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REINDUSTRIALIZATION PROBLEMS OF REGIONS OF ECONOMIES IN TRANSITION - CASE OF VOJVODINA

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Abstract

An industrial policy means regulations in the field of development of, or investment in a particular industry that is practically conducted by governments of all countries in the world, either directly or by indirect measures, under a system of such trade and tax rules that limit the protectionism of any one industry. Modeling of development is generally related to a certain quantitative approach aimed at finding out interdependences between factors and indices of development. In this paper the long range and short range industrial development of Serbia as a transitional country and its regional units, with special consideration of Vojvodina are investigated along with historical conditions and tendencies. Effort is made to give reasonable proposals to attain desired or possible goals of sustainable development and growth in the European environment.

Key Words: Reindustrialization, Regional Development, Serbia, Vojvodina

Topic Groups: Industry, area or region specific studies, Economics and business

INTRODUCTION

There are vast number of countries that face all of the problems of transition, tending to form a stabile and sustainable society and economy followed by appropriate open and free market and policies, so that they could become an equal member of group of highly developed countries of the World. Macroeconomic stabilization, inflation control, social and economic reforms, development of institutional and regulation system all are factors that initiate development, which is very specific in every country. One of the means of achieving goals of developing countries obviously is industrialization or in some cases reindustrialization, for there are countries, like Serbia, which over the previous decades suffered from loss of its position in many areas: fall of overall production and consequently its GDP, deteriorating sector structure, rising unemployment connected to evolving of social problems, lag behind in application of contemporary innovations and modernization of industry and especially transportation system, worsening external trade etc. Reindustrialization is an imperative for Serbia and regional units, here belonging Vojvodina as well: manufacturing seems to be the main intensifying factor for overall development in majority of countries. An appropriate industrial policy is needed, meaning regulations in the field of development of, or investment that, is conducted by governments, either directly or by indirect measures, under a well designed system of trade and tax rules.

In this paper the main goal of research is to analyze contemporary situation of manufacturing in Serbia and its regional units, to present general problems, which this country as a transitional economy faces, and by econometric modeling of economic performances for Serbia and its regional unit Vojvodina to find out characteristic interdependences related to well established growth theories, with intentions to give reasonable explanation to the achieved level and proposals for future courses of development.

Transition Countries and Industrial Policy

Transitional economy is a wide term used to cover countries of the world where there are efforts taken to introduce market economy. To this set belong post-colonial and post-dictatorial countries in Asia, Africa and Latin America, and Central- and Eastern European countries as well. There are a huge number of 170 of these countries which comprise around 70% of the World population (EBRD, 2006). Serbia, along with its regional unit Vojvodina, belongs to European transitional countries with specific characteristics and problems.

There are several observations important to transitional countries which aim to achieve consistent and sustainable development (Havrylyshyn, Wolf, 1999):

- macroeconomic stabilization with inflation control,
- realization of all the reforms even when they cause temporary problems, because they can only initiate development,
- there is not a golden rule for transition – every country has its problems and ways to overcome them and
- development of institutional and regulation system are unavoidable.

Relative measures of the transitional process finished are e.g. privatization of small and medium enterprises, government restructuring, price liberalization, reformed trading and currency system, competition politics, banking system reforms, liberalization of the interest rate politics, development of stock markets, development of nonbanking financial institutions and reform of infrastructure.

An industrial policy means regulations in the field of development of, or investment in, a particular industry that, practically, is conducted by governments of all countries in the world, either directly or by indirect measures, under a system of such trade and tax rules that limit the protectionism of any one industry.

Generally speaking, regulations designed to develop economy are related to all sectors, the main are agriculture and industry, while industry is all the time the main intensifying factor for overall development. There are different concepts to formulate industrial politics in particular countries. In the modern world in the majority of highly developed market economy countries the minimalistic policy prevails, that means interventions are only made rarely and in extreme situations, when there are some internal or external reasons for mistaken factor allocation that can lead to negative consequences in economic development. Some of developed and most of transitional countries perform structural industrial policy. This policy presupposes insufficient flexibility and efficacy of the market, so continuous active state interventions are needed in the field of forming appropriate business environment for the industrial sector, developing conditions for industrial firms, defining the structure of industrial sectors by appropriate resource allocation. In transitional countries one of the basic problems is the underdeveloped market structure and mechanism system and intensive influence of non economic factors. Not satisfactory economic system and not developed financial market ask for the formulation of specific industrial policies in transitional countries which will enable forming competitive position under the conditions of open market.

