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Competitiveness of the Polish Manufacturing Sector: Does Government Policy Matter?

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Abstract

This paper investigates an impact of the government policies aimed at the enterprise sector on competitiveness of this sector. The analysis was based on an example of the Polish manufacturing sector and the eight-year period from 1996 to 2003. Section 1 presents different notions and measures of competitiveness and defines the one adopted for the purpose of the present analysis - the trade measure. Section 2 presents an assessment of the competitiveness of the Polish manufacturing sector on both the internal (domestic) and external market, in particular the EU-15 market. Subsequently, the authors compare domestic and external competitiveness of individual manufacturing industries and present conclusions on the competitive and non-competitive branches. Section 3 describes a size of government interventions affecting manufacturing enterprises in the years 1996-2003. These interventions took the following forms: income (corporate and personal) taxes imposed on enterprises, excise taxes, VAT, depreciation rates, subsidies, and social security contributions. A size of the state ownership in the manufacturing sector was examined in the analysis, too. Section 4 presents results of the econometric analysis of factors influencing the competitiveness of the Polish manufacturing sector on both the internal (Polish) and external (EU-15) market. Moreover, an impact of different government policy instruments on competitiveness is assessed by means of the linear regressions. Section 5 contains conclusions. The general recommendation is that the competitiveness of the Polish manufacturing sector could be increased by relaxing fiscal burden, further privatization and restructuring of state owned companies. The state aid in a form of subsidies seems to harm both internal and external competitiveness rather than to support them.

Introduction[1]

There is a vast body of economic literature discussing the role of the state and its scope in democratic countries. A role of the state in market economies as well as its implications for economic processes and their outcomes is an aspect widely examined by economists. A number of issues are of interest to us here. They can be grouped in four themes.

The role of the state as an owner has been a topic of debates both in theoretical works and empirical studies. The dominant question appears: is it necessary for the state to be an owner at all? If yes, what the areas of ownership should be and under what conditions the government is justified to take the role of an owner? Furthermore, the efficiency of the state in this capacity is being tested and questioned in the subject literature.

The second important issue of interest connected to the topic is the role of the state as a regulator. Regulations are examined from the point of view of their impact on the scope of economic activities undertaken by entrepreneurs and macroeconomic performance of the country. Such by-outcomes of regulations as: costs and time burden for businesses, the grey economy development and corruption are frequently discussed by economists. Additionally, numerous empirical investigations have been undertaken in order to examine if the state intervention meets the regulations` aim, which is to improve quality of public goods and eliminate externalities.

The third issue of relevance to us is the scope of government, which is measured by the scope of government expenditures. Governments pursue fiscal policies with an aim to generate sufficient financial resources to deliver not only core public goods (such as internal and external security, functioning of the rule of law), but also to cover social and investment spending. For this aim they employ not only the tax policy, but also the labor policy and pension regulations. The

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impact of the scope of government on behavior of entrepreneurs (the micro approach) as well as employment and economic growth (the macro approach) have attracted the attention of both the economic theory and empirical economic research. It is worth remembering that economists' findings are very important to policy makers.

Finally, there is the industrial policy performed by governments on the grounds of market failure. The usual instruments of government interventions are tax allowances, subsidies, investment incentives and free or cheap credit for certain activities. In transition economies there was an extra reason for governments to intervene: the need to alleviate consequences of major transition shocks suffered by enterprises undergoing restructuring[2]. In the member countries of the European Union the governments' support to enterprises (formally called the *state aid*) is strictly regulated by the European law, monitored by independent public institutions and reported to the European Commission. It results from the fact that any public aid that distorts or threatens to distort competition is generally regarded as incompatible with the EU four freedoms. Transition countries negotiating for accession had to gradually adjust their industrial policies to the EU state aid regulations[3].

The aim of this paper is to investigate the impact of the government enterprise sector policies on the competitiveness of the manufacturing sector in Poland. In addition, this study also examines the impact of state ownership in the manufacturing sector. The analysis is made for 2-digit industries (i.e. *divisions*) as well as for 3-digit industries (i.e. *groups*)[4]. There are 23 *divisions* and 102 *groups* altogether (see them listed in the Appendix, Tables 1 and 2). The period observed embraces the years 1996-2003 and the scope of analysis was constrained by the availability of data.

The paper is organized as follows:

- Section 1 presents different notions and measures of competitiveness and defines the one adopted for the purpose of the present analysis - the trade measure.

[2] This subject was studied within the framework of the same project at the earlier stage. The findings and a comparative analysis for the three transition countries: Poland, the Czech Republic and Hungary are presented in Hashi et al (2004).

[3] The evolution of industrial policies in Poland, Hungary and the Czech Republic in the view of the EU accession was also examined within the same project (for the comparative analysis see Hashi et al, 2004).

[4] As defined by the NACE rev. 1.1 classification, which is a nomenclature of economic activities used by the European Community EUROSTAT. Besides 2-digit and 3-digit industries, data was collected also for bigger groupings: *sections* (1-digit level); *subsections* - intermediate level between 1- and 2-digit level industries. In Poland this classification was introduced in 1994 (under the term PKD - The Polish Classification of Activities).

- Section 2 presents an assessment of the competitiveness of the Polish manufacturing sector on both the internal (domestic) and external market, in particular the EU-15 market. Subsequently, domestic and external competitiveness of individual manufacturing industries are compared and conclusions are drawn on competitive and non-competitive branches. The EU-15 market was chosen for the analysis due to the fact that in the 1990ties the European Union's member countries taken as a group became the main trading partner for Poland[5] and in the first years of the new decade remained at this position. Moreover, their importance is expected to further increase thanks to the Poland's EU accession in May 2004.
- Section 3 describes a size of government interventions affecting manufacturing enterprises in the years 1996-2003. These interventions took the following forms: income (corporate and personal) taxes imposed on enterprises, excise taxes, VAT, depreciation rates, subsidies, and social security contributions. In addition, the analysis also examines a size of the state ownership in the manufacturing sector.
- Section 4 presents results of the econometric analysis of factors influencing the competitiveness of the Polish manufacturing sector on both the internal (Polish) and external (EU-15) market. Moreover, an impact of different government policy instruments on competitiveness is assessed by means of linear regressions.
- Section 5 contains conclusions.

[5] In the years 1995-2001 68-70% of the total Polish exports were absorbed by the EU (Yearbook of Foreign Trade Statistics 2002). In 2003 the EU's share in the Polish exports accounted for 68.8% (Concise Statistical Yearbook of Poland 2005, Table 237). In the case of the Polish imports the importance of the EU zone was smaller, however, the European goods and services dominated (61-65%).

1. What does Competitiveness Mean and How do We Measure It?

Although competitiveness is a commonly used term, there is not a single or dominant definition, or one, which would make the notion a comprehensible one. Different understandings of the notion "competitiveness" brought about numerous measures of competitiveness used to assess a position of an economy, sector or enterprise vis-à-vis others (Wziątek-Kubiak, 2003). One of the explanations could be that the term competitiveness has its origin not in the economic theory, but in the politics.

In this paper we use the term competitiveness in the sense that was proposed to the project team by the project coordinator: Professor Anna Wziątek-Kubiak. In our paper competitiveness is understood as an ability to sell products on a market in competition with other producers. It is a relative term, i.e. the position of a producer is assessed vis-à-vis its competitors (see Wziatek-Kubiak and Winek 2004). The novelty of the approach adopted lies in the fact that besides export performance (which is typical for the trade definition of competitiveness), it also examines performance on the domestic (internal) market. More specifically, competitiveness is being judged by the ability of manufacturers based in Poland to sell on EU markets as well as on their domestic market where they are competing with EU producers. The adopted measures of competitiveness are the changes in the share of the domestic and external (EU) markets. Obviously, these measures have some weaknesses (Wziątek-Kubiak and Winek 2004, p. 5), but none approach is free of them.

Being constrained by data available for the Polish manufacturing sector on the one side, and for the EU member countries' consumption of the manufacturing goods - on the other side, we will use the following two measures to evaluate competitiveness of the Polish manufacturers on the two markets:

For the domestic market we take the share of the Polish manufacturing goods in the domestic consumption (in Poland) of manufacturing products. **The domestic (internal) competitiveness of the manufacturing sector (DCM** in short**)** is calculated it in the following way:

DCM = [(Total Sales of Manufacturing Sector) - (Total Exports)]: [(Total Sales) - (Total Manufacturing Exports) + (Total Manufacturing Imports)]

To measure the competitiveness of Polish manufacturing products on the external, and in particular on the European Union market we should analogically calculate the share of Polish manufacturing exports in the apparent consumption of manufacturing goods in the EU-15. We did so for the years 1996-2001[6], however, due to lack of data for the years 2002-2003, we had to employ a different measure. To evaluate **external (foreign) competitiveness of the Polish manufacturing sector** (in short **ECM**), we studied the share of Polish manufacturing exports to the EU-15 in intra-exports of manufacturing goods of the EU-25. The following formula was applied:

ECM = [Polish Manufacturing Exports to EU-15] : [EU-25 Intra Exports], where EU-25 Intra Exports = [EU-15 Intra Exports + EU-15 Exports to 10 acceding countries + Exports of 10 acceding countries to EU-15]

[6] See Balcerowicz (2005).

2. Competitiveness of the Polish Manufacturing Sector, 1996-2003

2.1. Overall Competitiveness

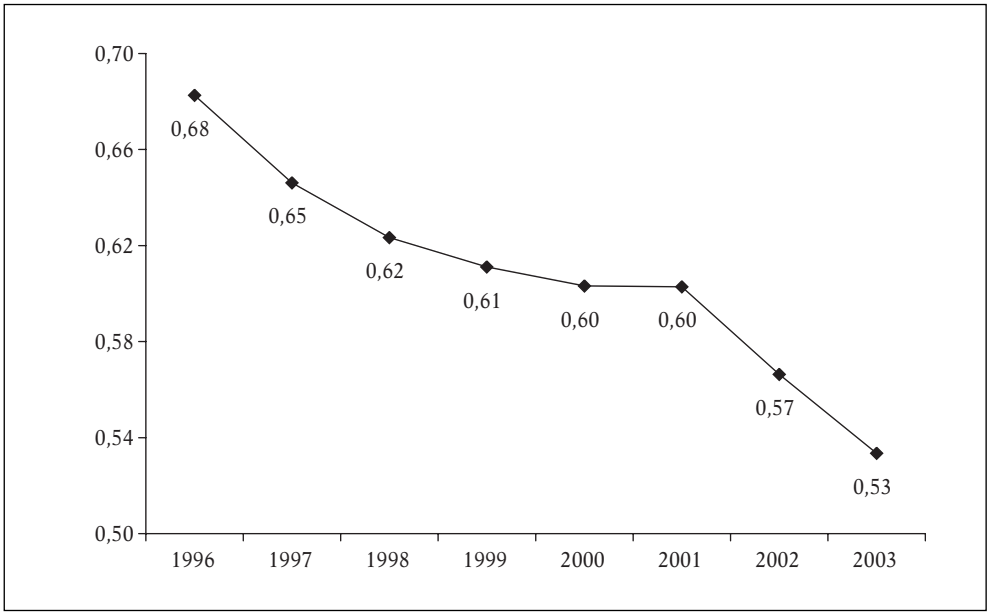
In the beginning of the period subject to observation in this study, 68% of manufacture products sold on the Polish market were produced by the domestic manufacturing sector; the remaining 32% were coming from imports, including the EU-15 (see Figure 1 below). In the course of next years the share of Polish manufacturers in consumption of manufacturing goods in Poland had been constantly dropping, and in the last two years the pace of decrease had even speeded up. Altogether their share in the domestic market had decreased by 15 percent points, and in 2003 was at the level of 53%. Therefore, taking our definition of competitiveness, we have to conclude that overall domestic competitiveness of the Polish manufacturing sector had substantially decreased in the eight-year time preceding Poland's EU accession.

This conclusion needs to be placed in an appropriate context. Firstly, it is important to notice that the domestic consumption of manufacturing goods grew faster than the domestic production, therefore the gap between the two had to be filled in by imports. Secondly, increased imports indicate that the Polish market has become more open and competition has become fiercer. Thirdly, Polish manufacturing exports increased significantly and at a faster pace than the production did, which indicates that Polish manufacturers expose themselves increasingly and with a success[7] to tough competition on developed markets that dominate in Poland's exports destinations[8].

