THE EVALUATION OF TRADE RELATIONS BETWEEN POLAND AND GERMANY FROM 2003 TO 2012

Iwona M.Pawlas

University of Economics in Katowice, 1 Maja 50, 40-287 Katowice, Poland

Abstract
Foreign trade constitutes an important factor of economic development. Germany became the number one trade partner of Poland in the beginning of 1990s. Poland's accession to the European Union resulted in considerable improvement of conditions for the Polish-German trade. An attempt has been made in the paper to analyze the amount, dynamics, balance and commodity pattern of trade between Poland and Germany from 2003 to 2012. Competitiveness of Polish goods on the German market was studied in order to determine fields of revealed comparative advantage as well as to measure intensity of intra-industry trade. The development of trade relations between Poland and Germany was presented against the background of the engagement of the two countries in world trade.

Key words: *Poland, Germany, exports, imports, revealed comparative advantage, intra-industry trade*

1. INTRODUCTION

Transition of the Polish economy and its gradual opening have resulted in considerable structural changes. The accession to the European Union created favourable conditions for the development of economic cooperation. Poland became a member of single European market which intensified economic relations with other EU member states. Germany is the number one trade partner of Poland. There are many factors influencing the importance of Germany: geographical location, dimension of the economy, cultural and political ones. Membership in the European Union gave an additional positive impulse for deepening bilateral Polish-German relations. Trade relations should be seen as crucial form of economic cooperation between the two countries. The paper presents Poland and Germany as participants of international trade in the beginning of the 21st century. An attempt has also been made to analyze the value, dynamics, balance and commodity pattern of trade between Poland and Germany from 2003 to 2012. The asymmetry of Polish-German trade relations was analyzed. Competitiveness of Polish goods on the German market was studied in order to determine fields of revealed comparative advantage as well as to measure intensity of intra-industry trade.

2. POLAND AND GERMANY AS PARTICIPANTS OF INTERNATIONAL TRADE FROM 2003 TO 2012

Germany is the 5th economic power in the world and unquestionable leader in the European Union (Sporek 2008, Central Intelligence Agency 2014). In 2012 GDP of Germany amounted to USD 3.25 trillion (according to purchasing power parity – PPP). The economic position of Germany is strongly related to its engagement in international trade. From 2003 to 2011 the German exports rose from USD 751 billion to USD 1474 billion; in 2012 it was slightly reduced to USD 1407 billion. In the same period of time Germany's imports increased from USD 604 billion to around USD 1200 billion. Huge trade surplus should be stressed. It amounted to USD 147 billion in 2003 and USD 240 billion in 2012.

In 2012 GDP of Poland equaled USD 814.1 billion (PPP); Poland was the 20th economy in the world. The engagement of Poland in international trade has risen considerably between 2003 and 2012. In 2003 the Polish exports equalled USD 53.7 billion while in 2011-2012 it exceeded USD 180 billion. In the same period of time Poland's imports rose from USD 68.3 billion to USD 196.0 billion. In case of Poland trade balance is negative. Trade deficit was the highest in 2008 (USD 38 billion); in 2012 it amounted to USD 12.6 billion (see table 1).

Table 2 presents shares of the two economies in world exports and world imports. In 2003 the share of Germany in world exports was as high as 9.9% and in world imports it amounted to 7.7%. In the analyzed period of time it was reduced to 7.65% on the exports side and to 6.27% on the imports side in 2012. The share of Poland in world exports rose from 0.7% in 2003 to around 1% in 2007-2012. Poland's share in world imports equalled 0.87% in 2003. It showed an upward tendency up to the year 2008 when it reached 1.26%. Later a downward tendency was observed and in 2012 it was 1.05% only.

Table 1. Foreign trade of Poland and Germany from 2003 to 2012 (million USD)

Year	Germany			Poland		
	Exports	Imports	Balance	Exports	Imports	Balance
2003	751 560	604 612	146 948	53 762	68 272	-14 510
2004	909 887	715 742	194 145	75 047	89 696	-14 649
2005	970 915	777 073	193 842	89 437	101 639	-12 202
2006	1 108 107	906 684	201 423	110 780	126 989	-16 209
2007	1 321 214	1 054 983	266 231	140 147	165 710	-25 563
2008	1 446 171	1 185 067	261 104	170 458	208 804	-38 346
2009	1 120 041	926 347	193 694	136 503	149 459	-12 956
2010	1 258 924	1 054 814	204 110	159 724	178 049	-18 325
2011	1 473 985	1 254 869	219 116	188 697	210 597	-21 900
2012	1 407 082	1 167 236	239 846	183 421	196 021	-12 600

Source: WTO data from http://www.wto.org/english/res_e/statis_e/its2013_e/its13_appendix_e.htm, viewed 10 March 2014.

