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Impact of Changes in Competitiveness on Labour Market Developments

in Polish Manufacturing Industry over the Years 1995–2001¹

Abstract

The paper focuses on the relation between competitiveness of the industry and its performance regarding employment. We introduce two concepts of competitiveness, which are well-grounded in economic theory and employ them to the analysis of competitiveness in the Polish processing industry branches. Both detailed descriptive and econometric analyses are carried out to determine the links between competitiveness and the level of employment in particular branches. In the study we are also aware of the influence of macroeconomic situation on labour market developments.

1. Introduction

The main goal of the paper is to attempt to analyse links between changes in the level of economic competitiveness of an industry on one side and developments in the labour market on the other. The analysis is carried out in 91 NACE 3-digit branches of processing industry and covers the period of 1995–2001.

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As a starting point (part 2) of the study, some concepts of competitiveness itself are discussed and theoretical links between industry competitiveness and labour market are presented with references to theoretical mainstreams in economics. This introduction leads to developing two measures of competitiveness, which allow carrying out the analysis in two disjunctive aspects of competitiveness: in the domestic or external market. The theoretical part is recapitulated by some early hypotheses regarding the expected results of the empirical analysis. Part 3 states precisely all the statistical data used in the empirical part as well as its sources. The main part investigates dependency between competitiveness of the industry and the situation in the labour market through both an extensive descriptive analysis (part 4), and an econometric model (part 5), based on the Keynesian labour demand function. At all stages the paper devotes much space to discussing and interpreting the results, referring to a wide range of variables, from typically macroeconomic to branch-specific. Eventually, an attempt is also made to compare the research outcomes obtained for the both mentioned types of competitiveness. Part 6 sums up and draws major conclusions from this complex research.

2. Theoretical background

Competitiveness is a vast notion encompassing different aspects of relative comparison of economic units (enterprises, branches, industries). In the context of the goal of this paper the most appropriate seems to be the approach based on international trade theory, which accounts for competitiveness developments on the microeconomic level (See: Lubiński 1995, p. 10; Wziątek-Kubiak 2003, p.17; Jakóbiak 2001, p. 6; Balassa 1965, p. 101; Bieńkowski 1998; Bossak 2000, p. 47). On this ground, the level of competitiveness and its changes are revealed by export and import characteristics (structure and volume). The measures commonly used for evaluating competitiveness are, among others, share of a domestic branch in world imports (exports), the indicator of relative markets share (RMS), the import penetration indicator and the share in meeting domestic demand.

Competitiveness, in every possible definition of the word, is strongly linked to labour market. The dependency between the two can be explained basing on economic theory. Referring to the Keynesian economics, an increase of engagement in international markets means increased popularity of goods supplied by a given branch. Higher demand for goods will eventually find its reflection in the growth of labour demand. We can therefore expect positive

dependency between changes of competitiveness and volume of labour demand. Similar conclusions can be reached while analysing neoclassical economics. An improvement of competitiveness, being a result of favourable changes occurring on the supply side (e.g. lowering unit labour cost), will foster demand for the production factor of increased relative efficiency.

It is worth to notice that the sources of changes in competitiveness on the supply side can be found in optimisation processes of production factors utilisation. In practise it can lead to actions resulting in employment reductions. Therefore, short-run effects of competitiveness improvements may be reflected by reductions in the number of employed. However, following the adjustment period, as soon as changes in sales volume becomes apparent, they should start to develop in a similar way.

In this paper the two following measures are employed to analyse dependency between employment and competitiveness: share of domestic production in total domestic demand (CCA) and share of export from Poland in total internal export of the European Union (CCC).

The competitiveness indices were calculated according to the following formulas:

CCA index:

$$CCA_{it} = \frac{Y_{it}}{Y_{it} - Ex_{it} + Im_{it}}$$

where:

CCA_{it} – value of competitiveness indicator CCA in i-th branch in year t;

Y_{it} – sold production in i-th branch in year t;

Ex_{it} – volume of exports from i-th industry in year t;

Im_{it} – volume of imports from i-th industry in year t.

CCC index:

$$CCC_{it} = \frac{Ex_{it}^{UE}}{D_{it}^{UE}}$$

where:

CCC_{it} – value of competitiveness indicator CCC in i-th branch in year t;

Ex_{it}^{UE} – volume of exports from Poland to the European Union in i-th industry, year t;

D_{it}^{UE} – volume of the total internal exports in the European Union comprising products manufactured by i-th industry in year t.

Positive changes in values of the mentioned indicators will give evidence of a rising level of competitiveness in a given industry. This is due to the facts that:

- An increase of the domestic production's share in total consumption (CCA) reveals relative improvement of the domestic branch against external, which means rising competitiveness.
- An increase in the share of imports from Poland in total EU internal export indicates relative improvement in evaluation of goods brought to Poland, thus rising industry competitiveness of the country of their origin.

Positive changes of both employed indicators should eventually lead to growth in labour demand.

The CCA index value rises when domestic goods are better valued by consumers than imported goods. This allows the domestic enterprises to increase production, which in turn should translate into higher demand for labour.

A positive change of CCC means higher share of Polish goods on European Union markets. This improvement of their evaluation in relation to substitutes exported by other EU countries onto the internal market favours growth in sales. The expected outcome is an increased demand for labour in Polish enterprises.

3. Statistical data

The following variables were used for purposes of analysing dependency between competitiveness and employment: employment, sales revenues, productivity and also competitiveness indicators: share of domestic production in total domestic demand and share of the Polish exports in total internal export of the European Union.

The research covered the Polish industrial enterprises' sector. The statistical data being a basis of the analysis accounts for the division of economic activities accordingly with 3-digit NACE. A simplified to NACE-2 digit classification of industries is presented in table 1².

The selection of NACE branches indicates that the analysis was carried out in the production section of industry³. By NACE 3-digit, 91 branches were included⁴.

² For the full list of NACE 2-digit industry branches covered by the research see: annex 1.

³ With exclusion of NACE 37 *Recycling*.

⁴ Some branches were excluded due to breaks in statistical data.

Table 1. Industries covered by the research of dependency between competitiveness and employment (NACE 2-digit classification)

NACE	Name
15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of wearing apparel; dressing and dyeing of fur
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21	Manufacture of pulp, paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Manufacture of chemicals and chemical products
25	Manufacture of rubber and plastic products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of fabricated metal products, except machinery and equipment
29	Manufacture of machinery and equipment n.e.c.
30	Manufacture of office machinery and computers
31	Manufacture of electrical machinery and apparatus n.e.c.
32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision and optical instruments, watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
36	Manufacture of furniture; manufacturing n.e.c.

Source: own.

The source of the required information were data obtained by the Center for Social and Economic Research from the Central Statistical office (GUS, financial reporting F01 and SAD declarations) and from Eurostat (New Cronos). The obtained statistical data covered the period 1995–2001.

4. Descriptive analysis (Employment, production, productivity and competitiveness indices of industrial enterprises in Poland over the years 1995–2001 – statistical analysis)

In this part of the paper we present characteristics of particular variables covered by the analysis over the period 1995–2001. It seems extremely useful for the proper evaluation of the data presented to draw a general picture of macroeconomic trends occurring in Poland during this time. This is especially important due to the fact that years 1995–2001 saw radical changes of the country's economic situation, which frequently had crucial impact on performance of particular industries.

