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The effects of industrial policy on regional development in Ukraine

The paper is based on an empirical analysis of industrial policy effects on regional development. It looks at the state of the Ukrainian industrial policy and proposes the basic measures for future structural adjustments in Ukraine. The analysis of two groups of factors includes general and specific sources of growth for Ukraine's 27 regions and estimates the effects of regional industrial policy in Ukraine. The first group of indices comprises macroeconomic indicators. In the aggregate, transition-specific factors combine the indicators of success of reforms, including labour productivity, capital intensity, technological change and regional differences. The regional imbalance assessment is determined by the gross regional product per capita, regional employment and expenditures on education.

The use of econometric modelling proves the division into industrial regions with a high urbanisation rate and backward agrarian regions in Ukraine. Different types of industrial policies of protection and production subsidies across industries are proposed for the reforming process within the regions.

Keywords: industrial policy, econometric modelling, regional development.

I. Introduction

The study aims to investigate the effects of industrial policy on regional development. It aims to contribute to a deeper understanding of the state of the Ukrainian industrial policy. The global industrialisation upswing, international division of labour, capital expansion and foreign trade stimulate the involvement of the developing countries into the system of global economic relations. Felipe (2015) identifies and analyses new forms of modern industrial policy that are effective and could overcome the problems of the past.

The industrial policy has been successful when those with political power who implemented it either themselves directly wished for industrialisation to succeed, or were forced to act in this way by the incentives generated by political institutions (Robinson 2009).

With regard to the above-mentioned issues, the existence of modern approaches concerning

the industrial policy is a key policy option to promote the reallocation of human, physical and financial resources to high value added sectors of the economy and to provide efficient utilization (Mbate 2016). The spatial development policy analyses the crucial questions concerning the nature of changes in the spatial dimension (Massey 2007), whereas the structural policy debate highlights the vital role of industrial development in fostering structural change and promoting the country's long-term development objectives (Swiston, Barrot 2011). The stylised facts of structural change, estimating the contribution of structural change to economy-wide productivity growth, and developing multisector growth models consistent with the stylised facts of structural change (McMillan et al. 2016) contribute to the exploration of the key forces and the substantial theoretical and empirical knowledge to offer adequate economic policy recommendations.

The use of economic complexity, bounded rationality, socio-economic dynamics and econometric modelling provides a complex approach to deal with a broad range of industrial policy considerations. The application of the complex method of analysis to regional industrial

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policy suggests measures to improve regional competitiveness.

The progress in the reforming process within the regions depends on the success of industrial policy providing different measures of support (including protection and production subsidies) among the sectors to see whether the supported industries demonstrate a faster growth. Studies on trade policies and growth show a strong correlation between the increasing trade shares and country performance. The positive EU experiences in industrial policy which affects the process of capital, labour, technology accumulation and knowledge diffusion from global to regional and national levels should be noted in this context.

II. Analysis of recent studies and publications

The intensive development of industry and industrial policy is one of the main tendencies of modern world economy trends. Industrial policy is an integral and coordinated management system of state authorities, focused on the development of industry in general and of its separate (priority) branches; it is maintained by the corresponding mechanisms of implementation, including stimulation, regulation and monitoring through the appropriate institutions – state and market ones. The purpose of this mechanism is to solve strategic and tactical tasks of development of the real sector: increase in the volume and changes in the structure of industrial production, creation of new jobs, competitive growth of the national economy and its individual branches, etc. Industrial policy provides targeted government effects to develop the industrial sector through a set of policies and special tools.

Scientists point out positive economic results of the industrialisation theory which was applied in the Soviet Union. The negative consequences of its implication included an uneven and unfair distribution of common goods among the former Soviet republics. The positive economic result of the industrialisation theory, applied in the Soviet Union, and of the application of the Soviet model of production, was a 50% share of industrial production in the GDP. Simachev et al. (2014)

pointed out that the technical change and the institutions which promoted it played a central role both in the forging-ahead process and in the catching-up process. Saha (2015) suggests the existence of elements of structural change visible in the evolution of Ukraine's industry. The author indicates that there is no correlation between the relative size and growth of the subsector but, rather, that growth was differentiated by the type of industry. Some studies argue that, in the case of particular industries that have received protection, this may lead to higher growth but result in net welfare losses (Madsen et al. 2003; Grossman, Elhanan 1991). The effects of both the movement of labour from low- to high-productivity sectors and productivity improvements within sectors are considered as a source of economic growth, and of its strong convergence property effect in manufacturing. Growth, based on industrialisation, is defined as a relatively easy kind of growth, which can be accomplished without placing too great demands on the fundamental capabilities of the economy (Rodrik 2013). Warwick (2013) proposes the evolution of thinking about the rationale for industrial policy interventions, which has moved from a traditional approach based largely on product market interventions (production subsidies, state ownership, tariff protection), through market failure-correcting taxes and subsidies operating mainly on factor markets (R&D incentives, training subsidies, investment allowances, assistance with access to finance), to a focus on interventions that help build systems, create networks, develop institutions and align strategic priorities. Clemens and Williamson (2001) analyse types and forms of protection and affirm that measures that provide export promotion are likely to be more successful than other types of interventions (such as tariffs or domestic content requirements).