Table 2. Poland's and Germany's share in world exports and imports (%)

Year	Germany		Poland	
	Exports	Imports	Exports	Imports
2003	9.90	7.68	0.71	0.87
2004	9.87	7.48	0.81	0.94
2005	9.24	7.15	0,85	0.94
2006	9.13	7.27	0,91	1.02
2007	9.42	7.36	1.00	1.16
2008	8.95	7.15	1.05	1.26
2009	8.92	7.25	1.09	1.16
2010	8.24	6.80	1.04	1.15
2011	8.05	6.78	1.03	1.14
2012	7.65	6.27	1.00	1.05

Source: Own calculations based on WTO data from http://www.wto.org/english/res_e/statis_e/its2013_e/its13_appendix_e.htm, viewed 10 March 2014.

3. VALUE AND DYNAMICS OF POLISH-GERMAN TRADE FROM 2003 TO 2012

Table 3 and figure 1 present value of trade between Poland and Germany. The Polish exports to Germany increased from USD 17.2 bullion in 2003 to USD 42.1 in 2008. In 2009 it dropped to USD 35.6 billion due to financial crisis. Its value was the highest in 2011 – USD 48.9 billion. In 2012 Poland exported USD 46.4 billion worth of goods to Germany. On the imports side an upward tendency was observed between 2003 and 2008. The Polish imports from Germany rose from USD 16.5 billion in 2003 to USD 47.4 billion in 2008. A year later the value of goods imported from Germany amounted to USD 32.7 billion. From 2009 to 2011 it showed un upward tendency (to USD 46.4 billion in 2011) and in 2012 a decrease was noted again (USD 42.2 billion). From 2005 to 2008 deficit in Poland's trade with Germany was observed. From 2003 to 2004 as well as from 2009 to 2012 trade surplus was noted. Surplus in trade with Germany was the highest in 2012 – it reached USD 4.1 billion.

Table 3. Poland's trade with Germany from 2003 to 2012 (million USD)

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exports	17240	22132	24396	29241	35347	42158	35681	40890	48868	46406
Imports	16536	21479	24434	29638	38799	47439	32693	37796	46437	42272
Balance	704	653	-38	-397	-3452	-5281	2988	3094	2431	4134

Source: *Yearbook of Foreign Trade Statistics of Poland 2004*, Central Statistical Office, Warsaw 2004, *Yearbook of Foreign Trade Statistics of Poland 2005*, Central Statistical Office, Warsaw 2005, *Yearbook of Foreign Trade Statistics of Poland 2006*, Central Statistical Office, Warsaw 2006, *Yearbook of Foreign Trade Statistics of Poland 2007*, Central Statistical Office, Warsaw 2007, *Yearbook of Foreign Trade Statistics of Poland 2008*, Central Statistical Office, Warsaw 2008, *Yearbook of Foreign Trade Statistics of Poland 2009*, Central Statistical Office, Warsaw 2009, *Yearbook of Foreign Trade Statistics of Poland 2010*, Central Statistical Office, Warsaw 2010, *Yearbook of Foreign Trade Statistics of Poland 2011*, Central Statistical Office, Warsaw 2011, *Yearbook of Foreign Trade Statistics of Poland 2012*, Central Statistical Office, Warsaw 2012, *Yearbook of Foreign Trade Statistics of Poland 2013*, Central Statistical Office, Warsaw 2013.

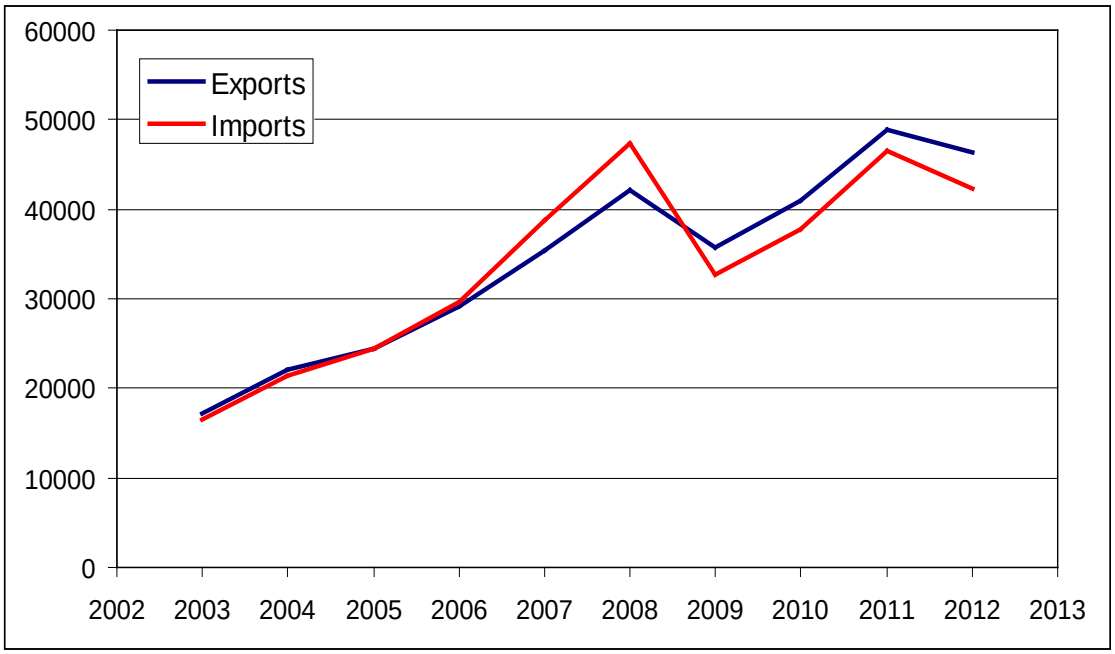


Figure 1. Poland's trade with Germany from 2003 to 2012 (million USD)

Source: Own presentation.