4.1. Short characteristics of Poland's macroeconomic situation over the years 1995–2001

Following the dynamic economic growth between 1995 and 1997, the Polish economy entered in 1998 a period of slowdown. That was revealed both in lower pace of GDP growth rate and in rising unemployment rate (see: table 2).

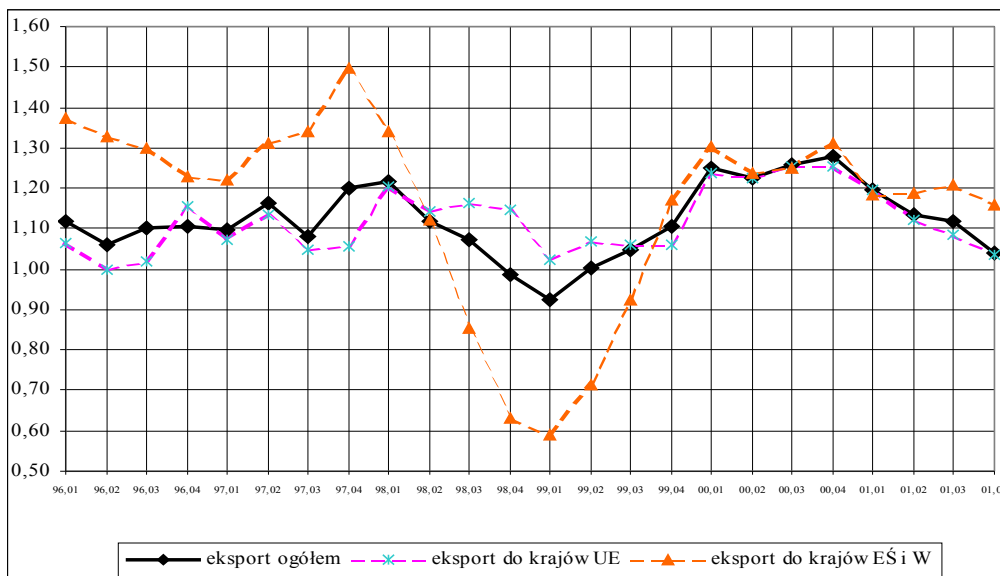
Table 2. Selected macroeconomic variables in Poland in the years 1996–2001

	1996	1997	1998	1999	2000	2001
Annual growth rate (constant prices, %):						
- GDP	6.0	6.8	4.8	4.1	4.0	1.0
- gross fixed capital outlays	19.7	21.7	14.2	6.8	2.7	-8.8
- individual consumption	8.7	6.9	4.8	5.2	2.7	2.0
- export of goods and services	12.0	12.2	14.3	-2.6	23.2	3.1
- import of goods and services	28.0	21.4	18.5	1.0	15.6	-5.3
Unemployment rate (at the end of the year, %)	13.2	10.3	10.6	15.3	16.0	18.5
CPI (%)	19.9	14.9	11.8	7.3	10.1	5.5

Source: Rachunki kwartalne Produktu Krajowego Brutto w latach 1995–2002 (Quarterly Accounts of Gross Domestic Product in years 1995–2002), GUS, Warszawa 2003; www.stat.gov.pl; www.nbp.pl.

Years 1995–1997 constituted a period of favourable economic situation in the Polish economy: real GDP was rising 6% annually, unemployment and inflation was decreasing. This fostered gross fixed capital outlays, which only in 1997 increased by 22%⁵. However, some signs of possible reversal of this situation could have been observed at that time. For instance, growth in individual consumption was slowing down since the first quarter of 1997. The slowdown was at first compensated by the still rising dynamics of fixed capital outlays, but eventually in 1998 the negative trend in household demand made an impact on decisions of enterprises. The GDP growth rate fell by 2 percentage points, situation in the labour market deteriorated as well. Growth of gross fixed capital outlays started to slacken since the first quarter of 1998. This tendency intensified following another drop in individual demand and turmoil on international markets. Starting from the third quarter of 1998 the effects of “the Russian crisis” added to further deterioration of the situation. The dynamics of exports of goods to the central and eastern European countries (CEECs) was on the decline since the first quarter of 1998 (see: graph 1).

Graph 1. Quarterly dynamics of exports of goods over the years 1996–2001
(constant prices, analogical period of the previous year = 100)



Source: own on the basis of www.stat.gov.pl.

⁵ Gross fixed capital outlays comprise „investment outlays incurred for fixed capital and developing non-physical and legal values (Quarterly Accounts of Gross Domestic Product in years 1995–2002, GUS, Warszawa 2003, p. 24).

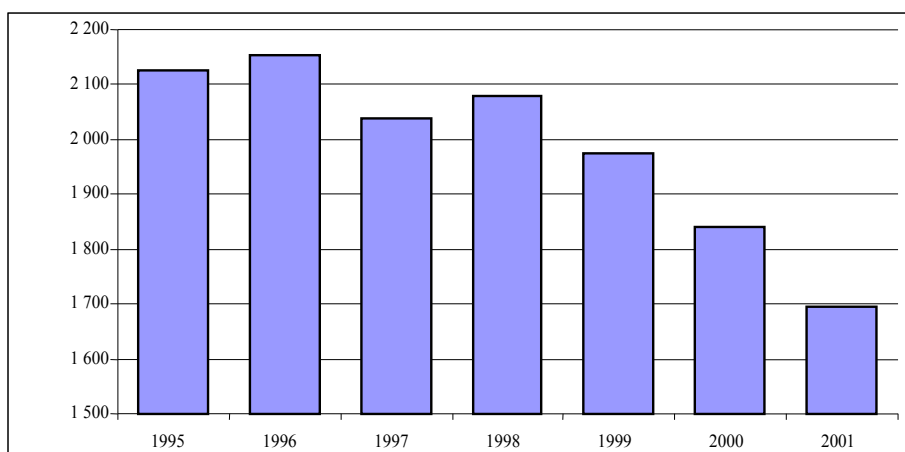
Negative trends intensified in subsequent quarters causing a drop in the volume of export: in the first quarter of 1999 exports to CEECs reached merely 60% of its value from the precedent year.

It needs to be emphasised that the situation in exports was also influenced by the weakening of the demand growth for Polish products in non-CEECs in 1999. Having drawn this general picture, we shall now discuss changes of the selected economic variables in the processing industry branches.

4.2. Trends in employment over the years 1995–2001 in 91 branches of industry

The statistical data obtained from GUS indicate that overall employment in those 91 branches of processing industry was on the decline during the period analysed.

Graph 2. Overall employment in the analysed 91 branches over the years 1995–2001 (thousands)



Source: own calculations on the basis of data from GUS.

It is worth to notice that pace of changes in employment differed in particular years. The most striking drop in employment was seen in 1999.

Table 3. Dynamics of changes in overall employment in 91 branches over the years 1996-2001

1996	1997	1998	1999	2000	2001
1.25%	-5.35%	2.03%	-4.96%	-6.86%	-7.88%

Source: own calculations on the basis of data from GUS.

These negative changes were related to the reaction of enterprises for deterioration of the economic situation, which became apparent in 1998 (see: table 1).

Considering changes in particular branches we should emphasise large differences regarding their performance. The gap index varied in particular years ranging from 52 to 250 percentage points.

