencies and forces in the food economy of other countries, but it also gives an answer to the question how to establish and execute the development strategy of this sector of national economy. Poland may learn many new things from the experience of western market economies [Tracy 1997].

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The main aim of the article is an analysis of the supply of imported material to the food economy in Poland and in Germany. The period of time under study comprises the years 1995, 2000 and the latest available data concerning the input-output tables. In Poland, the latest data are available for 2005, whereas in Germany for 2007. The analysis comprised the volume and the share of imported products in the supply of material to agriculture and the food industry from sector I (industries manufacturing means of production and services for agriculture and the food industry), sector II (agriculture) and sector III (food industry)[3].

The main research method was the input-output analysis. The basis for this methodology is the statistics of inter-branch flows. It consists in summing those components of inputs, products and potentials, which altogether form the agribusiness. In other words, it is a model of quantitative relations between different branches of production, leading to a general economic equilibrium [Czyżewski 2008; Leontief 1936 & 1949]. The model is a useful instrument of the economic functioning [Tomaszewicz 1994]. On the basis of the general equilibrium theory assumptions, it is possible to analyse the creation and distribution of the produced macroeconomic effects, the connections between agribusiness and environment, the influence of global processes on this sector through exports and imports [Czyżewski 2001 & 2008, Leontief 1936 & 1949]. The input-output tables are the only available statistical material, on the basis of which it is possible to make analyses of these volumes in the agri-food sector.

The evaluation of the streams of means volume flowing to the agri-food sector from non-agricultural branches is subjective. It is possible to try making it objective by international comparisons. Although international analogies are not a warranty and usually they cause numerous and justified reservations, they undoubtedly have the advantage of certain points of reference, which enable a relative assessment of processes and phenomena [Woś 1979]. For this reason, the article uses the method of analogies (similarities) and comparisons, which gives a possibility to obtain a prognostic information by transferring the regularities from one phenomenon to another. The German economy was chosen for the comparison, because Germany is Poland's most important trade partner (the share of exports to Germany in the total exports of agri-food products from Poland was about 23.0% in 2011[4]). This fact is caused by the geographical closeness, the demographic and economic potential and the traditions of Polish socio-economic connections [Cziomer 2001]. In Germany, there are similar soil and climate conditions to the Polish ones; there is also a similar volume of agricultural land, structure of production and consumption. Because of the much higher level of economic development in Germany, this comparison may be a premise enabling the formulation of conclusions concerning the direction of development of this branch in Poland.

[3]A fundamental work on the theory of agribusiness, its internal structure and relations with the national economy is the work by Davis and Goldberg [1957], traslated also to Polish. in 1967. According to the authors of the book, the agribusiness as a branch of the national economy consists of three main economic aggregates (groups), which are used in this analysis. Sector I is the industries manufacturing means of production and services for agriculture and for the food industry, sector II is agriculture and sector III is the food industry.

[4]www.epp.eurostat.ec.europa.eu

The supply of imported materials in the Polish and German agriculture

Agriculture is one of the aggregates in agribusiness and, together with the food industry, it directly participates in the production and distribution of food. Determining the importance of foreign countries, especially imports therefrom, in indirect consumption is an important element in researching the development of agricultural sector in a given country. This analysis is possible thanks to the data from the input-output tables, concerning the supply of materials to agriculture from the domestic production and imports. Table 1 shows the volume of imported materials supply to the Polish and German agriculture. In 2005, the imported products for intermediate consumption in agricultural production in Poland were worth about 8.0% (0.9 EUR billion), which was about 2% more than in 2000. In Germany, this share was two times higher and amounted to about 17.0% in 2007 (4.5 EUR billion). Those results point to the much higher import intensity of intermediate consumption in Germany than in Poland. In a detailed analysis of the share of imported products in each component of the intermediate consumption in agriculture, it is possible to notice the fact that both in Poland and in Germany the highest significance of imports could be observed for products from the chemical industry. In Poland in the years under investigation, their share was about 40.0%, whereas in Germany in 2007 more than 60.0% of all fertilisers and crop protection products used by agriculture were imported. In the German agriculture, there was an equally high (about 60.0%) share of imported products, classified in the 'other industries' section (more than 216 EUR million was spent in 2007 on products purchased abroad). It is chiefly related with a higher inflow of imported products made out of rubber and plastics. On the other hand, a significant importance of imports for the intermediate consumption was observed in Poland for products of electrical machinery and means of transport industries (about 30.0% of the total supply from those sectors came from imports in the years under investigation).

As far as the imports of products classified as sectors II and III of agribusiness is concerned, their share in the total value of intermediate consumption in those sectors reached about 5.0% in Poland. On the other hand, in the internal turnover in agriculture in Germany as much as 28.0% of agricultural products were imported in 2007. Also, as far as the products flowing to agriculture from the food industry are concerned, 17.0% of them were imported.

