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# **Scientific Journal**

**Warsaw University of Life Sciences – SGGW**

# **PROBLEMS OF WORLD AGRICULTURE**

**Volume 16 (XXXI)**

**Number 4**

**Warsaw University of Life Sciences Press  
Warsaw 2016**

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## Poland's Trade in Services with Germany – EU Membership Experience

**Abstract.** Services play an increasingly important role in economies and international trade and are a vital element of building competitive advantage of nations. The aim of the paper is to determine the competitive position of Poland in trade in services with Germany and its changes. The RCA index is used to determine the international competitiveness of services. A special attention is devoted to high-tech knowledge-intensive services due to their potential impact on building competitiveness of all sectors of economy. Germany is a reference country as it is the most important trade partner of Poland. The time scope covers generally years 2004-2014. The analysis revealed that services development is lagged in Poland in comparison with Germany, but there is an ongoing convergence of structures of both economies. The share of high-tech services increased in Poland's services exports, but Poland does not reveal comparative advantage in any of high-tech knowledge-intensive services.

**Key words:** services, knowledge-intensive services, international competitiveness, international trade, RCA, Poland

### Introduction

Services have become the main source of economic output and employment in most economies, whether developed or not. They are also increasingly important in international trade, despite the fact that the share of services in global trade compared to manufacturing is still relatively small. As many services are present at virtually every stage of the supply chains and the links between the services sector and manufacturing are tighter (see more in: Chilimoniuk-Przeździecka, Kuźnar, 2016), they play an increasingly important role in building competitive advantage of individual firms, sectors and whole economies.

Poland, as a market economy, experienced de-industrialisation of its economy and the shift towards services. These changes affect Poland's competitive position in services as well. The aim of this paper<sup>2</sup> is to examine Poland's competitive position in trade in services with Germany and its changes since the time Poland had joined the EU. This is a current and important topic because before 1989 the socio-economic policy was aimed at Polish industrial development, neglecting the role of services in economy. The economic transformation and then the accession to the EU have brought significant changes in this area which are worth examining. In order to determine the international competitiveness of Polish service sector, the RCA index was used. As Germany is the most important trade partner of Poland, it has been chosen as the reference country. The analysis was carried out mainly on the basis of Eurostat and OECD statistics. The time scope covers the years 2004-2014 (or earlier, if the data were not available).

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<sup>2</sup> The project is funded by the National Science Centre of Poland based on decision No. DEC-2013/11/B/HS4/02126.

## **Indicators of competitiveness in international trade**

Increasing role of services in economies and international trade, whether measured traditionally (gross exports) or on the basis of value added (see Kuźnar, 2014) causes the growing interest in research on the competitive position of individual countries in services (e.g. Wörz (2008) investigated Austria's competitive position in services, Mongiało (2007) examined the export specialisation in services of EU member states, Wyszowska-Kunia (2014) analysed Poland's competitiveness in international trade in knowledge-intensive services).

The first problem in any analysis of the competitiveness of countries that a researcher encounters, is the definition of "competitiveness". On the one hand, the microeconomic perspective focuses on interests of individual firms, whose objective is to survive and strengthen their market position vis-à-vis their competitors. On the other hand, the macroeconomic perspective deals with an internal and external balance at the country level (Inal, 2003).

The problem is that at the higher level of aggregation of entities (sectors, regions, nations) it is harder to find and point out common goals of these entities. They tend to have different objectives, thus making it difficult to unambiguously define competitiveness (Wörz, 2008). Lengyel (2004) provided a review of definitions and concepts of competitiveness, focusing on its regional dimension. Concentrating in this paper mainly on the country and the industry level makes interesting the definition provided by Trabold (1995). According to him competitiveness involves the strengthening of four abilities: the ability to sell (goods and services) internationally; the ability to attract resources, in particular foreign direct investment (FDI); the ability to adjust to changing external conditions through structural change and upgrading; and finally the ability to earn, which can be measured by GDP and its growth (Wörz, 2008). The OECD defines competitiveness in international trade as a measure of a country's advantage or disadvantage in selling its products in international markets (OECD, n.d.). It highlights one of the four aspects of competitiveness identified by Trabold (1995), i.e. ability to sell.

Another issue that a researcher is confronted with when investigating the competitiveness is the way of measuring it. There are mainly two possibilities: using input measures or output measures. Input measures address factors determining competitiveness, such as cost and price factors (e.g. wages, export unit values, factorial or price terms of trade) and output performance (e.g. labour and capital productivity). The output measures investigate country's performance on export markets. The popular ways of measuring such performance is revealed comparative advantage, the size of market shares and their evolution over time (Wörz, 2008). Some other measures of good national trade performance suggested in the literature are: a shift in export composition toward higher value added or high-technology products; and current account surplus (McFetridge, 1995). There are also multidimensional indicators combining the two approaches (composite competitiveness indicators) (Wyszowska-Kunia, 2014).

In this paper, Poland's trade in services with Germany is analysed through the perspective of international competitiveness, which is understood as the ability to sell services at foreign markets. It is quantified with the output measures, such as:

- market shares in exports and imports of services, total and at industry level;

- export composition with special attention to high-tech knowledge intensive services;
- evolution of market shares over time;
- balance of trade in services;
- revealed comparative advantage (RCA).

