Does Polish foreign trade impact employment? Empirical investigation.

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Labour market in Poland

One of the most striking result of the transformation taking part in Poland from the end of the 1980s is massive growth of unemployment. There are numerous reasons for this:

1) demographic processes: the population boom generation is entering labour market. In the last 10 years there was an average surplus of 200.000 people every year in the balance of workers entering and leaving labour market for retirement, what makes total number of 2 million in the decade. If we compare it to the current number of unemployed persons: 3,1 million in the beginning of 2003, the relation is quite visible. Unfortunately in the next 10 years an average surplus number will be even higher: of 250.000 per year.

2) In the same period, neglecting last 3 years slowdown, which is seemingly going to end, relatively high GDP growth was observed, what normally results in the job creation process. But in the same time obsolete economy improved even faster its productivity, what resulted in job destruction. Netto effect is unknown.

3) There are also few political reasons. Among the most frequently stressed political issues there are neglected structural reforms, mainly in steal and mining industry, what resulted in high costs of keeping these sectors alive, and in shifting resources to subsidize them. The next political fact is still too strict labour law, which discourages entrepreneurs from hiring workers.

4) High labour costs are to heavy to cope with by entrepreneurs. Although labour cost in comparison with EU countries are lower, but all overheads, especially social system tax makes labour more expensive.

5) Some authors mention also low social mobility as a reason for unemployment. In the North-Eastern and North-Western regions unemployment rate has reached level of 30%,

whereas in regions surrounding biggest cities, like Warsaw, Krakow and Poznan it is much lower – around 10%. But low wages make it impossible to motivate people to leave their houses and settle down in the expensive cities.

6) Last, but not least is foreign trade development. Foreign trade evolution has resulted in the massive rise of import, what pushed workplaces from Poland abroad. In the same time slower, but still rapid export growth was reported. Hypothesis of negative impact of import on the labour market and positive influence of export, is very controversial. It has been raised for several times by politicians and researchers. But in many cases their point of view depends more on their political sympathy than upon empirically justified evidences. Thus we decided to investigate the issue, basing it on the empirical investigation.

Polish foreign trade

In 2001 value of Polish export reached 36 bln USD, and is systematically rising. It has very important role in the economy: in 1999 share of export in the GDP reached 26%, whereas for 2003 is estimated to 30%. Predominant part of exported goods is sold to the EU – more than 70%. The most developed countries import 75% of the Polish exports. 12% is sold to the CEEC. In 2001 manufactured goods amounts to 85% in the composition of the exports (machines – 21%, transport equipment, metallurgy – 12%, textiles – 8%).

Value of Polish imports reached in 50 bln USD in 2001. 62% of imported goods were produced in the EU, and 70% in the most developed countries. 10% of import comes from the CIS, mainly due to the high value of Russian oil. More than 8% import comes from the CEEC.

Poland has traditionally high deficit on the trade balance, which share in the GDP reached 7,5%, which is dangerous level and was together with rising inflation rate the main reason for the strict monetary policy imposed by the Polish central bank in the beginning of the 21st century.(Polish Main Statistical Bureau, reports from years 1989-2002; for year 2003 – Ministry of Finance estimations)

Job creation-destruction and trade in transition countries

In an open economy export is treated as foreign investments and on the contrary – import is treated as foreign savings. The higher surplus of export over import, the higher amount of investments could be financed by foreign countries. Export increases national income similarly to domestic investments and as a final result employment and productivity increase. Export increases demand for domestic production and in the same time import

decreases demand for domestic production and pushes jobs abroad (Bożyk et all, 2002; Samuelson and Nordhaus, 1989; Hall and Taylor, 1993).

Employment and Trade in transition

In the last time several studies were made in order to investigate relationship between foreign trade trends and employment changes in the countries in transition. Special attention has been paid to the Central and East European Countries, which underwent spectacular trade liberalization. For the economic theory it has been rather unique chance to prove links between trade and domestic economies and employment as well (Dasgupta, 2002). Of course few uncontrollable variables seemed to disturb the ideal model at the time. It was because of the fact that apart from the trade liberalization other processes effected the economies' performance, specifically: massive privatization, numerous structural reforms on the financial and labour markets, and many other factors hidden under the transition phenomena. For example Dasgupta (2002) raises the question: is it employment which follows trade expansion or it is trade which follows employment changes?