Table 4. Rate of employment change differentiation in 91 branches over the period 1995-2001

	1996	1997	1998	1999	2000	2001
Variation ratio (absolute value)	6.43	3.05	8.24	2.63	1.26	3.29
Gap index (pp)	73	129	154	75	52	250

Source: own calculations on the basis of data from GUS.

The values of the indicators in 1998 may suggest polarisation of branches regarding the pace of employment change. This can arise from asymmetric effects of export breakdown in particular industries. It should also be mentioned that the indicator values in 2001 can suggest the existence of specific branches, which differ remarkably from the majority of others.

Years of highest drops in employment were characterised by the lowest differentiation across the sample. This means that the period of economic slowdown from the late 90s had severe consequences in most of researched branches of the processing industry. A confirmation of this hypothesis can be found in decline of share of industries revealing positive changes in employment (from 50% in 1996 to 13% in 2001).

Table 5. Branches of the processing industry characterised by the highest dynamics of employment over the years 1995–2001 (1995=1)

296	Manufacture of weapons and ammunition	4.672
362	Manufacture of jewellery and related articles	1.753
204	Manufacture of wooden containers	1.682
267	Cutting, shaping and finishing of ornamental and building stone	1.608
252	Manufacture of plastic products	1.602
343	Manufacture of parts and accessories for motor vehicles and their engines	1.530
282	Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers	1.510
281	Manufacture of structural metal products	1.508
221	Publishing	1.490
205	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	1.487

Source: own calculations on the basis of data from GUS.

The average growth rate of employment in the 10 best branches fell down significantly between 1998 and 2000 (by 37.4%, 18.7% and 8.2% respectively)⁶. Branches with the highest growth of employment are listed in table 5.

We should emphasise that the growth of employment in NACE 296 and 362 was generated mainly by sudden increase in just single year. In case of NACE 296 (Manufacture of weapons and ammunition) this may be linked with Poland's participation in the war in Iraq (employment in 2001 in this section went up by almost 200%). In case of 5 industries (NACE 252, 204, 205, 221, 281, 343) this growth of employment was more stable since each of them at least three times during the period was among industries of highest employment growth.

Branches, where employment was being reduced to the highest extent are presented in table 6.

⁶ In 2001 the average growth rate among top ten industries increased to 22.7%, which was however mostly caused by contribution of one branch: *Manufacture of weapons and ammunition*. The average growth rate of employment in the remaining 9 industries amounted to ca 3.6%.

Table 6. Processing industry branches with highest rates of decline in employment between 1995 and 2001 (1995=1)

354	Manufacture of motorcycles and bicycles	0.442
341	Manufacture of motor vehicles	0.416
271	Manufacture of basic iron and steel and of ferro-alloys	0.406
181	Manufacture of leather clothes	0.398
171	Preparation and spinning of textile fibres	0.391
293	Manufacture of agricultural and forestry machinery	0.386
172	Textile weaving	0.366
191	Tanning and dressing of leather	0.343
247	Manufacture of man-made fibres	0.287
363	Manufacture of musical instruments	0.186

Source: own calculations on the basis of data from GUS.

The volume of labour stock in these industries decreased by 55% to 80%. This decrease was relatively stable over time and occurred during most of the analysed years.

4.3. Trends in real output in 91 branches of the processing industry over the period 1995–2001

The analysis of the volume of output was based on information regarding revenues from sales of goods in particular branches. These data were deflated by the PPI index (for NACE 2-digit). Over the years 1995–2001 the real value of output was generally on the increase.

Table 7. Aggregate production growth rate in 91 industrial branches over the years 1996–2001 (in real terms)

1996	1997	1998	1999	2000	2001
11.1%	13.1%	5.9%	1.0%	8.0%	-1.3%

Source: own calculations on the basis of data from GUS.

On the basis of data enclosed in table 7 one can notice that since 1997 the positive growth rate of output weakens. What is more, in 2001 the researched

enterprises revealed decline in sales of products by more than 1%. Reasons of the decrease in production are twofold. Firstly it is the lowered domestic demand growth rate and secondly – the exports breakdown.

It must be noticed that changes occurring in industry were significantly diversified across branches. The weakening of real output growth rate, seen in 1998, affected as much as 78% of the researched branches, from which 30 (33% of the total number) recorded absolute decline in volume of output. At the same time some branches saw outstanding growth in sold production (NACE 362 recorded an increase of 489%)⁷.

Table 8. Measures of differentiation in real output rate of change in 91 branches over the years 1995–2001

	1996	1997	1998	1999	2000	2001
Variation ratio (absolute value)	1.26	0.98	4.58	8.03	1.31	16.80
Gap index (pp)	84	95	522	90	68	329

Source: own calculations on the basis of data from GUS.

In subsequent years the downward tendency was preserved which caused more and more branches recording negative growth rates in sales. In 2001 there were already 51 such industries (that is 56% of total number). High values of the variation measures in 2001 result mainly from the situation in NACE 296 (Manufacture of weapons and ammunition), where the production went up by ca 300%⁸. The industries of highest overall production dynamics between 1995 and 2001 are arranged in table 9.

The increase of production in branches, shown in table 9, must be appreciated. At the same time it is worth to mention that the overall production in all researched branches went up merely by 43%. This gives evidence of strong differentiation of industries regarding capabilities to generate growth of product sales.

Branches, which to the highest extent reduced production are presented in table 10.

⁷ The reason of the output growth in 1988 in NACE 362 was a jump in exports by ca 400%.

⁸ It should be stressed that in this year the branch increased exports by ca 230%.

Table 9. Processing industry branches of highest dynamics of real output between 1995 and 2001 (1995=1)

362	Manufacture of jewellery and related articles	9.599
296	Manufacture of weapons and ammunition	7.838
343	Manufacture of parts and accessories for motor vehicles and their engines	4.384
267	Cutting, shaping and finishing of ornamental and building stone	3.912
281	Manufacture of structural metal products	3.168
323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	3.122
282	Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers	3.102
205	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	3.059
300	Manufacture of office machinery and computers	2.800
316	Manufacture of electrical equipment n.e.c.	2.735

Source: own calculations on the basis of data from GUS.

Table 10. Branches of the processing industry of highest decline in real production between 1995 and 2001 (1995=1)

271	Manufacture of basic iron and steel and of ferro-alloys	0.774
192	Manufacture of luggage, handbags and the like, saddlery and harness	0.763
293	Manufacture of agricultural and forestry machinery	0.760
355	Manufacture of other transport equipment n.e.c.	0.717
191	Tanning and dressing of leather	0.710
231	Manufacture of coke oven products	0.693
154	Manufacture of vegetable and animal oils and fats	0.663
247	Manufacture of man-made fibres	0.629
183	Dressing and dyeing of fur; manufacture of articles of fur	0.600
363	Manufacture of musical instruments	0.320

Source: own calculations on the basis of data from GUS.