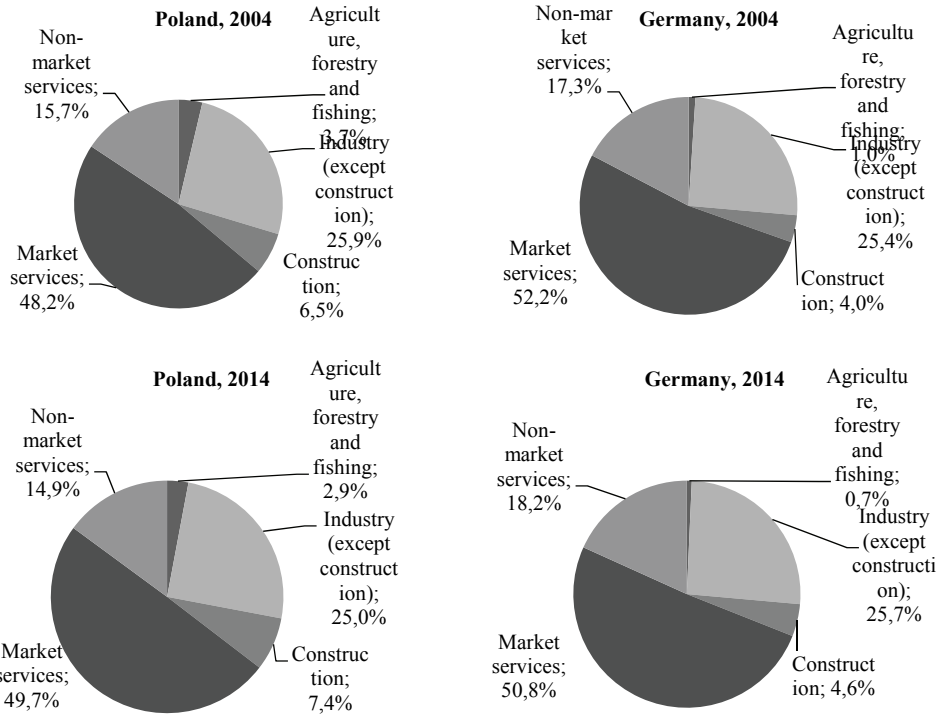
### **Services sector in economies of Poland and Germany as compared to the EU**

Since 2004 the structure of value added has not changed significantly in Polish economy. Services then and now account for the largest share of value added, followed by industry and agriculture. Similarly to advanced European economies, the role of agriculture and industry in Polish economy has decreased. However, the share of agriculture in Poland is still significantly higher than in Germany. On the other hand, the share of industry (construction excluded) is similar and relatively high in both economies, reaching around 25%, which is more than the EU average (19%). There is a much larger share of construction in Polish than in German value added. Another difference is that non-market services<sup>3</sup> account for a larger part of value added in Germany than in Poland, whereas there is virtually no difference when it comes to market (or commercial) services (i.e. services that are traded in markets)<sup>4</sup> (fig. 1).

More disaggregated data show that financial and insurance services as well as information and communication constitute a larger share of value added in Germany than in Poland (see figure 2). At the same time, in both these sub-sectors, a higher average annual growth rate was observed in Poland. What may seem a bit surprising, a relatively high share of professional, scientific and technical activities (i.e. business services) is observed in Polish GDP as compared to the German one and – given the growth rate in both countries – this distance is likely to grow. What is more, business services in the EU account on average for the larger share of value added than in Poland, which also indicates a relatively low level of development of this sub-sector in German economy. The dominant contribution of wholesale and retail trade, transportation, accommodation and restaurants in value added in both countries does not indicate the low level of development of services in their economies. Such a feature is regarded as typical for both developing and developed economies (Growiec *in.*, 2014).

<sup>3</sup> Services provided to the community as a whole free of charge, or to individual consumers either free of charge or at a fee which is well below 50 per cent of production costs. They are produced by government, private non-profit institutions serving households and by private households who employ domestic staff (OECD, n.d.).

<sup>4</sup> According to the Classification of Economic Activities based on NACE rev. 2 the industry sector covers the following activities: mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management and remediation activities; construction. Market services include: wholesale and retail trade, repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities; information and communication; financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities; arts, entertainment and recreation; other service activities; activities of households as employers, undifferentiated goods- and services-producing activities of households for own use; activities of extraterritorial organisations and bodies. Non-market services are the following: public administration and defence, compulsory social security; education; human health and social work activities.



Note: sectors according to NACE rev. 2

Fig. 1. Value added by industry in Poland and Germany, 2004 and 2014 (current prices, million euro)

Source: own work based on Eurostat.