Kebir (2016), Acemoglu et al. (2007), Altenburg et al. (2008) argue that a rethinking of regional development dynamics is necessary in order to properly consider current sustainable development requirements. They reassess the development models proposed in the 1980s that emerged in the context of globalisation, competitiveness and technological innovation. A new typology

of organisational forms of sustainable innovation is provided, and the traditional concept of an innovative milieu is challenged (Kebir et al. 2016). The structural policy debate demonstrates the predominance of the approach for the interdependence of economic growth and development changes with the structure of economic activity. The diversification away from agriculture into manufacturing and, eventually, services (intersectoral structural change), triggers a process of sustained growth. As the share of the total workforce in the primary sector declines in favour of the manufacturing (secondary) and service (tertiary) sectors, the intersectoral process of resource allocation results in systemic changes in the composition of domestic demand, generating a continuous rise in the level of skills, productivity and wages and, as a consequence, increasing the consumer purchasing power (Alcorta et al. 2013). Modern industrial policy refers to the set of actions and strategies used to favour the more dynamic sectors of the economy.

Tridico (2011) understands, by institutional, structural and systemic change, getting the right institutions to adapt those which do not fit well, keeping the old institutions which could still work and overcoming the inefficient ones. New conceptual developments are proposed, showing how modern industrial policy is able to initiate, upgrade and transform economic activity for the benefit of all. The evidence is used to provide a new theory of industrial policy, distinguishing modern industrial policy from the practices of the past. Felipe (2015) stresses that the developing countries need a “modern industrial policy” which refers to the set of actions and strategies used to favour more dynamic sectors of the economy. A key aspect of modern industrial policy is embedding private initiative in a framework of public action to encourage diversification, upgrading and technological dynamism to achieve development in the 21st century. Patel and Pavitt (1994) highlight, in addition to diversity in cumulative technological trajectories, the divergent patterns that reflect international differences in the capacities of management, financial and training institutions properly to evaluate and exploit – the learning benefits of technological investments. Theoretical

analysis of diverse approaches anticipates and adapts industrial policy to structural changes. The new relationship between the market and the production process proves the necessity of further empirical research aimed to assess the effectiveness of industrial policy.

In market economy, the private sector and private sector enterprises are the long-term driving forces of industrial development. It is the vibrant private sector that triggers economic dynamism, enhances productivity, enables transfer and diffusion of new industrial technologies and maintains competitiveness. In so doing, it also shapes the economic globalisation process. At the same time, it must be underscored that the ultimate objective of this process is poverty reduction. The difference between a viable and not viable industrial policy lies in the objectives and functioning of the institutions implementing the policies, and these are determined by the political system (Robinson 2009).

III. Peculiarities of industrial development in Ukraine

The basic idea of the state industrial policy is ensuring economic power, independence and security of the country through the development of high-tech and competitive industries. The purpose of the state industrial policy is suspension of slump production to ensure modernisation, restructuring and sustainable development of the Ukrainian industry in its transition to industrial economy as the basis of economic independence of the state, the welfare of the people and the country's integration into the global space. The relative importance of the industrial sector in Ukraine has continuously decreased since the fall of the Soviet Union. The share of industry in Ukraine's economy has dropped from around 50% of gross value added (GVA) in 1991 to 27%, including energy and water supply. In 2004, the situation of the Community of Independent States, or CIS countries, was severe, and all the former Soviet republics (FSRs) were still below their 1989 GDP levels (Tridico 2009). Ukraine did not succeed in carrying out sufficient reforms, had hyperinflation, unstable

economy and high corruption. UNIDO experts (2003) provided explanations for the declining trend in the manufacturing sector in the CIS countries. Firstly, the privatisation of the state-owned enterprises (SOEs) in the region was a measure to improve the government's fiscal position by reducing subsidies to SOEs, while simultaneously increasing government revenue by their sale. Instead, many SOEs were engaged in asset stripping, selling off company assets piece by piece at discounted prices to make a quick return, which led to the decline of competitiveness. Secondly, the inefficient use of resources, including labour, was rather high in the previously state-owned enterprises, and it was impossible to avoid generating significant unemployment as a result of the restructuring process. Sectoral studies showed that "there is no evidence of a substantial diminution of the technological gap between the Soviet Union and the West in the past fifteen to twenty years, either at the prototype commercial application stages or in the diffusion of advanced technology" (Amann et al. 1982). The transition countries did not reach a leading position in the world in a particular branch of economic activity on the basis of innovation. They relied on imported technology, which does not provide integration into the global economy (Myant, Drahokoupil 2011). New sources of growth have not as yet been able to compensate for the stagnant or diminishing performance of the old industrial substance. Identifying and strengthening these new sources of growth will be a key to secure Ukraine's status as an industry-based economy (Saha, Kravchuk 2015).

The structure of the Ukrainian economy is under the influence of the global challenges of the world economy. The economy recovered modestly, by 2.3% in 2016, with a bumper agriculture harvest leading to stronger growth of 4.8% in the fourth quarter. Decisive reforms in the face of unprecedented shocks in 2014 and 2015 helped to stabilise confidence. Other sectors experienced a pickup from low levels in 2016, with a growth of 3.6% in manufacturing, 16.3% in construction, 4% in domestic trade and 3% in transport. Fixed investment rebounded strongly by 20% from a low base, including manufacturing equipment and imported capital

goods, pointing toward a strengthening investor confidence. However, the overall pace of recovery has been modest as significant weaknesses remain in some parts of the services sector, including education, health and financial services (The World Bank 2017).