[7] In the sense that they place their products on the external markets (i.e. manage to sell them). The first and most important step to check what instruments the manufacturers use to compete, should be the analysis of their export prices vis-à-vis prices of their competitors. This would bring the answer whether this is a price competition. In order to examine whether export is a profitable activity for Polish producers, costs of export production and costs of export itself should be evaluated and confronted with export revenues.

[8] For more discussion on these developments see Balcerowicz (2005).

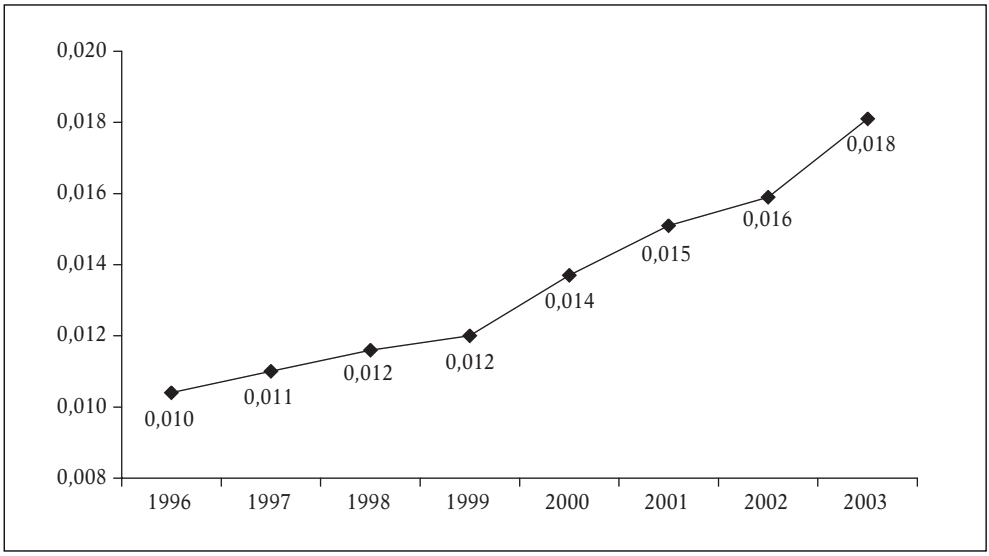
Figure 1. Domestic Competitiveness of the Polish Manufacturing Sector (DCM), 1996-2003



Note: DCM ranks from 0 to 1.

Source: The authors' own calculations based on data from the Central Statistical Office (Statistical Yearbook of Industry and Yearbook of Foreign Trade Statistics, different years).

Figure 2. External Competitiveness of the Polish Manufacturing Sector (ECM), 1996-2003



Note: ECM ranks from 0 to 1.

Source: The authors' own calculations based on data from the Central Statistical Office (Statistical Yearbook of Industry and Yearbook of Foreign Trade Statistics, different years) and COMEXT database.

Contrary to the evidence for the domestic market position of the Polish manufacturing sector, the external competitiveness of the sector had increased in the eight-year period from 1,0% to 1.8% (see Figure 2 below). The increase was substantial; however the EU-15 market share of Polish producers remains at a marginal level. This can be explained by the difference in size between the Polish economy and rich and well-developed economies of the majority of the EU-15 members (the consumption of manufacturing commodities in the EU is enormous in comparison with the size of the Polish manufacturing production) and also by the fact that the Polish economy had been practically closed for decades.

2.2. Domestic and External Competitiveness of 2-digit Industries

Within the framework of the research study we performed a panel data analysis, which enabled us to identify relative differences in competitiveness among industries. The differences can be attributed to a fixed individual effect of each industry. Estimated values of these effects turned out to be significant in the model[9]. Generally, we can divide industries into three categories: higher than average competitive, lower than average competitive and close to average competitive. A strong and positive fixed effect indicates an above average competitiveness of an industry, while a strong and negative fixed effect indicates a below average level of performance of an industry on the market. Findings for 2-digit and 3-digit industries are presented in the following two subsections.

The level of **domestic competitiveness** is diversified among different manufacturing *divisions*. Results of the panel data regression indicate the most competitive 2-digit industries[10] in the following way:

15 – Manufacture of food products and beverages

16 – Manufacture of tobacco products,

20 – Manufacture of wood and wood, straw and wicker products,

22 – Publishing, printing and reproduction of recorded media,

23 – Manufacture of coke, refined petroleum products,

26 – Manufacture of the non-metallic mineral products, and

37 – Recycling.

[9] Estimations were done by Szymanski (2005) and the results are discussed in Sobolewski (2005a, 2005b).
[10] See Table 3 in the Appendix, row 37.

The least competitive *divisions* had been:

17 – Manufacture of textiles,

29 – Manufacture of machinery and equipment n. e. c.,

30 – Manufacture of office machines and computers,

32 – Manufacture of radio, television and communication equipment and apparatus,

35 – Manufacture of other transport equipment.

The remaining eleven 2-digit manufacturing industries were included in the average competitive group. This group contains divisions with fixed effects deviating by less than 20 percent points (in plus or in minus) from the average level of the domestic market share. Among them 18, 19, 24, 27, 31, 33 and 34 deviated by more than 10 percent points in minus from the average market share.

As far as **external competitiveness** is concerned, the panel data regression shows[11] that the following three manufacturing *divisions* were the most competitive on the external market:

18 – Manufacture of wearing apparel and furriery,

20 – Manufacture of wood and wood, straw and wicker products,

36 – Manufacture of furniture and manufacturing not elsewhere classified.

For this group of industries their shares in the EU-25 intra exports exceeded by more than one percent point the average share of the Polish manufacturing exports to the EU-15 in the EU-25 intra exports.

The least competitive *divisions* were:

15 – Manufacture of food products and beverages,

16 – Manufacture of tobacco products,

22 – Publishing, printing and reproduction of recorded media,

23 – Manufacture of coke, refined petroleum products,

24 – Manufacture of chemicals and chemical products,

30 – Manufacture of office machines and computers.

The remaining 14 manufacturing *divisions* (no: 17, 19, 21, 25-29, 31-35, 37) belonged to the average competitive group (with less than 1 percent point deviation either in plus or in minus from the average).

[11] For the results see Table 4 in the Appendix, row 19.

The overall competitiveness of individual manufacturing *divisions* is presented in Table 1 below.

Table 1. Domestic and External Competitiveness of Manufacturing Divisions (n=23)

External Competitiveness	**Domestic Competitiveness**		
	Highly Competitive	Average	Least Competitive
Highly Competitive	**20**	**18 36**	
Average	**26 37**	**19 21 25 27 28 31 33 34**	**17 29 18 32 35**
Least Competitive	**15 16 22 23**	**24**	**30**

The best group of the most competitive manufacturing *divisions* on both the domestic and EU markets consists of one industry only and this is 20 - Manufacture of wood and wood, straw and wicker products. The next group of well performing industries consists of four *divisions* (26 – Manufacturing of the non-metallic mineral products, 37 – Recycling, 18 – Manufacture of wearing apparel and furriery and 36 – Manufacturing of other transport equipment) that possess a much above average share in either of the two markets and an average share in the EU one.

There is a group of four industries which have a very strong position on the domestic market, but are less than averagely competitive on the external market. These are: 15 – Manufacture of food products and beverages, 16 – Manufacture of tobacco products, 22 – Publishing, printing and reproduction of recorded media and 23 – Manufacturing of coke, refined petroleum products.

The most numerous group is the one with an average DCM and ECM (eight *divisions*). Successive eight industries have an average share in one of the two markets and are the least competitive on the EU market. Finally, we need to notice that one *division* (30 – Manufacturing of office machines and computers) is performing poorly on both the domestic and EU markets.

2.3. Domestic and External Competitiveness of 3-digit Industries

The highly competitive 3-digit industries hold **domestic market shares** within the range of 70-90 percent. At the opposite extreme end there are uncompetitive (or the least competitive) manufacturing *groups* whose domestic market shares do not

exceed 30 percent. Results of the panel data analysis[12] exhibit regularities in the sense that usually the situation of a 3-digit industry's competitive position is coherent with the market position of a *division* to which this industry belongs.

The most competitive 3-digit industries on the **domestic market** were:

1) 151, 153, 155-159 – seven out of nine *groups* belonging to food and beverages division (15);
2) 160 – tobacco industry (at the same time division 16);
3) 201-203 – three industries belonging to division 20 (Manufacture of wood and wood, straw and wicker products)13;
4) 221, 222 – two *groups* of division 22 (Publishing, printing and reproduction of recorded media[14])
5) 231 – Manufacture of coke oven products and 232 – Manufacture of refined petroleum products, two dominating industries out of the three which form division 23;
6) 264, 265, 266 – three industries out of eight belonging to division 26 (Manufacturing of the non-metallic mineral products);
7) 281, 283 – two out of six industries from division 28 (Manufacturing of metal products);
8) 352 – Manufacture of railway, tramway locomotives, rolling stock, which is one of the five industries[15] classified to division 35 (Manufacturing of other transport equipment);
9) 361 – Manufacture of furniture; one, yet substantial industry classified together with five others to division 36.

Altogether 22 out of 77 manufacturing *groups* (for which data is available) may be regarded as highly competitive on the domestic market. This constitutes almost one third.

The group of the least competitive manufacturing industries on the domestic market is slightly less numerous and consists of 19 industries, i.e. 25% of the total number of these for which data is available. These are:

1) 172 and 175 – two out of seven industries in the textiles division (17);
2) 191 – tanning and dressing of leather industry, one of three *groups* that belong to division 19 – Processing of leather and manufacture of leather

[12] See Table 5 in the Appendix, row 20.
[13] For the remaining two industries (204, 205) data is unavailable.
[14] For the third and last *group* (223) data is missing.
[15] Data for one of them is unavailable.

products;

3) the majority of industries classified to division 24: Manufacturing of chemicals and chemical products (241-244 and 246-247);

4) 291 – Manufacturing of machinery and equipment for the production and use of mechanical power and 294 – Manufacture of machine tools;

5) 300 – Manufacture of office machinery and computers;

6) 315 – Manufacture of lighting equipment and electric lamps;

7) 322 and 323 – two out of three industries in division 32 (Manufacturing of radio, television and communication equipment and apparatus);

8) 331 – Manufacture of medical and surgical equipment and orthopedic appliances;

9) two out of three *groups* of division 34: 341 – Manufacture of motor vehicles, 342 – Manufacture of bodies (coachwork) for motor vehicles; Manufacture of trailers and semi-trailers);

10) 363 – Manufacturing of musical instruments.

As far as performance of the Polish manufacturers **on the EU-15 market** is concerned, the panel data regression shows that the majority of 3-digit industries are below the average external competitive level[16]. Out of the total number of 89 manufacturing *groups* examined, the following 19 are competitive above average:

1) 153 – Processing and preserving of fruits and vegetables;

2) 174 – Manufacture of made-up textile articles, except apparel;

3) all three industries (181, 182, 183) of division 18 (Manufacture of wearing apparel and furriery);

4) all five industries (201-205) forming division 20 (Manufacture of wood and wood products);

5) 231 – Manufacture of coke oven products;

6) 261, 262, 264, 265 (Manufacture of ceramic tiles, cement, lime and plaster, glass and glass products, cable wires, metal construction);

7) 351, 352, 355 (Building and repairing of ships and boats, rolling stock);

8) 361 – Manufacture of furniture.

The majority of the above average competitive manufacturing *groups* produce

[16] For the results see Table 6 in the Appendix, row 19.

labor intensive and not technologically advanced goods.

Finally, let us compare the findings for the two markets: domestic and EU-15 one. The best group, which is very competitive on the domestic market and more than average competitive on the external market, consists of 10 industries, which accounts for 10% of the total population of 3-digit industries. These are the following manufacturing *groups*:

153 – Processing and preserving of fruits and vegetables;

201 – Sawmilling and planing of wood, impregnation of wood;

202 – Manufacture of veneer sheets; manufacture of plywood, lamina-board etc.;

203 – Manufacture of builders' carpentry and joinery;

231 – Manufacture of coke oven products;

264 – Manufacture of bricks, tiles and construction products;

265 – Manufacture of cement, lime and plaster;

351 – Building and repairing of ships and boats;

352 – Manufacture of railway, tramway locomotives, rolling stock; and

361 – Manufacture of furniture.

3. Government Intervention into the Manufacturing Sector in the Years 1996-2003: Instruments and Scope

Government interventions into economy may take different forms. Below, we briefly present government policies exercised in the Polish manufacturing sector in the years 1996-2003, which directly influenced performance of enterprises (direct instruments). In addition, despite the fact that it is an indirect instrument of influence on performance and competitiveness, we take a close look at the role of the state as an owner of manufacturing companies. As far as direct interventions are concerned, it is important to observe that in our studies we were limited by the availability of data for individual industries: aggregated into 2-digit industries and 3-digit industries[17].