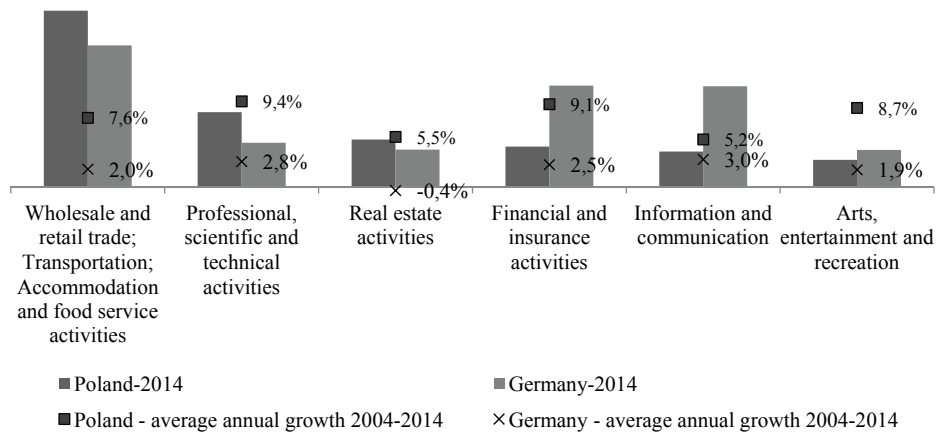
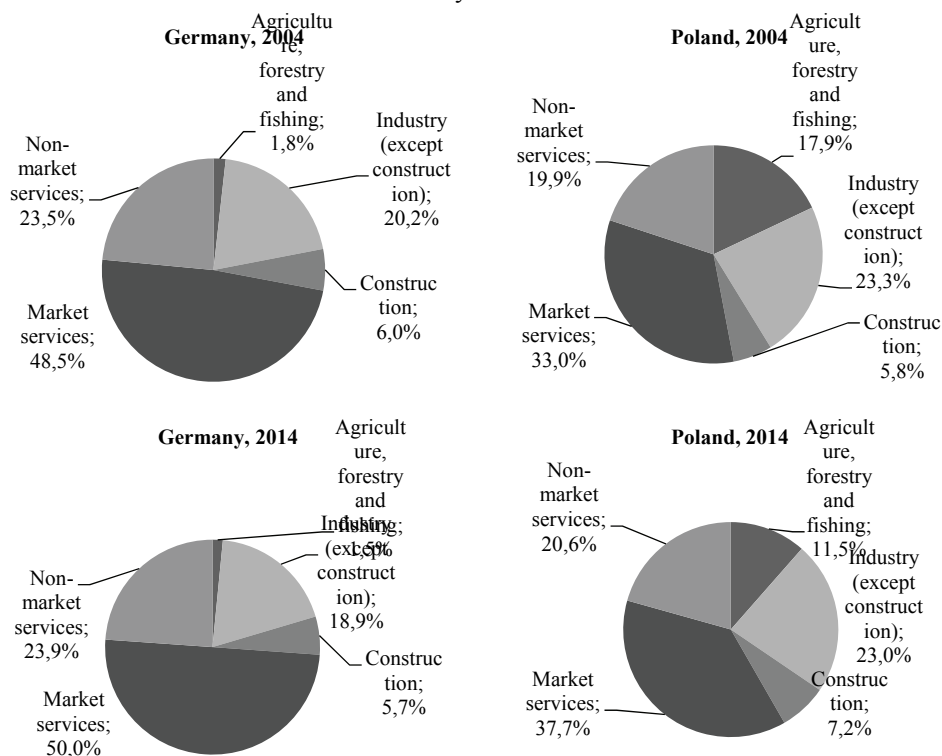


Fig. 2. Contribution of market services to value added in Poland and Germany and average annual growth, 2004-2014 (current prices, million euro)

Source: own work based on Eurostat.

Much greater differences between the two countries exist in the structure of employment (Figure 3). In Poland, in contrast to Germany and the EU, much of the labour force is still employed in agriculture. In 2014 it was 11.5% of total employment (compared to 5% in the EU and 1.5% in Germany). However, a positive trend of declining share of agriculture in employment is observed for the benefit of the service sector. The share of persons employed in industry remains stable, reaching approx. 23% in Poland, whereas it was 15.6% in the EU and 18.9% in Germany.



Note: sectors according to NACE rev. 2

Fig. 3. Employment by industry in Poland and Germany, 2004 and 2014

Source: own work based on Eurostat

The share of employed in market services in Poland reached 37.7% in 2014. Another 20.6% of total labour force were employed in non-market services. Altogether the services accounted for 58.3% of employed persons. These figures are much less than in Germany, where the corresponding values were 50%, 23.9% and 73.9%. Given the similar share of services in valued added in Poland and Germany and differences in the structure employment, further investigation is needed as how to explain the relatively high share of services per employee in Poland (the usual reason – relatively higher labour productivity – seem to be questionable, especially if years of underinvestment in service sector in Poland is taken into account).

## **The role of knowledge-intensive services in economies of Poland and Germany**

Due to the role played in improving the competitiveness and innovativeness of countries, a specific services sub-sector that can be distinguished and subject to a more detailed analysis is knowledge-intensive services (KIS). These services are considered to be the most dynamic components of services sub-sectors in most industrialized countries (Strambach, 2001) and are essential to the development of knowledge-based economy (Muller, Zenker, 2001). In turn, transforming the EU economies into smart, sustainable and inclusive economies based on knowledge and innovation is the aim of the Europe 2020 strategy (Europe 2020, 2010).

Knowledge-intensive services are regarded as activities that rely heavily upon professional knowledge and either are themselves primary sources of information and knowledge or use knowledge, technology and highly-skilled professionals to provide services for their clients. They are not only users but also providers of knowledge and technology, which explains their importance in improving competitiveness of businesses and whole economies.

Eurostat classifies an activity as knowledge intensive if employed tertiary educated persons represent more than 33% of the total employment in that activity<sup>5</sup> (Eurostat, n.d.). In addition, Eurostat also distinguishes high-technology knowledge-intensive services (hereinafter referred to as: high-tech KIS), which include<sup>6</sup>:

- motion picture, video and television programme production, sound recording and music publishing activities;
- programming and broadcasting activities;
- telecommunications;
- computer programming, consultancy and related activities;
- information service activities;
- scientific research and development.