SOME IMPLICATIONS OF GROWTH MODELS

Classical growth models suppose giving intentions to growth through resources, while the output is in the function of labor, capital and land use. From this relation it appears that the rate of growth of output is function of rates of growth of labor, capital, land and overall productivity of production factors. In this theory endogenous variables are population growth dependent on life conditions of the labor force and capital growth, which is in the function of savings. Land use growth is the result either of new land areas or new technology adoption. Technological progress contributes to growth of output through specialization that is intensified by modernization of production means and international trade. Specialization results in output and market growth and that request for further specialization, the final consequence being self-induced growth if connected to economy of scales. As stated, the main resources of growth are savings for investments, but in the same time this could mean decline in living standards for the labor force if savings comprise a greater part of income. Originally the classical growth theory foresees increasing growth rates but in the same time an upper limit of growth exists.

Exogenous growth models (Neoclassical models of Solow and Swan) have a different starting point in modeling long range economic growth in the scope of the neoclassical economy (Solow, 1956 and 1957, Swan, 1956). Labor is a new source of productivity, the marginal contribution of labor and capital are diminishing, there is a constant rate of substitution between factors, and there is a changing rate of technological progress independent of labor and capital; relations of capital to labor and output are not fixed, so there is a possibility to separate capital intensity from technological progress. In short range tax reduction and investment subventions affect the equilibrium state of the output but they do not have a long range effect on growth rate. Accumulation determined by savings and depreciation affects the output growth rate as the economy is tending towards equilibrium state. For economy is always tending towards an equilibrium of the growth rate determined by labor force and technological progress growth rates, the long range growth rate is determined exogenously, outside the model. Greater savings mean greater growth rate, nevertheless

long range growth is more dependent on technological progress than accumulation. In this kind of models technological progress is measured by the total factor productivity, which represents a residual derived on the basis of aggregate factor contributions. Exogenous growth model introduces the law of convergence, which means countries on lower level of development will in long range converge towards developed (measured by GDP per capita, for example).

Despite of this preposition, the reality showed different patterns. After the WW II in the XX century convergences did not happen in general: most of less developed countries were developing at a lower rate than the developed. There were some exceptions, e.g. Japan which at first came close to the developed world and then overcame it; recent years its growth is moderate, showing that convergence remains after achieving convergence. The tendency of convergence between regional units of particular countries led to the formulation of conditional convergence, dependent on institutional conditions, inner free market, quality of external trade and the quality of educational policy. Main disadvantages of the neoclassical theory are neglecting the importance of entrepreneurship and institutional organization as intentional forces of development.

In the contemporary world it comes into view that the modern information technology did not produce expected economic growth, and that is in contrast with the assumption of connection of high productivity with high technology (the Solow paradox). Main reasons for this may be expended lag in effectuating computer use, and then computers are used for ordinary job completing but in a faster manner; traditional productivity is still concerning quantity and not quality and modern information technology mainly effectuates in quality; in service sectors where computers are widely used it is hard to find out the output/input quotient; sometimes increase in output is less than investment to information technology causing diminishing productivity. Besides that in the modern world information technology only comprises 2% of the fixed capital.

As an answer to the neoclassical theory, which supposes exogenously determined growth by savings in the Harrod-Domar models and by technological progress in the Solow model, during the 1980s a new theory was formulated. The endogenous growth model (Romer, 1986) formulates a macroeconomic growth model based on microeconomic foundations: households maximize their utility under income constraints and firms maximize their profit with special attention to human capital (T. Schultz, 1979 and G. Becker, 1992 are winners of the Nobel Prize for formulating and developing the concept of the human capital) and new technologies. Models under these prepositions are formulated either with constant rates of return or through models which encompass knowledge transition and higher quality. Economic policy has a special importance to long range development: investments to research and development and education will enhance rate of growth through introduction of innovations. Openness of the economy enabling competition could lead to continuous innovations and transformations forming a good basis for long range development, while restrictive politics only favors particular industries which produces stagnation or very slow development (Howitt, 2007). Knowledge represents a special source of economic growth – knowledge economy produces high added values with positive effects on externalities and has extra effects which result in development of competitiveness in the global economy. As other theories this one also has some disadvantages like: constant marginal productivity of capital and not satisfactory divergence in development between developed and underdeveloped.