3.1. Government as an Owner

The role of the government as an owner had decreased considerably over the last eight years under observation, however, the pace of change was very uneven across various industries. These observations are based on two available data sets which are used as proxies for the scope of the government. The sets are: (a) a share of state owned manufacturing companies in the total employment in the manufacturing sector, and (b) a share of state owned manufacturing companies in the total sold production of the manufacturing sector. Two reservations need to be made here. Data is available only for 2-digit industries and due to specific rules of statistical classifications[18] gives an underestimated picture of the scope of the state ownership in the manufacturing industries.

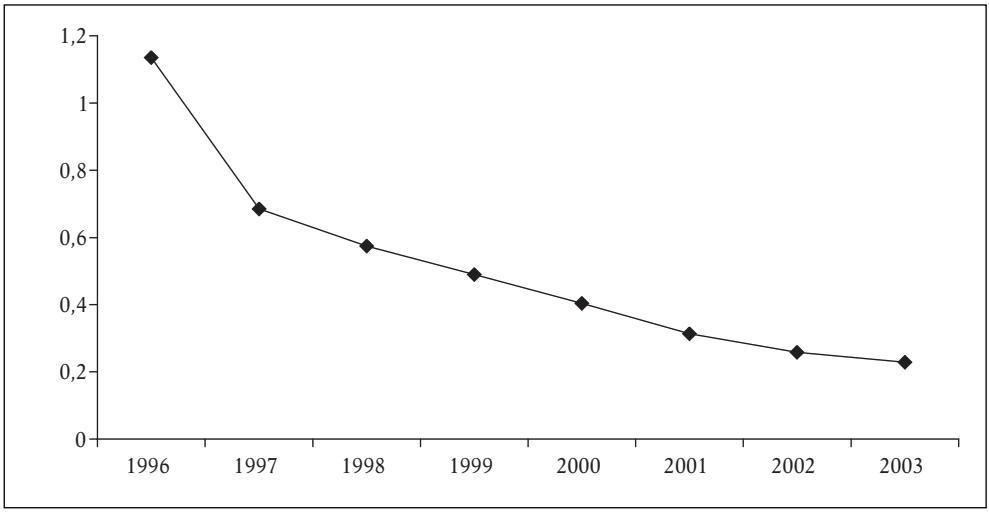
[17] The entire list of direct instruments in use with annotation for which data is available is presented in Section 4. There we also discuss shortcomings of the collected data.

[18] In public statistics a company is regarded as state-owned when the government owns more then 50% of the company's shares. This implies that enterprises with less than 50% of shares in the state disposal are

In 1996, the first year of our analysis, state-owned companies employed 1,135 thousand people in total (see Figure 3 below) and this accounted for as much as 40.5% of the total employment in the manufacturing sector (Figure 4). In the course of the next seven-year period employment in state-owned companies had been decreasing every year (see Figure 3) and altogether it shrank dramatically: by 906.6 thousand people (that is by 80%). On the one hand, this was an effect of the privatization processes: its formal end result being a statistical reclassification of enterprises (from the state to the private sector). On the other hand, state enterprises undertook restructuring processes, in the course of which excessive labor force was shed. A vast part of the labor force was absorbed by the fast growing greenfield private sector. By the end of the studied period the state part of the manufacturing sector employed 228.3 thousand workers. In relative terms it was still a substantial number: 10.3% of the total manufacturing employment.

Obviously, a pace of privatization was very different in individual *divisions* of the manufacturing sector and this is true for the entire transition period (1990-2004). In the first year of our analysis 4 *divisions* out of the total number of 23 2-digit industries lagged behind in privatization: more than 80% of their total work

Figure 3. Total Employment in State Owned Manufacturing Companies, 1996-2003 (in million)



Source: Statistical Yearbook of Industry 1997, 1998, 1999, 2000, 2001, 2002 and 2004.

classified as private. One may argue that this is correct since the majority shareholder may impose their decision on the board, however, the Polish experience shows that the minority state shareholder may effectively push important decisions through. Furthermore, in June 2005, after a hot debate, a new Law on Special Rights of the Minority State Shareholder was voted by the Parliament. It gives the state the so-called golden veto right in the case of listed crucial decisions in a group of enterprises that are "of special importance for the public good and public security".

force concentrated in state owned enterprises[19]. This figure needs to be confronted with the average employment in state owned companies of 40.5% for the manufacturing sector. On the other side of the scale there are three *divisions*[20] in which employment had already concentrated in private companies, and state companies accounted only for less than 20% of the total labor force. Seven years later the size of the state sector remained to be differentiated among individual industries. One industry, in which the state employment still dominated was Manufacturing of coke and refined petroleum products (50.1%). In all others (22 *divisions*) the private sector was dominant, yet, the size of the state employment varied very much: from the extreme of 44.8% (Manufacturing of basic metals) to close to 1% (in two *divisions*: (a) Manufacture of pulp and paper; and (b) Manufacturing of furniture).

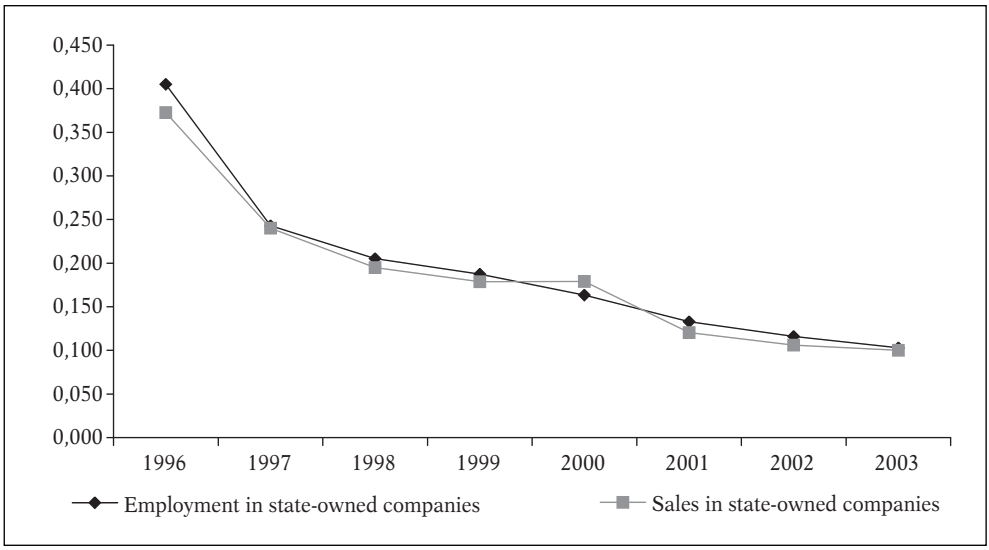
As far as the other measure of the size of the state ownership in the manufacturing sector is concerned, in 1996 the state sector had 37.3% share in manufacturing sales (see Figure 4), which was slightly below the figure for employment. In the course of the following years sales of state owned manufacturing companies had declined (in nominal terms and current prices) with the exception of the year 2000. By the period's end the share of the state sector in the total manufacturing sales had gone down dramatically to 10%.

Similarly to the case of employment, also in sales there were and still are big differences between individual *divisions*. In 1996, the seventh year of transition for the Polish economy, in four *divisions* (out of the total number of 23) the state ownership was still very strong with the more than 80% share in total manufacturing sales. They were the same *divisions* as in the case of employment (see Footnote 19). In the following years production (and sales) shifted significantly from the state sector to the private one in every single *division*, however, in two industries state enterprises maintained to play a substantial role. These were: (a) Manufacture of basic metals, where the state owned companies generating 50,9% of the total *division's* sales (in 2003), and (b) Manufacture of coke and refined petroleum products with the 43,8% share. Next, there are three *divisions* in which the share of state companies in total manufacturing sales ranged from 20 to 30%; these are (a) Manufacture of chemicals and chemical products, (2) Manufacture of other transport equipment, and (3) Recycling. In the remaining 18 *divisions* the

[19] These were: (1) Manufacture of tobacco products; (2) Manufacturing of coke and refined petroleum products; (3) Manufacturing of basic metals; (4) Manufacturing of other transport equipment.

[20] These were: (1) Manufacture of wearing apparel and furriery; (2) Publishing, printing and reproduction of recorded media; and (3) Manufacturing of rubber and plastic products.

Figure 4. The Employment in State Owned Manufacturing Companies to Total Employment in the Manufacturing Sector Ratio (0-1). The Sold Production of State Owned Manufacturing Companies to Total Sales of the Manufacturing Sector Ratio (0-1)



Source: Statistical Yearbook of Industry 1997, 1998, 1999, 2000, 2001, 2002 and 2004; Statistical Yearbook of Poland 1997, 1998, 1999, 2000, 2001, and 2002; the authors' own calculations.

share of the state sector was less than 10%. In 6 industries out of these 18 ones privatization practically had come to an end and the state ownership was hardly present (only the 1-2% share in sales). These industries are: (a) Manufacture of wearing apparel and furriery; (b) Manufacture of pulp and paper; (c) Manufacture of office machines and computers; (d) Manufacture of radio, television, communication equipment; (e) Manufacture of motor vehicles, trailers and semi-trailers, and (f) Manufacture of furniture.

3.2. Fiscal Policy

Companies registered in Poland are obliged to pay a number of taxes and these are: (1) corporate income tax CIT (in the case of companies), or personal income tax PIT (in the case of individual running of business as a sole proprietor), (2) VAT[21], (3) customs taxes, (4) excise tax (for a limited number of products sold on

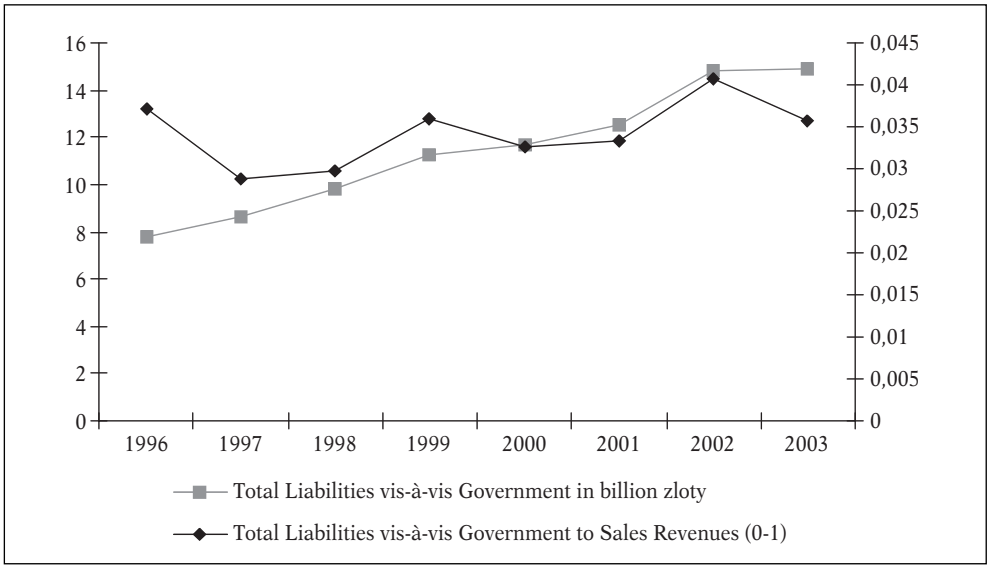
[21] A business entity has to register for VAT and pay it when its annual turnover on transactions subject to VAT exceeds 10,000 euro.

the market), (5) local taxes, (6) social security contributions for employees, and (7) social security contribution for the entrepreneur (in the case of individual running of business).

Publicly available statistics for the manufacturing sector and its 2-digit *divisions* present very limited amount of data on fiscal obligations of the enterprise sector vis-à-vis the budget, i.e. on the fiscal policy of the government as perceived by enterprises. Among the limited information there is data on liabilities due to the central government stemming from three tax entitlements: income taxes (CIT and PIT from individual businessmen), customs and social security as of an end of a year. Another group of data available reveals the amount of income tax due in a year. However, the received picture does not represent the entire sector and all individual divisions. The presented data is collected solely from enterprises employing over 9 people. We miss data concerning liabilities owed from smaller companies and natural persons' businesses.