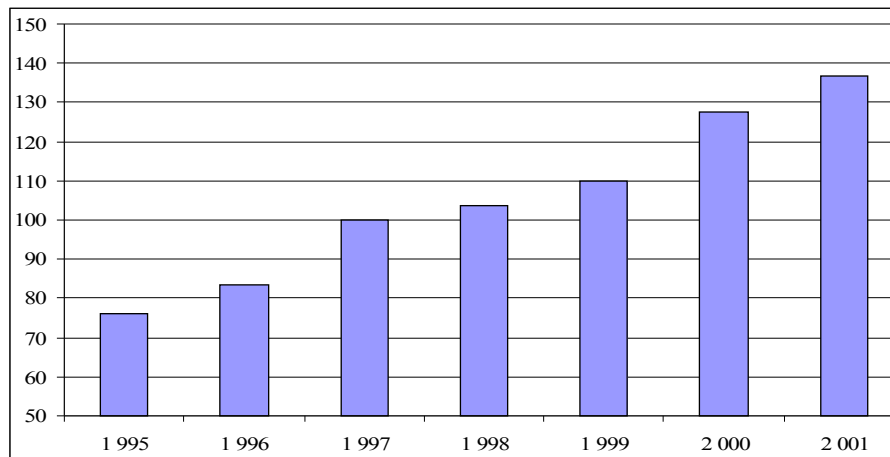
The drop in production in case of these industries ranged from 22% (NACE 271) to 68% (NACE 363). On the overall, reduction of production volume between 1995 and 2001 was recorded in 19 branches (21% of the total number), and from this number just 4 saw a decrease of less than 20%. In group of these 19 industries almost a half (42%) were textile branches (NACE

17, 18, 19). Also chemical industry (NACE 24) had a significant representation in the group.

4.4. Real labour productivity in 91 branches of the processing industry in the years 1995–2001

Real labour productivity was calculated as a relation of revenues from sales (in real terms) to the total employment in a given year. In aggregate values there is a visible growth of productivity over the researched period.

Graph 3. Aggregate real labour productivity in 91 branches of the processing industry between 1995 and 2001 (thousands PLN, constant)



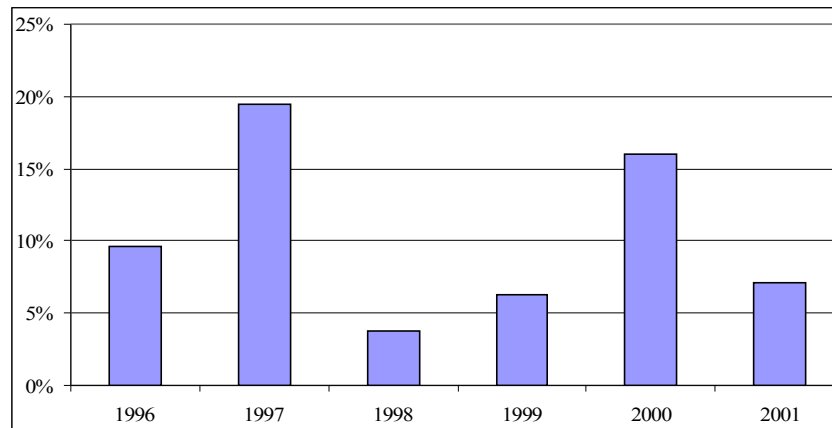
Source: own calculations on the basis of data from GUS.

The pace of growth was significantly different in particular years. The highest growth was seen in 1996 and 1997.

Data presented on graph 4 show significant slowdown of real productivity in the years 1998 and 1999. The reasons of this situation can be seen in lower dynamics of the domestic demand growth as well as in drop of the value of exports. Year 2000 brought effects of first reactions of enterprises to changing situations on markets. The visible increase of the analysed indicator resulted from major employment reduction as well as from increased exports (lasting only one year though). Positive changes in 2001 had their source in advancing

restructuring of the labour force stock. Table 11 presents industries of the highest dynamics in real labour productivity between 1995 and 2001.

Graph 4. Annual growth rates of aggregate real labour productivity in 91 branches of the processing industry between 1995 and 2001



Source: own calculations on the basis of data from GUS.

Table 11. Processing industry branches of highest dynamics of real labour productivity between 1995 and 2001 (1995=1)

362	Manufacture of jewellery and related articles	5.475
341	Manufacture of motor vehicles	4.910
323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	4.723
343	Manufacture of parts and accessories for motor vehicles and their engines	2.865
286	Manufacture of cutlery, tools and general hardware	2.848
352	Manufacture of railway and tramway locomotives and rolling stock	2.677
315	Manufacture of lighting equipment and electric lamps	2.587
211	Manufacture of pulp, paper and paperboard	2.516
300	Manufacture of office machinery and computers	2.496
366	Miscellaneous manufacturing n.e.c.	2.450

Source: own calculations on the basis of data from GUS.

Among the best ranked branches, those belonging to the electro-machine industry dominated. In most of the mentioned branches an increase of

productivity was gradual, revealing high dynamics in subsequent years⁹. In the sole case of the best ranked NACE 362 there was a sudden one-time increase of productivity in 1998, amounting to 163%.

Branches of the lowest dynamics of real labour productivity are arranged in table 12.

Table 12. Processing industry branches of lowest dynamics of real labour productivity between 1995 and 2001 (1995=1)

232	Manufacture of refined petroleum products	1.432
331	Manufacture of medical and surgical equipment and orthopaedic appliances	1.432
204	Manufacture of wooden containers	1.346
221	Publishing	1.329
159	Manufacture of beverages	1.315
158	Manufacture of other food products	1.290
183	Dressing and dyeing of fur; manufacture of articles of fur	1.251
243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	1.195
154	Manufacture of vegetable and animal oils and fats	0.936
231	Manufacture of coke oven products	0.714

Source: own calculations on the basis of data from GUS.

One common characteristic feature of majority of these industries is negative dynamics of productivity recorded in 1998. A possible explanation may be an influence of “the Russian crisis”.

Among branches of lowest labour productivity dynamics there are two, in which drop (in real terms) was recorded.¹⁰: 154, *Manufacture of vegetable and animal oils and fats* and 231, *Manufacture of coke oven products*. In case of the former branch, the slowdown in dynamics occurred mostly in 1996 and resulted from strong employment growth, whilst the level of output remained fairly stable. In the latter case, slackening of labour productivity may have been brought about by the lack of influence of market mechanisms on labour management. During most of the period (up to 2000) there was a decline in production, which was not accompanied by relevant adjustments on the labour demand side. In fact, the situation was opposite: an increase in employment was

⁹ It should be emphasised that NACE: 247, 286, 323 and 341 in at least three years qualified to the top ten of industries with highest growth rate of labour productivity.

¹⁰ In other branches there were slow yet positive changes observed.

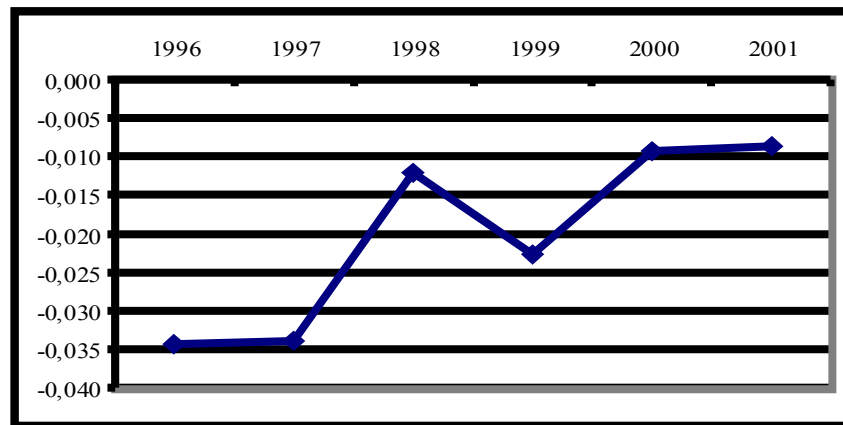
recorded in 1999 by as much as 40%. It was not until years 2000–2001 that some actions promoting efficiency were initiated.