The basic structure of the global economy shifts is defined by the following tendencies: accelerated pace of development of new advanced high-tech industries, compared with the traditional growth rates; reducing the share of environmentally hazardous mining and manufacturing industries in the total industrial production; increase of the share of the social-service industry, which in developed countries "absorbs" up to 70% of wage earners and self-employed, economically active population. At the same time, the world's attention on industrial policy is growing. The governments of the developed countries and those of the developing countries consider industrial policy as a means of promoting sustainable economic growth and improving the welfare of citizens.

In exploring the impact of technological and industrial structural changes in Ukraine's economic development, one could mention the stable rate of economic growth in the period from 2000 to 2004. It was ensured by economic activity, accompanied by a rapid turnover of capital (metallurgy, chemical industry, mining industry and food industry).

In Ukraine, as a result of the global financial crisis, political instability, weaknesses of the control system and the level of investment activity do not allow for accumulating sufficient investment resources for the modernisation of the economy. In the period 2010–2013, a deep crisis led to a slowdown in capital investments and reduction of new production capacity, growth of volumes of incomplete construction, low technological parameters and reproductive structures of capital investments. In recent years, some stabilisation in the dynamics of gross capital investment in industry was largely due to the low base of comparison with the level of investment in the post-crisis years.

In recent years, the share of industry in Ukraine's GDP has been decreasing. Industrial companies are forced to respond to the growing challenges and threats before their

activity is reduced: demand for domestic and foreign markets, deterioration in access to many traditional industries in the Russian market, appreciation of domestic financial resources and an urgent need to update obsolete fixed capital. The industry of Ukraine occupies a prominent place in the global economy. In terms of iron and steel production, Ukraine occupies the eighth place in the world, and in traded products – the third.

During 25 years of independence, Ukraine did not develop a clear and systematic approach to its industrial policy and its place in the economic policy of the country in general. Various governmental initiatives to support industry consisted mainly of decisions (often political) of tax reliefs for certain industries and direct financial support to “sensitive” industries on account of their social aspect. This support did not stimulate restructuring and development of distressed industries but, on the contrary, preserved their problems.

The main characteristic features of the industrial development of Ukraine are the following:

- a significantly weakened position of investment-oriented activities;
- a widening technological gap between Ukraine and developed countries;
- a big share of the most energy-intensive and environmentally harmful fuel and energy and metallurgical complexes;
- a rapid reduction in the share of light industry – an industry that, along with the food industry, is directly focused on meeting consumer needs.

The consequences of the slowdown in industrial development are explained by a deepening technological backwardness of its material and technological base. Resolving the economic problems is impossible without active state structural policies. The whole industrial complex of the country acts as an object of industrial policy. Wide acknowledgment of the industry's important role in the current pressing issues reflects on new tasks of accelerated development of the industry, which is a generator of scientific and technical progress and innovations, as well as an important factor of global competitiveness of national economies and a driver of economic growth. Ukraine also needs to use the indicated advantages of industry more actively, taking

into account the current situation at home and abroad. As regards the structure of the economy of Ukraine, the industrial sector made up 21% of Ukraine's GDP in 2013. In comparison, agriculture contributed only 8%, while services – 58% (Radeke et al. 2014).

However, it should be noted that the intra-structure manufacturing industry of Ukraine has a “bias” towards heavy industry – the steel and energy sector. During the period from 1990 to 2013, the proportion of engineering, which is the basis of high and medium technological industries in the structure of industrial production, dropped almost three times: from 31% to 10.6%, while the industry that is weak, the low and medium resource sector industry, increased 1.5 times, from 11% to 17.5%.

The Ukrainian regional structure demonstrates spatial unevenness, which reflects a limited number of regions-leaders that account for the bulk of the gross regional product distribution and concentrate the significant potential of the country (Fig. 1).

The structural changes in the economy affect the regional distribution of Ukrainian industry. Heavy industry is concentrated in the southern and eastern parts of Ukraine. The western part of the country specialises in agriculture and trade activities. The regional industrial policy in Ukraine depends on the economic structure, which reaffirms the need to change the structure of the economy in the direction of reducing the share of extractive industries and increasing the share of processing industries (Nosova, Salashnyi 2016).

Industrial activity is concentrated and unevenly distributed in certain regions, especially in the eastern part of Ukraine; the share of the east is almost 60%. Weak external demand, negative terms – off-trade shock, inappropriate monetary and exchange rate policy contributed to the decline in the real industrial production in 2013 (Radeke et al. 2014).