On the basis of the volume of supply of imported materials to agriculture, it is possible to calculate import intensity ratios (the value of imported products used directly by agriculture in relation to the global production of this sector). In the years under investigation, the ratio for Poland was 0.04-0.05[5]. In comparison with the German economy, the share is half as high; in 2007 in Germany it was 0.1. The low import intensity ratio in Poland also points to the smaller importance of imports in the stimulation of agricultural development. It also means that the inflow of progress (new technologies decisive for the modernisation of agriculture) is limited in Poland.

[5] The import intensity ratio comprises only the supply of materials and does not allow for imports of fixed production assets.

The supply of imported materials in the Polish and German food industry

In many aspects the processing of agri-food products is a special sector in each country's economy, which chiefly results from its function of supplying ready food products to people [Rejman & Halicka 2001; Urban 1997]. Apart from agriculture and the branches providing agriculture and the food industry with means of production and services, the agri-food industry is one of the components of agribusiness [Davis & Goldberg 1957; Czyżewski & Helak 1991; Czyżewski 1995; Czyżewski 2001; Woś 1979; Woś 1996a; Woś 1998; Woś 1996b]. It is regarded as one of its main elements and a part of close surroundings of agriculture [Poczta & Mrówczyńska 2002]. The agri-food industry is critical for the effective functioning of food economy as a whole. It is decisive for the effectiveness of connections between its individual sectors [Nieżurawski 1993] and it is regarded as a locomotive for the development of integration processes in the agri-food sector [Grabowski 1995]. In modern food economy, the importance of food industry is constantly growing and assigning it the role of an organiser and integrator of this economy. Obviously, the equivalence of all components in the food economy is unquestionable, but the modern and developed agri-food industry should play the leading and integrating role. The highly industrialised agri-food processing fulfils a stimulating function in agriculture and accelerates its modernisation, which means that agriculture is more and more dependent on this industry. On the other hand, the agri-food industry is also agriculture dependent [Zegar 1973].

The supply of materials to the food industry and agriculture comes from the domestic production and from imports [Table 2]. Both in Poland and in Germany, the importance of imported products in the supply of materials to the food industry is relatively significant. In the years under investigation in Poland, the imports share increased from about 11.0% in 2000 to 12.4% in 2005. On the other hand, in Germany as early as in 1995 the share of imported products in the overall intermediate consumption in food industry was 16.2%, whereas in 2007 it reached almost 20.0%. Similarly to agriculture, these results show that the import intensity of this intermediate consumption in Germany was much higher than in Poland.

In a detailed analysis of the share of imported products in each component of indirect consumption in the food industry, we can notice the fact that in Poland in 2005 the highest significance of imports could be observed in other industries, i.e. fish and fish products (as much as 76.2% of products from this sector of the national economy, which were used in the food industry, were imported[6]). In Germany, this share was also relatively high. In 1995, it reached 43.4%, but since 2000 it was relatively stable and amounted to about 24.0%. There were relatively significant differences in the supply of imported materials to the Polish and German food industries as far as products of the energy industry and metallurgic industry are concerned. In the last year under investigation in Germany, this

[6] The development of fish industry in the first decade of the 21st century is a typical example of the development of those sectors of food industry which do not have their own raw material base. Connections with the EU market in the form of exports of food industry products and imports of raw materials and semi-finished products enabled a very rapid development of this sector of food industry. A similar situation can be observed for the tobacco industry, manufacturing of chocolate products or tea and coffee processing.

share amounted to 20.3% and 35.5% respectively, whereas in Poland the values were 10.7% and 7.3% respectively.

Both in Poland and in Germany, about 40.0% of the total intermediate consumption of products of the chemical industry used in the food industry comes from imports. This value amounts to 30,0% for paper products, paper package and plastics. Additionally, in Poland in 2000 nearly 40.0% of the total consumption within a given branch came from the electrical machinery industry and means of transport (in 2005 this share decreased to about 25.0%). This may prove the fact that in 2000, before Poland's integration with the European Union, there was a higher demand of the food industry for modern electrical machinery or modern imported means of transport.

As far as the imports of agricultural products used in the Polish and German food industry is concerned, their share in the total value of intermediate consumption in the sector III of agribusiness reached about 9.0% in Poland, whereas in 2007 in Germany it was 20% higher and amounted to 29.0%. As far as the internal turnover in food industry is concerned, both in Poland and in Germany imports are relatively significant (about 23.0% of products used in the food industry in Poland and about 30.0% in Germany were purchased abroad).