4.5. Developments of the chosen competitiveness indices over the years 1995–2001

4.5.1. Appraisal of the CCA index (share of domestic production in total domestic demand)

Analysing the calculated values of CCA index across branches (accordingly with NACE 3-digit classification), we should notice first of all a negative change of the average value of the indicator in every subsequent year. This may suggest relatively lower appreciation of domestic production as compared to imports.

Graph 5. Average change of CCA index in 91 branches of the processing industry in the years 1995–2001



Source: own calculations on the basis of data from GUS.

One of the possible explanations of this outcome which may be considered is a progressive relative deterioration in competitiveness of the Polish industry. One must however be very cautious while giving this kind of arguments. Firstly, it should be kept in mind that production in most of branches in the analysed period was on the increase. Taking under consideration the rising domestic demand, this means that domestic enterprises were able to develop their activities, yet more slowly than the highly competitive foreign companies. Nevertheless, some efforts were made towards improvement of the current

situation and development on markets. Secondly, the effectiveness of the domestic industry restructuring is confirmed by the annual CCA changes taking less negative values as time goes by. Polish branches took up the challenge of competition and more and more often they are successful in defending their market position. Thirdly, we can presume that domestic companies focus on penetrating foreign markets (if only those markets allow to achieve higher profitability) to a higher extent than formerly. If this should be the case, the dynamics of domestic actions would weaken. Fourthly, it is also worth to consider the macroeconomic conditions. The declining dynamics of domestic demand affected domestic firms' production relatively more severely than the imported production.

One other confirmation of positive transformations in the processing industry is an increasing share of branches revealing growth in ratio of meeting domestic demand (see: table 13).

Table 13. Share of industrial branches revealing positive changes of CCA index in each year

1996	1997	1998	1999	2000	2001
16.5%	17.6%	33.0%	27.3%	47.3%	45.1%

Source: own calculations on the basis of data from GUS.

The changes, which occurred in particular branches differed significantly from each other, which is shown by variation measures in subsequent analysed years (see: table 14).

Table 14. Variation measures of CCA index in 91 branches of the processing industry in each year

	1996	1997	1998	1999	2000	2001
Variation ratio (absolute value)	1.24	1.70	5.52	1.84	5.27	8.62
Gap index (pp)	29.1	53.2	53.1	22.7	40.6	78.1

Source: own calculations on the basis of data from GUS.

The effects of the export collapse from 1998 were significantly diversified. Moreover, the domestic economic slowdown from the last years of the period analysed promoted further diversification of developments in particular branches. The deepest division was seen in 2001.

The analysis of disaggregated data (NACE 3-digit) shows branches of greatest positive changes in the CCA value over the 1995–2001 period.

Table 15. Processing industry branches of highest increases in the CCA value (in percentage points)

296	Manufacture of weapons and ammunition	37.0
362	Manufacture of jewellery and related articles	11.4
263	Manufacture of ceramic tiles and flags	10.7
221	Publishing	10.7
342	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	7.3
267	Cutting, shaping and finishing of ornamental and building stone	6.3
151	Production, processing and preserving of meat and meat products	6.3
222	Printing and service activities related to printing	5.9
281	Manufacture of structural metal products	5.5
212	Manufacture of articles of paper and paperboard	4.6

Source: own calculations on the basis of data from GUS.

In case of NACE 296, the increase in share amounted to as much as 37 percentage points. This leader position was assured in 2001, when the share in the domestic market increased by more than 35 pp. A similar single-year jump in CCA value was seen in NACE 362 (in 1998, by 39%).

In the remaining cases, the indicator was growing in value more evenly. This is confirmed by the data presented in table 16, showing branches with the most frequent value of CCA growth in the researched years.

Table 16. Branches with positive changes in CCA value in more than three years within the 1995–2001 period

Number of years with positive change in value of CCA	NACE ¹¹
5	157, 221 , 266
4	151 , 153, 156, 160, 212 , 252, 263 , 267 , 281 , 283, 292, 342

Source: own calculations on the basis of data from GUS.

As much as seven out of ten branches of the highest overall positive change in CCA value recorded its growth in at least four years.

Table 17 shows industries, which lost share in the domestic market to the highest extent during the analysed period.

¹¹ The 7 marked branches qualified to the top ten industries of highest changes in CCA values between 1995 and 2001.

Table 17. Processing industry branches of deepest declines in the CCA value (in percentage points)

311	Manufacture of electric motors, generators and transformers	-29.6
171	Preparation and spinning of textile fibres	-29.7
315	Manufacture of lighting equipment and electric lamps	-34.7
293	Manufacture of agricultural and forestry machinery	-35.5
247	Manufacture of man-made fibres	-36.5
341	Manufacture of motor vehicles	-37.3
362	Manufacture of jewellery and related articles	5.475
181	Manufacture of leather clothes	-44.7
353	Manufacture of aircraft and spacecraft	-54.3
351	Building and repairing of ships and boats	-71.5

Source: own calculations on the basis of data from GUS.

All of these industries saw a decrease of share in the domestic market by more than 28 pp between 1995 and 2001. A particular severe decline in CCA value occurred in case of NACE 353 (by more than 50 pp) and NACE 351 (by more than 70 pp). The majority of ten worst ranked branches recorded relatively stable annual declines of shares in the domestic market, which confirms that tendencies of those transformations are long-term. Solely in case of NACE 351 in 2001 a severe collapse took place in domestic activity (change of CCA value by nearly 42 pp).

4.5.2. Appraisal of the CCC index (share of export from Poland in total internal export of the European Union)

The second of the analysed competitiveness indices is a share of the Polish export to the European Union in total internal export of the EU (CCC). In the period analysed there were some significant differences in values of this indicator across industries.

Table 18. Basic statistics of CCC index in 91 branches of the processing industry over the period 1995–2001

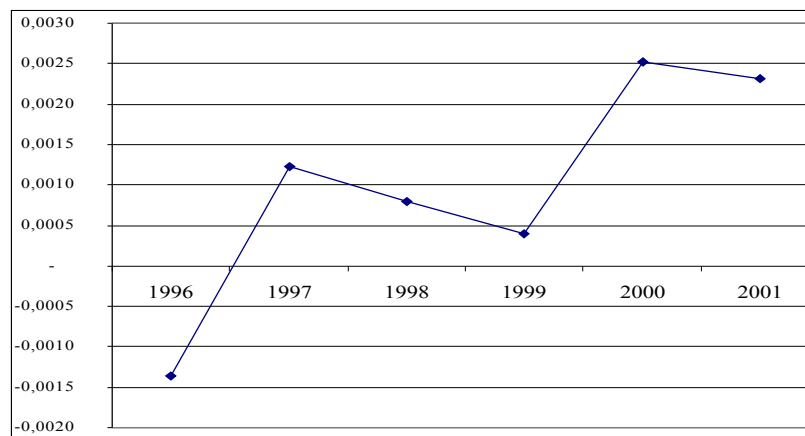
	1995	1996	1997	1998	1999	2000	2001
Min	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.01%
Mean	2.09%	1.95%	2.08%	2.16%	2.20%	2.45%	2.68%

Max	35.27%	27.65%	33.73%	37.06%	26.28%	33.45%	34.73%
Standard deviation	0.046	0.038	0.042	0.044	0.035	0.042	0.043

Source: own calculations on the basis of data from GUS.

