

ASSESSING INDUSTRIAL POLICY EFFECTS IN THE CZECH REPUBLIC USING STATE AID DATA

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Only few area of economics arouses such passion as debate on industrial policy (IP). Moreover, practically all governments engage in industrial policies and since economic downturn in 2008 we can see a worldwide revival of these policies. The key question in thus: does industrial policy really work? We will provide an answer in this paper for the Czech Republic case. Aim of our work is to develop an econometric model and estimate effects of Czech industrial policy on the performance of particular industrial sectors. We are using state aid data to estimate effects on industrial productivity. Results suggest that state aid to industry increase industrial performance and enhance productivity.

Keywords: Industry, State Aid, Czech Republic

Introduction and Motivation

Czech Republic is one of the most industrialized countries in the world. The industrial sector accounts for nearly 39.6% of Czech GDP (data for 2012), which is the highest share in the EU (CIA, 2012). The industrial sector in the Czech Republic currently employs almost one third of the Czech labor force, while the European average is 16.5% (Eurostat, 2013). Also, the average monthly nominal wage paid to workers in the industrial sector is almost by a one fifth higher than the average wage in the whole economy (ČSÚ, 2013). Czech industry also constitute the majority of exports and industrial products include the basic export commodities (MPO, 2012).

All of these statistics point to the fact that the prosperity of the Czech economy is highly dependent on the performance of the industrial sector. For this reason we have chosen for our research the performance of the Czech industry since this is an important condition of Czech economy performance. The aim of our work is therefore to test the relationship between state subsidies which are paid to the industry and the industrial performance. The research question is then as follows: Can we see a statistically significant relationship between state subsidies and industrial performance in the Czech Republic industrial sectors?

This relationship will be examined using an econometric model, which is introduced later in this text. To answer the research question, it is necessary first to define the key concepts that will be operationalized for the purposes of the econometric model.

Definitions of key terms and concepts

Industry

By the term industry we understand the economic sectors with the CZ-NACE classification numbers 10-33. This classification consist of manufacturing sector (a detailed list of sectors that fall within NACE classification 05-39, which will be collectively referred as the industry is presented at the end of work in the Annex).

Industrial Policy (IP)

Economic and political measures in the area of industrial sector are referred to be industrial policy (IP). Generally, we can defined industrial policy as: "Any type of selective government intervention or policy that attempts to alter the structure of production in favour of sectors that are expected to offer better prospects for economic growth that would not occur in the absence of industrial intervention" Pack and Saggi (2006: 2). For the purposes of our econometric model, we need a more precise and specific definitions of industrial policy. Therefore, for the purposes of our model we mean by industrial policy the government grants paid to individual industries in the form of state aid.

State Aid

Now it is necessary to clearly define the concept of State Aid. The term State Aid is the indicator of Eurostat, which tells us how much public money has been paid to manufacturing sector.

Industrial performance

The last term, which is necessary to define and operationalize is the term industrial performance. The concept of industrial performance means the output in industrial sectors, which will be measured by the Industrial Production Index (IPI).

Data and model

In order to test the relationship between state aid and industrial performance in the Czech Republic, we use the data from the European Statistical Office (Eurostat). Those data are publicly available with internationally comparable methodology of collection. To assess the relationship between state aid to industry and industrial performance, it is necessary to use an econometric model. The general form of an econometric model for the assessment of economic policies might look like this one used in Rodrik (2008).

$$g_{it} = \gamma IP_{it} + \mathbf{Z}_{it} \beta + \varepsilon_{it}$$

Where i denotes the industrial sector, g_i is the dependent variable measuring industrial performance in particular sector, IP_i indicates the industrial policy, \mathbf{Z}_i is a vector of control variables and ε_i is the error term. The efficiency of industrial policy is then based on the estimated parameter γ and we will ask if this parameter is statistically significant or $\gamma \neq 0$. This general econometric model we will modify for purposes of our research. So to obtain the answer to the research question, our model therefore looks like this equation:

$$IPI_{it} = \alpha_0 + \beta_{it}SUB + \delta_{it}\mathbf{X} + \varepsilon_{it}$$