The structure of the national economy of Ukraine did not meet the technological stability criterion. The share of high-tech industries is about 5% (four times less), the total share of high-tech and medium high-tech industries is about 25% (two times less) of the GDP (Fig. 2). An

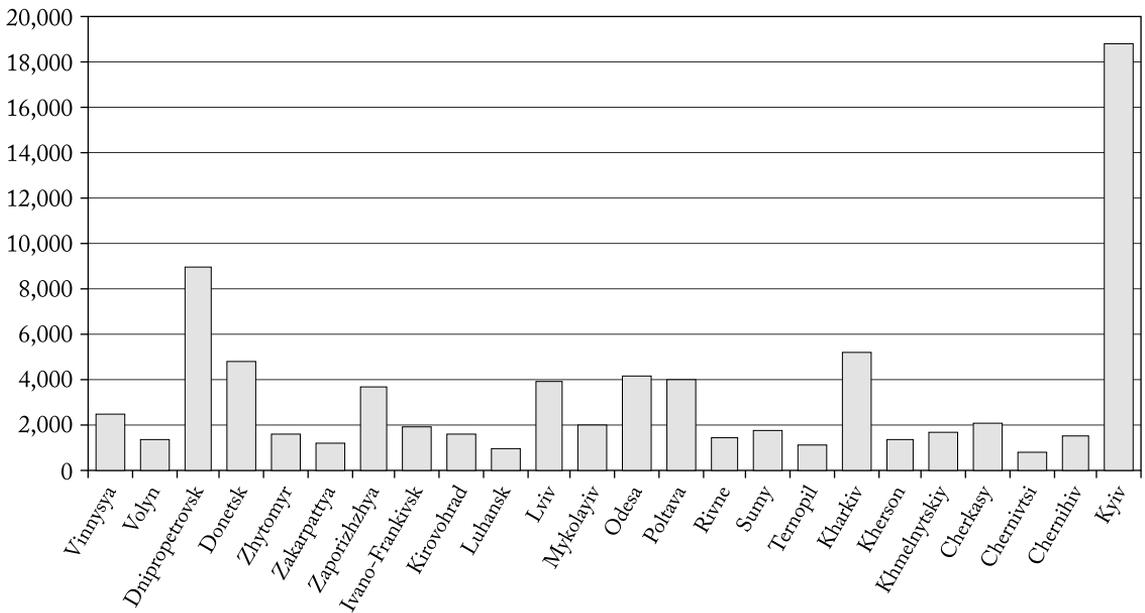


Fig. 1. Gross Regional Product in Ukraine 2015 (in USD million)

Source: Data of Ukrstat.

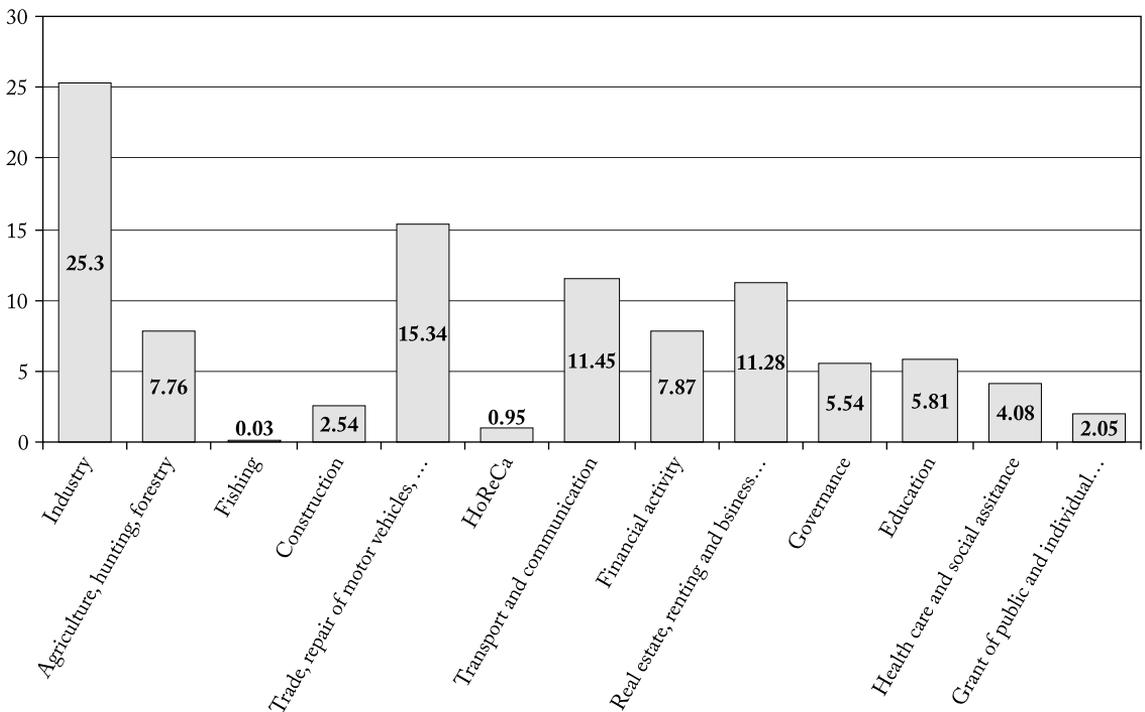


Fig. 2. Sectoral structure of Ukrainian economy in 2013 (% GDP)*

Source: Data of Ukrstat.

analysis of the Ukrainian industrial structure shows that the fifth technological mode of production made up 3%, the third share was 46%, the fourth – 50% in 2013. The share of the sixth technological mode of production was not significant in Ukraine. The proportion of product industries classified as high technologies was very low (Yatsenko 2009).