Exports from the researched branches of the Polish industry constituted shares ranging from 0.01% to ca 35% of the EU internal trade. The average share was about 2% and revealed a slight upward tendency. The differentiation of branches regarding CCC index remained at a similar level during the analysed period. The CCC value was growing over the whole period.

Graph 6. Average change of CCC index in 91 branches of the Polish processing industry over the years 1995–2001



Source: own calculations on the basis of data from GUS.

These positive changes were somewhat weakened in the years 1998–1999. It can be linked with the lower rate of export growth to the EU countries (especially to Germany). Table 19 shows industries of the highest increase in the CCC value between 1995 and 2001.

Table 19. Branches of the processing industry of highest positive change of CCC between 1995 and 2001 (in pp.)

183	Dressing and dyeing of fur; manufacture of articles of fur	5.7
352	Manufacture of railway and tramway locomotives and rolling stock	4.8
205	Manufacture of other products of wood; manufacture of articles of cork, straw	4.2

	and plaiting materials	
283	Manufacture of steam generators, except central heating hot water boilers	3.6
361	Manufacture of furniture	3.5
314	Manufacture of accumulators, primary cells and primary batteries	3.2
323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	3.0
174	Manufacture of made-up textile articles, except apparel	2.7
355	Manufacture of other transport equipment n.e.c.	2.7
262	Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products	2.1

Source: own calculations on the basis of data from GUS.

It should be appreciated that the mentioned branches recorded relatively high growth of its share in total internal import of the European Union. It becomes even more evident if we consider the average change of the CCC indicator in all 91 industries, which amounts to ca 0.6 pp. A half of the total number of industries from table 19 (183, 352, 361, 323 and 174) were at least three times in the top ten of industries achieving biggest changes of the CCC indicator. This may confirm stability of tendencies towards strengthening of positions of these industries on the EU markets.

Despite of the growth in average value of CCC, as much as 21% branches experienced deterioration in this competitiveness measure during the researched period. However, in majority of industries these changes were not dramatic¹². Only three industries recorded significant decrease in the CCC value: 182 (−1.08 pp), 204 (−8.06 pp) and 265 (−10.18 pp). At the same time those industries were most frequently (at least four times) among branches characterised by the most significant decrease of CCC. Ten industries, which saw the most severe decline in CCC value are presented in table 20.

Table 20. Branches of the processing industry of highest negative change of CCC between 1995 and 2001 (in pp.)

321	Manufacture of electronic valves and tubes and other electronic components	-0.27
193	Manufacture of footwear	-0.28
363	Manufacture of musical instruments	-0.44
231	Manufacture of coke oven products	-0.54

¹² In case of 8 industries (NACE: 364, 244, 160, 246, 242, 241, 351 i 296) they did not exceed -0,1 pp, whilst the further 8 (NACE: 152, 321, 193, 363, 231, 192, 274 i 201) recorded a decline of CCC by not more than -1%.

192	Manufacture of luggage, handbags and the like, saddlery and harness	-0.81
274	Manufacture of basic precious and non-ferrous metals	-0.86
201	Sawmilling and planing of wood; impregnation of wood	-0.90
182	Manufacture of other wearing apparel and accessories	-1.08
204	Manufacture of wooden containers	-8.06
265	Manufacture of cement, lime and plaster	-10.18

Source: own calculations on the basis of data from GUS.

4.6. Comparison of the obtained results regarding changes in competitiveness

Having put together results obtained from both competitiveness indices employed, it must be admitted that divergence of conclusions would arise. Correlation between CCA and CCC equals to only 0.014. This suggests, if theoretical assumptions regarding information value of the indices are correct, that the results obtained describe separate fields of competitiveness of the analysed economic structures.

Setting together best industries regarding competitiveness growth (measured by CCA and CCC, see: table 21) with their performance in the field of employment, could also lead to divergent conclusions. The dependency between competitiveness and employment does not appear to be as straightforward as it emerges from theoretical assumptions.

None of the best ranked industries in the ranking of CCA was qualified to the group of the industries characterised by the highest growth of CCC index. What is more, both measures reveal opposite directions of impact on employment.

Table 21. Changes in employment in branches of highest positive changes in competitiveness between 1995 and 2001

CCA				
NACE	Position of a branch in competitiveness growth ranking (measured by CCA) between 1995 and 2001	CCA change (in pp)	Position of a branch in employment growth ranking between 1995 and 2001	Employment change 1995–2001(in %)
296	1	37.0	1	45.1%
362	2	11.4	2	16.9%
263	3	10.7	16	3.0%
221	4	10.7	10	7.3%
342	5	7.3	28	-0.4%
267	6	6.3	5	8.5%
151	7	6.3	30	-0.6%
222	8	5.9	19	2.1%
281	9	5.5	9	7.5%
212	10	4.6	12	5.8%
CCC				
NACE	Position of a branch in competitiveness growth ranking (measured by CCC) between 1995 and 2001	CCC change (in pp)	Position of a branch in employment growth ranking between 1995 and 2001	Employment change 1995–2001(in %)
205	1	4.24%	7	7.8%
183	2	5.66%	77	-11.2%
352	3	4.75%	68	-8.8%
283	4	3.58%	58	-6.5%
361	5	3.46%	21	1.5%
314	6	3.15%	36	-1.7%
323	7	2.96%	59	-6.6%
174	8	2.72%	33	-1.4%
355	9	2.70%	75	-10.5%
262	10	2.12%	52	-5.0%

Source: own calculations on the basis of data from GUS.

In the top ten industries regarding CCA growth, an increase of share in the domestic market seemed to have been an important factor fostering growth of employment. On average, employment in these branches went up by ca 9.5% during the analysed period. At this point it should be emphasised that in all 91

branches the average change of employment amounted to -3.1% . This gives evidence of strong dependency between labour demand developments and competitiveness in these branches.

If competitiveness is measured by the share of export in total internal export of the European Union, only two out of ten best industries increased employment between 1995 and 2001. Other branches saw declines in the number of employed. The average decline in the top ten industries amounted to -4.3% . This can imply that the necessary condition of achieving success in foreign markets (revealed by the CCC growth) was a reduction of employment.

The discord in conclusions regarding dependencies of the researched competitiveness indices and employment in the best performing industries can provoke to make a few hypotheses. An improvement in the value of indicator measuring share in the domestic market, linked with employment growth can suggest that the market expansion advances along with utilization of the existing technologies and exploiting the possessed capital stocks. In such a situation, the output growth is induced by an increase of employment (accordingly with the short-run production function). The CCC indicator shows changes in competitive position of industries on the basis of data characterising their situation on the European Union market. A statement can be proposed that CCC describes changes in branches on a more demanding market than domestic, covered by CCA. Consequently, the ability to increase share in internal export of the EU requires more radical and deeper transformations.

