GLOBAL VALUE CHAINS: POSITION OF POLISH ECONOMY

Marlena Gołębiowska[1]

Abstract

The processes of internationalization and fragmentation of production significantly increase importance of global value chains in the world economy. These economic links may be a way for the international expansion for local companies and individual economies. This article analyses the position of the Polish economy in the context of global value chains. The analysis used sources: OECD-WTO Trade in Value Added Database (TIVA). In the years 1995–2011, a significant increase of foreign value added's involvement in Polish gross export was detected, which suggests a growing participation of Polish economy in the global value added chains.

Key words: global value chains, foreign trade, innovation.

JEL Classification: F14, F15, F62.

1. Introduction

At a time of progressing globalisation and an increasing degree of internationalisation of national economies, the occurrence of fragmentation of production processes intensifies. The source literature illustrates such phenomenon by using a well-known example of an "American" car whose value generated in the United States amounted to only 37%. Design services, assembly, components and parts production as well as advertising, marketing and data processing were entrusted to specialists from eight other countries (WTO, 1998). Distributing production processes within not only one country but on the international scale as well, implicates changes in competitive position of not only local companies but also the whole economies. In a situation where international trade and movement factors of production lack essential obstacles, the issue of global competition has to be faced. At the same time, it is because of these

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changes that countries are able to increase their involvement in global value chains (GVC) and, by turn, become more competitive (Taglioni, Winkler, 2016).

The global value chains are a concept allowing the analysis of the international division of production, which goes beyond the traditional production of goods and encompasses the whole cycle of a product's life. The analysis of international expansion and fragmentation processes within GVC focuses on the issues in creating value, beginning from the concept of a product until the final application and attributing a suitable part of value added included in the final product to different countries (Taglioni, Winkler, 2016).

The previous way of measuring international trade made analysing the data based on added value impossible. The main issue was trade statistics which regarded all products as final goods (Koopman, Powers, Wang, Wei, 2010). It can be explained using above-mentioned example of an "American" car. In a situation where the car is sold outside of country, the total value of export is assigned to the United States despite only the 37% of it having been produced domestically. Said example illustrates that the traditional measurement of trade implicates the magnitude of export being overvalued due to the repeated reckoning of raw materials, semi-finished goods, subassemblies or services production value. Therefore, the role of the country which produces final goods and the value of international trade are being overestimated (UNCTAD, 2013). According to R.C. Johnson and G. Noguer (2012), the size of production within international trade based on final values may be, depending on the country, higher than the actual one by 3% and even 50%. Thus, it was necessary to develop methods to measure international trade that would allow to display the value of domestic production factors expenditure with the exclusion of contribution from other countries. In other words, it was essential to pinpoint the part of country's export not coming from semi-finished goods and services imported beforehand (Kuźniar, 2014).

The breakthrough happened in the past few years and, at present, a few databases that allow the analysis of trade based on added value are accessible. One of them, which has been created by The Organisation for Economic Co-operation and Development (OECD) and The World Trade Organization (WTO), is the Trade in Value Added (TiVA) database. The newest version dated October 2015 includes selected years from the 1995–2011 period. It presents the data of 61 countries (including Poland) as well as the aggregated statistics of main integrational groups and the entire world.

Having suitable tools at disposal, it is advisable to have a closer look at global value chains from Poland's perspective. The purpose of this article is to analyse the scale of involvement of foreign components in domestic production, the scale of involvement of domestic components in foreign production as well as to determine Poland's place within global added value chains. Present article shall cover all of the mentioned issues.

2. Added value in Poland's export

The main measurement which allows to evaluate the scale of involvement of foreign components in domestic production is the contribution of foreign added value in gross export. It is the so-called relations up the value chain (Amroziak, Marczewski, 2014).

As per data from OECD, the relevance of foreign added value in Polish export is relatively high. In the years 1995–2011 the rate was higher in Poland than the average in OECD countries and in countries from the European Union (with the exception of the year 1995) (see table 1).