Few studies were conducted on the micro- and macro level of analysis in order to cope with the problem. Levinsohn (2000), who investigated Chile after trade liberalization found it difficult to separate trade effects from other economical processes, because employment patterns where similar in industrial sectors regardless of their foreign trade exposure. Haltiwanger and Vodopivec (2002) found positive effects of trade development on job reallocation in Estonia. Levinsohn (2000) again proved positive effects on job creation among Polish export oriented enterprises. Boehri and Oliveira-Martins (2000) showed that in transition countries sectors, which were exposed to the import competition were able to grow. They explain it with so called "shelf-shock". According to them after trade liberalization enormous demand occurred, mainly for the most developed products. Rapid growth of demand was enough high to cover imported and newly created domestic production, thus enabling increase in domestic employment.

Hecksher – Ohlin – Samuelson paradigm

Hecksher-Ohlin-Samuelson (H-O-S) theory is a traditional way of linking trade and employment together. It is based on the assumption of hypothetical influences of economy structure on trade specialization, which firstly leads to exploitation of competitive advantage in productive factors endowments, and secondly in the longer run, to the economical integration. The theory was proposed in the 1950s in order to explain development of trade

between Northern and Southern hemispheres (Raines, 2001) but the main idea makes it useful for researching trade processes between the most developed countries and the CEECs in the last decade of the 20th century. Two reasons make it possible. Firstly it is a fact, that predominant part of foreign trade of the CEECs is associated with the most developed countries (EU, Norway, Switzerland, USA, Canada, Japan). Secondly the main premise of differences in productive factors endowment between two trade partners (CEECs versus the most developed countries) appears to be valid in this case. H-O-S theory in the simplest version is based on division of production into two groups: labour intensive and capital intensive. Partner with the comparative advantage of labour endowment specializes itself in production and trade with such products. The same is in the situation of the partner well endowed with capital. As a result in a country characterized by high labour endowment employment should rise in the sectors based on labour and decrease in the capital intensive goods. The basic idea of two factors composition of production was revisited in the modern studies. It is suggested, that more factors should be taken into account but there is still no agreement how many and which (Kaminski, Smarzynska, Cavalcanti, 2000; Neven, 1995; Greszta, Michalek, Sledziewska-Kolodziejska, 2001).

For the purpose of this paper we put sectors into one of two groups judging on their added value level and production capital demands. As in the contemporary world division based on capital seems to be less adequate, it is rational to add into the second group also sectors, whose production seems to be based also on know – how capabilities.[1] However this division could be controversial. Firstly, some sectors could consist of both high endowment of labour and capital (car industry). Secondly, labour force in the industrialized world could be divided onto less or more skilled. Big difference exists between usage of labour in furniture industry (skilled) and mining (unskilled). Thirdly knowledge becomes to be treated as a productive factor. Having this assumption in mind we decided in the sake of simplicity to divide sectors into two groups, as it was proposed in the original H-O-S model. As in analyzed data, sectors are accumulated at 3 digit SITC level, such a decision is more advocated.

[1] Kaminski, Smarzynska, Cavalcani (2000) divided production into 4 groups. They based they division intuitively on judgment of domination of one of following factors: (1) natural resources, (2) unskilled labor, (3) capital, (4) skilled labor. This division although not based on systematical more adjusted to the nature of contemporary economy proved also movement of Polish foreign trade toward modern structure and integration of Polish and EU economies.

Building the model

Thus we propose that there are 3 kinds of variables explaining changes in the trade between Poland and the world, which could be associated with the labour market. First variable indicates influence of the pattern proposed by the H-O-S theory. The second kind of variables is export intensiveness and import penetration, which indicate exposition of a sector for a long term influencing of the trade, because it is obvious that H-O-S premises don't explain the whole spectrum of external powers influencing the trade. The third kind of variables is export annual growth and import annual growth, which indicate the short term changes in the foreign trade, which could affects enterprises, especially those like Polish – very restricted in the availability of resources.