Table 4 shows the share of Germany in Polish foreign trade. Germany is Poland's crucial trade partner. In the analyzed period of time, however, Germany's share in both Polish exports and imports was reduced. In 2003 more than 32% of Polish exports went to the German market and 24.4% of Polish imports came from the German market. In 2012 the share of Germany in Polish exports amounted to 25.3% and its share in Poland's imports stood for 21.6%. The next table (table 5) presents the importance of Poland for German foreign trade. Un upward tendency is observed on both exports side and imports one. The share of Poland in Germany's exports increased from 2.2% to around 3.0% (it was the highest in 2008 – 3.3%). In 2003 2.9% of imported goods came from Poland. In 2012 the share of Poland in German imports reached 4.0%. Still, however, asymmetry of Polish-German trade relations is easily visible.

Table 4. The share of Germany in Poland's exports and imports from 2003 to 2012 (%)

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exports	32.3	30.1	28.2	27.2	25.9	25.0	26.2	26.1	26.1	25.3
Imports	24.4	24.4	24.7	24.0	24.1	23.0	22.4	21.9	22.3	21.6

Source: Own calculations.

Table 5. The share of Poland in Germany's exports and imports from 2003 to 2012 (%)

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exports	2.2	2.4	2.5	2.7	2.9	3.3	2.9	3.0	3.1	3.0
Imports	2.9	3.1	3.1	3.2	3.3	3.6	3.8	3.9	3.9	4.0

Source: Own calculations.

4. COMMODITY STRUCTURE OF POLISH-GERMAN TRADE

Tables 6-9 present commodity structure of Polish-German trade according to twenty one CN sections. In Poland's exports to Germany five sections are the most important:

- section XV – Base metals and articles thereof,
- section XVI – Machinery and mechanical appliances, electrical and electronic equipment,
- section XVII – Transport equipment,
- section VII – Plastics and rubber and articles thereof,
- section XX – Miscellaneous manufactured articles (furniture, toys).

They accounted for more than 66%. Section XVI alone (Machinery and mechanical appliances, electrical and electronic equipment) represented more than 22%. Section XI – textiles and textile articles represented 7.5% of Poland's exports to Germany in 2003, but its significance was reduced to less than 5% in 2012.

On the imports side the following five sections are prevailing:

- section XV – Base metals and articles thereof,
- section XVI – Machinery and mechanical appliances, electrical and electronic equipment,
- section XVII – Transport equipment,
- section VII – Plastics and rubber and articles thereof ,
- section VI - Products of the chemical industry.

Altogether they stood for more than 77% in 2003 and nearly 72% in 2012. Again section XVI - Machinery and mechanical appliances, electrical and electronic equipment was the number one. It accounted for more than 28% in 2003 and about 22% in 2012.

Table 6. Poland's exports to Germany according to CN sections from 2003 to 2012 (million USD)

CN SECTION	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I	338	593	882	1068	1423	1648	1233	1413	1726	1705
II	332	406	453	469	752	833	976	969	1017	1275
III	4	28	86	158	220	207	121	210	189	100
IV	453	638	793	893	1052	1440	1234	1385	1778	1958
V	751	1243	1308	1097	1195	1615	813	1427	1926	1595
VI	471	602	673	857	1212	1753	1247	1905	2576	2416
VII	861	1098	1342	1874	2321	2757	2272	2897	3914	3805
VIII	199	193	198	204	222	200	152	193	157	153
IX	641	780	782	833	947	937	805	922	1043	1073
X	558	641	677	785	1031	1238	1174	1401	1645	1526
XI	1283	1404	1316	1319	1486	1884	1829	2101	2513	2229
XII	97	88	92	97	106	147	160	186	222	217
XIII	336	379	423	514	643	718	554	624	807	740
XIV	74	71	93	176	91	105	88	147	162	174

XV	2334	3413	3557	4881	5880	6616	4069	5400	7007	6562
XVI	3774	4507	5258	6599	8662	10217	8329	9808	10739	10271
XVII	2714	3521	3676	4449	4803	6218	6666	6224	7055	6286
XVIII	147	200	232	268	353	395	336	461	514	508
XIX	0	0	0	0	1	0	0	0	0	1
XX	1869	2324	2554	2690	2935	3212	2919	3196	3863	3809
XXI	4	3	1	10	12	18	704	21	15	3
TOTAL	17240	22132	24396	29241	35347	42158	35681	40890	48868	46406