Table 1. Foreign value added share of gross exports for Poland, OECD member countries and EU28 in 1995–2011, percentage

Countries \ Years	1995	2000	2005	2008	2009	2010	2011
Poland	16.1	24.0	28.3	31.1	27.1	31.3	32.4
EU28	19.2	23.5	24.4	27.6	24.5	26.4	28.2
OECD member countries	15.0	18.1	20.8	24.6	21.2	22.5	24.3

Source: own compilation based on: OECD (2015)

In the years 1995–2011, Poland's (as well as EU28 countries and OECD) foreign value added content of its gross export was characterised by increasing tendency. In 2009, which was an exception, the rate fell as compared to the previous year. It happened as a result of global crisis which impacted international trade in a strong and negative way and was reflected in foreign value added of respective countries as well (Białowąs, 2016). Relatively good state of Polish economy at that time, which was the only country in European Union that didn't suffer the consequences of recession, didn't translate into the changing of foreign sector's position in Poland. It could be observed by the decrease of foreign value added involvement in Polish export by 13% in 2008 as compared to the previous year (see Fig 1).

It is also worth to analyse the development of foreign value added in Poland's gross export as compared to respective EU countries. In 2011 (the most actual data from OECD) the rate was substantially diverse, amounting to, depending on the country, from 20% to 59%. A relatively small share of imported components and subassemblies characterised export of the Netherlands, Croatia, Cyprus and the United Kingdom. Whereas the biggest share was noted for Luxemburg, Hungary, Slovakia and Czech Republic. In terms of foreign value added in Poland's gross export Poland ranks at 14th place (32.4%) among 28 EU countries (see Fig. 2).

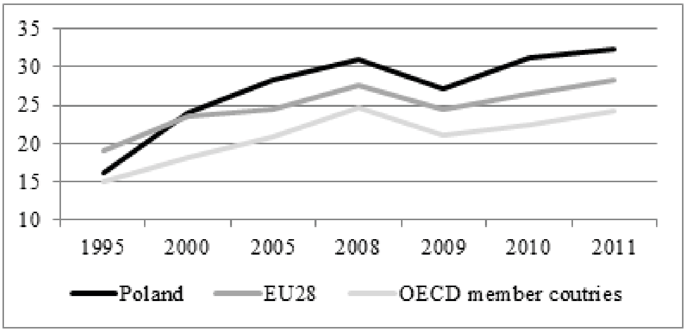

Fig 1. Foreign value added share of gross exports for Poland, OECD member countries and EU28 in 1995–2011, percentage

Source: own compilation based on: OECD (2015)

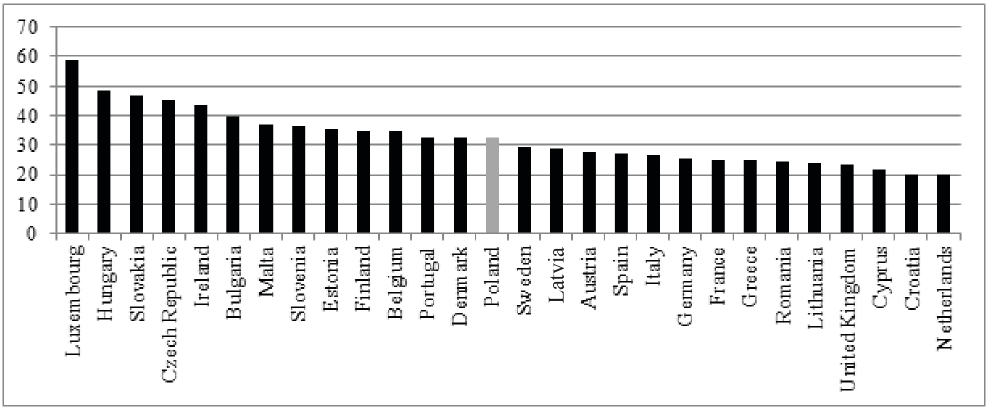

Figure 2. Foreign value added share of gross exports for UE-28 in 2011, percentage

Source: own compilation based on: OECD (2015)

In conclusion, in the studied period of 1995–2011, the rate of foreign value added in Poland's gross export had a rising tendency. Such trend is in accordance with other EU countries and OECD and indicates a growing participation of respective economies in global value chain.