However, economic growth, based on these economic activities, has a long-term nature. Heavy industry remained very important for Ukraine. Metals, mining and machinery production accounted for almost 50% of industrial sales in 2013. However, light industry subsectors such as food processing, furniture and chemicals/pharmacy production outperformed heavy industry in sales growth in 2010–2013, before the present crisis. Food processing, a relatively labour-intensive light subsector accounting for 26% of industrial sales in 2013, is the largest single subsector of industry 2.

Other “light” industry sectors such as textiles, wood processing, rubber and plastic are much smaller in proportion at present but, on average, the light subsectors were growing faster than the heavy ones already before 2013. The structural change is still incomplete, and it is considered that new growth should replace the collapsing old industries. Structural change was underway before the conflict in the east of Ukraine: slow growth in key heavy industry sectors (metals, machine building), faster growth in lighter sectors: food, wood processing, rubber/plastic, also a fast growth in the mining and chemical sectors. Different industrial structures could explain differential regional growth (Saha 2015).

During 2014, according to the data of the National Bank of Ukraine, the GDP drop was 7.5%, and UAH devaluation reached 100%, while the consumer inflation rate rose to 25%. The banking system lost one third of all the deposits, and the foreign exchange reserves of the country decreased to 7.5 billion US dollars. Industrial production in Ukraine averaged –1.66% from 2000 until 2015, reaching an all-time high of 17.60% in April 2010 and a record low of –33.8% in January 2009. In 2015, the industrial production in Ukraine fell by 13.4%. The main industrial potential is concentrated in eastern Ukraine. The most affected production sectors

included coke and refined petroleum products, chemical products, steel products, engineering products. According to the National Institute for Strategic Studies, industrial production (excluding the portion of ATO zone) decreased 2.5 times compared with 2014, metallurgical production suffered the greatest reduction – 42.6%, and mechanical engineering – 46.3%.

In 2015, the fall in GDP was estimated to be 10–11%. Ukrainian producers could not use their capacities in full due to the high competition from the cheap import that is increasingly coming into the country, including grey economy transactions. These problems could be solved by decreasing the level of corruption and adopting transparent customs regulations, which would not only “raise” domestic producers, but also increase the attractiveness of the Ukrainian market for foreign investors.

Ukraine has improved its position in the ease of doing business according to the World Bank’s *Doing Business* report, rising to 76th place in 2017 (*Doing Business* 2017). The representatives of business organisations unanimously put equal conditions for all market participants as a very important element of the industrial policy. The duty of the state is to create equally clear and predictable rules for business. Without this, any industrial policy will not be implemented in full.

While discussing the conditions for domestic manufacturers in the domestic and foreign markets, some experts stressed the importance of offering support, primarily to small and medium-sized businesses. Scientists are of the opinion that Ukraine needs to identify priority areas of economic development in order to define what type of the country’s industrial development model they prefer to select. It should be mentioned that the industrial and investment policies should not be compensatory, but stimulating. Foreign investors compare tax burdens in different locations in order to receive tax rate reductions. The last will provide favourable conditions for domestic and foreign investors in the Ukrainian production (Nosova 2014).

The problems of attraction and distribution of investments in the industrial sector in Ukraine involve the need to eliminate structural disparities, whether technological, sectoral or re-

gional. They are susceptible to the deepening of the imbalances in commodity and financial markets, preserving the inefficient structure of production, monopolisation of certain strategic or socially important sectors of the economy and inefficient use of the raw resource base and production capacity.

IV. Econometric modelling

Econometric estimation of the parameters influencing gross regional product per capita (GRP) growth has been used to analyse the regional development in Ukraine. The study strives to test the hypothesis according to which industrial policy depends on the existing sectoral structure of the economy.

Modelling was based on the annual data of gross regional product per capita for 27 Ukrainian regions from 2005 to 2009. The available data from the regional statistical survey in Ukraine was used and applied for consistency and reliability of research. In detail, the following variables are available and are considered where index i runs over all 27 regions, and index t – over all the regarded time periods (years). We assume the estimation of the following equation:

$$GRP_{it} = F(FCI_{it}, IPI_{it}, CPI_{it}, FDI_{it}, AW_{it}, NT_{it}, UR_{it}, RTR_{it}, WTR_{it}, EMP_{it}, RIN_{it}) \quad (1)$$

where: GRP_{it} – Gross Regional Product per Capita (UAH); IPI_{it} – Industrial Production Index, % (2000 = 100%); FCI_{it} – Fixed Capital Investment per Capita (UAH); CPI_{it} – Consumer Price Index (%); FDI_{it} – Foreign Direct Investment per Capita (UAH); AW_{it} – Average Nominal Wage per Worker (UAH); NT_{it} – Number of Telephones per 100 Families; UR_{it} – Unemployment Rate (%); RTR_{it} – Retail Trade Turnover per Capita (UAH); WTR_{it} – Wholesale Trade Turnover (in million UAH); EMP_{it} – Employment of Working People Aged 17 to 70 years (in thousand); RIN_{it} – Real Income Per Citizen (UAH).