In particular industries, those which proved to be successful in terms of CCC changes, a restructuring process is implemented towards modernisation of technology, lowering the cost of labour and increase of labour productivity. This appears to be the necessary condition to improve the level of competitiveness. One can expect that securing market share on the EU market in longer perspective will generate additional demand for labour.

We can presume that a difference in potential of changes in CCA and CCC indices values exist across branches. The changes of shares in internal EU export require probably more fundamental transformations than in the domestic market.

A greater accordance of results was found in case of branches characterised by the deepest decline in competitiveness (see: table 22).

Table 22. Changes in employment in branches of highest negative changes in competitiveness between 1995 and 2001

CCA				
NACE	Position of a branch in competitiveness growth ranking (measured by CCA) between 1995 and 2001	CCA change (in pp)	Position of a branch in employment growth ranking between 1995 and 2001	Employment change 1995–2001 (in %)
311	82	-29.6	54	-5.7%
171	83	-29.7	86	-14.4%
315	84	-34.8	34	-1.5%
293	85	-35.5	85	-14.3%
247	86	-36.5	89	-18.2%
341	87	-37.3	83	-13.2%
192	88	-42.0	76	-10.9%
181	89	-44.7	82	-12.7%
353	90	-54.3	56	-6.1%
351	91	-71.5	48	-3.4%
CCC				
NACE	Position of a branch in competitiveness growth ranking (measured by CCC) between 1995 and 2001	CCC change (in pp)	Position of a branch in employment growth ranking between 1995 and 2001	Employment change 1995–2001 (in %)
321	82	-0.27	72	-9.7%
193	83	-0.28	74	-10.4%
363	84	-0.44	90	-21.7%
231	85	-0.54	22	1.0%
192	86	-0.81	76	-10.9%
274	87	-0.86	66	-7.8%
201	88	-0.90	38	-2.0%
182	89	-1.08	57	-6.3%
204	90	-8.06	3	9.6%
265	91	-10.18	71	-9.5%

Source: own calculations on the basis of data from GUS.

In case of branches arranged in table 22, a decline in value of competitiveness indices entailed reduction of employment (on average by 10% for CCA and almost 7% for CCC). The direction of dependency stands in line with our expectations emerging from theoretical assumptions regarding appraisal of relations between the competitiveness measures and labour demand. The obtained results can be interpreted as follows: industries, which recorded deterioration in competitiveness (that is industries, which have lost the competitiveness battle against foreign enterprises) were forced to limit their area of activity and, consequently, reduce employment.

5. Econometric analysis

The impact of competitiveness on labour demand in the analysed branches was also verified using an econometric model. In the analyses presented further in this point, we use statistical data referring to the Polish economy, sourcing from the CASE database and covering the years 1995 to 2001. In order to test for an impact of the competitiveness indicators CCA and CCC on labour demand changes, the following Keynesian labour demand equation was estimated:

$$\ln(L_{it}) = \alpha - \beta t + \gamma_A CCA_{it} + \gamma_B CCC_{it} + \phi \ln(Y_{it}) \quad (A.1)$$

$$\Delta \ln(L_{it}) = -\beta + \gamma_A \Delta CCA_{it} + \gamma_B \Delta CCC_{it} + \phi \Delta \ln(Y_{it}) \quad (A.2)$$

where:

L_{it} – number of employees in i -th branch ($i=1, 2, \dots, 91$; accordingly with the NACE 3-digit classification of industries shown in appendix 1) in year t ($t=1995, 1996, \dots, 2001$);

Y_{it} – revenues from sales of products in i -th branch in year t ;

CCA_{it} – competitiveness indicator CCA in i -th branch in year t ;

CCC_{it} – competitiveness indicator CCC in i -th branch in year t ;

t – time variable taking a value of 100, 101, ..., 107 respectively in years 1995, 1996, ..., 2001;

$\alpha \in \Re$ – constant with no direct economic interpretation;

$\beta > 0$ – rate of labour demand decline, which would occur if CCA, CCC and Y variables remained constant. The existence of this rate of decline can result from technical progress inducing labour productivity growth;

$\gamma_A \in \Re$ ($\gamma_B \in \Re$) are parameters revealing an impact of the CCA (CCC) indicator on labour demand volume;

$\phi \in (0;1)$ – *ceteris paribus*, elasticity of labour demand with respect to sold production. Equations (A.1)–(A.2) were estimated employing the constant diversification procedure for each branch.

The estimated values of parameters are presented in table 23.

Table 23. Estimated values of parameters in equations (A.1)–(A.2) with diversified constant¹³

Explanatory variable	Exogenous variable					
	ln(L)			$\Delta \ln(L)$		
Constant	61.829 (1.803)	127.264 (3.625)	64,636 (1,880)	-0,0412 (-1,059)	-0,0470 (-1,217)	-0,0418 (-1,078)
CCA	0.638 (7.742)	-	0,629 (7,596)	-	-	-
CCC	-	-0.977 (-1.773)	-0,582 (-1,106)	-	-	-
ΔCCA	-	-	-	0,115 (1,234)	-	0,113 (1,212)
ΔCCC	-	-	-	-	-0,682 (-1,602)	-0,674 (-1,584)
t	-0.0280 (-1.629)	-0.0609 (-3.463)	-0,0294 (-1,706)		-	-
ln(Y)	0.557 (23.470)	0.647 (29.368)	0,560 (23,459)		-	-
$\Delta \ln(Y)$	-	-	-	0,380 (11,089)	0,405 (14,032)	0,382 (11,159)
R ²	0.992	0.992	0.993	0,611	0,612	0,613
Adj. R ²	0.991	0.990	0,991	0,526	0,527	0,528
Number of observations	635			544		

Source: own calculations.

- The following strictly statistical conclusions can be drawn from the estimation results of parameters in equations (A.1)–(A.2):
- Elasticity of employment with respect to production sold in the sample took values of 0.55 to 0.65 in case of (A.1) and 0.38 to 0.41 in case of (A.2).
- The CCA competitiveness indicator turned out to have a significant, positive impact on the volume of labour demand in case of equation (A.1), whilst in case of the equation (A.2) it was not statistically significant.

¹³ Constant was diversified across time and branches.

- The CCC practically appeared to be insignificant in determining employment (it is on the edge of significance as t-statistics show). It is worth to mention nevertheless that a negative value was obtained in case of CCC, which suggests that an increase of its value may have had some negative impact on employment.

6. Summary

The research outcomes of the analysis presented in this paper can be summed up as follows:

- A drop in employment, which was recorded in the Polish industry following 1998 was determined to a large extent by the economic slowdown from the years 1997–2001. It must be emphasised however that a decrease in employment and in output growth rate was significantly differentiated across branches of industry. This means that it was not only the dynamics of GDP but also structural changes and structural transformation of the consumption, investment and external demand were important factors influencing employment.
- Among branches, which saw largest increase in employment between 1995 and 2001 there were: NACE 296, 362, 204, 267, 252, 343, 282, 281. In these industries employment went up by more than 50% over the period. The most severe drop in employment was recorded in branches: NACE 181, 171, 293, 172, 191, 247 and 363 – by more than 60%.
- The highest dynamics of production growth (by more than 300%) was observed in the following industries: 362, 296, 343, 267, 281, 32, 282 and 205. On the other hand, in branches 231, 154, 247, 183 and 363 a decrease of production occurred by more than 30% between 1995 and 2001.
- A level of competitiveness in a branch can be measured by an indicator reflecting the share of production in the domestic (CCA) or foreign market (CCC). Both descriptive and statistical analyses of an impact of these measures on labour demand in particular branches lead to conclusions that, firstly, a fairly strong and positive impact exists of CCA indicator value on employment in the Polish industrial branches. Secondly, the influence of the indicator reflecting expansion to foreign markets seems on the volume of employment seems to have been negative in the analysed period. The expansion to external markets of the European Union was linked with a decline in employment in particular branches. Thirdly, the changes in values of the indicators turned out to have much smaller impact on employment than the volume of production.