3. The structure of value added in Poland's export

From the point of view of Polish economic development, it is crucial for it to be characterised by a high level of participation in global value chains. What matters, though, is not only the quantity of connections but also their structure. According to the data from OECD, the foreign added value's involvement in Polish economy is highly diverse in respective sectors. Sectors characterised by above the average involvement of foreign added value in studied period (1995–2011) were: electrical and optical equipment, transport equipment, basic metals and fabricated metal products, chemicals and machinery and equipment. Comparatively lesser involvement of foreign components characterised exported products and services from sectors: wood and products of wood and cork, construction, gas, tobacco, agriculture, mining and quarrying, transport, post and telecommunication, business sector services, wholesale and retail trade, hotel industry, catering industry and financial intermediations (see Table 2).

Table 2. Foreign value added in Poland's gross exports in 1995–2011, percentage (selected sectors)

Sectors / Years	1995	2000	2005	2008	2009	2010	2011	2011/1995 the percentage change
Total	**16.1**	**24.0**	**28,3**	**31,3**	**27.1**	**31.3**	**32.4**	**101**
Electrical and optical equipment	22.9	31.8	38.0	42.5	37.8	48.2	48.0	110
Transport equipment	24.1	40.1	44.5	48.3	40.7	47.6	47.2	96
Basic metals and fabricated metal products	21.0	34.7	36.5	41.6	33.3	39.3	41.9	100
Chemicals	19.1	34.2	34.7	37.0	33.0	37.4	40.4	112
Machinery and equipment	20.3	25.1	32.1	37.8	30.8	34.3	36.9	82
Textiles, textile products	17.2	23.8	27.7	29.6	**30.3**	30.4	33.8	97
Wood and products of wood and cork	14.3	19.6	24.2	25.6	21.4	24.4	25.8	80
Construction	15.9	20.8	23.2	24.8	21.6	23.9	25.5	60
Food products, beverages and tobacco	12.9	17.5	19.4	23.0	20.9	22.0	24.2	88
Agriculture	11.4	14.7	16.2	20.5	18.7	19.1	20.2	77
Mining and quarrying	12.7	15.6	14.3	16.6	15.5	16.2	17.0	34
Transport, storage, post and telecommunication	10.1	13.1	14.7	15.5	14.3	15.5	15.4	52
Business sector services	5.4	10.8	12.7	13.0	12.2	14.7	14.4	167
Wholesale and retail trade, hotels and restaurants	9.0	11.5	12.1	13.4	12.0	12.8	13.0	44
Financial intermediations	3.4	8.0	9.0	9.2	**11.1**	11.5	11.6	241

Source: own compilation based on: OECD (2015)

While analysing the rate of foreign value added involvement in Poland's gross export, particular tendencies can be pointed out. First and foremost, in the years 1995–2011 an increase in foreign value added involvement in gross export can be observed in respective sectors. The year 2009 was an exception, as most sectors observed a decline (excluding sectors: financial intermediations and textiles and textile products) (see Table 2).

The scale of increase of foreign value added in respective sectors is illustrated by the comparison of data from the years 1995 and 2011. In such comparison, the biggest growth was observed in sectors: financial intermediations (by 241%), business sector services (by 167%), chemicals (by 112%) and electrical equipment (by 110%). In contrast, the increase was the smallest in sectors: mining and quarrying (by 34%), trade, wholesale and retail trade, hotels and restaurants (by 44%).