According to the State Statistic Service of Ukraine, the GRP is determined as the sum of the value added of all kinds of activities,

including net taxes. The industrial production index is calculated as a value of produced products (works, services) in the corresponding prices. The consumer price index (inflation index) is considered as the index of the change of prices and tariffs for consumer goods and services consumption. Wholesale trade turnover is defined as resale of goods by enterprises without any changes (except conventional trade-related operations) to other enterprises and organisations (excluding individuals) for their consumption, subsequent resale either within Ukraine or for exports. Wholesale turnover figures exclude VAT and excise tax. Retail trade turnover includes retail turnover of the enterprises which are engaged in retail trade activities and sales on the markets and by entrepreneurs. We apply the ordinary least squares estimation (OLS) for modelling the correlation of GRP from 11 exogenous variables (Equation 2).

$$Y_t = \sum_{i=1}^k \beta_i x_{it} + u_t, \quad i = 1, 2, \dots, n \quad (2)$$

The significance of the coefficient is tested at a 5% level of significance. Standard error is given in brackets. The estimation for 2009 shows the existence of a significant relationship of the GRP with fixed capital investment, wholesale trade turnover, employment of working people and real income per citizen (Equation 3).

$$GRP_{27,2009} = -4788,2 + 1,17FCI_{27,2009} + 0,042WTR_{27,2009} - 0,56EMP_{27,2009} + 1,76RIN_{27,2009} \quad (3)$$

(2136,2) (0,39) (0,01) (0,51) (0,43)

$R^2 = 0,97$; $DW = 1,7$

The GRP modelling using 11 exogenous variables demonstrates the econometric results from 2005 to 2009. The GRP model, dependent on fixed capital investment, wholesale trade turnover, employment and real income per citizen, confirms significant relationships during 2005–2009 in Ukraine (Tab. 1).

The GRP increase depends on the development of the wholesale trade turnover among enterprises in the regions. Negative coefficients for employment are caused by low labour productivity in industry, demographic trends, high share

Table 1. Results of GRP modelling dependent on exogenous variables (ordinary least squares estimation)

Regressor	2005	2006	2007	2008	2009
INT	-129.9 (687.3)	336.2 (682.5)	-1979.6 (1331.6)	-5512.9 (1374.9)	-4788.2 (2136.2)
FCI	2.7 (0.3)	2.4 (0.3)	1.5 (0.4)	1.2 (0.3)	1.17 (0.39)
WTR	0.05 (0.01)	0.07 (0.01)	0.06 (0.01)	0.03 (0.01)	0.042 (0.01)
EMP	-1.2 (0.3)	-1.1 (0.2)	-1.5 (0.4)	-1.3 (0.4)	-0.56 (0.51)
RIN	0.9 (0.3)	0.7 (0.3)	1.6 (0.4)	2.4 (0.3)	1.76 (0.43)
R ²	0.96	0.97	0.97	0.98	0.97
DW-statistics	1.75	2.07	2.19	2.19	1.7

Source: Author's estimations.

of pension expenditure in GDP ratio, in excess of 14% (OECD 2011), and a significant share of people working in retail trade.

The use of the SURE (Seemingly Unrelated Regression Estimation) model is intended for the analysis of a system of multiple equations with cross-equation parameter restrictions. A set of equations may be interrelated, because the error terms are assumed to be correlated across the equations,

$$Y_i = X_i\beta_i + u_i \quad i = 1, 2, \dots, m \quad (4)$$

where Y_i is an $n \times 1$ vector of observations on the i^{th} equation's regressor, X_i is an $n \times k$ matrix of observations on k regressors, and u_i is $n \times 1$ vector of the i^{th} equation's disturbances.

The application of the SURE model offers a more accurate estimation and is used for estimating uncorrelated variables. We estimated the dependence of the gross regional product per capita from fixed capital investment per capita, wholesale trade turnover, employment of working people and real income per citizen, using the annual data for 27 Ukrainian regions from 2005 to 2009. The results of estimation for 2005–2009 are provided in Table 2.

The significance of the coefficient is tested at a 5% level. Standard error is given in brackets. Estimation results show a significant relationship

between GRP per capita and fixed capital investment per capita, wholesale trade turnover, real income per citizen in 2006–2007.

An insignificant relationship of GRP per capita with the real income per citizen in 2007 and fixed capital investment in 2008 and 2009 is caused by regulatory impediments for the growing business. A product-market regulation in Ukraine includes three components: state control; barriers to entrepreneurship and barriers to trade and investment. It suggests that a regulatory reform could contribute to a greater efficiency of both resource allocation and production, thus accelerating the convergence of Ukrainian regions. OECD experts (2011) pointed to the underpinning economic diversification, enhanced competitiveness and private sector development.

A decrease in standard errors values in Table 2 in comparison with the analogous results for the same variables in Table 1 points to improved estimation results. The absence of significant coefficients in some equations confirms a need for ongoing statistical analysis of the data for a longer estimation period. The existence of regional disparities in fixed capital, asymmetry in incomes, foreign direct investment distribution, various production endowment, create basis for regional contradictions. The research shows that regional industrial policy in Ukraine depends on the economic structure, which reaffirms

Table 2. Results of Gross Regional Product Estimations from Exogenous Variables (SURE)

Regressor	2005	2006	2007	2008	2009
INT	2007.9 (414.3)	2667.3 (438.2)	3676.1 (659.1)	1948.6 (1004.5)	2036.2 (1569.7)
FCI	0.3 (0.12)	0.4 (0.1)	0.3 (0.1)	0.16 (0.1)	0.05 (0.19)
WTR	0.01 (0.004)	0.02 (0.01)	0.02 (0.001)	0.01 (0.01)	0.02 (0.01)
EMP	-0.5 (0.2)	-0.3 (0.2)	-0.5 (0.3)	-0.16 (0.5)	-0.08 (0.6)
RIN	0.5 (0.1)	0.3 (0.09)	0.18 (0.14)	0.95 (0.2)	0.92 (0.27)
R ²	0.46	0.48	0.43	0.53	0.61
DW-statistics	2.06	2.02	2.0	2.06	2.0

Source: Author's estimations.

the need to change the structure of the economy in the direction of reducing the share of extractive industries, increasing the share of processing industries, products with high value added and high-tech sectors.