SOME FACTS ABOUT SERBIA AND VOJVODINA

Area of Serbia is 88361 km2, of which Autonomous Province of Vojvodina situated in the northern part of Serbia covers around one quarter or 21506 km2. The population of Serbia in 2007 is estimated to 7,528,262 and of Vojvodina 2,007,581. In 2007 the total GDP of Serbia was 40,423 million USD or 5,476 USD per capita. In the same year in Vojvodina the GDP is estimated to 13,749 million USD or 6,848 USD pc. The majority of European countries have per capita GDP over the Serbian (Figure 1) that means Serbia has a lot to do about its economic policy and there is a need for a high development rate in every area so that some convergence could be realized. Average rates of growth in some European countries are shown in Figure 2, in the last decade Serbia have performed GDP growth with a relatively higher rate compared to selected European countries, but growth rates of GDP were changing (as in Serbia, so in Vojvodina) and it only achieved higher percentage from 2004, as shown in Figure 3.

Figure 1: GDP in USD per capita for some European countries, 2007

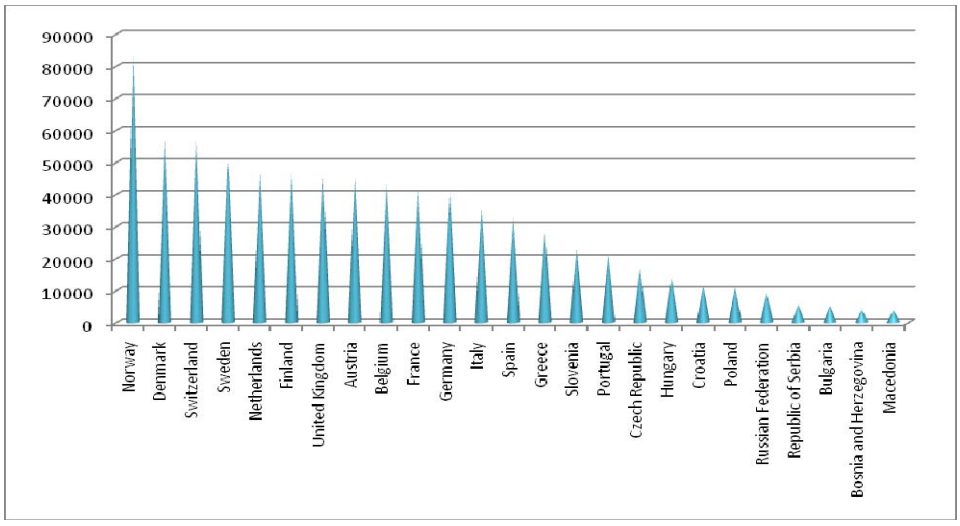


Figure 2: Average GDP growth rates (%) for European countries 1990-2007 (Serbia 2000-2007)