The Eurostat data on employment in knowledge-intensive sectors by level of education indicates that in 2014 on average 64% of employed in high-tech KIS in EU-28 completed at least first or second stage of tertiary education, whereas in case of total KIS the corresponding number reached 52%<sup>7</sup>. Due to unusually high graduate-intensity in high-tech KIS, the relation between the level of production of high-tech KIS and the competitiveness of countries seems to be relatively stronger than in case of remaining KIS, therefore they are further analysed in more detail.

The share of high-tech KIS in both Polish and German economies is quite limited. In case of value added it does not exceed 5% and in employment it is less than 3% (table 1). There are no significant differences in favour of Germany, which might have been

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<sup>5</sup> According to Eurostat, knowledge-intensive market services (excluding financial intermediation and high-tech services – see below) include: water transport; air transport; legal and accounting activities; activities of head offices, management consultancy activities; architectural and engineering activities; technical testing and analysis; advertising and market research; other professional, scientific and technical activities; employment activities; security and investigation activities.

<sup>6</sup> [http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge-intensive\\_services\\_\(KIS\)](http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge-intensive_services_(KIS)) (date of access: 10.07.2016).

<sup>7</sup> [http://ec.europa.eu/eurostat/web/products-datasets/-/htec\\_emp\\_niscsd2](http://ec.europa.eu/eurostat/web/products-datasets/-/htec_emp_niscsd2) (date of access: 10.07.2016).



expected. Moreover, during the years 2004-2014 the share of employed in high-tech KIS in Poland increased by 0.7 p.p. whereas in Germany it has increased only by 0.2 p.p. Opposite situation is observed in statistics regarding the value added – Poland has experienced a slight decrease of the share of high-tech KIS in value added (by 0.3 p.p.) while Germany noted small increase of this share (by 0.2 p.p.).

Table 1. Share of high-tech knowledge intensive services in value added and employment, Poland and Germany

	2004		2014	
	Germany	Poland	Germany	Poland
Value added in high-tech KIS, million euro	99763	7997	130870	14882
including NACE rev. 2 services:				
Motion picture, video, television programme production; programming and broadcasting activities	13.0%	13.4%	11.8%	12.1%
Telecommunications	37.3%	58.1%	20.0%	31.2%
Computer programming, consultancy, and information service activities	35.9%	19.2%	53.0%	42.9%
Scientific research and development	13.8%	9.2%	15.2%	13.8%
<i>Share of high-tech KIS in total value added</i>	<i>4.8%</i>	<i>4.4%</i>	<i>5.0%</i>	<i>4.1%</i>
Employment in high-tech KIS, thousand persons	1 023	220	1 207	355
including NACE rev. 2 services:				
Motion picture, video, television programme production; programming and broadcasting activities	11.8%	15.5%	10.9%	12.7%
Telecommunications	19.4%	38.4%	10.4%	28.2%
Computer programming, consultancy, and information service activities	54.5%	27.1%	62.1%	48.9%
Scientific research and development	14.3%	19.0%	16.7%	10.2%
<i>Share of high-tech KIS in total employment</i>	<i>2.6%</i>	<i>1.6%</i>	<i>2.8%</i>	<i>2.3%</i>

Source: own work based on Eurostat.

There were more significant changes in the internal structure of these services in Poland. The share of telecommunications in value added in high-tech KIS fell by almost a half, but it is still relatively high in comparison with Germany (31,2% share in value added in Poland in 2014 was almost as big as it was in Germany ten years earlier). Positive changes occurred with regard to computer programming, consultancy, and information service (hereinafter referred to also as: IT) as well as in case of R&D activities. The share of IT in value added in high-tech KIS more than doubled (from 19.2% to 42.9%), narrowing the gap between their role in Polish and German economy. Poland has also improved its position in the share of R&D services in value added in the last 10 years, reaching the level of 13.8% (which is 1.4 p.p. less than in Germany and 4.6% more than it was in Poland in 2004). The last high-tech KIS sub-sector, motion picture, video, television programme production; programming and broadcasting activities did not experience significant changes.

The shift in the structure of value added was accompanied by corresponding changes in employment in Poland. There was a growing share of employed in IT services, and decreasing share – in all remaining services listed in table 1. Whereas it was somehow expected in case of telecommunications and motion picture..., etc., it may be surprising when it comes to R&D as we observed the growing share of R&D in value added. This result may indicate increasing productivity of employees in this sub-sector.

To sum up, there is a process of gradual of convergence of structures of value added and employment in high-tech services in both analysed countries indicating increasing innovativeness and competitive abilities in Poland.

### The role of services in international trade of Poland

The position of Poland in international trade in services is quite modest. Poland is the 29<sup>th</sup> world exporter and 31<sup>st</sup> world importer of commercial services, with shares of 0.97% and 0.75% respectively (WTO, 2015). Germany, on contrary, is the main exporter and importer of services, with respectively 4<sup>th</sup> and 3<sup>rd</sup> position in the world. At the same time, the value of exports of services in relation to total merchandise and services exports (18.2%) and to GDP (8.7%) is larger in Poland than in Germany (14.8% and 6.9%, respectively). It indicates that the level of internationalisation of services in Poland is relatively high.

Table 2. Exports of commercial services per capita, EU-28 and selected member states (euro and percentages)

Country/region	2004	2013*	Percentage change 2013/2004
Poland	281	794	182
Czechia	757	1602	112
Slovakia	556	1034	86
Hungary	851	1626	91
Germany	1355	2717	101
EU-28	1742**	2982	71

\* Data for 2014 is not available.