Scientists are of the opinion that Ukraine needs to identify priority areas of economic development in order to define what type of the country's industrial development model they prefer to select. It should be noted that industrial and investment policies should not be compensatory, but stimulating.

Conclusions

In order to create a competitive modern industry, it is suggested to use the experiences of high-income countries in modern industrial policy, which is defined as the sum of policy measures to achieve "high-road competitiveness". It is based on three main principles: international competitiveness of industrial products, export expansion and state protectionism with an emphasis on modernisation of the economy. Industrial policy promotes high competitiveness of industries and services, integration of industrial and innovation policies which are driven by social goals (Aiginger 2014).

Statistical data confirms the division into industrial regions with high urbanisation and backward agrarian regions in the Ukraine. The basic problems influencing the integration process of Ukrainian regions are the following: industrial development disparities among regions; insufficient infrastructure (telecommunications, roads, hotels, services, etc.), low labour productivity in the industrial sector and insufficient regional trade. There is a need for adopting priority measures for regional policy improvement, including structural change towards high-tech sector development, production of high value added products, adoption of programmes stimulating skilled workers' training, and creation of an institutional network for regional development.

A number of specific measures that can be effective instruments of industrial policy include efficient regulatory framework, stable tax system and barriers to decrease the amount of corruption schemes. The government should support the economy with special measures and state guarantees for protection of business.

Carrying out specific policies for attracting foreign direct investments (FDI) suggests removing barriers, selecting and analysing of Ukraine's most attractive sectors in terms of competitiveness and FDI appeal.

References

- Acemoglu, D., Antras, P., Helpman, E. (2007). Contracts and technology adoption. *American Economic Review*, 97 (3), 916–943.
- Aiginger, K. (2014). Industrial policy for a sustainable growth path. *Policy Paper No. 13*. WIFO, June.
- Altenburg, T., Rosendahl, C., Stamm, A., Drachenfels, C. (2008). Industrial policy – A key element of the social and ecological market economy. In *The Social and Ecological Market Economy – A Model for Asian Development* (pp. 134–153). Eschborn: GTZ.
- Alcorta, L., Haraguchi, N., Rezonja, G. (2013). Industrial structural change, growth patterns, and industrial policy. In J.E. Stiglitz, J.L. Yifu, E. Patel (eds), *The Industrial Policy Revolution II. International Economic Association Series*. London: Palgrave Macmillan.
- Amann, J.M., Cooper, J.M., Davies, R.W. (1982). *The Technological Level of Soviet Industry*. New Haven: Yale University Press.
- Clare, A. (2009). Trade, foreign investment, and industrial policy. In D. Rodrick, M.R. Rosenzweig (eds), *Handbook of Development Economics*, Vol. 5. Elsevier.
- Clemens, M.A., Williamson, J.G. (2001). Why the tariff-growth correlation changed after 1950. *NBER Working Paper Series*, October.
- Data from Regional Statistical Surveys Ukraine in 2010. State Statistical Committee in Ukraine. Available at: <http://www.ukrstat.gov.ua>
- Doing Business 2017. Measuring Business Regulations*. World Bank Group. Available at: <http://www.doing-business.org/data/explore/economies/ukraine>
- Felipe, J. (2015). *Development and Modern Industrial Policy in Practice: Issues and Country Experiences*. Cheltenham, UK–Northampton, MA: Edward Elgar Publishing.
- Grossman, G., Elhanan, H. (1991). *Innovation and Growth in the Global Economy*. Cambridge, MA: MIT Press.
- Kebir, L., Crevoisier, O., Costa, P., Peyrache-Gadeau, V. (eds) (2016). *Innovation, Sustainability and Regional Development. Rethinking Innovation Milieus*. Cheltenham, UK–Northampton, MA: Edward Elgar Publishing.
- Madsen, E.S., Jensen, C., Hansen, J.D. (2003). Scale in technology and learning-doing in the windmill industry. *Journal for International Business and Entrepreneurship Development* 1 (2), 27–35.
- Massey, D. (2007). In what sense a regional problem? *Journal of the Regional Studies Association*, 41 (S 1), 49–59.
- Mbate, M. (2016). Structural change and industrial policy. A case study of Ethiopia's leather sector. *Journal of African Trade*, 3 (1–2), 85–100.
- McMillan, M., Rodrik, D., Sepulveda, C. (eds) (2016). *Structural Change, Fundamentals, and Growth. A Framework and Case Studies*. Washington, DC: International Food Policy Research Institute.
- Myant, M., Drahokoupil, J. (2011). *Transition Economies. Political Economy in Russia, Eastern Europe, and Central Asia*. Hoboken, NJ: John Wiley & Sons, Inc.
- Nosova, O.V. (2014). The role of the state in the goods competitiveness improvement in Ukraine. *Problems of Social and Economic Development of Business: Collection of Scientific Articles*, Vol. 1 (pp. 120–126). Montreal: Publishing House “BREEZE”.
- Nosova, O., Salashnyi, S. (2016). The investment and innovation strategy of regional development in Ukraine. *Problems of Development Modern Science: Theory and Practice: Collection of Scientific Articles* (pp. 135–137). Madrid: EDEX.
- OECD (2011). *Competitiveness and Private Sector Development: Ukraine 2011. Sector Competitiveness Strategy*. Paris: OECD Publishing.
- Patel, P., Pavitt, K. (1994). Uneven (and divergent) technological accumulation among advanced countries: Evidence and a framework of explanation. *Industrial and Corporate Change*, 3 (3), 759–787.
- Radeke, J., Kirchner, R., Naumenko, D. (2014). Ukraine's industrial sector: Analysis and latest trends. *Technical Note Series*. TN/02. German Advisory Group. Institute for Economic Research and Policy Consulting. Berlin, Kyiv, February.
- Robinson, J.A. (2009). *Industrial Policy and Development: A Political Economy Perspective*. Harvard University, Department of Government and IQSS.
- Rodrik, D. (2004). Industrial policy for the twenty-first century. *CEPR Discussion Paper*, No. 4767. Centre for Economic Policy Research, London.
- Rodrik, D. (2013). Structural change, fundamentals, and growth: An overview. Institute for Advanced Study. Available at: https://scholar.harvard.edu/files/dani-rodrik/files/structural-change-fundamentals-and-growth-an-overview_revised.pdf
- Rodrik, D. (2013). The past, present, and future of economic growth, global citizen foundation. *Working Paper*, No 1, June 2013. Available at: http://www.sss.ias.edu/files/pdfs/Rodrik/Research/GCF_Rodrik-working-paper-1_-6-24-13.pdf
- Saha, D. (2015). From heavy to light: structural change in Ukraine's industry. *Newsletter*. German Advisory Group, Issue No. 81, July.