The table bellow shows the data for the second kind of variables.

Table 1. Import penetration, export intensiveness and coverage ratio in percentage in trade between Poland and the EU.

	AVG Export intensity 1989 - 99	**AVG Export intensity 1995 - 99**	**AVG Import Penetration 1989 – 99**	**AVG Import Penetration 1995 – 99**	**AVG Coverage Ratio [2]1989 -99**	**AVG Coverage Ratio 1995 -99**
Food products	12	14	13	12	111	106
Beverages	2	1	2	2	109	80
Tobacco	2	1	9	8	28	25
Wearing apparel, except footwear	91	111	17	18	525	446
Leather products	39	50	49	78	124	66
Footwear, except rubber or plastic	32	35	20	27	216	132
Wood products, except furniture	45	49	9	14	1003	361
Furniture, except metal	53	65	7	8	1010	836
Pottery, china, earthenware	28	29	9	12	406	252
Glass and products	32	33	27	37	81	59
Other non-metallic mineral products	10	11	14	19	215	116
Iron and steal	22	20	13	18	471	224
Non-ferrous metals	41	35	12	17		
SECTORS						
Paper and products	24	31	47	61	58	50
Printing and publishing	8	12	48	47	22	31
Textiles	23	30	62	89	52	34
Industrial chemicals	31	31	53	72	82	43
Other chemicals	17	18	62	76	37	24
Petroleum refineries	3	2	11	9	27	19
Miscellaneous petroleum and	3	2	11	9	27	19

[2] Coverage ratio indicates which share of import is covered by export. 100% indicates balance, less than 100% is deficit, more – surplus. Nevertheless this variable is not used in the further analysis.

coal products						
Rubber products	18	22	24	28	85	77
Plastic products	15	22	39	46	39	47
Fabricated metal products	30	32	29	37	144	85
Machinery, except electrical	23	22	70	86	40	26
Machinery, electric	29	36	57	68	54	53
Transport equipment	31	31	34	44	111	75
Professional and scientific equipment	33	26	150	146	26	18
Other manufactured products	30	36	71	90	37	40

Source: Calculated on WTO Production and Trade Database.

Sector was found export intensive if the value of export intensiveness (share of export of a sector in the output of a sector) was at least near 20% in years 1989-1999, and above 20% in years 1995-1999. Analogically sector was considered import penetrated when the value of import penetration (import share of a sector in the output of a sector) was at least near 20% in years 1989-1999 and above 20% in years 1995-1999. In the empirical model developed bellow these variables were taken as dummy variables, according to the next table.

In order to operationalize the H-O-S assumptions we decided to divide sectors into 4 groups. Firs is a group of high import penetration (IMPE) and high export intensity (EXIN) from the world. Second group consist of sectors with high EXIN and low IMPE. In the third group we put sectors of high IMPE and low EXIN. Forth group consists of sectors with low both EXIN and IMPE.

Table 2. Sectors divided by export intensity and import penetration in trade between Poland and the EU.

		EXPORT INTENSITY	
		HIGH	**LOW**
IMPORT PENETRATION	**HIGH**	- Leather products - Glass and products -Footwear, except rubber or plastic *-Fabricated metal products* *- Transport equipment* *-Paper and products* *-Textiles* *-Industrial chemicals* *-Rubber products* *-Plastic products* *-Machinery, except electrical* *-Other manufactured products*	*-Printing and publishing* *-Other chemicals* *-Machinery, electric* *-Professional and scientific equipment*
	LOW	-Wearing apparel, except footwear -Iron and steal -Wood products, except furniture -Furniture, except metal -Pottery, china, earthenware - Non-ferrous metals	-Food products -Beverages -Tobacco -Other non-metallic mineral products *-Petroleum refineries* *-Miscellaneous petroleum and coal products*

Capital sensitive sectors in *italics.*

The third kind of independent variables is annual export and import growth.