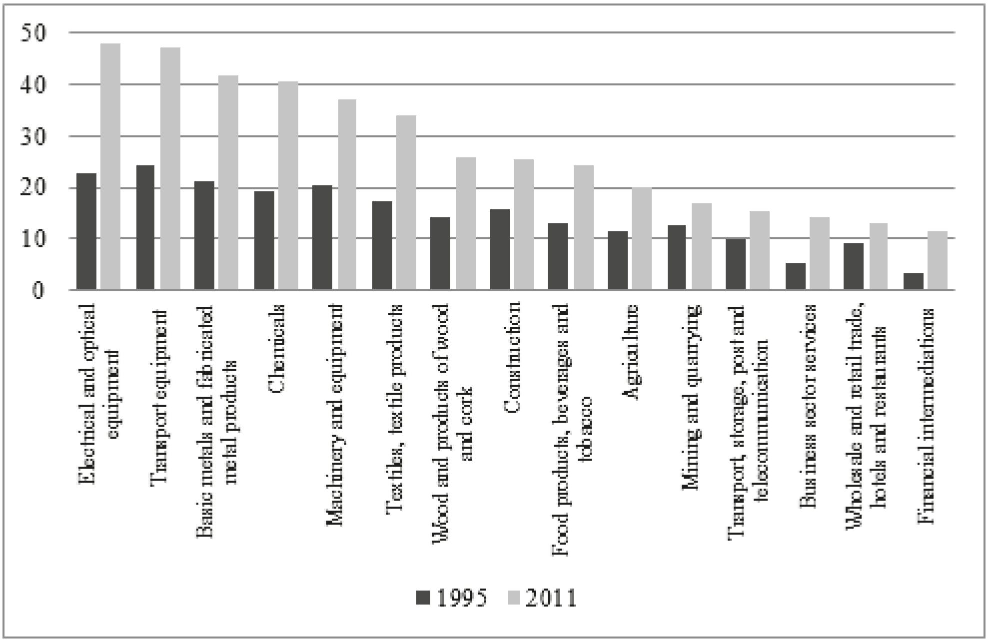

Figure 3. Foreign value added in Poland's gross exports in 1995–2011, percentage (selected sectors)

Source: own compilation based on: OECD (2015)

In order to surmise the analysis of the structure of foreign value added in Polish export, it is necessary to realise that what is crucial for country's development is that the most valuable activity in the value chains (connected to the application of advanced technology) should be produced domestically while those of less importance imported from abroad (Kraciuk, 2016). It appears that in the case of Polish economy it is otherwise. The model of Poland's participation in global value chain is based on the import of foreign technologies, raw materials and using them in labour-intensive sectors which generate the lowest value added. Electrical equipment sector can serve as an example as the involvement of foreign value added in it amounts to 46% (see Fig. 2). D. Ścigała (2013) indicates the necessity to change such tendency in Polish economy and "moving to more valuable activity in the value chains which are usually placed at the very end of a chain, close to final products' markets or are tied to initial stages of concepts, studies". However, it requires a substantial increase of expenditure for research and development activity in Poland stimulating investments that ensure a bigger productivity.

4. Poland's value added in other countries' export

Another way that allows to evaluate the global value added chains is the involvement of domestic value added encompassed in other destination countries' export, which means the involvement of domestic components used in export of third countries. Those are the so-called relations down the value chain (Ambroziak, Marczewski, 2014).

In the years 1995–2011 the rate of domestic added value's involvement in other countries' export in relation to Poland's export was higher than the average in EU countries (see Table 3). In case of both Poland and the entirety of EU, said rate was characterised by increasing tendency. The year 2009 was an exception as the value of said rate decreased in comparison to the previous year (see Table 3).

Table 3. Domestic value added share of gross exports. Data for Poland and EU28 in 1995–2011, percentage

Years / Countries	1995	2000	2005	2008	2009	2010	2011
Poland	19,9	20,6	21,8	21,7	21	21,8	23,3
EU28	14,5	17,9	19,3	19,1	18,1	18,9	19,4

Source: own compilation based on: OECD (2015)

Value added produced in EU countries, which was the export by other countries, made up from 16.7% to 27.5% of their export in 2011, depending on the country.