\*\* 25 member states.

Source: own work based on Eurostat.

One of the measures of international competitive position of countries is the value of exports per capita. Comparison of the values of exports of services per capita in Poland and Germany, as well as in other Central European countries (table 2) leads to the conclusion that the competitive position of Poland is low, both in relation to more advanced countries and countries which in past also experienced the period of neglecting role of services in their economies. However, the most dynamic increase of exports per capita occurred in Poland, therefore the distance to other countries in 2013 was smaller than in 2004.

### Geographical and sectoral structure of Poland's trade in services

The main foreign market for services from Poland is the EU. In 2014 the total value of services exported to the EU was 25.5 billion euros, which accounted for over 70% of Poland's exports of services (OECD 2015). It is facilitated by close geographical and cultural distance – especially that provision of many services requires simultaneous interaction between the provider and the customer – accession to the EU and implementation of so-called Services Directive (2006). Apart from these institutional aspects, there is no doubt that Polish enterprises had to adapt their offer in order to meet requirements on the demanding markets of more developed EU countries.

The largest Polish EU partner is Germany. In 2014 Poland exported to this country 35% of services directed to the EU-28 market (figure 3). However, its share is systematically decreasing. In 2004 Germany purchased 55% of Polish services sold in the EU. The EU is also the main provider of services to Poland. In 2014 the combined share of imports from all EU member states reached 78%. Germany accounted for 28% of Poland's imports from the EU.

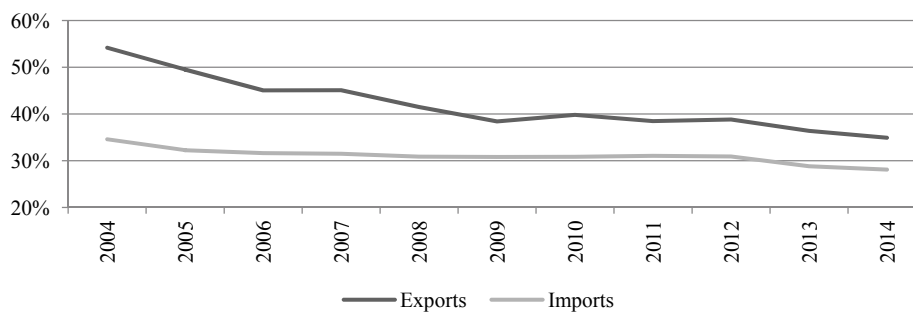


Fig. 3. Share of Germany in Poland's trade in services with the EU-28 (EU-28=100%)

Source: own work based on OECD. Datasets: EBOPS 2002 and EBOPS 2010 - Trade in Services by Partner Country.

The trade balance in services with the EU and Germany is positive. The surplus with Germany is the largest among EU members, reaching 2822 million euro in 2014, and it is increasing (with the exception of 2009 – see figure 4), which is a positive trend from the perspective of competitive position of Poland in trade in services.

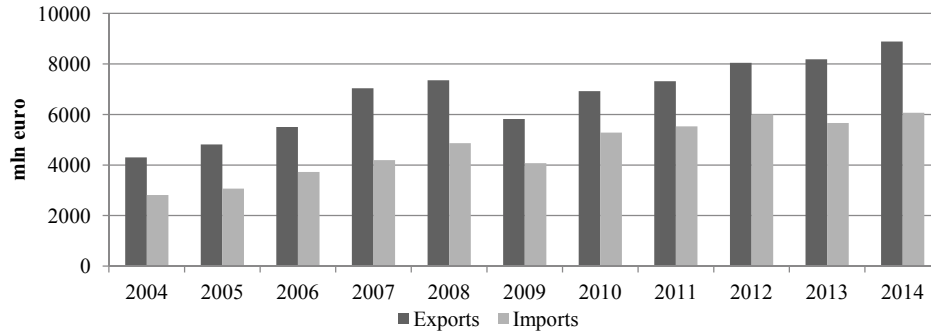


Fig. 4. Poland's trade in services with Germany, 2004-2014

Source: own work based on OECD. Datasets: EBOPS 2002 and EBOPS 2010 - Trade in Services by Partner Country.

There were substantial changes occurring in the sectoral structure of Poland's exports of services to Germany. In 2004 the most important service sub-sectors in exports were travel (62%) and transport (20%). The share of travel in exports of services to Germany was exceptionally high, as exports of this sub-sector to the EU at that time accounted for much less, i.e. 44% of Poland's services exports.

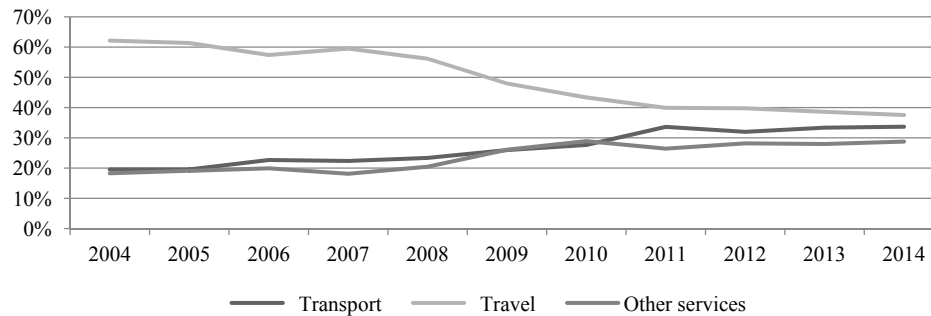


Fig. 5. Sectoral structure of Poland's exports of services to Germany, 2004-2014

Source: own work based on OECD. Datasets: EBOPS 2002 and EBOPS 2010 - Trade in Services by Partner Country

As of today the structure of services exports to Germany and the EU is similar. In 2014 travel was still at the first position, with much lower share than 10 years earlier (38%). The second place was taken by transport (34%) and the lowest share was recorded in other services (29%). The high share of travel services is due to the popular at the cross-border area phenomenon of crossing the border for the purpose of purchasing goods and services. These are the so-called one-day trips, which by definition are also treated in the balance of payments statistics as travels.