The dependent variable is annual percentage growth of employment in the given sectors. Short summary of employment changes in the sectors is presented in the table bellow.

Table 3. Changes in employment and productivity and the H-O-S model

	EMPLOYMENT		Annual growth of employment 1989-1999	Average Annual growth of employment in 1995-99
	1989	1999		
LABOR BASED SECTORS				
Food products	377	383	0%	2,5%
Beverages	29	36	1,7%	2,3%
Tobacco	11	12	1%	0%
Wearing apparel, except footwear	186	160	-1,5%	1,6%
Leather products	39	17	-4,1%	3,7%
footwear, except rubber or plastic	94	58	-4,0%	1,8%
Wood products, except furniture	73	46	-4,2%	-2,7%
Furniture, except metal	92	61	-3,7%	-2,3%
Pottery, china, earthenware	24	26	0%	6,5%
Glass and products	48	51	0,5%	6,0%
Other non-metallic mineral products	108	135	1,8%	9.8%
Iron and steal	144	134	-0,8%	2,4%
Non-ferrous metals	31	28	-0,5%	2,9%
CAPITAL/KNOW HOW BASED SECTORS				
SECTORS				
Paper and products	46	24	-5,6%	-3,4%
Printing and publishing	44	20	-6.9%	-4,2
Textiles	322	193	-4%	1%
Industrial chemicals	44	20	-6.9%	-4,2
Other chemicals	108	68	-4,1%	-1,0%
Petroleum refineries	69	49	-1,9%	-1,3%
Miscellaneous petroleum and coal products	16	15	-0,2%	-0,8
Rubber products	13	6	-5,7%	-2,2%
Plastic products	36	18	-6,5%	-3.9%
Fabricated metal products	44	39	-1,4%	1,6%
Machinery, except electrical	223	213	-0,4%	6,8%
Machinery, electric	462	290	-4,4%	1,2%
Transport equipment	256	125	-6,4%	-0,1%
Professional and scientific equipment	301	265	-1,3%	4,8%
Other manufactured products	40	13	-9,7%	-6,4%

Source: Calculated on WTO Production and Trade Database

8. Proposed model

Data taken into the analysis are taken from WTO Trade and Production Database. Data are accumulated at the 3-digit manufacturing industry level. Employment level, output, export value and import value are provided in the database. Export and import is divided by geographical destinations. For year 1999 output value is not provided and was extrapolated for the purpose of this paper. Because of important economical distortions in the beginning of

the 1990s (Boeri and Oliveira, 2000) we decided to exclude data from years 1989 – 1992. Thus, we pool data for 28 sectors for years 1993 – 1999 and as result we had 196 observations. To include H-O-S effects we added dummy (qualitative) variable LC indicating that sector exploit work based competitive advantage (value 1) or not (value 0).
EX and IM are variables indicating dynamics (annual growth) of export and import in the sector. Even if a sector notices export or import growth its impact could be problematic and could dependent on actual competition created by import or opportunities created by export. The rationale hidden behind those variables is given above.

High export intensity ratio informs that a sector sells big share of its output abroad. Suspicion could be made that in those sectors jobs exist in much extent thanks to demand created by other countries. High import penetration indicates strong competition from foreign suppliers. In sectors having high values of import penetration ratio domestic producers are under competitive stress.

Stepwise multiple regression analysis was conducted for the proposed equation:

$$\Delta EMP_{i,t} = \beta_0 + \beta_1 \Delta EX_{i,t} + \beta_2 \Delta IM_{i,t} + \beta_3 LC_{i,t} + \beta_4 IMPE + \beta_5 EXIN + \beta_6 OUT_{i,t} + \varepsilon_{i,t}$$

Where:
EMP indicates annual percentage change of employment in sector i in a year t;
EX indicates annual percentage change in export from Poland in sector i in year t;
IM indicates annual percentage change in import from Poland in sector i in year t;
LC is a dummy variable taking 1 for sector classified as work-intensive and 0 for sectors classified as capital intensive
IMPE is a dummy variable taking 1 for sector classified as highly penetrated by import or 0 when import penetration is low
EXIN is a dummy variable taking 1 for sector classified as having high export penetration or 0 when export share in output generated by sector is low
OUT indicates annual percentage
ε is a noise error term.