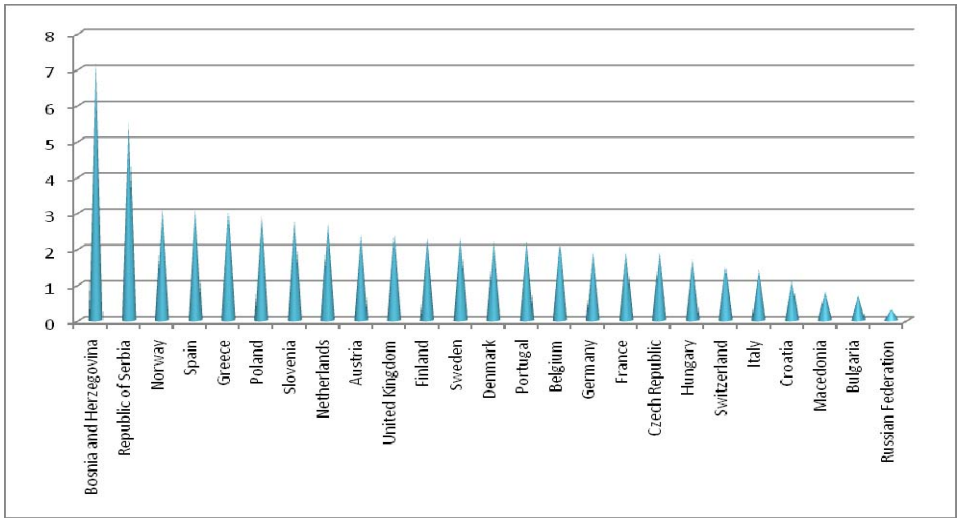
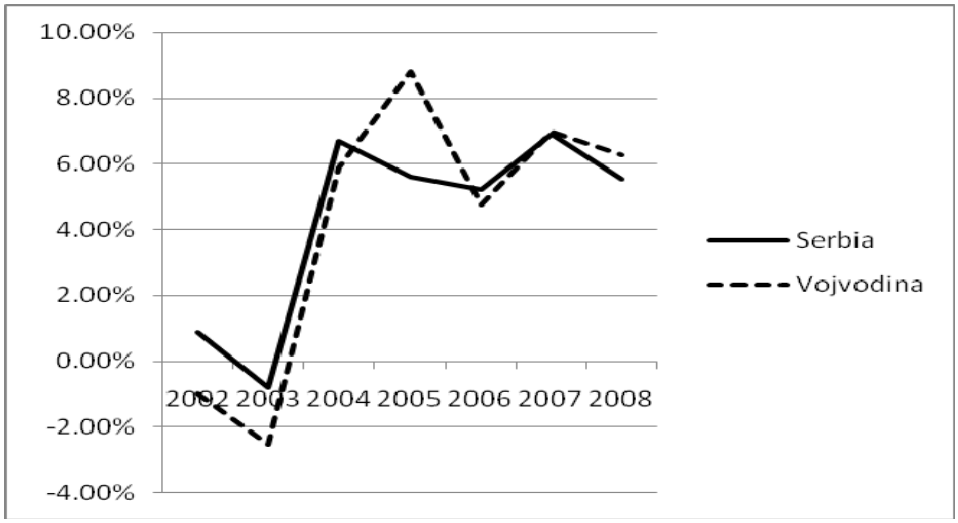


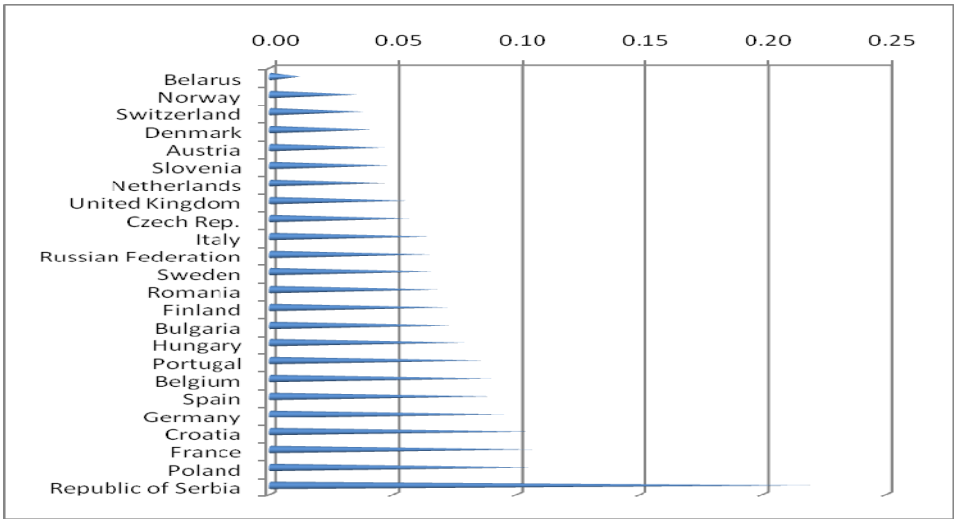
Figure 3: GDP growing rates in Serbia and Vojvodina (2002 constant prices)



Population of Serbia and Vojvodina has not shown significant changes in the last decade, but the number of active populations is decreasing (in the last five years around 5% in Serbia and around 2% in Vojvodina). The number of employed persons is decreasing as well (in the last five years around 2% in Serbia and Vojvodina).

One of great problems in underdeveloped countries represents unemployment derived from a low level of economic activities and that causes further economic, social and political problems, emerging black markets and non official activities. Serbia has the highest proportion of unemployed to employed persons among selected European countries as shown in Figure 4.