- The CCA and CCC indicators describe different aspects of competitiveness. Moreover, it appears from the analysis that these aspects are irrespective. Different actions are required to achieve success in each of these two fields. The processes initiated in branches revealing highest positive changes of shares in internal import of the European Union seem to be deeper, encompassing also technological transformations. Industries competing on the domestic market act basing upon the short-run production function. This may mean that an investment barrier appear at the stage of selecting strategies to increase competitiveness: branches lacking sufficient capital focus on the domestic market, whilst industries with capabilities to incur enough development funds, carry out an expansive policy on international markets.

Bibliography

- Balassa B. (1965), *Trade Liberalisation and Revealed Comparative Advantage*, „The Manchester School of Economic and Social Studies”, Vol. XXXIII, p.101.
- Bieńkowski W. (1998), *The Applicability of Western Measurement Methods to Assess East European Competitiveness*, „Comparative Economics Studies”, Vol. XX, No 3.
- Bossak J. (2000), *Międzynarodowa konkurencyjność gospodarki kraju i przedsiębiorstwa. Zagadnienia teoretyczne i metodologiczne (International competitiveness of the economy and an enterprise. Theoretical and methodological issues)*, [in:] *Konkurencyjność gospodarki Polski w dobie integracji z Unią Europejską i globalizacji (Competitiveness of the Polish economy in the era of integration with the European Union)*, ed. J. Bossak, W. Bieńkowski, IGŚ SGH, Warszawa.
- Jakóbik W. (2001), *Konkurencyjność gospodarki polskiej (Competitiveness of the Polish Economy)*, 7th Congress of Polish Economists, PTE, Workbook 7, p. 6.
- Lubiński M. (1995), *Proces integrowania się ze wspólnotami europejskimi jako czynnik wzrostu międzynarodowej konkurencyjności polskiej gospodarki (The process of integration with European Communities as a factor of improvement in international competitiveness of the Polish economy)*, Final Report no 40, IRiSS, Warszawa.
- Wziątek-Kubiak A. (2003), *Konkurencyjność polskiego przemysłu (competitiveness in the Polish industry)*, Dom Wydawniczy Bellona, Warszawa, p. 17.
- Rachunki kwartalne Produktu Krajowego Brutto w latach 1995–2002 (Quarterly Accounts of Gross Domestic Product in years 1995–2002)*, GUS, Warszawa 2003.
- www.stat.gov.pl.
- www.nbp.pl.

ANNEX

NACE 3-digit classification of branches researched in the paper and forming processing industry.

NACE	Name
151	Production, processing and preserving of meat and meat products
152	Processing and preserving of fish and fish products
153	Processing and preserving of fruit and vegetables
154	Manufacture of vegetable and animal oils and fats
155	Manufacture of dairy products
156	Manufacture of grain mill products, starches and starch products
157	Manufacture of prepared animal feeds
158	Manufacture of other food products
159	Manufacture of beverages
160	Manufacture of tobacco products
171	Preparation and spinning of textile fibres
172	Textile weaving
173	Finishing of textiles
174	Manufacture of made-up textile articles, except apparel
175	Manufacture of other textiles
176	Manufacture of knitted and crocheted fabrics
177	Manufacture of knitted and crocheted articles
181	Manufacture of leather clothes
182	Manufacture of other wearing apparel and accessories
183	Dressing and dyeing of fur; manufacture of articles of fur
191	Tanning and dressing of leather
192	Manufacture of luggage, handbags and the like, saddlery and harness
193	Manufacture of footwear
201	Sawmilling and planing of wood; impregnation of wood
202	Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards

ANNEX – cont.

203	Manufacture of builders carpentry and joinery
204	Manufacture of wooden containers
205	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
211	Manufacture of pulp, paper and paperboard
212	Manufacture of articles of paper and paperboard
221	Publishing
222	Printing and service activities related to printing
231	Manufacture of coke oven products
232	Manufacture of refined petroleum products
233	Processing of nuclear fuel
241	Manufacture of basic chemicals
242	Manufacture of pesticides and other agro-chemical products
243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
244	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
245	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
246	Manufacture of other chemical products
247	Manufacture of man-made fibres
251	Manufacture of rubber products
252	Manufacture of plastic products
261	Manufacture of glass and glass products
262	Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products.
263	Manufacture of ceramic tiles and flags
264	Manufacture of bricks, tiles and construction products, in baked clay
265	Manufacture of cement, lime and plaster
266	Manufacture of articles of concrete, plaster and cement
267	Cutting, shaping and finishing of ornamental and building stone
268	Manufacture of other non-metallic mineral products
271	Manufacture of basic iron and steel and of ferro-alloys

ANNEX – cont.

272	Manufacture of tubes
273	Other first processing of iron and steel
274	Manufacture of basic precious and non-ferrous metals
275	Casting of metals
281	Manufacture of structural metal products
282	Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers
283	Manufacture of steam generators, except central heating hot water boilers
284	Forging, pressing, stamping and roll forming of metal; powder metallurgy
285	Treatment and coating of metals; general mechanical engineering
286	Manufacture of cutlery, tools and general hardware.
287	Manufacture of other fabricated metal products
291	Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines
292	Manufacture of other general purpose machinery
293	Manufacture of agricultural and forestry machinery
294	Manufacture of machinetools
295	Manufacture of other special purpose machinery
296	Manufacture of weapons and ammunition
297	Manufacture of domestic appliances n.e.c.
300	Manufacture of office machinery and computers
311	Manufacture of electric motors, generators and transformers
312	Manufacture of electricity distribution and control apparatus
313	Manufacture of insulated wire and cable
314	Manufacture of accumulators, primary cells and primary batteries
315	Manufacture of lighting equipment and electric lamps
316	Manufacture of electrical equipment n.e.c.
321	Manufacture of electronic valves and tubes and other electronic components
322	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy.
323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods

ANNEX – cont.

331	Manufacture of medical and surgical equipment and orthopaedic appliances
332	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
333	Manufacture of industrial process control equipment
334	Manufacture of optical instruments and photographic equipment
341	Manufacture of motor vehicles
342	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
343	Manufacture of parts and accessories for motor vehicles and their engines
351	Building and repairing of ships and boats
352	Manufacture of railway and tramway locomotives and rolling stock
353	Manufacture of aircraft and spacecraft
354	Manufacture of motorcycles and bicycles
355	Manufacture of other transport equipment n.e.c.
361	Manufacture of furniture
362	Manufacture of jewellery and related articles
363	Manufacture of musical instruments
364	Manufacture of sports goods
365	Manufacture of games and toys
366	Miscellaneous manufacturing n.e.c.