Saha, D., Kravchuk, V. (2015). The industrial sector of Ukraine: Trends, challenges and policy options, *Policy Briefing*. PB//05//2015.

Simachev, Y., Kuzyk, M., Kuznetsov, B., Pogrebnyak, E. (2014). Russia on the path towards a new technology industrial policy: Exciting prospects and fatal traps. *Foresight-Russia*, 4, 6–23.

Swiston, A., Barrot, L.-D. (2011). The role of structural reforms in raising economic growth in Central America. *IMF Working Paper*, WP/11/248.

Tridico, P. (2011). *Institutions, Human Development and Economic Growth in Transition Economies*. Houndmills, Basingstoke: Palgrave Macmillan.

UNIDO (2003). The role of industrial development in the achievement of the millennium development

goals. *Proceedings of the Industrial Development Forum and Associated Round Tables*. Vienna, 1–3 December 2003. Compendium Edition.

Warwick, K. (2013). Beyond industrial policy: Emerging issues and new trends. *OECD Science, Technology and Industry Policy Papers*. No. 2, OECD Publishing, 1–57.

The World Bank (2017). *Ukraine Economic Update – April 2017*. Available at: <http://www.worldbank.org/en/country/ukraine/publication/economic-update-spring-2017>.

Yatsenko, N. (2009). Economy of Ukraine 1999–2008: Lost by the decade, *Mirror of the Week*, 51 (779), 26 December.

Oddziaływanie polityki przemysłowej na rozwój regionalny na Ukrainie

Prezentowany artykuł opiera się na analizie empirycznej wpływu polityki przemysłowej na rozwój regionalny. Autorka analizuje w nim stan ukraińskiej polityki przemysłowej i przedstawia podstawowe parametry mogące determinować przyszłe zmiany strukturalne na Ukrainie. Analiza dwóch grup czynników obejmuje ogólne, a także szczegółowe źródła rozwoju i wzrostu gospodarczego 27 regionów Ukrainy oraz ocenę skutków regionalnej polityki przemysłowej w tym kraju. Do pierwszej grupy czynników zaliczają się wskaźniki makroekonomiczne. Ogólnie rzecz biorąc, czynniki swoiste dla okresu przejściowego obejmują wskaźniki powodzenia reform, wydajności pracy, kapitałochłonności, zmian technologicznych i zróżnicowania regionalnego. Dysproporcje regionalne poddano ocenie w odniesieniu do produktu regionalnego brutto na mieszkańca, poziomu zatrudnienia w regionie i wydatków na edukację. Zastosowanie modelowania ekonometrycznego potwierdza istnienie podziału kraju na regiony przemysłowe o wysokim wskaźniku urbanizacji oraz zacofane regiony rolnicze. Autorka przedstawia propozycje różnego rodzaju reformatorskich rozwiązań w zakresie polityki przemysłowej, w tym ochrony rodzimych producentów i dopłat do produkcji w ramach regionów zależnie od gałęzi przemysłu.

Słowa kluczowe: polityka przemysłowa, modelowanie ekonometryczne, rozwój regionalny