where IPI stands for the Industry production index, which measure the performance of the industry, SUB represents subsidies – State Aid to industry (our proxy variable for industrial policy), X denotes vector of control variables, and ε_i is the error term. The model is estimated for years 2000 to 2011, which is the longest available time series for the Czech Republic. Originally, we have included to our model ten control variables and subsequently by sequential elimination at a 10 % significance level we have omitted those variables which were not statistically significant. The final form of our model is therefore as follows:

$$IPI_{it} = \alpha_0 + \beta_{it}SUB + \delta_{1t}TAX + \delta_{2t}POL + \delta_{3t}OPEN + \delta_{4t}ELEC + \delta_{5t}CORR + \delta_{6t}LANG + \varepsilon_{it}$$

Table No. 1 contains the results of an econometric model and captures the marginal effects of variables that have a statistically significant effect on the Industrial production index and also captures the relationship between state aid and industrial performance in the Czech Republic between 2000-2011.

Results and conclusion

Table No. 1. OLS estimates using the 12 observations 2000-2011 Dependent variable: IPI, Adjusted R-squared: 0.696.

	<i>Coefficient</i>	<i>p-value</i>	
const	-54.918	0.11340	
SUB	0.022	0.02303	**
TAX	4.586	0.00246	***
POL	0.372	0.00452	***
OPEN	0.554	0.00912	***
ELEC	215.67	0.01080	**
CORR	-1.822	0.00053	***
LANG	13.115	0.01413	**

* indicates significance at the 10 percent level

** indicates significance at the 5 percent level

*** indicates significance at the 1 percent level

The above table clearly shows us the results of our model. We can say that the statistically significant factors affecting industrial performance in the Czech Republic in the years 2000-2011 were: state aid paid to the manufacturing industry, the overall level of taxation, degree of political stability, level of industry participation in the international trade, the price of electricity for manufacturing companies, the level of corruption and the degree of proficiency in English, according to the methodology ISCD97 in the general population. A more detailed description of the explanatory variables that are statistically significant brings Table no 2.

Table no 2. Definitions of variables and their measurement.

IPI	Industry production index, (%), 2005 = 100, NACE
SUB	State Aid, (mil. EUR)
TAX	Overall level of taxation, (% GDP)
POL	Degree of political stability
OPEN	Level of industry participation in the international trade, (% of exports)
ELEC	Price of electricity for manufacturing companies, (EUR/kWh)
CORR	Level of corruption, (CPI)
LANG	Degree of proficiency in English (ISCED97 – level 3) in total population, (%)

The answer to our research question is then, that state subsidies are statistically significant and have positive impact on industrial performance in the country, but this positive effect is relatively small. The price of electricity, or the total amount of paid taxes play a greater role in influencing the industrial performance.

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- 12.

Annex

The list of industries that fall into the category of C_Manufacturing, according to the European classification of economic activities NACE (second revised edition)

C_Manufacturing
10 Manufacture of food products
11 Manufacture of beverages

- 12 Manufacture of tobacco products
- 13 Manufacture of textiles
- 14 Manufacture of wearing apparel
- 15 Manufacture of leather and related products
- 16 Manufacture of wood and of products of wood and cork
- 17 Manufacture of paper and paper products
- 18 Printing and reproduction of recorded media
- 19 Manufacture of coke and refined petroleum products
- 20 Manufacture of chemicals and chemical products
- 21 Manufacture of basic pharmaceutical products and pharmaceutical preparations
- 22 Manufacture of rubber and plastic products
- 23 Manufacture of other non-metallic mineral products
- 24 Manufacture of basic metals
- 25 Manufacture of fabricated metal products, except machinery and equipment
- 26 Manufacture of computer, electronic and optical products
- 27 Manufacture of electrical equipment
- 28 Manufacture of machinery and equipment n.e.c.
- 29 Manufacture of motor vehicles, trailers and semi-trailers
- 30 Manufacture of other transport equipment
- 31 Manufacture of furniture
- 32 Other manufacturing
- 33 Repair and installation of machinery and equipment