Some favourable changes in the internal structure of other services' exports to Germany occur. Construction services have traditionally been important in exports to Germany. Recently they were responsible for 17% of other services exports, but a sharp

decline was observed (from 35% in 2004). There is an increasingly strong positive contribution of other business services to other services exports. In 2014 this category of services accounted for 60% of other services exports, while ten years earlier it was 44%. The most striking change is the increased share of computer services exports from 3% of other services exports in 2004 to 16% in 2014. Since the last two mentioned categories represent important knowledge-intensive activities, the increased shares in exports indicate positive trend.

### **The role of knowledge-intensive high-tech services in Poland's foreign trade**

The Eurostat data indicate that the role of high-tech knowledge intensive services in Poland's trade in services with Germany increases, both in exports and imports. In 2004 the total share of this sub-sector accounted for 2.8% of exports of services to Germany, while in 2012 this share increased to 5.1%. In imports the respective numbers were 4.8% and 7.2%.

During the analysed period of time, a significant increase of exports of IT services in exports of high-tech KIS was noted (from 18.1% to 70.4%) at the expense of telecommunications (decrease from 57% to 16.4%). Unfavourable situation is observed in case of R&D services, as their role in high-tech KIS exports dropped from 22.1% in 2004 to 12% in 2012 (table 3). However, it is worth to note that many German companies establish R&D centres in Poland and provide services locally (e.g. Volkswagen in Poznan, Siemens in Wroclaw).

As many services are key inputs increasing efficiency in all other sectors of the economy, analysis of imports of high-tech KIS is also important in the study on the competitiveness of Poland's trade in services. Similarly to the situation observed in exports, a dynamic increase of imports of computer and information services (from 34.5% to 67%) was noted in parallel with a high decrease of telecommunications (from 49.5% to 19.5%), and a slight decrease of R&D and audiovisual services in imports of high-tech KIS from Germany.

Poland recorded a deteriorating trade balance in high-tech KIS with Germany. In 2012 the deficit was observed in all categories but R&D. The relatively poor performance of Poland in high-tech KIS does not necessarily give cause for concern, as their imports may be a valuable supplement for domestic offer and they may enhance competitive position of Poland in future.

Table 3. The role of high-tech knowledge intensive services in Poland's trade in services with Germany, million euro and percentages

		Telecommuni- cations	Computer and information	Research and development	Audio-visual and related	High-tech KIS
2004	Exports	68.9	21.9	26.7	3.3	120.8
	Share in exports of high-tech KIS	57.0%	18.1%	22.1%	2.7%	100%
	Imports	66.3	46.2	17.2	4.2	133.9
	Share in imports	49.5%	34.5%	12.9%	3.1%	100%

	of high-tech KIS					
	Net exports	2.7	-24.3	9.5	-0.9	-13.0
2012*	Exports	60.7	261.0	44.4	4.5	370.6
	Share in exports of high-tech KIS	16.4%	70.4%	12.0%	1.2%	100%
	Average annual growth 2004-2012	-1.6%	36.3%	6.6%	4.0%	15.0%
	Imports	80.3	276.0	43.3	12.4	412.0
	Share in imports of high-tech KIS	19.5%	67.0%	10.5%	3.0%	100%
	Average annual growth 2004-2012	2.4%	25.0%	12.2%	14.5%	15.1%
	Net exports	-19.6	-15.1	1.2	-7.9	-41.3

\* Data for 2013 or 2014 not available.

Source: own work based on Eurostat.

### Poland's competitive position in services as revealed by trade flows with Germany

In this paper, David Ricardo's principle of comparative advantage is applied for the analysis of competitiveness in services. Relative advantage of countries arises from lower opportunity costs in the production of goods or services due to differences in endowments (e.g. natural resources, labour, capital, human capital), different technologies, legal and institutional differences, etc. As these are difficult to measure, Balassa (1965) used trade flows to draw conclusions on the underlying factors that determine competitiveness<sup>8</sup> (Wörz, 2008). The Balassa's RCA index (hereinafter also Balassa Index, BI) was designed to analyse merchandise trade flows only, but there are no reasons to exclude it from using with respect to services trade (except the fact that services trade flows are more difficult to measure).

A nation's RCA can be calculated on an industry basis or for disaggregated products. The RCA for country *i* in product/sector *j* is defined by the following formula:

$$BI_{ij} = RCA_{ij} = \frac{[(\text{exports of product/sector } j \text{ by country } i) / (\text{world exports of product/sector } j)]}{[(\text{total exports of country } i) / (\text{total world exports})]} \quad (1)$$

The index measures a country's exports of a product or sector relative to its total exports and to the corresponding export performance of group of countries. If  $RCA > 1$ , then a comparative advantage is revealed. There are several suggestions which modify and overcome shortages of the original Balassa's formula<sup>9</sup>. In this paper, a symmetric RCA

<sup>8</sup> RCA has been applied to measure competitiveness at the industry and nation level [Porter, 1990] and is now widely used as the competitiveness indicator.