I – Live animals, animal products

II – Vegetable products

III –fats and oils thereof

IV – Prepared foodstuffs

V – Mineral products

VI – Products of the chemical industry

VII – Plastics and rubber and articles thereof

VIII – Raw hides and skins, articles thereof

IX – Wood and articles of wood toys)

X – Pulp of wood, paper, paperboard and articles thereof

XI – Textiles and textile articles

XII – Footwear, headwear and articles thereof

XIII – Articles of stone, ceramic products, glass

XIV – Pearls, precious stones and metals, articles instruments

XV – Base metals and articles thereof

XVI – Machinery and mechanical appliances, elect. electron. equipment

XVII – Transport equipment

XVIII – Optical, photographic, measuring, checking

XIX – Arms and ammunition

XX – Miscellaneous manufactured articles (furniture,

XXI – works of art., collectors pieces and antiques

Source: *Yearbook of Foreign Trade Statistics of Poland 2004*, Central Statistical Office, Warsaw 2004, *Yearbook of Foreign Trade Statistics of Poland 2005*, Central Statistical Office, Warsaw 2005, *Yearbook of Foreign Trade Statistics of Poland 2006*, Central Statistical Office, Warsaw 2006, *Yearbook of Foreign Trade Statistics of Poland 2007*, Central Statistical Office, Warsaw 2007, *Yearbook of Foreign Trade Statistics of Poland 2008*, Central Statistical Office, Warsaw 2008, *Yearbook of Foreign Trade Statistics of Poland 2009*, Central Statistical Office, Warsaw 2009, *Yearbook of Foreign Trade Statistics of Poland 2010*, Central Statistical Office, Warsaw 2010, *Yearbook of Foreign Trade Statistics of Poland 2011*, Central Statistical Office, Warsaw 2011, *Yearbook of Foreign Trade Statistics of Poland 2012*, Central Statistical Office, Warsaw 2012, *Yearbook of Foreign Trade Statistics of Poland 2013*, Central Statistical Office, Warsaw 2013.

Table 7. Poland's imports from Germany according to CN sections from 2003 to 2012 (million USD)

CN SECTION	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I	61	140	262	289	468	970	970	989	1239	1241
II	70	120	162	221	462	585	408	442	740	678
III	101	119	119	128	150	290	180	232	375	372
IV	312	435	555	683	954	1401	1296	1431	1712	1658

V	380	442	793	1139	1760	2357	1520	1491	1980	1534
VI	1706	2144	2418	2718	3427	4666	3552	4004	5122	4659
VII	1893	2343	2741	3313	4073	4696	3502	4252	5451	4873
VIII	88	120	132	120	131	122	95	116	147	141
IX	200	284	330	357	497	599	349	369	439	371
X	755	940	1037	1225	1589	1837	1444	1711	1999	1718
XI	773	952	971	1017	1116	1181	918	1025	1260	1176
XII	13	28	29	28	33	42	30	31	77	141
XIII	340	385	377	496	709	807	572	646	742	630
XIV	14	21	24	42	51	65	97	83	98	79
XV	2127	2954	3579	4781	6243	7057	4501	5625	6785	6152
XVI	4686	5873	6724	7710	9728	10856	7227	8205	9688	9216
XVII	2366	3344	3207	4150	5741	7849	4405	5451	6410	5514
XVIII	341	453	528	586	769	940	764	837	950	850
XIX	7	6	12	6	16	20	6	10	11	91
XX	301	374	432	457	556	651	445	466	548	537
XXI	2	2	2	172	326	448	412	380	664	641
TOTAL	16536	21479	24434	29638	38799	47439	32693	37796	46437	42272

Source: Ibidem.