In 1996 the total amount of liabilities of the manufacturing sector accounted for 7.7 billion zloty. The amount had been growing each year since then and had reached the level of 15 billion zloty by the end of the period under observation (see Figure 5 below, left axis). The ratio of total liabilities to sales had fluctuated in the analyzed period in a narrow bracket of 2.9 – 4% (see Figure 5 and right axis).

Figure 5. Total Liabilities vis-a-vis Government (in billion zloty; left axis), and The Total Liabilities vis-a-vis Government to Sales Revenues Ratio (0-1; right axis)



Source: Statistical Yearbook of Industry 1997, 1998, 1999, 2000, 2002, and 2004; the authors' own calculations.

For individual 2-digit industries the ratio of total liabilities to sales varied considerably. In 1996 it ranged from 1.1% (for division 21 - Manufacture of pulp and paper) to 14.6% (division 19 - Processing of leather and manufacture of leather products). By the end of the period the range had decreased to 1:5.

The next Figure 6 presents obligations stemming solely from income tax entitlements. In 1996 the total amount of income tax accounted for 4.2 billion zloty. In the next year it increased by 24%, however, in the course of the following four years had been constantly decreasing to finally fall down below the 1996 level by 12%. In 2001 the downward trend came to a halt and the amount of income payments increased. In the last year under observation it grew again, yet this time the increase was substantial - by 35%.

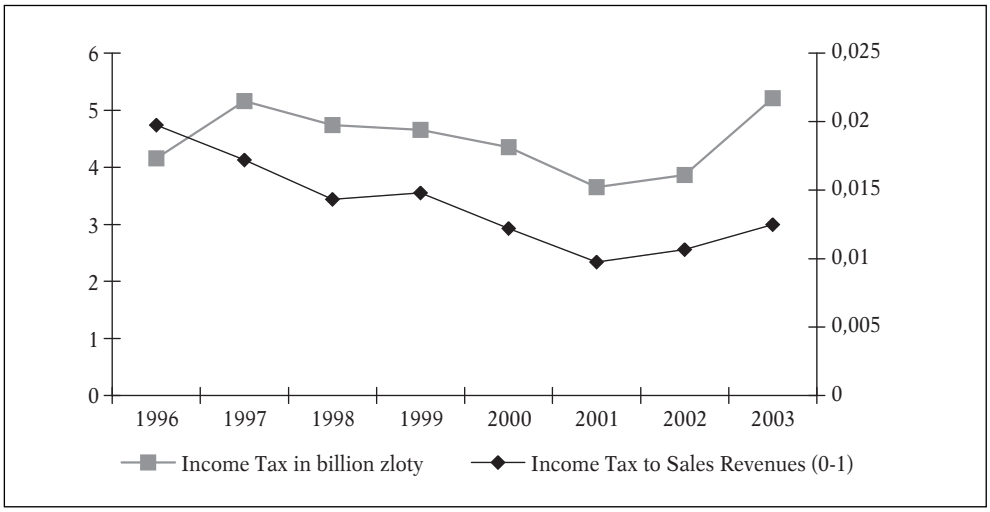
In 1996 the amount of the paid income tax to manufacturing sales ratio accounted for close to 2% and had been decreasing each year until 2001, when it reached 1% - the lowest level in the eight-year period. In 2002 the ratio exceeded 1% and in 2003 reached 1.2%.

These changes have to be seen in the context of decreasing CIT rates. From the beginning of the transition to the market economy in 1990 and until 1996 inclusive the CIT rate had been at the level of 40% and was regarded as high compared to the majority of European countries and some other transition economies. In the years 1997-1999 the tax rate had been gradually decreasing by 2 percent points every year. The 1999 CIT reform envisaged a schedule for a gradual decrease of the CIT rate over a five-year period (2000-2004) by a massive 12 percent points (from 34% in 1999 to 22% in 2004). Accordingly, in 2000 the rate was cut to 30%. In the next years the reform schedule was changed: a pace of the rate's decrease was slowed down and in the last year under observation CIT was paid at the 27% rate. A recent (as of 01/01/2004) and substantial cut to 19% was without any doubt incited by good practices in other emerging economies. A volume of CIT tax revenues for this year, however, is not captured by our analysis.

Ratios for individual 2-digit industries varied and ranged from 0.6% (for division 23 – Manufacturing of coke, refined petroleum products) to 4.2% (for division 22 – Publishing, printing and reproduction of recorded media) in 1996 and from 0.2% (in division 16 – Manufacture of tobacco products) to 2.1% (division 33 – Manufacturing of medical, precision and optical instruments, watches and clocks) in 2003.

The next fiscal instrument under analysis is the excise duty, which was imposed on the following goods: (a) engine fuel and its components, (b) alcohol and

Figure 6. Income Tax (in billion zloty; left axis) and the Income Tax to Sales Revenues Ratio (0-1; right axis), 1996-2003



Source: Statistical Yearbook of Industry 1997, 1998, 1999, 2000, 2002, and 2004; the authors' own calculations.

beverages, (c) tobacco products, (d) cars, (d) perfumes and cosmetics, (e) electricity. The excise duty is calculated either as a percentage of a value of goods produced or on a volume basis (a fixed rate per unit).

Data at our disposal comprise only 3-digit industries and is available for 94 manufacturing *groups* out of the total number of 102. Since we do not possess data for all the industries, we are not in a position to say precisely what the total burden of excise for the entire manufacturing sector (including 2-digit industries) was. Below, there are findings for 3-digit industries. In the entire period the excise tax had not been paid at all by 16 industries, which constitutes 17% of the total population. For the majority of the remaining manufacturing *groups* the size of excise payments was meaningless. Obviously, excise duty payments were an important obligation to the state for three industries which produce goods levied with this tax. These were:

159 – Manufacture of beverages (the paid excise tax to total sales ratio accounted for 43% in 1996 and 40% in 1997; in the next years it decreased and fluctuated at 33.8% – 36.8%);

160 – Manufacture of tobacco products (51-55.8% in the years 1996-2000; increased to 63.8-64.9 % in the years 2001-2002 and increased further to 72.4% in 2003);

232 – Manufacture of refined petroleum products (25.3-28.6% in the first two years of observation; an increase to 32.2-33.9% in the course of next six years).

A relative volume of excise payments from other two industries producing taxed goods: 341 – Manufacture of motor vehicles, and 245 – Manufacture of soap, detergents, cleaning, polishing goods and perfumes, was much lower and accounted for 0.2-1.2% and 0.3-0.4% respectively.

3.3. Industrial Policy: Government Subsidies

In view of the fact that there is a variety of instruments available and used in practice, the industrial policy may take different forms, however, in the case of Poland negotiating its EU accession, the instruments had to be gradually adjusted to state aid regulations binding in the European Union. Below we discuss a traditional and the simplest instrument. Subsidies are transparent and easy to be traced in companies' books. Furthermore, they are reported to the public statistics, which makes them easily accessible.

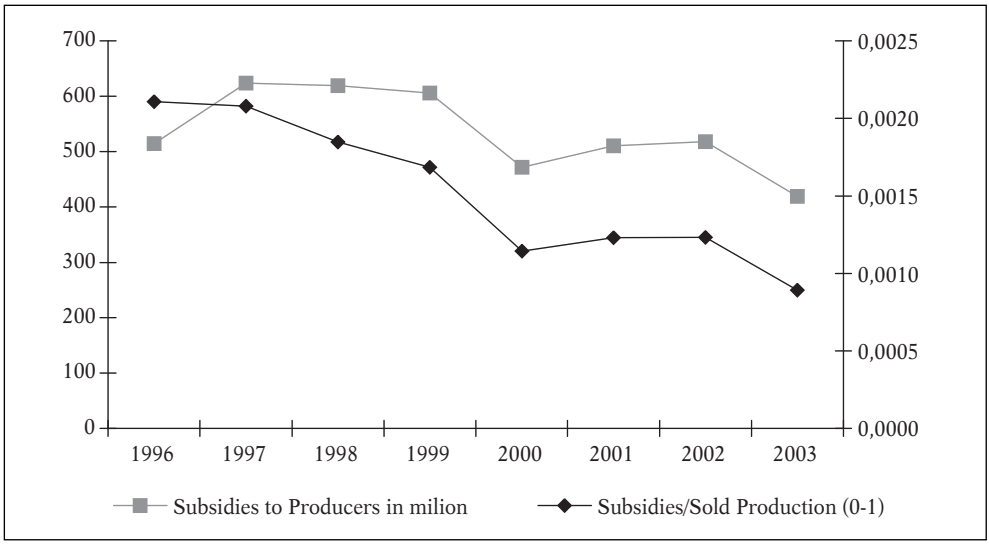
The Polish manufacturing sector as a whole had not received a substantial amount of direct subsidies in the eight-year period of 1996-2003. In 1996 a direct state support to manufacturers accounted for 514.6 million zlotys, which constituted 0.2% of the total sales of the sector (see Figure 7 below). In 1997 government subsidies increased (in nominal terms) by 20% (to 623 million zloty) and this 1997 (nominal) level was maintained in the subsequent two years. However, a relative weight of state support decreased. In 2000 the total amount of subsidies to the sector was cut by 22% as compared to the previous year. In the years 2001-2002 the amount was raised by 8-10% to 510-520 million zloty. In the last year of the analyzed period it fell to a much lower level of 419 million zloty (less than 0.1% of the total manufacturing sales). Yet, the experience from the past two years shows that this figure may be underestimated and can be increased in the next edition of statistical yearbooks.

Generally, we are able to conclude that this instrument of a direct support to the manufacturing sector was meaningless in the whole period and its scope had been decreasing.

All 2-digit industries had been receiving subsidies, however, some of them not every year[22]. The state support was unevenly distributed among industries (recipients of the relatively biggest support could get subsidies eight times bigger

[22] The extreme case is the tobacco industry which had not received subsidies in the years 1996-2000, but since 2001 had been a beneficiary of the state aid as all other manufacturing *divisions*.

Figure 7. Figure 7. Government Subsidies to Manufacturing Enterprises (in million zloty, current prices; left axis) and the Government Subsidies to Manufacturing Enterprises to Revenues from Sold Production Ratio (0-1; right axis), 1996-2003



Source: Statistical Yearbook of Industry 1998, 2000, 2002 and 2004; the authors' own calculations.

than the average), nevertheless, even for these privileged industries the relative size of public aid was minor and had not reached 1% of the total sales[23] in any case.

Data for 3-digit industries (available for 90 out of the total number of 102 industries) shows a bigger differentiation between various groupings of manufacturers. First of all, it is worth mentioning that a strong majority of manufacturing *groups* received state subsidies regularly (i.e. every year) and only 4 industries received a direct public support rather seldom, in 3 or 4 years out of 8 years under observation[24]. For the majority of the aid's recipients the relative size of the support remained to be very inconsiderable. Only for three 3-digit industries state subsidies substantially surpassed the average for the whole manufacturing sector and constituted a lasting trend and not a one-time intervention. For two manufacturing *groups* (192 - Manufacture of luggage, handbags and the like, saddler; 353 - Manufacture of aircraft and spacecraft) state subsidies had ranged from 1 to 3% of sales within the eight-year period. A direct state aid had a vital importance for one industry. In five years from 1996 to 2000 weapons and ammunition producers (group 296) had received a huge financial support from the government (14.5%, 22.6%, 16.2%, 11.9%, and 7.4% respectively). In the subsequent three years it had decreased substantially and at the end of the analyzed period accounted for only 0.4%.

[23] The highest one was for Manufacturing of machinery and equipment in 1996 when it accounted for 0.84%.

[24] These were: 154 - Manufacture of vegetable and animal oils and fats; 183 - Dressing and dyeing of fur and manufacture of articles of fur; 263 - Manufacture of ceramic tiles and flags; and 363 - Manufacture of musical instruments.

4. Impact of Government Policies on Competitiveness of the Polish Manufacturing Sector – Empirical Evidence

In this section we present results of an econometric analysis undertaken to test a hypothesis that government policies negatively impact performance of the enterprise sector. In other words, the hypothesis implies that the smaller the government's intervention to the economy, the better the economic performance. In this paper we focus on an important part of the Polish economy: the manufacturing sector, and as a performance indicator we use its domestic and external competitiveness (DCM and ECM, as defined in Section 2 above).

The econometric analysis was carried out for:

1) 2-digit industries (i.e. manufacturing *divisions*), and

2) 3-digit industries (i.e. manufacturing *groups*).

Data sets for these two groupings of enterprises come from different sources and they both have shortcomings, although different ones. The data on 2-digit industries comes from publicly available publications of the Central Statistical Office of Poland (Statistical Yearbooks of Industry). The available information covers whole divisions[25] for the majority of calculated indicators, which is an advantage over the other data set. A disadvantage is a limitation of types of published data, and consequently, some government instruments, which would be of interest here, are not listed in the yearbooks.