Table 1. The material supply to agriculture from imports and the share of imports in the intermediate consumption in agriculture in Poland and Germany

Imports by branch	Poland, in				Germany, in					
	2000		2005		1995		2000		2007	
	EUR million	%	EUR million	%	EUR million	%	EUR million	%	EUR million	%
From sector I	395	8.7	571	12.2	2 209	14.3	2 590	15.6	3414	16.4
Fuel and energetic industry	8	1.0	17	2.2	188	13.4	577	29.0	572	25.1
Metal industry	12	10.3	11	6.6	82	22.6	109	30.2	150	31.8
Electromechanical industry	17	30.9	19	32.2	13	19.1	18	31.0	17	31.5
Industry of means of transport	78	26.9	129	28.7	182	20.0	185	25.1	273	22.3
Chemical industry	256	40.1	371	39.3	1 402	54.9	1408	55.1	2 001	61.6
Industry of construction material	3	2.7	5	5.1	75	11.8	66	12.8	102	19.6
Other industry	3	8.6	6	17.1	145	43.8	165	51.7	216	59.2
Services	14	4.2	8	1.5	4	0.1	19	0.3	14	0.2
Trade	-	x	-	x	41	1.4	-	x	-	x
Construction	-	x	-	x	2	0.5	1	0.4	1	0.4
Transport and telecommunication	4	1.8	4	2.2	71	11.7	36	14.9	56	22.5
Forestry	-	x	-	x	4	7.3	6	9.8	12	14.5
Other branches	-	x	-	x	-	x	-	x	-	x
From sector II	192	5.0	195	4.8	107	9.8	261	15.5	336	27.7
From sector III	50	4.1	91	5.2	433	11.8	785	19.4	742	16.7
Total	637	6.7	857	8.2	2 749	13.6	3 636	16.3	4 492	16.9

Source: own calculations on the base of input-output tables for Poland in 2000 and 2005 [Bilans… 2004 & 2009] and for Germany in 1995, 2000 and 2007 [European… 2012].

On the basis of the supply volume of imported material to the food industry, it is possible to calculate import intensity ratios (the value of imported products used directly by sector III of agribusiness in relation to the global production of this sector). In Poland this ratio increased from 0.08 in 2000 to 0.10 in 2005, whereas in Germany it rose from 0.12 in 1995 to 0.15 in 2007. These results point to the fact that foreign trade is an important factor stabilising development of the food sector.

Table 2. The material supply of food industry from imports and the share of imports in the intermediate consumption in food industry in Poland and Germany

Imports by branch	Poland, in				Germany, in					
	2000		2005		1995		2000		2007	
	EUR million	%	EUR million	%	EUR million	%	EUR million	%	EUR million	%
From sector I	490	6.3	920	8.1	2 542	6.7	3 635	8.4	4 686	8.8
Fuel and energetic industry	2	0.4	7	0.7	268	10.9	584	21.3	811	20.3
Metal industry	24	14.0	24	7.3	192	12.0	337	22.1	412	35.4
Electromechanical industry	9	36.0	11	26.2	5	11.4	18	32.1	12	20.0
Industry of means of transport	63	39.1	79	25.1	76	10.0	74	8.9	210	17.2
Chemical industry	84	38.4	177	41.3	305	48.0	467	39.1	595	41.2
Industry of construction material	9	7.1	13	5.6	143	14.8	135	17.5	142	14.9
Other industry	174	22.1	343	27.4	918	18.4	1 206	26.4	1 579	30.0
Services	32	4.6	117	5.9	83	0.6	267	1.5	318	1.5
Trade	-	x	-	x	-	x	68	0.7	-	x
Construction	-	x	-	x	4	0.6	2	0.5	-	x
Transport and telecommunication	60	7.2	49	4.7	261	7.8	345	8.6	436	7.5
Forestry	-	x	3	14.3	-	x	-	x	-	x
Other branches	33	24.6	96	76.2	287	43.4	132	24.9	171	24.1
From sector II	564	9.1	750	9.3	7 518	23.9	8 427	25.9	9 480	29.1
From sector III	1 028	18.8	1 632	22.9	4 524	22.0	5 234	30.0	8 133	30.4
Total	2 082	10.7	3 302	12.4	14584	16.2	17296	18.6	22299	19.8

Source: own calculations on the base of input-output tables for Poland in 2000 and 2005 [Bilans… 2004 & 2009] and for Germany in 1995, 2000 and 2007 [European… 2012].

Conclusions

After a comparison of the significance of imports in the supply of material to the Polish and German agri-food sector, it is possible to state that in the Polish food economy the situation is at an early stage of transformations towards modernity. The internal turnover which chiefly comes from domestic production continues to play in Poland a significant role in the supply of material to agriculture and the food industry. On the other hand, in spite of the low share of internal turnover in agriculture, the share of imports in the supply of material to this sector is much higher in Germany than in Poland. The situation in the food industry looks similar, but the differences are not as significant as in agriculture.

Those results point to the much higher import intensity of intermediate consumption in Germany than in Poland The low import intensity ratio in Poland also points to the smaller importance of imports in the stimulation of agri-food sector development. It also means that the inflow of progress (new technologies decisive for the modernisation of agri-food sector) is limited in Poland. The results of the analysis point to the fact that foreign trade is an important factor stabilising the development of the food sector.

The comparison with the agri-food sector shows the desirable direction of changes in Poland. In Germany, the foreign trade is a much stronger stimulator of the agriculture and food industry development than in Poland. It suggests that the role of imports in the supply of material to the Polish agriculture and food industry should increase. However, it is important that the significance of foreign trade in the Polish agri-food sector is constantly growing and there is a chance that imported products and global processes will have significant influence on further development and modernisation of the Polish agriculture and food industry.

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