Calculations were made using STATISTICA 5.5 PL.

Table 4. Results of multiple regression analysis for the model with 6 variables

	(1)	(2)	(3)	(4)	(5)
LC	0.248***	0.292***	0.300***	0.297***	0.310***
Standard error	0.069	0.068	0.067	0.067	0.067
Significance	0.000	0.000	0.000	0.000	0.000
OUT		0.265***	0.272***	0.276***	0.287***
Standard error		0.068	0.067	0.067	0.067
Significance		0.000	0.000	0.000	0.000
IM			-0.170**	-0.170***	-0.230***
Standard error			0.066	0.066	0.076
Significance			0.013	0.009	0.003
EXP_INT				0.120*	0.134**
Standard error				0.066	0.067
Significance				0.072	0.046
EXP					0.106
Standard error					0.076
Significance					0.167
F-test	12.762	14.419	11.953	9.890	8.335
Significance	0.000	0.000	0.000	0.000	0.000
n. of observation	194	193	192	191	190
R^2	0.062	0.130	0.157	0.171	0.180
R^2 adjusted	0.057	0.121	0.144	0.154	0.158

** indicates significance at 10% level; ** significance at 5% level; *** significance at 1% level*

F(5,189)= 8.335, p<0.000

R^2 = 0.179

R^2 adjusted = 0.158

Table 5. Estimation for the proposed model.

Variable	LC	OUTPUT	IMPORT	EXPORT_PEN	EXPORT
Beat estimation	0.310***	0.287***	-0.230***	0.134**	0.106
Standard error	0.067	0.067	0.076	0.067	0.076
Significance	0.000	0.000	0.003	0.046	0.167

F(5,189)= 8.335, p<0.000

R^2 = 0.179

R^2 adjusted = 0.158

Conclusions

As we can see from the above results, there are evidences for positive connection between employment growth and output. The higher growth of production in a sector is, the more chances exist for the growth of employment in the sector. This obvious relationship occurred to be valid in the investigation. There is also evidence, that sectors with high labour endowment have better results in employment. Sectors with high capital/know-how endowment are less resistant to employment decrease.

Import growth has negative effect on employment changes, but variable indicating import penetration was excluded from the model. Thus moderate evidence exists for negative impact of import on the employment level in 28 sectors. Stronger evidence exists for impact of export for employment growth. Positive and statistically significant connection was found between employment and export penetration. There is also a positive link between export growth and employment, but not at the statistically significant level. R squared adjusted is amounted to almost 16% what is not high value, but as it was already said more factors influenced employment at the time. It seems that moderate evidences were found for traditional theories linking trade and employment. It seems that in the last decade of the 20th century Polish labour market in the industry profited from export and was hurt by import. It is in accordance with the observations. Many enterprises were closed due to high competition from foreign production. On the other hand sectors based on labour endowment manage to expand their production to the foreign markets.

Discussion

It has occurred that import negatively affects employment, whereas export helps to create new or at least to protect already existing jobs in the industry sectors. But due to the data unavailability, model was tested only for years before 2000. It is very probable, that in the first decade of the Polish transformation link between trade and employment could be explained on the basis of the traditional theory. But in the same time, new patterns of trade emerged, and were even more visible in the next years. Due to the high FDIs spendings Polish trade became to resemble modern Intra Industries Trade (ITT). Poland became to export also more sophisticated goods, what created possibilities for expansion of employment in the high-tech industries. It must be also beard in mind, that industry gives only 1/6 of all workplaces in Poland. But deficit it generates could act more destructively on the other sectors of the economy. One of the macroeconomical example could be the policy of high interests rates, which was introduced in the last years, due to the rising inflation and dangerous deficit on the

current account balance. It is highly difficult to employ all of these factors into one model, because it goes without saying, that in the same time import enabled modernisation of the economy and creation many new workplaces.

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