The data on 3-digit industries comes from the official statistics of the enterprise sector (collected by means of the so-called F-01 forms that are filled in by companies), aggregated by the Central Statistical Office. An advantage of this source is affluence of types of data collected. Nevertheless, there are two disadvantages and

[25] with the exception of data on two out of ten independent variables for 2-digit industries examined in this paper; these two regard economic entities employing over 9 persons. For more details see Section 4.1.1 below.

both are serious. One is that the data is collected only for economic entities employing over 9 persons. This means that a part of the manufacturing sector remains beyond our analysis. Consequently, our findings are biased towards bigger enterprises[26]. The other one is that the Central Statistical Office does not on purpose disclose data for quite a big number of 3-digit industries. Additionally, the data base was difficult to obtain since it is not publicly accessible; it was disclosed at a special individual request and the access was charged.

Results of econometric estimations made in order to test the hypothesis about a negative influence of the government policies on the competitiveness of the Polish manufacturing sector on the domestic and EU-15 market are presented in two subsections below[27].

4.1. Estimation for 2-digit Industries

4.1.1. Variables and Types of Analysis

As our main interest focuses on the impact of government policies on the performance of Polish manufacturing divisions on both domestic and external markets, we take into consideration two variables as dependent ones:

1. a share of Polish sold manufacturing production in the domestic consumption of manufacturing products (DCM) ; and
2. a share of Polish exports to the EU-15 in intra-exports of the EU-25 (EMC)*.

Data necessary to calculate DCM was obtained from KWIU statistical databases, while data for ECM - from COMEXT database. Values of ECM for *divisions* are aggregated from data available for 3-digit industries.

Let us underpin that all 23 *divisions* were included into the analysis.

We used the following 10 factors as independent variables:

1. a share of employment in state owned manufacturing companies in the total employment in the manufacturing sector;

[26] A question arises, however, in which direction this bias disturbs our results, i.e. whether the sector of bigger enterprises is on average more or less competitive than the entire manufacturing sector.

[27] Grzegorz Szymański made the estimations; subsequent procedures, steps and results of regressions are presented in his technical report (Szymański 2005).

* See definitions in Section 2.

2. a share of sales of state owned manufacturing companies in the total sales of the manufacturing sector;
3. the subsidies to sales ratio;
4. the total labor cost to sales revenues ratio;
5. the gross fixed assets (deflated with the investment goods prices index) to sales (deflated with producer price index - PPI) ratio;
6. the income tax to sales ratio[28]
7. the total liabilities vis-à-vis government (CIT and PIT income taxes, customs and social security contributions) to sales ratio[29];
8. the investment to sales ratio;
9. the concentration coefficient for 2-digit manufacturing sections[30];
10. the producer price index, 2-digit industries.

Five out of ten independent variables (numbered 1, 2, 3, 6, 7) are regarded here as indicators of the size of the Polish government's intervention into economy to which Polish manufacturers are directly or indirectly exposed. As it was mentioned above, while choosing these 5 indicators, we were constrained by accessibility of data for 2-digit industries.

Three types of analysis were made for each of the two dependent variables[31]. First, we analyzed the overall competitiveness of the Polish manufacturing sector by making regressions on averages for the entire period under observation. Thanks to this step, we could receive a general model and separate key economic factors explaining change in DCM and ECM. Second, competitiveness in subsequent years was analyzed separately. As a result, a set of models was obtained, allowing us to examine what factors influenced both DCM and ECM in different years. This enabled us to observe trends. Third, we carried out panel data regressions with fixed effects in order to look for differences among manufacturing *divisions*. Individual effects appeared to be significant[32].

[28] Note: data on income tax available only for economic entities employing over 9 persons; this is why in order to calculate the ratio for this group of companies, we also take the data for sales revenues (and not the total sales for the manufacturing sector as the case with the dependent variable of DCM is).

[29] The same reservation applies as for variable 6.

[30] This is a so-called *market concentration coefficient* (MCC). Concentration is understood here as irregularities in a distribution of a given phenomenon according to a class dimension (i.e. deviation of an actual distribution from a regular distribution). In addition to a general weakness of this particular index, values of the coefficient calculated for the Polish manufacturing sector and for 2-digit industries have to be interpreted with reservations. The index is calculated for economic entities employing more than 50 persons until 1998, and over 49 since 1999.

[31] Methodology is discussed in detail in Sobolewski (2005a).

[32] Results of the panel data regressions are presented in sub-section 2.2 above.

Final specifications of all models were obtained by applying general to specific methodology. With some exceptions, the specifications are robust to problems arising from autocorrelation, heteroscedasticity and multicolinearity.

Additionally, regressions were made on the restricted sets of variables which had appeared to be significant in the previous analysis made for the years 1996-2001 (see: Sobolewski 2004a). These models, applied to an enlarged data set, have lower explanatory power (lower goodness-of-fit) than new models elaborated in the present study, which are estimated on an unrestricted data set.

In the process of estimation, a proper functional form of models used in the analysis of both types of competitiveness turned out to be linear[33].

4.1.2. Results of Estimations for Domestic Competitiveness of the Polish Manufacturing Sector

Results of regressions from various models made for 2-digit manufacturing industries (see: Table 3 in the Appendix, rows 1-4) show that the overall domestic competitiveness of the Polish manufacturing sector in the whole studied period was positively influenced by:

1) a share of total labor costs in the revenues from sales,
2) the producer price index (PPI),
3) a size of investment, and
4) a share of sales of state owned manufacturing companies in the total manufacturing sales.

A relevant fact for the aim of this paper is that the model revealed a negative influence of the state policies on the performance of the manufacturing sector also on the domestic market. Three out of five factors proved to have a significant and negative impact on DCM. These were:

5) the subsidies to sales ratio,
6) the employment in state owned manufacturing companies to total manufacturing employment ratio,
7) the total liabilities vis-à-vis government to sales ratio.

[33] This conclusion differs from an outcome of the previous estimation, performed for the six-year period from 1996 to 2001. In the mentioned estimation a proper functional form of models used in an analysis of domestic competitiveness proved to be log-linear, whereas external competitiveness was best described by linear functional form models. The functional form is important for interpretation of relationship between coefficients' values and dependent variables. In the case of log-linear models these values indicate elasticity and in the case of linear models they indicate changes in absolute levels of dependent variables.

The bigger a relative size of subsidies and total liabilities vis-à-vis government, the smaller domestic competitiveness of the manufacturing sector turned out to be. The same was found to be true for the state ownership in the manufacturing sector[34]. These three findings support our hypothesis about an unfavorable impact of the government's fiscal policies and involvement in corporate governance on the performance of the enterprise sector.

In the case of subsidies there is a finding that questions an aim of the state aid[35]. Subsidies are commonly perceived as a proper government's instrument to even the playground for economic entities. Instead, as this study may indicate that they reduce pressure on firms to engage in restructuring and petrify economic inefficiency; as a result, competitiveness of industries on the domestic market worsens.

The inefficacy of this form of state aid may be also explained by the fact that it was wrongly addressed, since it was motivated by political rather than economic considerations and under pressure of well-organized employees protecting their workplace[36].

A negative impact of a size of employment in the state manufacturing sector on the competitiveness of industries did not surprise us. An influence of the state ownership on the performance of individual enterprises, industries, and entire economies has been tested in numerous empirical studies worldwide. In the case of Polish manufacturing enterprises in the years 1996-2003 the negative impact of the state ownership may by explained primarily by poor management exposed and prone to pressures exercised successfully by strong trade unions and influential politicians. As a result, state-owned enterprises could continue to have excessive employment and similarly higher wages than their private counterparts[37].

A negative impact of fiscal duties to central and local governments on the competitiveness of companies is not surprising, too. Obligatory payments to the central or local budgets either increase costs of manufacturing production or decrease an amount of profits that remains at enterprises' disposal and may be

[34] This conclusion is yet weakened by the opposite result for the impact of sales of the state sector on DCM (in model no 2, see row 2 in Table 3 in the Appendix).

[35] An important reservation has to be made here. This relationship needs to be checked and a time lag should be introduced to the analysis, which would, however, require more observations than we had. Therefore, we may come back to this issue sometime in future, when a number of observations increases.

[36] This hypothesis is supported by findings of Kopczewski, Rogowski and Socha (2003). Having analyzed data of a panel of 10,000 Polish enterprises they found that the state aid was more pronounced in large, state owned firms in more concentrated industries.

[37] This has been proved in another project completed recently at CASE, see Antczak (2004).

spent on investments. The importance of a size of investment for domestic competitiveness of manufacturing *divisions* was proved by our study.

Regressions made for each year of the analyzed period indicate a growing negative importance of concentration on domestic competitiveness of the manufacturing sector (from -1.1 in 1996 up to -1.7 in 2003)[38]. Interestingly enough, this variable is not significant in the model for overall competitiveness. In the majority of studied years a size of total liabilities vis-à-vis government had an increasing negative impact on domestic competitiveness (-2.7 in 1998, -6.2 in 2003). Similar regressions but made with under log-linear specification brought about the same findings with regard to these two variables[39]. Moreover, they indicated a growing positive impact of investment size (increasing coefficients) for the years 1999-2001, and a positive and stable relation between domestic competitiveness and a relative size of labor costs in the years 1996-1997 and 2002-2003. Additionally, in the first two years under observation we noticed a negative impact of the income tax on domestic competitiveness. Other factors seem to have a stable impact on domestic competitiveness over a sequence of years, although according to our modeling, not all of them are significant in each year.

4.1.3. Results of Estimations for External Competitiveness of the Polish Manufacturing Sector

Results of the linear modeling (see: Table 4 in the Appendix, rows 1 and 2)[40] show that six factors turned out to be important for the performance of external competitiveness (or strictly speaking the EU-15 one) of the Polish manufacturing sector. One of them:

(1) the total labor costs to sales revenues ratio

positively influenced ECM in the whole period under observation. It is worth noticing that this factor was found significant and positive also in the case of domestic competitiveness.

The following remaining five factors (four of them indicating the government's intervention into the business environment) had a major negative impact:

(2) income tax payments,

[38] See Table 3 in the Appendix, rows 21-28 which present results of linear regressions for unrestricted set of variables.
[39] See rows 29-36.
[40] For more details see Sobolewski (2005a).

(3) total liabilities vis-à-vis government,

(4) concentration,

(5) subsidies, and

(6) a size of the state owned sector (measured by its share in the total manufacturing employment).

These findings seem to support our hypothesis that fiscal duties and the state ownership do not facilitate an increase of ECM. It provides us with yet another piece of evidence that a direct state support to enterprises in a form of subsidies does not contribute to improvement of the position of Polish manufacturers on the EU-15 market, but, on the contrary, weakens their performance on foreign markets.

The next step in studying an impact of group of factors on ECM of the manufacturing sector were regressions made for each year of the analyzed period. They produced several results[41]. Income tax payments had a bigger (and negative) impact on performance of exporters to the EU-15 market in the course of time (an increase from -0.75 in 1996 to -1.8 in 2001). Variables such as: state ownership (measured by the state employment ratio), liabilities vis-à-vis government and the concentration coefficient (all three having a negative impact) and relative labor costs (a positive impact) appeared to be significant in the model of overall competitiveness, yet, only in some years. Interestingly enough, there are not any variables significant in models for years 2002 and 2003.

4.2. Estimation for 3-digit Industries

4.2.1. Variables and Types of Analysis

In order to make estimations for 3-digit industries we took the same two variables (as for 2-digit industries) treated as dependent ones:

1. a share of Polish manufacturing industries' sold production in the domestic consumption of manufacturing products - DCM;
2. a share of Polish manufacturing industries' exports to the EU-15 in EU-25 intra-exports (EMC).

[41] See them presented in Table 4, rows 3-10.

Due to a lack of data for a number of manufacturing *groups*, the analysis could not embrace the entire population: for DCM regressions were made only for 77 out of the total number of 102 industries, while for ECM – 89 industries were taken into account.