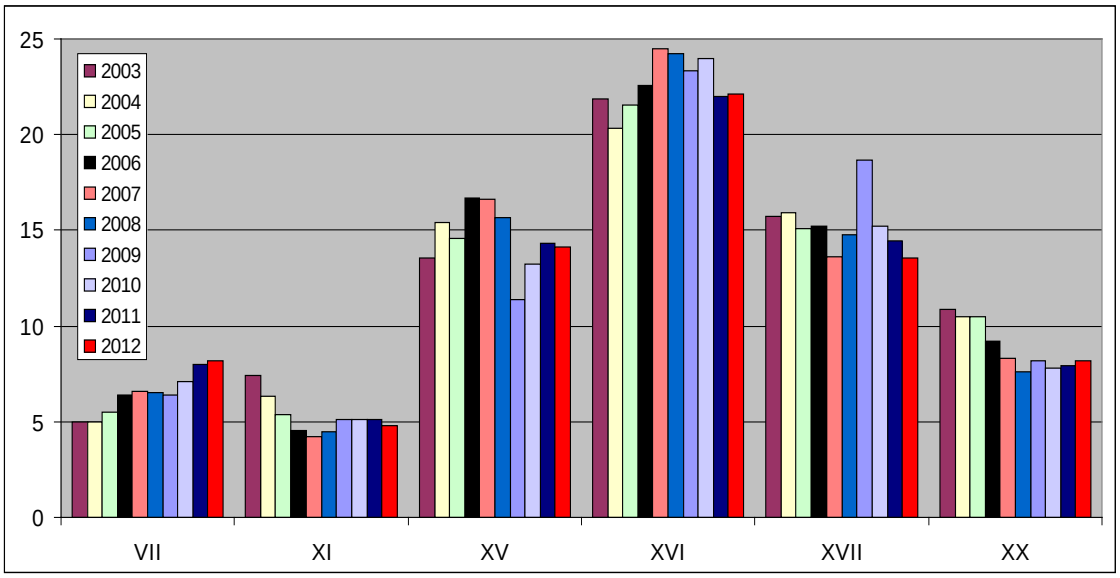


Figure 2. The most important CN sections in Polish exports to Germany (%)

Source: Own elaboration, own presentation.

Table 8. Commodity structure of Poland's exports to Germany (%)

CN SECTION	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I	1.96	2.68	3.62	3.65	4.03	3.91	3.46	3.46	3.53	3.67
II	1.93	1.83	1.86	1.60	2.13	1.98	2.74	2.37	2.08	2.75
III	0.02	0.13	0.35	0.54	0.62	0.49	0.34	0.51	0.39	0.22
IV	2.63	2.88	3.25	3.05	2.98	3.42	3.46	3.39	3.64	4.22
V	4.36	5.62	5.36	3.75	3.38	3.83	2.28	3.49	3.94	3.44
VI	2.73	2.72	2.76	2.93	3.43	4.16	3.49	4.66	5.27	5.21
VII	4.99	4.96	5.50	6.41	6.57	6.54	6.37	7.08	8.01	8.20
VIII	1.15	0.87	0.81	0.70	0.63	0.47	0.43	0.47	0.32	0.33
IX	3.72	3.52	3.21	2.85	2.68	2.22	2.26	2.25	2.13	2.31
X	3.24	2.90	2.78	2.68	2.92	2.94	3.29	3.43	3.37	3.29
XI	7.44	6.34	5.39	4.51	4.20	4.47	5.13	5.14	5.14	4.80
XII	0.56	0.40	0.38	0.33	0.30	0.35	0.45	0.45	0.45	0.47
XIII	1.95	1.71	1.73	1.76	1.82	1.70	1.55	1.53	1.65	1.59
XIV	0.43	0.32	0.38	0.60	0.26	0.25	0.25	0.36	0.33	0.37
XV	13.54	15.42	14.58	16.69	16.64	15.69	11.40	13.21	14.34	14.14
XVI	21.89	20.36	21.55	22.57	24.51	24.24	23.34	23.99	21.98	22.13
XVII	15.74	15.91	15.07	15.21	13.59	14.75	18.68	15.22	14.44	13.55
XVIII	0.85	0.90	0.95	0.92	1.00	0.94	0.94	1.13	1.05	1.09
XIX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
XX	10.84	10.50	10.47	9.20	8.30	7.62	8.18	7.82	7.90	8.21
XXI	0.02	0.01	0.00	0.03	0.03	0.04	1.97	0.05	0.03	0.01
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Own calculations.

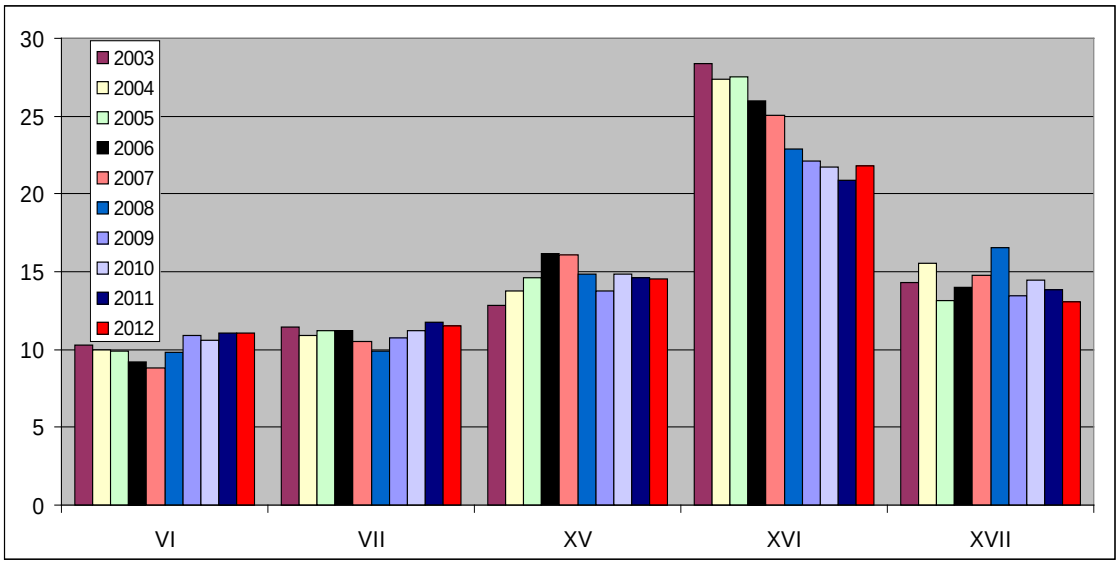


Figure 3. The most important CN sections in Polish imports from Germany (%)

Source: Own elaboration, own presentation.