Figure 4: Relation of unemployed to employed persons in selected European countries in 2007



MODELING DEVELOPMENT PERFORMANCES OF SERBIA AND VOJVODINA

In our investigations we estimated several models to find out some of stated interdependences proposed by theoretical growth models. Connections between basic aggregate values are estimated on the basis of GDP, land use and productivity (proxied with the index of agricultural production), capital growth (proxy is realized investments) and growth of labor (estimated through positive or negative rate of growth of number of employees). Models are estimated for Serbia (sign S) and Vojvodina (sign V) for the period 2000-2008 in two modifications. First variant concerns basic indices (2001=1) for GDP (Y), employment (L), investment (K) and agricultural production (Z). The second approach is based on chain indices of these variables (sign R is introduced for chain indices).

I. At first, linear models for basic indices of aggregate values were estimated:
$Y_t = A + b_1 \cdot L_t + b_2 \cdot K_t + b_3 \cdot Z_t + u_t$

1st model, Serbia

YS = 2,2883 – 1,7167*LS + 0,3794*KS + 0,0839*ZS

t: 1,47 - 1,14 4,17 0,73

R2=94,79%, DW=1,87, AIC= -3,26

2nd model, Vojvodina

YV = 0,3305 + 0,0615*LV + 0,3106*KV + 0,3387*ZV

t: 0,22 0,04 4,66 2,29

R2=94,56%, DW=2,94, AIC=-3,01

The results of these models point out the high level of statistical significance of estimated parameters of KS and KV, from which one can conclude the highest importance of effects of investments to the economy output i.e. GDP. Besides that, there is a significant parameter by indices of agricultural production for Vojvodina, as it was expected, for it is a special agricultural region in Serbia. The estimated value of the constant is not significant showing that the aggregate productivity of factors is irrelevant in these models.

Leaving out constant, the next estimated models were obtained:

3rd model, Serbia

YS = 0,4993*LS + 0,4947*KS + 0,06867*ZS

t: 3,29 9,69 0,54

R2=92,52%, DW=1,65, AIC= -3,12

4th model, Vojvodina

YV = 0,3722*LV + 0,3203*KV + 0,3532*ZV

t: 2,93 6,93 2,91

R2=94,51%, DW=2,85, AIC= -3,22

By AIC, the constant should be retained in Serbian model, pointing out some implications of technological progress, although with high value of p; in the same time in the Vojvodina model the constant should be eliminated.

In all the four upper models determination coefficients have high values and high F-values, meaning that the factors satisfactory explain the changes of the dependent variable.

II. Second, the log-log models were estimated:

$$Y_t = A \cdot L_t^{b_1} \cdot K_t^{b_2} \cdot Z_t^{b_3} \cdot u_t$$

Prefix L is introduced for natural logarithms of variables. Results obtained are the next:

5th model, Serbia

LYS = 0,0341 – 1,3995*LLS + 0,4120*LKS + 0,0938*LZS

t: 1,35 -1,13 4,14 0,84

R2=94,87%, DW=1,91, AIC= -3,63

6th model, Vojvodina

LYV = 0,0384 – 0,09201*LLV + 0,3249*LKV + 0,3449*LZV

t: 1,05 – 1,07 3,68 2,16

R2=93,11%, DW=2,84, AIC= -3,18

These results are similar to those derived from basic indices. Common effects of explanatory variables onto the dependent are high, investments have the highest impact and the influence of agricultural variable is important for Vojvodina. Total productivity is not significant in these models.

With constant eliminated, the results are the next:

7th model, Serbia

LYS = -2,5049*LLS + 0,3618*LKS + 0,1842*LZS

t: -2,51 3,68 1,93

R2=93,00%, DW=1,94, AIC= -3,54

8th model, Vojvodina

LYV = -0,9061*LLV + 0,2774*LKV + 0,4159*LZV

t: -0,86 3,63 2,85

R2=91,59%, DW=2,89, AIC= -3,20

III. Introducing the rate of technological development γ the log-log model becomes:

$$Y_t = A \cdot L_t^{b_1} \cdot K_t^{b_2} \cdot Z_t^{b_3} \cdot e^{\gamma \cdot t} \cdot u_t$$

(T is time units):

9th model, Serbia

LYS = -0,0215 + 0,7141*LLS + 0,2545*LKS + 0,0396*LZS + 0,0270*T

t: -0,81 0,63 2,90 0,52 2,72

R2=98,20%, DW=1,60, AIC= -4,45

10th model, Vojvodina

LYV = -0,0061 + 1,7946*LLV + 0,1829*LKV + 0,1978*LZV + 0,0332*T

t: -0,18 1,41 2,02 1,47 2,27

R2=96,98%, DW=1,91, AIC= -3,78

In these models the effects of investments on development indices are significant, and information criteria show the necessity of including technological progress into the models.