We applied the following 13 factors as independent variables:

1. the subsidies to sales ratio;
2. the relative unit labor cost: Poland to the EU-15 (i.e. a ratio of labor costs to sales revenues in Poland to labor cost to sales revenues in the EU-15);
3. unit energy costs (the energy costs to sales ratio);
4. the income tax to sales ratio;
5. the depreciation to sales ratio;
6. the depreciation to investment layouts ratio;
7. the investment layouts to sales ratio;
8. investment per employee (the investment layouts to employment ratio);
9. the excise tax to sales ratio;
10. the ratio of revenues from VAT free sales to total sales revenues from production subject to VAT taxation;
11. the ratio of revenues from sales subject to a special VAT rate to total sales revenues from production subject to VAT taxation;
12. the ratio of revenues from sales subject to a regular VAT rate (22%) to total sales revenues from production subject to VAT taxation;
13. the ratio of revenues from VAT free sales and special VAT rate sales to revenues from sales subject to a regular VAT rate (22%).

Nine out of thirteen independent variables (1, 4, 5, 6, 9, 10, 11, 12, 13) measure a size of the government's intervention into the activity and performance of manufacturing companies and their groupings. In the analysis we focus on their impact on competitiveness of the manufacturing sector.

In the case of domestic competitiveness, a subset consisted of 12 variables (1-12). In the case of external competitiveness, a subset contained variables 1-9 and 13.

We applied the same methodology as in the case of 2-digit industries[42]. In the process of estimation a proper functional form of models used in the analysis of

[42] See it briefly presented in Subsection 4.1.1. For more details see Sobolewski (2005b).

[43] The same functional form of models was found proper in the previous study done for the years 1996-2001. (see Sobolewski (2004b).

external competitiveness proved to be log-linear, whereas for domestic competitiveness - linear[43].

4.2.2. Results of Estimations for Domestic Competitiveness of the Polish Manufacturing Sector

Results of regressions from various models made for 3-digit manufacturing industries show (see Table 5 in the Appendix, row 1) that the overall domestic competitiveness of the Polish manufacturing sector in the whole period under consideration was positively influenced by:

1) depreciation relative to sales revenues,

2) excise tax payments relative to total sales revenues, and

3) a size of sales subject to preferential VAT taxation.

Two factors listed below had a significant negative impact on domestic competitiveness in the whole period under the analysis:

4) unit energy costs, and

5) the relative size of income tax.

Let us put emphasis on the fact that outcomes of regressions done for 3-digit manufacturing industries indicate different factors as positive and significantly important for overall competitiveness of the manufacturing sector on the domestic market, than outcomes produced by regressions performed on data for 2-digit industries do (see Section 4.1.2 above). In the case of all three factors listed above the explanation for such an outcome is obvious: we did not apply any of them as a variable in regressions based on the data set for 2-digit industries due to a lack of these types of data. On the other hand, two (out of a group of three) variables which had been discovered to be significant and positive in the previous analysis (a share of total labor costs in the revenues from sales and the producer price index) were not included in regressions made with the data set for 3-digit industries. The third variable found significant in regressions on the 2-digit industries data, i.e. a relative size of investment, did not prove to be important for DCM in regressions on the 3-digit industries data. However, a relative depreciation appeared, which is a significant source for financing investment layouts in enterprises.

The finding that preferential VAT rates affect DCM positively is consistent and may be explained by an increased demand for goods sold at lower prices due to a lower VAT imposed on them.

A positive influence of the excise tax (which is an *ad valorem* tax) on domestic

competitiveness could be explained with the following argument. The excise tax imposed on a limited number of goods (see them listed in Section 3.2) hinders imports of more expensive foreign products levied with the tax (cigarettes, alcohol, cars), thus making more room for cheaper domestic producers. This explanation needs further verification, though. At the same time the excise tax appears to have a negative effect on foreign competitiveness (see Section 4.2.3 below), which results from its impact on a consumer price, curbing a consumers' demand.

Corporate income tax payments proved to have a strong and negative effect not only on a position of Polish manufacturers on the domestic market vis-à-vis importers, but as we demonstrate in the next subsection, also on their market share in the EU-25. The reason is that due CIT payments are deducted from profits, and in that way they decrease enterprises' internal sources of financing investment and growth.

The regressions indicate that unit energy costs hinder domestic competitiveness. We may attempt to explain this phenomenon with prices of energy in Poland higher than in other countries, which would give a comparative advantage to foreign manufactures and place them in a better position vis-à-vis Polish producers on the Polish market. This hypothesis needs to be verified, especially taking into account results of the regressions on external competitiveness that seem to question such an explanation (see next subsection). These outcomes show that unit energy costs in Poland are found to affect positively competitiveness of Polish manufacturers on the EU-15 market. A correct explanation here may be cheaper imports to Poland from other than the EU-15 countries.

Regressions made for each year of the analyzed period separately[44] revealed a stable positive impact of the excise tax and an increasing positive impact of a size of sales subject to preferential VAT taxation on domestic competitiveness. A stable and negative impact of the corporate income tax on domestic competitiveness can be observed until 2000. The reasoning why this relation ended in 2000 was presented in sub-section 3.2 above, where we briefly discuss the 1999 CIT reform which lowered fiscal pressure.

4.2.3. Results of Estimations for External Competitiveness of the Polish Manufacturing Sector

Results of regressions made for the entire eight-year period (see Table 6 in the

[44] on the entire set of 12 regressors (see Table 6 in Appendix, rows 12-19), as well as on a restricted set of regressors (only these variables which occurred to be statistically significant in the whole eight-year period, see rows 4-11 in the same table).

Appendix, row 1) indicate that external competitiveness of the Polish manufacturing sector was positively influenced only by:

1) the unit energy cost,

and negatively affected by the following five factors:

2) the income tax relative to sales revenues ratio,

3) the depreciation to investment layouts ratio,

4) the investment layouts to employment ratio,

5) the excise tax to sales revenues ratio, and

6) the size of sales subject to preferential VAT taxation ratio.

Comments on two variables: unit energy cost and excise duties were inserted in the previous subsection. A significance of income tax payments for ECM resembles the same result from other regressions in this study. A negative impact of the investment layouts to employment and depreciation to investment layouts ratios is difficult to explain. A negative effect of investment on external competitiveness might be caused by the past structure of Polish exports that could concentrate more on labor-intensive products.

Results of regressions performed for each year separately[45] show that a negative influence of investment layouts to employment decreases every year. Moreover, a negative impact of both deprecation to investment layouts and the income tax on external competitiveness was rather stable and significant in almost every year.

Regressions based on a general-to-specific methodology suggest that, apart from the three above mentioned factors, relative unit labor cost (growing in importance) and unit energy cost are also persistent regressors.

[45] On the entire set of 10 regressors as well as on a restricted set of regressors (See Table 6 in Appendix, rows 3-10 and 11-18).

5. Conclusions

This study proved that the government policies are important for the performance of the enterprise sector.

Firstly, the analysis brought about yet another empirical evidence of a significant and negative impact of the state ownership on performance of the enterprise sector. Results of regressions carried out for the Polish manufacturing sector indicate that maintaining enterprises in the state's hands negatively influenced competitiveness of the industry on both the domestic and EU-15 markets in the years 1996-2003. Such a finding provides us with an obvious recommendation for the government to necessarily withdraw from the ownership of enterprises.

Secondly, the research proved the importance of the fiscal policy for a position of the enterprise sector. The tax burden imposed on manufacturers turned out to be negative for a competitive position of Polish enterprises both on the domestic and European Union member countries' markets. Therefore, it is justified to conclude that governments have to bear it in mind while preparing state budgets and looking for additional tax revenues to finance public spending. Since the state aid belongs to one of budgetary spending items, let us move to the third and last conclusion.

Results of the study question a rationale of public direct financial support to enterprises. The direct support was found to be counterproductive: instead of helping enterprises, subsidies negatively affected a competitive position of Polish manufacturers vis-à-vis foreign competitors on the domestic as well as external markets in the years 1996-2003.

Summing up, competitiveness of the Polish manufacturing sector could be increased by promoting competition in divisions through relaxing fiscal burden, further privatization and restructuring of state owned companies. State aid in a form of subsidies seems to harm both internal and external competitiveness rather than to support them.

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Appendix

Table 1. List of Divisions of the Manufacturing Sector (2-digit industries by the NACE rev. 1.1 classification)

Classification number	Name of Division
15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of wearing apparel and furriery
19	Processing of leather and manufacture of leather products
20	Manufacture of wood and wood, straw and wicker products
21	Manufacture of pulp and paper
22	Publishing, printing and reproduction of recorded media
23	Manufacturing of coke, refined petroleum products
24	Manufacturing of chemicals and chemical products
25	Manufacturing of rubber and plastic products
26	Manufacturing of the non-metalic mineral products
27	Manufacturing of basic metals
28	Manufacturing of metal products
29	Manufacturing of machinery and equipment n.e.c.
30	Manufacturing of office machines and computers
31	Manufacturing of electrical machinery and apparatus n.e.c.
32	Manufacturing of radio, television and communication equipment and apparatus
33	Manufacturing of medical, precision and optical instruments, watches and clocks
34	Manufacturing of motor vehicles, trailers and semi-trailers
35	Manufacturing of other transport equipment
36	Manufacturing of furniture; manufacturing n.e.c.
37	Recycling

Table 2. List of Groups of the Manufacturing Sector (3-digit industries by the NACE rev. 1.1 classification)

Classification number	Name of Group
151	Production, processing, preserving of meat, 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, saddler
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
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
223	Reproduction of recorded media
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 agrochemical 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, detergents, cleaning, polishing
246	Manufacture of other chemical products
247	Manufacture of man-made fibres

Table 2. Continued

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
265	Manufacture of cement, lime and plaster
266	Manufacture of articles of concrete, plaster, cement
267	Cutting, shaping and finishing of stone
268	Manufacture of other non-metallic mineral products
271	Manufacture of basic iron and steel and of ferro-alloys (ECSC)
272	Manufacture of tubes
273	Other first processing of iron and steel and production of non-ECSC ferro-alloys
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 machine-tools
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
331	Manufacture of medical and surgical equipment and orthopaedic appliances

Table 2. Continued

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, photographic equipment
335	Manufacture of watches and clocks
341	Manufacture of motor vehicles
342	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
343	Manufacture of parts, accessories for motor vehicles
351	Building and repairing of ships and boats
352	Manufacture of railway, tramway locomotives, 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.

Table 3. Regression Coefficients for the Dependent Variable: Domestic Competitiveness of the Polish Manufacturing Sector (DCM). Data for 2-digit industries

No.	Domestic Market Share <0-1>	Constant	Concentration coefficient for 2-digit manufacturing sections	Total Labour cost to sales revenues	Investment to sales	Subsidies to sales	Gross fixed assets (deflated, investment goods prices index) to sales (deflated, ppi used)	Income Tax to Sales	Total liabilities vis-à-vis government (income taxes (CI and PIT), customs and social securities) to sales	Employment in state owned manufacturing companies to total employment in Manufacturing sector	Sales of state owned manufacturing companies to total sales of Manufacturing sector	Producer price index, 2-digit level	R^2/number of observations	Collinearity	Heteroscedasticity	Normality residuals	RESET
	dms	cons	conc	labo	inv	sub	asset	inctax	liab	ssemp	sssale	ppi					
1	1996-2003	-7,255				-96,973				-0,432		7,822	0,6480	1	1	1	1
		0,00				0,01				0,05		0,00	23				
2	*1996-2003*	***0,469***			***5,513***		***-0,757***				***0,640***		*0,3487*	*1*	*1*	*1*	*1*
		0,00			*0,02*		*0,03*				*0,04*		23				
3	*1996-2003*	***-6,732***							***-2,628***			***7,156***	*0,5288*	*1*	*1*	*1*	*1*
		0,00							*0,06*			*0,00*	23				
4	*1996-2003*	***-1,910***		***0,143***					***-0,278***			***15,710***	*0,6032*	*1*	*1*	*1*	*1*
	model ln	*0,00*		*0,48*					*0,03*			*0,00*	23				
	restricted set of regressors (as in model in row 1)																
5	1996	0,701			-43,761				0,159				0,2298	insignificant variables			
		0,00			0,03				0,34				23				
6	1997	-1,493			-27,879				-0,242			2,088	0,3532	insignificant variables			
		0,16			0,24				0,35			0,05	23				
7	1998	-2,721			-33,603				0,082			3,177	0,3584	insignificant variables			
		0,07			0,25				0,69			0,03	23				
8	1999	-1,192			-87,958				-0,120			1,864	0,3288	insignificant variables			
		0,37			0,04				0,70			0,16	23				
9	2000	-1,381			-0,185				-0,275			1,899	0,1961	insignificant variables			
		0,17			1,00				0,44			0,06	23				
10	2001	1,613			26,510				-0,035			-1,101	0,0364	insignificant variables			
		0,52			0,52				0,95			0,65	23				
11	2002	-0,689			41,730				0,108			1,105	0,0619	insignificant variables			
		0,76			0,37				0,85			0,62	23				
12	2003	-1,052			-137,160				-0,482			1,680	0,1552	insignificant variables			
		0,43			0,21				0,41			0,20	23				
	restricted set of regressors (as in model in row 2)																
13	1996	0,606			1,988		-0,309				0,345		0,2465	1	1	1	1*
		0,00			0,20		0,09				0,12		23				
14	1997	0,521			2,392		-0,269				0,341		0,2944	1	1	1	1
		0,00			0,09		0,17				0,09		23				
15	1998	0,575			1,931		-0,450				0,492		0,2730	1	1	1	1
		0,00			0,11		0,09				0,05		23				
16	1999	0,470			3,260		-0,428				0,468		0,3080	1	1	1	1
		0,00			0,05		0,12				0,08		23				
17	2000	0,486			6,100		-0,921				0,602		0,3375	1	1	1	1
		0,00			0,02		0,02				0,02		23				
18	2001	0,517			8,381		-1,535				1,954		0,2711	1	1	1	1
		0,00			0,02		0,03				0,02		23				
19	2002	0,513			0,475		-0,170				0,437		0,0154	insignificant variables			
		0,02			0,91		0,82				0,67		23				
20	2003	0,251			5,548		-0,220				0,222		0,0690	insignificant variables			
		0,35			0,29		0,77				0,76		23				