<sup>9</sup> The Balassa's Index has been criticised for several shortcomings: incomparability across time and space, which originates from its asymmetry (the BI values fall on between zero and infinity with the comparative-advantage-

index as proposed by Dalum et al. (1998) is used. It is called the symmetrical revealed comparative advantage (SI). The SI index is calculated as follows:

$$SI_{ij} = \frac{BI_{ij} - 1}{BI_{ij} + 1}, \text{ where:} \quad (2)$$

$$BI_{ij} = RCA_{ij} = \frac{X_{ij} / X_{ik}}{X_{nj} / X_{nk}} \quad (3)$$

where:  $X_{ij}$  represents exports of product/sector  $j$  from country  $i$ ,  $X_{nj}$  represents exports of product/sector  $j$  from the world or reference group of countries  $k$ . SI ranges from -1 to +1. When SI is above 0, country  $i$ 's competitiveness in product  $j$  is greater than its average competitiveness. In other words, country  $i$ 's comparative advantage in this product is revealed.

In this paper the numerator represents the percentage share of a given service sector in Poland's total services exports to Germany. The denominator represents the percentage share of a given service sector in total services exports of EU-27 (without Germany) to Germany. As a result the index shows competitiveness of Poland at German services market compared to the position of EU-27 countries in Germany (this interpretation is based on the study by (Hagemejer, Michałek, Michałek, 2008, p. 11)).

The results of calculations of the symmetric revealed comparative advantage index in Poland's trade in services with Germany are presented in table 4.

Table 4. Revealed Comparative Advantage of Poland in trade in services with Germany, 2004-2012

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Transportation	0,11	0,08	0,12	0,13	0,11	0,17	0,17	0,26	0,25
Travel	0,19	0,19	0,19	0,23	0,21	0,15	0,14	0,10	0,10
Other services	-0,37	-0,37	-0,36	-0,42	-0,37	-0,27	-0,24	-0,27	-0,26
Communications services	-0,03	-0,29	-0,30	-0,27	-0,32	-0,03	-0,06	-0,06	-0,15
Construction services	0,64	0,66	0,67	0,63	0,67	0,65	0,63	0,63	0,65
Financial services	-0,70	-0,79	-0,87	-0,85	-0,81	-0,68	-0,79	-0,82	-0,78
Computer and information services	-0,78	-0,74	-0,66	-0,72	-0,71	-0,66	-0,39	0,02	-0,38
Royalties and license fees	-0,80	-0,92	-0,67	-0,83	-0,93	-0,79	-0,77	-0,75	-0,84
Other business services	-0,26	-0,16	-0,15	-0,26	-0,17	-0,04	-0,05	-0,11	-0,07
Personal, cultural and recreational services	-0,27	-0,29	-0,22	-0,26	-0,24	0,02	0,30	0,40	0,16
High-tech KIS:									
Telecommunication services	0,20	-0,03	-0,07	-0,08	-0,27	-0,02	-0,04	-0,07	-0,03
Computer and information	-0,78	-0,74	-0,66	-0,72	-0,71	-0,66	-0,39	0,02	-0,38

neutral point being 1), unstable mean across time and space, and aggregation effect (the BI varying depending on the aggregation level of countries or reference groups) (Sanidas, Shin, 2010).

services									
Research and development services	0,04	-0,21	-0,47	-0,59	-0,55	-0,46	-0,48	-0,54	-0,50
Audio-visual and related services	-0,55	-0,24	-0,47	-0,35	-0,62	-0,49	-0,20	-0,43	-0,49

Notes: insurance services have been excluded since in some cases exports takes negative value which cannot be taken into account in the symmetric RCA index. The possibility of negative value results from the way the value of insurance services is expressed. In general, it is the margin between charged premiums and paid claims.

Source: own work based on Eurostat.

Compared to other EU member states a comparative advantage of Poland in 2012 at German market was revealed in transportation, travel, construction and personal, cultural and recreational services. Among transportation services, the RCA was positive and relatively high in rail transport (freight on rail only), road transport (freight and passenger on road) and pipeline transport, which can be explained by Poland's geographical position as a transit country. In travel services Poland recorded high RCA in health-related personal travels (0.72 in 2012), which indicates not so much the tourist attractiveness of Poland but rather lower costs of health services. The largest revealed comparative disadvantage was recorded in royalties and license fees, financial services, and in all high-tech knowledge intensive services. The situation in IT services is ambiguous, as since 2004 there was an increasing specialisation in exports of these services and a positive RCA value in 2011, but in 2012 the RCA fall below zero again. The opposite trend occurred in R&D – in 2004 Poland benefited from RCA equalling 0.04, whereas in 2012 RCA fell to -0.50.