IV. Our next investigation was related to the manufacturing sector of Serbia and Vojvodina, including development of GDP, employment and investments in the manufacturing. Investments were slightly increasing and employment was mainly constant or had a negative rate but GDP was increasing in both cases. Two models have been estimated and both showed significant effects of investments onto the development of the manufacturing sector both in Serbia and its regional unit Vojvodina, as it could be presupposed on the basis of data.

11th model, Serbia

YPS = 0,4696 + 0,1493*KPS + 0,3892*LPS

t: 2,45 5,55 1,94

R2=83,91%, DW=1,75, AIC= -4,07

12th model, Vojvodina

YPV = 0,9819 + 0,0416*KPV – 0,0709*LPV

t: 6,11 3,35 -0,43

R2=67,05%, DW=2,32, AIC= -3,65

V. Upgrading upper models with the technological progress, the next results were derived:

13th model, Serbia

YPS = 0,5476 + 0,1632*KPS + 0,3066*LPS – 0,00301*T

t: 1,80 3,31 0,95 -0,35

R2=84,30%, DW=1,94, AIC= -3,88

14th model, Vojvodina

YPV = 0,9793 + 0,0447*KPV – 0,0662*LPV – 0,0015*T

t: 5,55 1,82 -0,36 -0,15

R2=67,20%, DW=2,35, AIC= -3,43

It is a disappointing fact that the coefficient of the technological progress is not significant in these models.

VI. By changing to log-log form we obtained the next results:

15th model, Serbia

LYPS = 0,1296*LKPS + 0,3189*LLPS + 0,0016*T

t: 3,73 0,93 0,27

R2=63,98%, DW=2,19, AIC= -3,51

16th model, Vojvodina

LYPV = 0,1259*LKPV – 0,1563*LLPV – 0,01171*T

t: 3,67 -0,80 -3,26

R2=63,98%, DW=2,19, AIC= -3,51

This form of the models also implicates importance of investments and but not show any effect of the technological progress.

IMPLICATIONS OF THE ENDOGENOUS GROWTH THEORY – RESEARCH AND EDUCATION

If we observe some prepositions of the endogenous growth theory, statistics on Serbia and Vojvodina seem to be not satisfactory enough. As a proxy for scientific research activity we took income from scientific research work in Serbia and Vojvodina. We compared these figures with GDP (both in constant prices) and found unexpected changes with a tendency of receding. These numbers are shown in Figure 5. Employment in scientific research work also has negative tendencies in Serbia and Vojvodina in recent years. Intensifying of development on the basis of new research and innovations are not realized as expected. In the Figures 6 and 7 the number of employees - scientific researchers in high-school scientific research organizations, in research and development units of enterprises and institutions and in independent scientific research institutions. The education activity is an indicator and factor of development as well. It is very symptomatic that the number of pupils in high schools related to the population is decreasing but the number of students at higher school institutions and on academic level related to the population is increasing in Serbia and in Vojvodina as well in the last ten years.

Figure 5: Income from scientific research work related to GDP in Serbia and Vojvodina 1998-2007

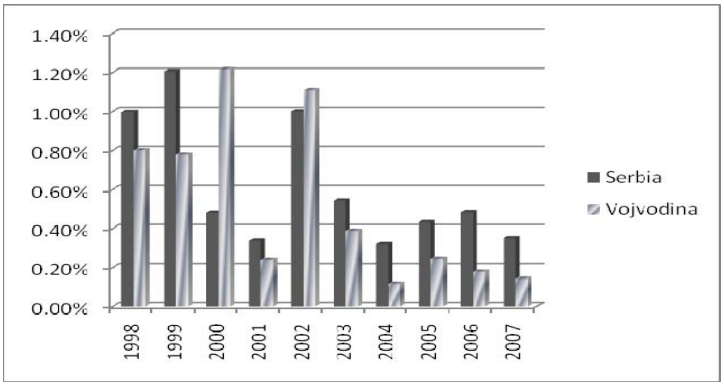


Figure 6: Number of employees - scientific researchers in high-school scientific research organizations, in research and development units of enterprises and institutions and in independent scientific research institutions in Serbia 1998-2007