Table 3. Continued

No.	Domestic Market Share <0-1>	Constant	Concentration coefficient for 2-digit manufacturing sections	Total Labour cost to sales revenues	Investment to sales	Subsidies to sales	Gross fixed assets (deflated, investment goods prices index) to sales (deflated, ppi used)	Income Tax to Sales	Total liabilities vis-à-vis government (income taxes (CI and PIT), customs and social securities) to sales	Employment in state owned manufacturing companies to total employment in Manufacturing sector	Sales of state owned manufacturing companies to total sales of Manufacturing sector	Producer price index, 2-digit level	R^2/number of observations	Collinearity	Heteroscedasticity	Normality residuals	RESET
	dms	cons	conc	labo	inv	sub	asset	inctax	liab	ssemp	sssale	ppi					
from-general-to-specific (linear functional form)																	
21	1996	**1,348** 0,00	**-1,108** 0,00										0,3463 23	1	1	1	1
22	1997	**1,487** 0,00	**-1,401** 0,00		**1,930** 0,09			**-7,684** 0,07					0,5182 23	1	1	1	1
23	1998	**-3,596** 0,04	**-1,070** 0,01						**-2,730** 0,03			**4,655** 0,01	0,5405 23	1	1	1	1
24	1999	**1,388** 0,00	**-1,143** 0,00						**-3,445** 0,05				0,3879 23	1	1	1	1
25	2000	**1,461** 0,00	**-1,244** 0,00						**-4,276** 0,03				0,3940 23	1	1	1	1
26	2001	**1,402** 0,00	**-1,215** 0,01						**-4,050** 0,05				0,3246 23	1	1	1	1
27	2002	**1,538** 0,00	**-1,502** 0,03						**-3,762** 0,06				0,2869 23	1	1	1	1
28	2003	**1,717** 0,00	**-1,728** 0,02						**-6,201** 0,01				0,3769 23	1	1	1	1
from-general-to-specific (log-linear functional form)																	
29	1996	**-2,147** 0,00	**-1,130** 0,01	**0,734** 0,01				**-0,263** 0,06	**-0,393** 0,00				0,5414 23	1	1*	1	1
30	1997	**-3,044** 0,00		**0,579** 0,01				**-0,265** 0,07	**-0,476** 0,00			**9,252** 0,00	0,6281 23	1	1	1	1
31	1998	**-2,619** 0,00	**-0,664** 0,08						**-0,285** 0,02			**10,796** 0,00	0,5654 23	1	1	1	1
32	1999				**0,292** 0,00							**3,252** 0,07	0,7484 23	1	1	1	1
33	2000				**0,482** 0,00		**-0,538** 0,02					**3,353** 0,02	0,7691 23	1	1	1	1
34	2001		**-1,884** 0,00		**0,612** 0,00							**14,806** 0,02	0,7807 23	1	1	1	1
35	2002	**-2,166** 0,00	**-1,899** 0,00	**0,660** 0,02					**-0,447** 0,01				0,4763 22	1	1	1	1
36	2003	**-3,336** 0,00	**-2,474** 0,00	**0,732** 0,07					**-0,714** 0,01				0,4395 22	1	1	1	1
37	Panel *levels*	**0,159** 0,24	**0,490** 0,05			**23,044** 0,00				**0,383** 0,00							

NACE	FE	NACE	FE	NACE	FE	NACE	FE
15	0,3928	21	-0,0803	27	-0,1534	33	-0,1251
16	0,4471	22	0,4016	28	0,1148	34	-0,1802
17	-0,2590	23	0,2056	29	-0,3173	35	-0,3602
18	-0,1224	24	-0,1694	30	-0,3719	36	0,1163
19	-0,1301	25	0,0743	31	-0,1688	37	0,4899
20	0,3282	26	0,2661	32	-0,3985		

Row 1: Overall competitiveness in the entire period of 1996-2003. The basic model has a linear form and was obtained by means of from-general-to-specific methodology (FGTS).

Rows 2 and 3: Estimations on the restricted sets of variables developed in two linear models from the previous analysis for the period 1996-2001.

Row 4: The log-linear estimation on the restricted set of variables developed in the best-fitted model from the previous analysis for the period 1996-2001.

Next rows contain models estimated for subsequent years with the restricted set of variables and according to from-general-to-specific methodology (FGTS).

In row 37 there is a panel data model with fixed effects (FE) underneath.

Table 4. Regression Coefficients for the Dependent Variable: External Competitiveness of the Polish Manufacturing Sector. Data for 2-digit industries

No.	UE-15 market share of the Polish manufacturing sector	Constant	Concentration coefficient for 2-digit manufacturing sections	Total Labour cost to sales revenues	Investment to sales	Subsidies to sales	Gross fixed assets (deflated, investment goods prices index) to sales (deflated, ppi used)	Income Tax to Sales	Total liabilities vis-à-vis government (income taxes (CI and PIT), customs and social securities) to sales	Employment in state owned manufacturing companies to total employment in Manufacturing sector	Sales of state owned manufacturing companies to total sales of Manufacturing sector	Producer price index, 2-digit level	R^2/number of observations	Collinearity	Heteroscedasticity	Normality residuals	RESET
	plexporteu	cons	conc	labo	inv	sub	asset	inctax	liab	ssemp	sssale	ppi					
1	1996-2003	**0,081**	**-0,073**	**0,137**				**-1,732**	**-0,297**	**-0,036**			0,5809	1	1	1	1
		0,01	0,06	0,01				0,00	0,03	0,08			22				
2	*1996-2003*	***0,037***		***0,113***		***-6,630***		***-1,411***		***-0,033***			*0,5137*	*1*	*1*	*1*	*1*
		0,01		*0,03*		*0,06*		*0,01*		*0,03*			22				
	restricted set of regressors (as in model in row 1)																
3	1996	**0,058**	-0,044	**0,113**				**-0,751**	-0,070	**-0,044**			0,5680	1	1	1	1
		0,02	0,12	0,02				0,01	0,40	0,00			22				
4	1997	**0,079**	**-0,088**	0,070				**-0,678**	-0,119	-0,023			0,4652	1	1	1	1
		0,02	0,04	0,14				0,05	0,30	0,16			22				
5	1998	**0,070**	**-0,076**	0,053				**-0,673**	-0,046	-0,026			0,3843	1	1	1	1
		0,05	0,10	0,25				0,10	0,64	0,19			22				
6	1999	**0,058**	**-0,066**	**0,164**				**-1,092**	**-0,349**	-0,025			0,4765	1	1	1	1
		0,03	0,06	0,01				0,02	0,04	0,16			22				
7	2000	**0,053**	-0,039	**0,103**				**-1,374**	**-0,281**	-0,022			0,4399	1	1	1	1
		0,07	0,32	0,04				0,01	0,09	0,31			22				
8	2001	**0,047**	-0,017	**0,116**				**-1,872**	-0,205	**-0,059**			0,4719	1	1	1	1
		0,07	0,62	0,08				0,01	0,21	0,09			22				
9	2002	0,002	0,036	0,080				-0,804	-0,155	-0,010			0,2882	insignificant variables			
		0,95	0,39	0,20				0,28	0,32	0,80			22				
10	2003	0,004	0,058	0,063				-0,937	-0,199	-0,027			0,3525	insignificant variables			
		0,89	0,19	0,38				0,30	0,22	0,41			22				
	from-general-to-specific																
11	1996	**0,024**		**0,131**		-2,582		**-0,733**		**-0,031**			0,5838	1	1	1	1
		0,05		0,01		0,06		0,05		0,01			22				
12	1997	**-0,143**		**0,111**			-0,020	**-0,732**	**-0,245**			**0,157**	0,5642	1	1	1	0
		0,05		0,02			0,06	0,02	0,04			0,02	22				
13	1998			**0,109**	0,198		-0,028	**-0,610**					0,7346	1	1	1	1
				0,00	0,01		0,04	0,02					22				
14	1999	**-0,173**		**0,217**		-6,908		**-1,433**	**-0,253**	**-0,036**		**0,188**	0,6304	1	1	1	0
		0,02		0,00		0,04		0,00	0,03	0,05		0,01	22				
15	2000	**0,023**		**0,100**				**-1,192**	**-0,278**				0,3917	1	1	1	0
		0,01		0,01				0,01	0,04				22				
16	2001	**0,326**		**0,123**	-0,534		0,076	**-1,944**	**-0,218**	**-0,163**		-0,276	0,7319	1	1	1	1
		0,01		0,03	0,00		0,01	0,00	0,09	0,00		0,03	22				
17	2002									**-0,041**		**0,025**	0,6666	1	1	1*	1
										0,09		0,00	22				
18	2003									**-0,053**		**0,028**	0,6818	1	1	0	1
										0,04		0,00	22				
19	**Panel**	**0,037**	**-0,019**	**-0,035**						**-0,010**							
	levels	0,00	0,02	0,00						0,00							

NACE	FE	NACE	FE	NACE	FE	NACE	FE
15	-0,0108	21	-0,0089	27	0,0042	32	-0,0057
16	-0,0220	22	-0,0103	28	0,0091	33	-0,0082
17	0,0000	23	-0,0105	29	-0,0024	34	-0,0054
18	0,0371	24	-0,0114	30	-0,0173	35	-0,0034
19	-0,0037	25	-0,0071	31	0,0056	36	0,0325
20	0,0353	26	0,0034				

Row 1: Overall competitiveness in the entire period 1996-2003. The basic model has a linear form and was obtained by means of from-general-to-specific methodology (FGTS).

Row 2. An alternative model with the analogous specification as in the previous analysis for the period 1996-2001 (updated).

Next rows contain models estimated for subsequent years with the restricted set of variables and according to from-general-to-specific methodology (FGTS).

In row 19 there is a panel data model with fixed effects (FE) underneath.