Table 9. Commodity structure of Poland's imports from Germany (%)

CN SECTION	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I	0.37	0.65	1.07	0.98	1.21	2.04	2.97	2.62	2.67	2.94
II	0.42	0.56	0.66	0.75	1.19	1.23	1.25	1.17	1.59	1.60
III	0.61	0.55	0.49	0.43	0.39	0.61	0.55	0.61	0.81	0.88
IV	1.89	2.03	2.27	2.30	2.46	2.95	3.96	3.79	3.69	3.92
V	2.30	2.06	3.25	3.84	4.54	4.97	4.65	3.94	4.26	3.63
VI	10.32	9.98	9.90	9.17	8.83	9.84	10.86	10.59	11.03	11.02
VII	11.45	10.91	11.22	11.18	10.50	9.90	10.71	11.25	11.74	11.53
VIII	0.53	0.56	0.54	0.40	0.34	0.26	0.29	0.31	0.32	0.33
IX	1.21	1.32	1.35	1.20	1.28	1.26	1.07	0.98	0.95	0.88
X	4.57	4.38	4.24	4.13	4.10	3.87	4.42	4.53	4.30	4.06
XI	4.67	4.43	3.97	3.43	2.88	2.49	2.81	2.71	2.71	2.78
XII	0.08	0.13	0.12	0.09	0.09	0.09	0.09	0.08	0.17	0.33
XIII	2.06	1.79	1.54	1.67	1.83	1.70	1.75	1.71	1.60	1.49
XIV	0.08	0.10	0.10	0.14	0.13	0.14	0.30	0.22	0.21	0.19
XV	12.86	13.75	14.65	16.13	16.09	14.88	13.77	14.88	14.61	14.55
XVI	28.34	27.34	27.52	26.01	25.07	22.88	22.11	21.71	20.86	21.80
XVII	14.31	15.57	13.13	14.00	14.80	16.55	13.47	14.42	13.80	13.04
XVIII	2.06	2.11	2.16	1.98	1.98	1.98	2.34	2.21	2.05	2.01
XIX	0.04	0.03	0.05	0.02	0.04	0.04	0.02	0.03	0.02	0.22

XX	1.82	1.74	1.77	1.54	1.43	1.37	1.36	1.23	1.18	1.27
XXI	0.01	0.01	0.01	0.58	0.84	0.94	1.26	1.01	1.43	1.52
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Own calculations.

5. COMPETITIVENESS OF POLISH GOODS ON GERMAN MARKET

In order to determine the areas of revealed comparative advantage in Poland's trade with the EU B.Balassa's formula was used:

$$RCA_{iy} = \frac{\frac{Ex_{iy}}{\sum Ex_{iy}}}{\frac{Im_{iy}}{\sum Im_{iy}}},$$

where: *i* – commodity section, *y* – trade partner, Ex – exports, Im – imports.

If RCA is higher than one, one may assume that the analyzed country achieves comparative advantage in trade with *y* trade partner in case of commodity section *i*. (Budzowski & Wydymus 1999)

The results of calculations are presented in table 10. From 2003 to 2012 Poland gained comparative advantage in trade with Germany in the following commodity sections:

- section I – Live animals, animal products,
- section II – Vegetable products,
- section IX – Wood and articles of wood,
- section XI – Textiles and textile articles,
- section XII - Footwear, headwear and articles thereof,
- section XIV - Pearls, precious stones and metals, articles thereof,
- section XIX - Arms and ammunition.

In case of some other sections comparative advantage was observed in first years of the analyzed period of time (sections IV and XV - from 2003 to 2008, section V – from 2003 to 2005, section VIII – from 2003 to 2011). A different situation was noted with respect to section XVI – Poland gained comparative advantage in trade with Germany from 2008 to 2012).

Table 10. Revealed comparative advantage in Poland's trade with Germany from 2003 to 2012

CN SECTION	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I	**5.315**	**4.111**	**3.372**	**3.746**	**3.338**	**1.912**	**1.165**	**1.321**	**1.324**	**1.252**
II	**4.549**	**3.284**	**2.801**	**2.151**	**1.787**	**1.602**	**2.192**	**2.026**	**1.306**	**1.713**
III	0.038	0.228	0.724	1.251	1.610	0.803	0.616	0.837	0.479	0.245
IV	**1.393**	**1.423**	**1.431**	**1.325**	**1.210**	**1.157**	0.872	0.895	0.987	1.076
V	**1.896**	**2.729**	**1.652**	0.976	0.745	0.771	0.490	0.885	0.924	0.947