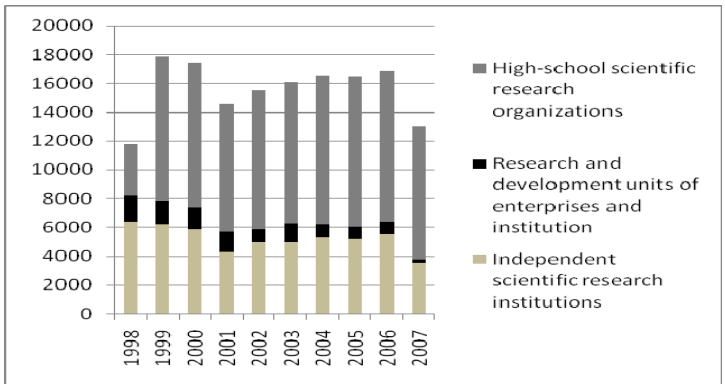
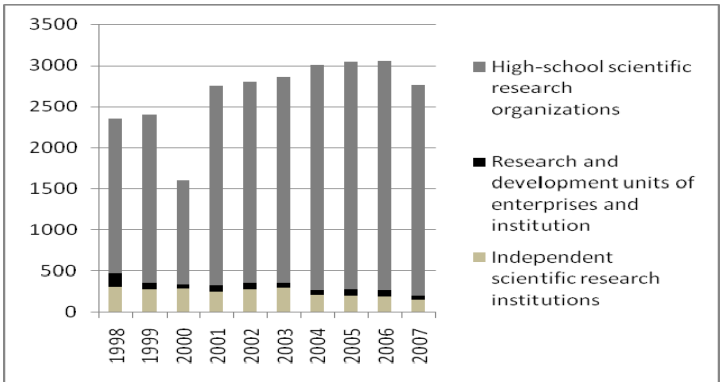


Figure 7: Number of employees - scientific researchers in high-school scientific research organizations, in research and development units of enterprises and institutions and in independent scientific research institutions in Serbia 1998-2007



POSITIONING INDUSTRIAL PRODUCTS OF VOJVODINA IN SERBIA AND TENDENCIES OF MANUFACTURING OF INDUSTRIAL PRODUCTS

Analysing data about product groups or individual products in Serbia and Vojvodina we can find out different structures and different levels of development of particular sectors, different growth or reduction patterns and diverse industrial structure in Vojvodina compared to Serbia. Relative quantities that show the share of Vojvodina's production of particular industrial products in Serbia are relatively stable in some sectors or subsectors, but there are significant share changes with others. The main reasons for these alternations are relative higher growth rates in production either in Vojvodina or other regions of Serbia, retreating production either in Vojvodina or Serbia, and either receding or closing down some productions. There are not well established production quantities that would contribute to overall stability of the region, but indices show upward or downward jumps. This can be found for almost all products, and the negative connotation is especially given by reduction of some production in recent years.

CONCLUSIONS AND IMPLICATIONS

Serbia along with its regional units performed retreating during the last decades. Recently it shows recovery with relatively high rate of GDP growth compared to other European countries, but still nowadays it did not achieve previous results. Reindustrialization is one of the main tasks Serbia should perform to solve other concomitant problems like underemployment which has a lot of economic and societal consequences.

The results of estimated models showed particular relations between inputs and outputs, i.e. resources and results of economic activity, productivity of resources incorporated. Productivity growth could contribute to rising GDP p.c., and it is the way to attain higher wages-lower prices-higher profit and accumulation-sustainable internal development-better position in international trade. No matter which policy Serbia and Vojvodina would lead to rehabilitate its industry - either minimalistic or structural – the increase in product quantities to one unit of production resources is an imperative.