The highest rate of value added included in destination countries' export was observed in the Netherlands, Austria and the United Kingdom, and the lowest in Luxembourg, Croatia and Ireland. In terms of the size of domestic added value's involvement in other countries' gross export, Poland places on the 10th spot (23.3%) among 28 EU countries (see Fig. 3).

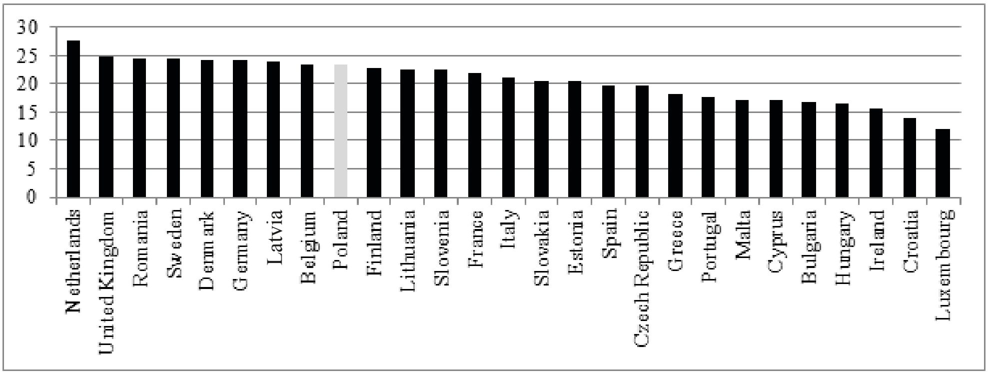

Figure 4. Domestic value added content of gross exports. Data for Poland and EU28 in 1995–2011, percentage

Source: own compilation based on: OECD (2015)

5. Poland's place in global value chain (GVC)

Economies participating in added value chain can derive benefits from intermediate goods to the need of pro-export production (which was examined in section 1) as well as provide intermediate goods to the need of pro-export production of other countries (as examined in section 2). Analysing both of these processes allows for the measurement of economy's participation in global system of production. Global value chain (GVC) participation index is used to measure the scale of such involvement. According to the definition, this index determines the involvement of a given country's export in multistage process of creating trade flux, through the inclusion of foreign contribution to its export to destination countries and domestic added value's contribution to export from destination coutnries (Amroziak, Marczewski, 2014). A different way to describe it is to consider it as a sum of foreign value added in gross export of other countries (down the chain) (De Backer, Miroudot, 2014).

Based on data from OECD, the index of involvement in global value chains for Poland amounted to 55.7% in 2011. Therefore, it means that more than half of Polish export took part in multistage process of creating trade flux (see Table 4).

It is also worth to analyse the development of the index of involvement in global value chains for Poland as compared to respective EU countries. In 2011, the index amounted to from 34% to 71%, depending on the country. The lowest index was observed in countries such as Italy, the United Kingdom, Hungary and Sweden whereas the highest one occurred in Austria, Belgium, Bulgaria and Croatia.

Table 4. The most important indicators regarding the participation of the EU28 in the global chain of values in 1995 and 2011, percentage