VI	0.265	0.272	0.279	0.320	0.388	0.423	0.322	0.440	0.478	0.472
VII	0.436	0.455	0.490	0.573	0.626	0.661	0.594	0.630	0.682	0.711
VIII	**2.169**	**1.561**	**1.502**	**1.723**	**1.860**	**1.845**	**1.466**	**1.538**	**1.015**	0.988
IX	**3.074**	**2.665**	**2.373**	**2.365**	**2.092**	**1.760**	**2.113**	**2.310**	**2.258**	**2.635**
X	0.709	0.662	0.654	0.650	0.712	0.758	0.745	0.757	0.782	0.809
XI	**1.592**	**1.431**	**1.357**	**1.315**	**1.462**	**1.795**	**1.826**	**1.895**	**1.895**	**1.727**
XII	**7.157**	**3.050**	**3.177**	**3.511**	**3.526**	**3.938**	**4.887**	**5.546**	**2.740**	**1.402**
XIII	0.948	0.955	1.124	1.050	0.995	1.001	0.887	0.893	1.033	1.070
XIV	**5.070**	**3.281**	**3.881**	**4.247**	**1.959**	**1.818**	**0.831**	**1.637**	**1.571**	**2.006**
XV	**1.053**	**1.121**	**0.995**	**1.035**	**1.034**	**1.055**	0.828	0.887	0.981	0.972
XVI	0.772	0.745	0.783	0.868	0.977	**1.059**	**1.056**	**1.105**	**1.053**	**1.015**
XVII	**1.100**	**1.022**	**1.148**	**1.087**	**0.918**	**0.891**	**1.387**	**1.055**	**1.046**	**1.038**
XVIII	0.413	0.428	0.440	0.464	0.504	0.473	0.403	0.509	0.514	0.544
XIX	0.000	0.000	0.000	0.000	0.069	0.000	0.000	0.000	0.000	0.010
XX	**5.956**	**6.031**	**5.921**	**5.966**	**5.794**	**5.552**	**6.010**	**6.339**	**6.699**	**6.461**
XXI	1.918	1.456	0.501	0.059	0.040	0.045	1.566	0.051	0.021	0.004

Source: Own calculations.

Finally the intensity of intra-industry trade in Polish-German relations was measured with the application of H.G.Grubel-P.H.Lloyd's formula for IIT index:

$$IIT_i = \frac{(Ex_i + \mathrm{Im}_i) - |Ex_i - \mathrm{Im}_i|}{(Ex_i + \mathrm{Im}_i)} = 1 - \frac{|Ex_i - \mathrm{Im}_i|}{(Ex_i + \mathrm{Im}_i)}$$

Where: *Ex* – exports, *Im* –imports, *i* – commodity section.

If IIT is close to one strong intra-industry trade is observed, if it is close to zero inter-industry trade is the case (Budnikowski 2003, Pawlas 2006). It is believed that the more developed the economies the more intense intra-industry trade between them (Czarny 2002, Rynarzewski (ed.) 2004). The results of analysis are presented in table 11. One should stress very intensive intra-industry trade for the following CN sections:

- section XV - Base metals and articles thereof,
- section XVI - Machinery and mechanical appliances, electrical and electronic equipment,
- section XVII - Transport equipment,
- section IV - Prepared foodstuffs,
- section X - Pulp of wood, paper, paperboard and articles thereof,
- section XIII - Articles of stone, ceramic products, glass.

In addition to that a rising intensity of intra-industry trade was noted for sections V (Mineral products), VII (Plastics and rubber and articles thereof) and VIII (Raw hides and skins, articles thereof).

Table 11. Intensity of intra-industry trade in Poland's relations with Germany from 2003 to 2012

CN SECTION	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I	0.31	0.38	0.46	0.43	0.49	0.74	0.88	0.82	0.84	0.84
II	0.35	0.46	0.53	0.64	0.76	0.83	0.59	0.63	0.84	0.69
III	0.08	0.38	0.84	0.90	0.81	0.83	0.80	0.95	0.67	0.42
IV	**0.82**	**0.81**	**0.82**	**0.87**	**0.95**	**0.99**	**0.98**	**0.98**	**0.98**	**0.92**
V	0.67	0.52	0.75	0.98	0.81	0.81	0.70	**0.98**	**0.99**	**0.98**
VI	0.43	0.44	0.44	0.48	0.52	0.55	0.52	0.64	0.67	0.68
VII	0.63	0.64	0.66	0.72	0.73	0.74	0.79	0.81	**0.84**	**0.88**
VIII	0.61	0.77	0.80	0.74	0.74	0.76	0.77	0.75	**0.97**	**0.96**
IX	0.48	0.53	0.59	0.60	0.69	0.78	0.60	0.57	0.59	0.51
X	**0.85**	**0.81**	**0.79**	**0.78**	**0.79**	**0.81**	**0.90**	**0.90**	**0.90**	**0.94**
XI	0.75	0.81	0.85	0.87	0.86	0.77	0.67	0.66	0.67	0.69
XII	0.24	0.48	0.48	0.45	0.47	0.44	0.32	0.29	0.52	0.79
XIII	**0.99**	**0.99**	**0.94**	**0.98**	**0.95**	**0.94**	**0.98**	**0.98**	**0.96**	**0.92**
XIV	0.32	0.46	0.41	0.39	0.72	0.76	0.95	0.72	0.75	0.62
XV	**0.95**	**0.93**	**1.00**	**0.99**	**0.97**	**0.97**	**0.95**	**0.98**	**0.98**	**0.97**
XVI	**0.89**	**0.87**	**0.88**	**0.92**	**0.94**	**0.97**	**0.93**	**0.91**	**0.95**	**0.95**
XVII	**0.93**	**0.97**	**0.93**	**0.97**	**0.91**	**0.88**	**0.80**	**0.93**	**0.95**	**0.93**
XVIII	0.60	0.61	0.61	0.63	0.63	0.59	0.61	0.71	0.70	0.75
XIX	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.02
XX	0.28	0.28	0.29	0.29	0.32	0.34	0.26	0.25	0.25	0.25
XXI	0.67	0.80	0.67	0.11	0.07	0.08	0.74	0.10	0.04	0.01