## Conclusions

The analysis of Poland's trade in services with Germany carried out in this paper shows that Poland is still affected by the underinvestment in the service sector in the years before political and economic transformation. However, the growing convergence of employment and value added structures between Poland and Germany is also well visible, indicating a positive direction of changes. Since 2004, when Poland joined the EU, substantial changes in the structure of Poland's exports were observed. They are to a lesser extent reflected in the structure of services exports to Germany, which is still dominated by travel and transport services. Both of them and additionally construction services are among categories in which Poland recorded revealed comparative advantage. The share of high-tech services increased in Poland's services exports, but Poland does not reveal comparative advantage in any of high-tech KIS. The conclusive assessment of changes in RCA is not possible. Some of them are positive, as for example the decreasing disadvantage in computer and information services or other business services, and others are negative as in case of R&D and telecommunications, with initial advantage transformed into disadvantage, or travel services with decreasing revealed comparative advantage. Further investigation would be needed to explore the specific reasons of low values of RCA in high-tech KIS, royalties and license fees, financial services, but one reason might be insufficient amounts and quality of human capital, which is a particularly important factor of provision of these services. The relatively weak position of Poland in trade in these services may have negative effects with regard to building competitive position in all other



sectors of the economy but it may also be positive as imported services are important inputs in all sectors, enhancing their innovativeness and competitiveness.

## References

- Balassa, B. (1965). Trade Liberalisation and “Revealed” Comparative Advantage, *Manchester School of Economic and Social Studies*, Vol. 33, Is. 2, May, 99–123.
- Chilimoniuk-Przeździecka, E., Kuźnar, A. (2016). Znaczenie usług w globalnych łańcuchach wartości, *Gospodarka Narodowa*, Nr 5/2016.
- Dalum, B., Laursen, K., Villumsen, G. (1998). Structural change in OECD export specialisation patterns: de-specialisation and 'stickiness', *International Review of Applied Economics*, Nr 12, 423-443.
- Europe 2020 (2010). A European strategy for smart, sustainable and inclusive growth. COM(2010) 2020, <http://ec.europa.eu/eu2020/pdf/COMPLETE%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf> [Access: March 2016].
- Eurostat [n.d.]. Aggregations of Knowledge Intensive Activities based on NACE Rev. 2, [Available at:]: [http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec\\_esms\\_an8.pdf](http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an8.pdf) [Access: July 2016].
- Hagemejer, J., Michałek, J. J., Michałek, T. (2008). Uwzględnienie rynku wewnętrznego UE: skutki liberalizacji w sektorze usług. Ekspertyza wykonana na zamówienie UKIE.
- Ínal, G.A. (2003). A study into competitiveness indicators. November. [Available at:]: [http://ref.sabanciuniv.edu/sites/ref.sabanciuniv.edu/files/inal\\_makale\\_0.pdf](http://ref.sabanciuniv.edu/sites/ref.sabanciuniv.edu/files/inal_makale_0.pdf) [Access: November 2016].
- Kuźnar, A. (2014). Wartość dodana w międzynarodowym handlu usługami (in:) A. Budnikowski, A. Kuźnar (eds.), Nowe procesy w gospodarce światowej. Wnioski dla Polski, Oficyna Wydawnicza SGH, Warszawa.
- Lengyel, I. (2004). The Pyramid Model: Enhancing Regional Competitiveness in Hungary, *Acta Oeconomica*, Vol. 54, No. 3, 323-342.
- McFetridge, D. G. (1995). Competitiveness: concepts and measures. *Occasional Paper Number 5*. Industry Canada.
- Mongiolo, D. (2007). Specjalizacja eksportowa krajów UE w międzynarodowym handlu usługami, *Studia Europejskie*, Nr 3, 99-125.
- Muller, E., Zenker, A. (2001). Business services as actors of knowledge transformation: the role of KIBS in regional and national innovation systems. *Research Policy*, Vol. 30, 1501-1516.
- Growiec, J., Gradzewicz, M., Hagemejer, J., Jankiewicz, Z., Popowski, P., Puchalska, K., Strzelecki, P., Tyrowicz, J. (2014). Rola usług rynkowych w procesach rozwojowych gospodarki Polski, *Materiały i Studia* nr 308, NBP.
- OECD. [n.d.]. Glossary of statistical terms. [Available at:] <https://stats.oecd.org/glossary/> [Access: November 2016].
- OECD. [2015], OECD.stat, Dataset: EBOPS 2010 - Trade in services by partner country. [Available at:] <http://stats.oecd.org/> [Access: April 2016].
- Porter, M. (1990). *The Competitive Advantage of Nations*. New York, The Free Press.
- Sanidas, E., Shin, Y. (2010). Comparison of Revealed Comparative Advantage Indices with Application to Trade Tendencies of East Asian Countries. Seoul: Department of Economics, Seoul National University.
- Services Directive (2006). Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market. OJ L 376, 27.12.2006.
- Strambach, S. (2001). Innovation Processes and the Role of Knowledge-Intensive Business Services (KIBS). *Innovation Networks*. Vol. 12 of the series Technology, Innovation and Policy, 53-68.
- Trabold, H. (1995). Die internationale Wettbewerbsfähigkeit einer Volkswirtschaft, *DIW-Vierteljahresheft* No. 2, Berlin, 169-183.
- Wörz, J. (2008). Austria's Competitiveness in Trade in Services. *FIW Research Report*. Nr 003. June.
- WTO 2015, Services Profiles 2015. [Available at:]: [https://www.wto.org/english/res\\_e/booksp\\_e/serv\\_profiles15\\_e.pdf](https://www.wto.org/english/res_e/booksp_e/serv_profiles15_e.pdf). [Access: April 2016].
- Wyszkowska-Kunia, J. (2014). Competitiveness in International Trade in Knowledge-Intensive Services – The Case of Poland. *Comparative Economic Research*. Vol. 17, No. 2, 79-100.