Indicators / Countries	Foreign value added share of gross exports (FVA)		Domestic value added share of gross exports (DVX)		GVC participiom index (GVC = FVA +DVX)		
	1995	2011	1995	2011	1995	2011	zmiana w p.p.
Luxembourg	41.0	59.0	13.8	11.9	54.8	70.9	16.1
Slovakia	31.9	46.8	18.9	20.6	50.8	67.4	16.6
Hungary	30.1	48.7	13.4	16.6	43.5	65.3	21.8
Czech Republic	30.5	45.3	17.4	19.6	47.9	64.9	17.0
Ireland	38.5	43.6	12.7	15.7	51.2	59.3	8.1
Slovenia	32.3	36.2	14.1	22.6	46.4	58.8	12.4
Belgium	31.1	34.5	17.6	23.5	48.7	58.0	9.3
Finland	24.1	34.7	20.7	22.7	44.8	57.4	12.6
Bulgaria	30.0	40.0	14.7	16.7	44.7	56.7	12.0
Denmark	23.1	32.6	16.7	24.1	39.8	56.7	16.9
Poland	**16.1**	**32.4**	**19.9**	**23.3**	**36.0**	**55.7**	**19.7**
Estonia	36.7	35.2	14.2	20.4	50.9	55.6	4.7
Malta	50.0	37.0	8.1	17.2	58.1	54.2	–3,9
Sweden	26.3	29.2	18.7	24.6	45.0	53.8	8.8
Latvia	22.7	28.7	17.9	24.0	40.6	52.7	12.1
Austria	21.5	27.8	17.3	24.7	38.8	52.5	13.7
Portugal	27.4	32.8	12.6	17.7	40.0	50.5	10.5
Germany	14.9	25.5	20.7	24.1	35.6	49.6	14.0
Romania	21.2	24.4	17.1	24.6	38.3	49.0	10.7
United Kingdom	18.3	23.1	19.0	24.7	37.3	47.8	10.5
Italy	17.2	26.5	15.4	21.1	32.6	47.6	15.0
Netherlands	23.2	20.1	17.9	27.5	41.1	47.6	6.5
France	17.3	25.1	17.9	21.9	35.2	47.0	11.8
Spain	19.2	26.9	14.3	19.7	33.5	46.6	13.1

continued tab. 4

Lithuania	24.6	23.7	15.8	22.6	40.4	46.3	5.9
Greece	16.3	25.0	11.9	18.3	28.2	43.3	15.1
Cyprus	20.9	21.5	11.0	17.1	31.9	38.6	6.7
Croatia	20.8	20.2	14.5	13.9	35.3	34.1	–1.2
EU	26.0	32.4	15.9	20.8	41.8	53.1	11.3
EU-15	24.0	31.1	16.5	21.5	40.4	52.6	12.1
EU-13	28.3	33.7	15.2	20.0	43.2	53.7	10.3

Source: own compilation based on: OECD (2015)

The GVC index, both in 20011 and in 1995, was lower in the Old Union countries (those European Union consisted of before the accession of members in 2004) than in the New Union countries (including Poland). Nevertheless, in comparison to the remaining countries in the group, the countries of the Fifteen were characterised by a higher involvement of domestic value added in the export of third countries. This means that they were providing more intermediate goods for the needs of pro-export production of other countries. Whereas the New Union countries were characterised by higher than in the countries of the Fifteen rate of foreign value added's involvement in gross export, in other words they acquired more intermediate goods from other countries for the needs of domestic, pro-export production.