Industry of Vojvodina represents an important part of Serbian manufacture. In the overall manufacturing production of Serbia some products are either predominantly or all produced in Vojvodina (here belonging food products and beverages), but for some products (especially mining and energy production) Vojvodina is totally connected to the Serbian economy. It can be logically concluded that Vojvodina is structurally associated to the Serbian economy as a whole. Vojvodina is a leading producer in sectors of Manufacture of food products and beverages, Manufacturing of tobacco, Cotton fabrics, Carpets and floor coverings, Hosiery, Manufacture of leather, leather products, Plywood, Veneer, Manufacture of coke and refined petroleum products (except lubricants), Colors and pigments, Nitric and complex fertilizers, half of amount of Detergents, Construction products of plastic matters, two thirds of Ceramics tiles and floor boards, half of Plaster, of Manufacture of basic metals cast iron, steel and aluminum only is significant, of Manufacture of metal products wire products are significant, of Manufacture of machinery and equipment Faucets and valves and Bearings, toothed wheels, cogged transmitters and operating mechanisms are significant, Vojvodina predominates in Alternating current motors and Instruments and apparatus for automatic regulation and control manufacturing of Manufacture of furniture Mattresses production is significant in Vojvodina. Manufacturing that is minimal or lacking in Vojvodina are in the sectors of Mining and briquetting of coal, Mining of metal ores, Mining and quarrying of non-metal ores (except sand), Manufacture of wearing apparel and fur, Manufacture of Fiber boards, Manufacture of pulp, paper and paper products, Phosphoric fertilizers, most of Manufacture of rubber and plastic products, Other non-metallic mineral products (except plaster), Manufacture of basic metals (except cast), Manufacture of metal products (except wire), most of Manufacture of machinery and equipment, Manufacture of radio, television and communication equipment, Manufacture of motor vehicles, trailers and semi-trailers, Manufacture of furniture and similar products (except mattresses), Recycling and Electricity, gas and hot water manufacturing and supply. The tendencies found in product quantities of particular manufacturing subsectors show non stability. Some product quantities are growing, others diminishing and most frequently there are unexpected upper and lower jumps pointing out the need for stabilization in production – financing, market conditions and stabilizing of demand, strengthening competitive position of the Serbian manufacturing sector.

The market structure of Serbia along with is unit Vojvodina is not satisfactory developed yet and the functioning of the market mechanism is subject to numerous direct or indirect factors, often comprising non-economic elements as well, the economic system is not well constructed (financial market, money market, property protection etc.) (Savin, 2010). These orientate towards establishing an appropriate ambient and formulating industrial policy that

could overcome the stated problems. In the first Serbian official document on strategy of regional development (Strategija…, 2007) a noticeable stress is put onto intraregional and interregional differences (1:7) that should be resolved by future industrial policy, one of means being forming of clusters, that was realized in 2005 and 2006 for automobile industry, industry of plastic products and rubber, agricultural machinery manufacturing, timber industry, furniture, textile, software production, fruit juices, electronics and mechanical engineering. In the same document the short range development basics is only chosen, here belonging energy, chemistry, textile, leather and footware. These cannot be bearers of long range development simply because they only are under the level of 10% of European productivity, but presently there is not a way to develop new sectors based on new high technologies. Besides that, the share of investments in GDP is 22% for Serbia, which is under the percentage of other European transition countries. Traditional sectors prevail in the industrial structure of Serbia: the share of high technological intensity in manufacturing is 18%, middle- 46 and low- 36%.

The preposition of the classical growth model starting from capital growth (internal savings and accumulation) should be rejected for Serbia. This country, along with its regional units (Vojvodina) has been closed for several years, but it is opening and should be opened to foreign capital (direct and portfolio investments, bank credits, credits from international financial organizations, donations, common investments).

By the exogenous growth model technological changes are a key factor for development. For the total economy of Serbia and its unit Vojvodina our models have shown the necessity of including the rate of technological development, and according to theoretical prepositions this factor followed by investments is the main element of growth. On the other side, the industrial sector – despite of all expectations that industry is the foremost driving force of the economy – for Serbia and Vojvodina did not have significant technological progress. This finding can be connected also to a preposition of the endogenous growth theory, i.e. founding the knowledge based economy that obtains long-range growth and embraces investments to research and development and education. Our findings for Serbia and Vojvodina were very critical in this sense; the situation could be improved by direct measures.

The main limitations of investigation presented in this paper are connected to data sources. Too short series, lack of the most actual data and lack of information about regional units on lower levels of disaggregation for Serbia and Vojvodina confine the possible range of analyses; also findings about comparative analyses could improve the quality of inferences. These and other problems will be tried to be overcome in a future research in the topic presented in this paper; these are connected to expansion of the time range of investigations, as to find out possible structural breaks in data series for Serbia and Vojvodina and their causes; then, on the basis of supposed convergence, an attempt will be made to project development paths on the basis of parallel analyses of time series of economic and especially industrial performances of EU countries, Serbia with its unit Vojvodina and other (at first European) transitional countries. In all these investigations special attention should be paid to monitor the prepositions of various growth theories and models.

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