Source: Own calculations.

6. CONCLUSION

Germany is one of the most important economies in the world economy and the number one in the European Union. For Poland, a young market economy, Germany is the crucial trade partner. Poland's accession to the European Union in 2004 changed the conditions for Polish-German trade for the better. From 2003 to 2012 considerable increase in bilateral trade was observed, though in 2009 both Poland's exports to Germany and its imports from Germany were reduced due to global financial crisis. In 2012 Poland exported USD 46.4 billion worth of goods to Germany and imported USD 42.2 billion worth of goods from this partner country; Germany accounted for more than 25% of Poland's exports and 21% of its imports. The asymmetry of Polish-German trade relations is easily visible when you look at Poland's shares in German foreign trade: on the exports side it's just 3% and on the exports side it reached 4% in 2012. Very intensive intra-industry trade was observed in the following sections: Base metals and articles thereof, Machinery and mechanical appliances, electrical and electronic equipment, Transport equipment, Prepared foodstuffs, Pulp of wood, paper, paperboard and articles thereof, as well as Articles of stone, ceramic products, glass. Poland gained comparative advantage in trade with Germany mostly with respect to raw material intensive goods and labour

intensive goods: Live animals, animal products, Vegetable products, Wood and articles of wood, Textiles and textile articles, Footwear, headwear and articles thereof.

REFERENCES

Budnikowski, A 2003, Międzynarodowe stosunki gospodarcze, PWE, Warsaw.

Budzowski, K & Wydymus., S (ed.) 1999, Handel zagraniczny: metody, problemy, tendencje. Część I, Akademia Ekonomiczna w Krakowie, Kraków.

Central Intelligence Agency, The World Factbook: Germany, https://www.cia.gov/library/publications/the-world-factbook/geos/gm.html, viewed 5 March 2014.

Central Statistical Office 2004, Yearbook of Foreign Trade Statistics of Poland 2004, Warsaw.

Central Statistical Office 2005, Yearbook of Foreign Trade Statistics of Poland 2005, Warsaw.

Central Statistical Office 2006, Yearbook of Foreign Trade Statistics of Poland 2006, Warsaw.

Central Statistical Office 2007, Yearbook of Foreign Trade Statistics of Poland 2007, Warsaw.

Central Statistical Office 2008, Yearbook of Foreign Trade Statistics of Poland 2008, Warsaw.

Central Statistical Office 2009, Yearbook of Foreign Trade Statistics of Poland 2009, Warsaw.

Central Statistical Office 2010, Yearbook of Foreign Trade Statistics of Poland 2010, Warsaw.

Central Statistical Office 2011, Yearbook of Foreign Trade Statistics of Poland 2011, Warsaw.

Central Statistical Office 2012, Yearbook of Foreign Trade Statistics of Poland 2012, Warsaw.

Central Statistical Office 2013, Yearbook of Foreign Trade Statistics of Poland 2013, Warsaw.

Czarny, E 2002, Teoria i praktyka handlu wewnątrzgałęziowego, Warsaw.

Pawlas, I 2006, Handel wewnątrzgałęziowy w polsko-niemieckich stosunkach handlowych, (in:) Kaszuba, K & Wydymus S (ed.), Handel międzynarodowy a rozwój gospodarczy, Akademia Ekonomiczna w Krakowie & Wyższa Szkoła Zarządzania w Rzeszowie, Kraków-Rzeszów.

Rynarzewski, T (ed.) 2004, Teoria handlu międzynarodowego a współczesna gospodarka światowa, Akademia Ekonomiczna w Poznaniu, Poznań.

Sporek, T 2008, Wpływ niemieckiego przywództwa w Radzie Unii Europejskiej na sytuację jednoczącej się Europy, (in:) Brocka-Palacz B. (ed.), Dokąd zmierzają Niemcy: reformy polityczne, gospodarcze i społeczne, Szkoła Główna Handlowa, Warsaw.

World Trade Organization, http://www.wto.org/english/res_e/statis_e/its2013_e/its13_appendix_e.htm, viewed 10 March 2014.