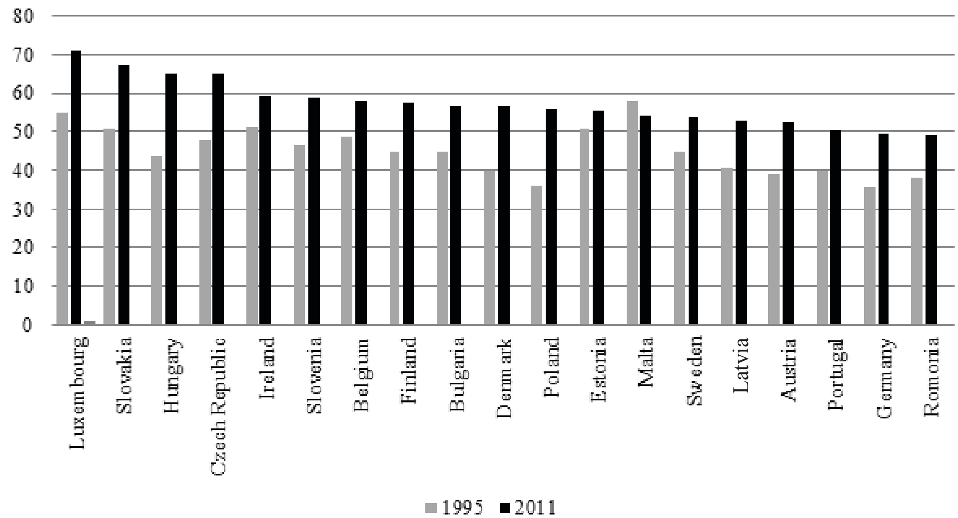

Figure 5. GVC participation index UE28 in 1995 and 2011
Source: own compilation based on: OECD (2015)

The breakdown of GVC index for EU countries from the years 1995–2011 indicates that almost all European economies (excluding Malta) increased their involvement in global value chains. Poland's case was no different. Importantly, the increase of such rate in terms of Polish economy (by 19.7 percentage points in the years 1995–2011) was bigger by 8.4 percentage points as compared to the average rate of different EU countries (where the average increase amounted to 11.3 percentage points). Therefore, even though in 1995, in regards to the value of GVC index, Poland placed on the 12th spot among the New Union countries (EU13) and on the 21st spot among every member country (EU28), in 2011 it was already the 9th and 11th spot respectively.

6. Conclusion

Polish economy participates in global value chain to a significant degree. Above half of Polish export took part in multistage process of creating trade flux. However, in the years 1995–2011 it was the involvement of foreign products in Polish production rather than the involvement of Polish products in foreign production that was increasing. The contribution of foreign value added to Polish gross export increased in that period from 16.1% up to 32.4%, and the contribution of Polish value added in other countries' gross export increased from 19.9% to merely 23.3%.

The tendency of increasing the participation of economies in the global value chain follows the trends observed in EU countries. Although, in the case of Poland the speed of index's growth is nearly the highest among EU countries (in this regard Poland is preceded only by Hungary). It should be remembered that such process may allow to obtain additional profits but it also brings certain risks.

On one side, it has a positive effect on innovation creating, both on the level of companies and the entire economy. Acquiring knowledge and technology from foreign cooperators working within GVC is one of the most effective and cheap source of innovation for developing countries' economies (NBP, 2016). Resulting from this connections give a chance for international expansion of local businesses.

On the other side, increasing the rate of participation in global value chains, as in mostly increasing the involvement of foreign components in domestic production, can cause, especially in "overhauling" countries, threat to the specialisation in uncomplicated, noninnovative production stages which generate low value added. To counter this, Polish economy should move to more valuable links of value chain through a substantial increase of funds for R&R in Poland as well as stimulating investments providing higher productivity.

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MIĘDZYNARODOWE ŁAŃCUCHY WARTOŚCI DODANEJ: POZYCJA GOSPODARKI POLSKIEJ

Streszczenie

Procesy internacjonalizacji i fragmentaryzacji produkcji powodują, że coraz większą rolę w gospodarce światowej odgrywają międzynarodowe łańcuchy wartości dodanej. Powstałe w ten sposób powiązania, tworzą szansę międzynarodowej ekspansji zarówno lokalnych firm, jak i poszczególnych gospodarek. Przedmiotem artykułu jest analiza pozycji polskiej gospodarki w ramach globalnych łańcuchów wartości. W analizie wykorzystano dane: OECD-WTO Trade in Value Added Database (TIVA). Stwierdzono wyraźny wzrost udziału zagranicznej wartości dodanej w polskim eksporcie brutto w latach 1995–2011, co świadczy o rosnącej partycypacji polskiej gospodarki w ramach globalnych łańcuchów wartości dodanej.

Słowa kluczowe: globalne łańcuchy wartości dodanej, handel zagraniczny, innowacyjność.

Klasyfikacja JEL: F14, F15, F62.