Table 5. Regression Coefficients for the Dependent Variable: Domestic Competitiveness of the Polish Manufacturing Sector (DCM). Data for 3-digit industries

No.	Share of Polish Manufacturing Sector Sales on the Domestic Market	Constant	Subsidies to sales	Relative unit labour cost Poland - EU-15	Unit energy cost	Income tax to sales	Deprecation to sales	Deprecation to investment layouts	Investment layouts to sales	Investment layouts to employment	Excise tax to sales	VAT free	VAT lower	VAT 22	Number of observations / R^2	Collinearity	Heteroscedasticity	Normality residuals	RESET
	mktshare	cons	sbsal	ulcpeu	uec	incometaxtotsales	desal	deinv	invtotsales	inen	excisetotsales	vatfreetotvatsales	vatlowertotvatsales	vat22totvatsales					
1	1996-2003	**0,457**			**-3,842**	**-9,642**	**4,950**				**1,116**		**0,483**		0,3569	1	1	1	1
		0,00			0,04	0,01	0,03				0,00		0,00		77				
2	*1996-2003*	***0,558***				***-6,228***		***-0,054***			***1,099***		***0,438***		*0,3089*	*1*	*1*	*1*	*1*
		0,00				*0,07*		*0,59*			*0,00*		*0,00*		77				
	restricted set of regressors (as in model in row 1)																		
4	1996	**0,638**			-0,525	**-5,626**	**0,532**				**0,831**		**0,366**		0,3025	1	1	1	1
		0,00			0,74	0,01	0,75				0,00		0,00		77				
5	1997	**0,555**			-0,932	-3,323	**0,686**				**1,053**		**0,343**		0,2388	1	1	1	1
		0,00			0,64	0,15	0,76				0,00		0,00		77				
6	1998	**0,543**			**0,783**	**-4,606**	**0,828**				**1,150**		**0,322**		0,2140	1	1	1	1
		0,00			0,68	0,14	0,67				0,00		0,00		77				
7	1999	**0,495**			-2,340	-6,043	2,456				**1,185**		**0,387**		0,2428	1	1	1	1
		0,00			0,17	0,07	0,20				0,00		0,00		77				
8	2000	**0,423**			-3,880	-7,800	4,367				**1,191**		**0,432**		0,3345	1	1	1	1
		0,00			0,02	0,04	0,02				0,00		0,00		77				
9	2001	**0,358**			-1,887	-4,796	3,718				**1,080**		**0,250**		0,2056	1	1	1	1
		0,00			0,28	0,31	0,06				0,00		0,01		77				
10	2002	**0,347**			-2,797	-4,524	3,629				**1,125**		**0,447**		0,3589	1	1	1	1
		0,00			0,07	0,21	0,06				0,00		0,00		77				
11	2003	**0,352**			-2,811	-8,500	4,733				**1,017**		**0,483**		0,3787	1	1	1	1
		0,00			0,10	0,02	0,04				0,00		0,00		77				
	from-general-to-specific																		
12	1996	**0,641**				**-5,450**					**0,839**		**0,359**		0,3012	1	1	1	1
		0,00				0,00					0,00		0,00		77				
13	1997	**0,654**				**-3,961**		**-0,136**			**0,984**		**0,318**		0,2770	1	1	1	1
		0,00				0,07		0,05			0,00		0,00		77				
14	1998	**0,695**	**0,355**			**-5,427**		**-0,207**			**1,057**		**0,293**		0,3094	1	1	1	1
		0,00	0,03			0,05		0,00			0,00		0,00		77				
15	1999	**0,670**				**-5,230**		**-0,174**			**1,025**		**0,282**		0,2498	1	1	1	1
		0,00				0,08		0,09			0,00		0,01		77				
16	2000	**0,423**			-3,880	-7,800	4,367				**1,191**		**0,432**		0,3345	1	1	1	1
		0,00			0,02	0,04	0,02				0,00		0,00		77				
17	2001	**0,872**	**31,351**	**-0,216**							**1,675**		**0,378**		0,2413	1	1	1*	1
		0,00	0,04	0,03							0,00		0,00		75				
18	2002	**0,289**	**17,661**	**-0,222**							**0,971**		**0,730**	**0,450**	0,4382	1	1	1	1
		0,02	0,06	0,01							0,05		0,00	0,01	75				
19	2003	**0,250**		**-0,199**							**0,988**		**0,763**	**0,492**	0,3910	1	1	1	1
		0,03		0,04							0,06		0,00	0,01	75				
20	**Panel**	**0,475**				**1,365**		**-0,036**		**-0,001**				**0,204**					
	levels	0,00				0,01		0,00		0,00				0,00					

NACE	FE	NACE	FE	NACE	FE	NACE	FE	NACE	FE	NACE	FE
151	0,4605	176	-0,2415	232	0,3249	264	0,4025	294	-0,3549	331	-0,3452
152	0,0316	177	-0,0087	241	-0,1057	265	0,4916	295	-0,2103	332	-0,1922
153	0,3794	191	-0,3293	242	-0,2427	266	0,4682	296	0,0486	333	0,3866
154	0,0781	193	-0,0263	243	-0,1817	268	0,0547	297	-0,1318	341	-0,1104
155	0,5043	201	0,2252	244	-0,1555	271	0,1495	300	-0,5275	342	-0,4067
156	0,4064	202	0,1852	245	0,0557	281	0,2054	311	-0,2256	343	-0,2153
157	0,4529	203	0,3993	246	-0,3912	282	-0,0374	312	-0,2369	351	0,1299
158	0,3119	211	-0,1484	247	-0,1430	283	0,2186	313	0,1417	352	0,1711
159	0,3245	212	-0,0203	251	-0,0940	286	-0,3213	314	-0,1409	353	-0,1383
160	0,3588	221	0,2216	252	-0,0203	287	-0,0790	315	-0,1706	354	-0,2326
171	-0,0958	222	0,3184	261	0,0782	291	-0,2078	316	-0,1357	361	0,1877
172	-0,3800	231	0,4497	262	0,1311	292	-0,2896	322	-0,3111	363	-0,3990
175	-0,2484	232	0,3249	263	-0,0078	293	-0,0073	323	-0,2386	366	-0,2471

Row 1: Overall competitiveness in the entire period 1996-2003. The basic model has a linear form and was obtained by means of from-general-to-specific methodology (FGTS).

Row 2: Estimation on the restricted sets of variables developed in two linear models from the previous analysis for the period 1996-2001.

Next rows contain models estimated for subsequent years with the restricted set of variables and according to from-general-to-specific methodology (FGTS).

In row 20 there is a panel data model with fixed effects (FE) underneath.

Table 6. Regression Coefficients for the Dependent Variable: External Competitiveness of the Polish Manufacturing Sector (ECM). Data for 3-digit industries

No.	Share of Polish Manufacturing Sector Exports to EU-15 in EU-15	Constant	Subsidies to sales	Relative unit labour cost Poland - EU-15	Unit energy cost	Income tax to sales	Deprecation to sales	Deprecation to investment layouts	Investment layouts to sales	Investment layouts to employment	Excise tax to sales	VAT	R^2/number of observations	Collinearity	Heteroscedasticity	Normality residuals	RESET
	lnseu	cons	lnsbsal	lnulcpeu	lnuec	lnincometaxtotsales	lndesal	lndeinv	lninvtotsales	lninen	lnexcisetotsales	lnvatfreelowerat22					
1	1996-2003	**-6,569**			**0,375**	**-0,771**		**-2,809**		**-0,760**	**-0,088**	**-0,112**	0,4833	1	1	1	1
		0,00			0,06	0,00		0,00		0,00	0,02	0,05	74				
2	*1996-2003*	***-5,670***		***-1,297***	***0,454***	***-0,908***		***-1,909***		***-0,784***		***-0,085***	*0,3396*	*1*	*0*	*1*	*1*
		0,00		*0,01*	*0,03*	*0,00*		*0,00*		*0,00*		*0,15*	*89*				
	restricted set of regressors (as in model in row 1)																
3	1996	**-4,064**			**0,724**	**-0,645**		**-2,013**		**-1,279**	**-0,014**	**-0,107**	0,4722	1	0	0	1
		0,01			0,01	0,01		0,00		0,00	0,77	0,18	54				
4	1997	**-5,831**			**0,319**	**-0,579**		**-2,251**		**-1,176**	**-0,057**	**-0,123**	0,3737	1	1	1	1
		0,02			0,25	0,09		0,00		0,00	0,32	0,16	52				
5	1998	**-7,241**			**0,077**	**-0,595**		**-1,742**		**-0,965**	**-0,104**	**-0,125**	0,4515	1	1	1	1
		0,00			0,78	0,04		0,00		0,00	0,02	0,09	50				
6	1999	**-6,425**			**0,181**	**-0,780**		**-1,272**		**-0,882**	**-0,034**	**-0,054**	0,4335	1	1	1	1
		0,00			0,53	0,01		0,01		0,00	0,53	0,51	42				
7	2000	**-8,106**			**-0,164**	**-0,614**		**-1,180**		**-0,494**	**-0,084**	**-0,106**	0,5218	1	1	1	0
		0,00			0,56	0,00		0,04		0,02	0,12	0,15	41				
8	2001	**-9,854**			**-0,397**	**-0,763**		**-0,569**		**-0,540**	**-0,126**	**-0,164**	0,4693	1	1	1	1
		0,00			0,21	0,01		0,38		0,03	0,03	0,04	47				
9	2002	**-7,384**			**0,080**	**-0,698**		**-0,937**		**-0,325**	**-0,073**	**-0,084**	0,2831	1	1	1	1*
		0,02			0,83	0,08		0,08		0,25	0,30	0,40	37				
10	2003	**-3,494**			**0,374**	**0,179**		**-2,201**		**-0,802**	**0,011**	**-0,029**	0,2623	1	1	1	1
		0,21			0,35	0,69		0,01		0,01	0,91	0,79	42				
	from-general-to-specific																
11	1996	**-3,507**		**-1,030**	**0,705**	**-0,535**		**-1,299**		**-1,038**			0,2673	1	1	1	1
		0,00		0,07	0,00	0,01		0,00		0,00			89				
12	1997	**-3,485**		**-1,294**	**0,607**	**-0,479**		**-1,658**		**-1,061**			0,2747	1	1	1	1
		0,01		0,02	0,01	0,04		0,00		0,00			89				
13	1998	**-4,681**		**-1,404**	**0,478**	**-0,698**		**-1,827**		**-1,099**			0,4029	1	1	1	1
		0,00		0,01	0,02	0,00		0,00		0,00			89				
14	1999	**-3,602**		**-1,626**	**0,448**	**-0,529**		**-1,534**		**-1,099**			0,3795	1	1*	1	1
		0,00		0,00	0,02	0,00		0,00		0,00			89				
15	2000	**-5,376**		**-1,385**		**-0,424**		**-0,702**		**-0,682**		**-0,140**	0,2879	1	0	1	1*
		0,00		0,00		0,01		0,03		0,00		0,02	89				
16	2001	**-4,713**		**-1,541**		**-0,394**		**-0,569**		**-0,788**			0,2641	1	0	1	1
		0,00		0,00		0,00		0,10		0,00			89				
17	2002	**-3,531**		**-1,531**				**-0,934**		**-0,515**		**-0,125**	0,2222	1	1	1	1
		0,00		0,00				0,00		0,01		0,03	89				
18	2003	**-2,917**		**-2,074**				**-0,636**		**-0,846**			0,2764	1	1	0	1
		0,00		0,00				0,03		0,00			89				
19	**Panel**	**0,047**	**0,086**	**-0,010**		**-0,370**	**-0,177**		**0,002**			**-0,00027**					
	levels	0,00	0,05	0,00		0,00	0,00		0,00			0,05					

NACE	FE	NACE	FE	NACE	FE	NACE	FE
151	-0,0119	203	0,0336	265	0,0443	314	-0,0042
152	-0,0003	204	0,0995	266	-0,0027	315	0,0109
153	0,0157	205	0,1170	267	-0,0133	316	0,0001
154	-0,0087	211	-0,0129	268	-0,0125	321	-0,0129
155	-0,0137	212	-0,0160	271	-0,0152	322	-0,0240
156	-0,0259	221	-0,0119	272	-0,0111	323	-0,0038
157	-0,0247	222	-0,0126	273	-0,0170	331	-0,0159
158	-0,0216	231	0,3027	274	-0,0015	332	-0,0231
159	-0,0264	232	-0,0250	281	0,0257	341	-0,0220
171	-0,0063	241	-0,0148	282	-0,0012	342	-0,0092
172	-0,0192	242	-0,0217	286	-0,0141	343	-0,0110
174	0,0403	243	-0,0252	287	-0,0008	351	0,0179
175	-0,0147	244	-0,0073	291	-0,0136	352	0,0028
176	-0,0174	245	-0,0253	292	-0,0192	353	-0,0120
177	-0,0031	246	-0,0208	293	-0,0125	354	-0,0181
181	0,0042	247	-0,0035	294	-0,0151	355	0,0320
182	0,0312	251	-0,0020	295	-0,0169	361	0,0409
183	0,0392	252	-0,0181	296	-0,0179	362	-0,0187
191	-0,0046	261	0,0021	297	-0,0144	363	-0,0184
192	-0,0100	262	0,0065	311	-0,0072	364	-0,0130
193	-0,0118	263	-0,0116	312	-0,0088	365	-0,0146
201	0,0010	264	0,0114	313	0,0040	366	-0,0084
202	0,0104						

Row 1: Overall competitiveness in the whole period 1996-2003. The basic model has a log-linear form and was obtained by means of from-general-to-specific methodology (FGTS).

Row 2. An alternative model with the analogous specification as in the previous analysis for the period 1996-2001 (updated).

Next rows contain models estimated for subsequent years with the restricted set of variables and according to from-general-to-specific methodology (FGTS).

In row 19 there is a panel data model with fixed effects (FE) underneath.