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Ivan Nikolić  
Economics Institute  
Belgrade

Miladin Kovačević  
Statistical Office of the Republic of Serbia  
Belgrade

# PROSPECTS AND LIMITS TO GROWTH: THE IMPORTANCE OF INVESTMENT EFFICIENCY?

Perspektive i ograničenja rasta - značaj efikasnosti  
ulaganja?

## Abstract

Investment management is one of the key challenges for policy makers. In the paper we present the findings confirming the hypothesis that for a more dynamic economic growth, apart from a mere increase in the investment rate, it is much more important to invest in the right things, with desired effect. In order to recognize new potentials for growth and development in addition to explicit calculation of the impact of investments on the GDP real growth rate of Serbia and European countries, we provide an exhaustive overview of the trends in the efficiency coefficient of investment in the key sectors and areas of Serbia's economy from 2006 to the present. While doing so, we also show that the investment rate can be sustainably raised to the desired level, firstly, with the expansion of dwelling construction.

**Keywords:** *growth, investment, efficiency, dwellings.*

## Sažetak

Upravljanje investicijama jedan je od najvećih izazova za kreatore ekonomske politike. U radu iznosimo nalaze koji potvrđuju hipotezu da je za dinamičniji privredni rast, osim pukog uvećanja stope ulaganja, mnogo važnije ulagati u prave stvari, na pravi način. U cilju prepoznavanja novih potencijala za rast i razvoj, pored eksplicitnog izračunavanja uticaja investicija na stopu realnog rasta BDP-a Srbije i evropskih zemalja, pružamo iscrpan pregled kretanja koeficijenta efikasnosti ulaganja po ključnim sektorima i oblastima privrede Srbije od 2006. godine do danas. Pri tome, pokazujemo i da je stopu investiranja moguće održivo podići na željeni nivo, najpre širenjem stanogradnje.

**Ključne reči:** *rast, investicije, efikasnost, stanogradnja.*

## Introduction

As the lever of the decisive significance for dynamic economic development we recognize investments in all their quantitative, but also qualitative practical manifestations, since the investment level in itself cannot be regarded as a measure of development, however this being the contribution to production that results from the increased production capacities. Due to the relative shortage of capital assets, as well as because of the limits to the supposed social and economic readiness to invest, the rational and economical, i.e., cost-effective allocation of investments is a prerequisite for the successful implementation of the anticipated macroeconomic objectives. However, investment management is seen as a major challenge for economic policy makers, taking into account the exquisite sensitiveness of this aggregate to the economic flows' fluctuations. On the other hand, it is the dynamics of versatile national investment activities that stands as the starting assumption for achieving the satisfactory economic growth rates and for the proper economic directing.

Apart from the explicitly calculated impact of investments by economic sections to the GDP real growth rate, for the purpose of anticipating and taking economic decisions it is appreciated to test also the extent of profitability/cost-

effectiveness of capital investments and thereby recognize the new growth and development capacities.

The basic indicators of successful investing are capital coefficient and economic investment efficiency, both in their average and marginal form. However, the economic investment efficiency is changing in time. Namely, the dynamics of capital investments and production growth resulting from these investments are not the same. To certain extent this is the result of transferring the investment effects to the forthcoming period, but is mainly caused by the fluctuations in the economic and technical structure of investments. As the prevailing factors of investment changes over the last decade expressive are the global economic trends, especially the destructive impact of the financial and economic crisis in 2009, then the specific investment policies practiced by the leading economic subjects from various economic domains, as well as the discretion decisions of economic policy makers.

In order to recognize new potentials for growth and development in addition to explicit calculation of the impact of investments on the GDP real growth rate of Serbia and European countries, we provide an exhaustive overview of the trends in the efficiency coefficient of investment in the key sectors and areas of Serbia's economy from 2006 to the present.

The economic growth is undoubtedly attributed to capital formation traditionally and has been discussed frequently by the classical, neo-classical and modern growth model postulates. Swan [24] goes through the classical and neoclassical views of economists that give an account of the capital accumulation. An important contribution to research into the incremental capital-output ratio (ICOR) linkage and economic growth has also been provided by Leibanstein, H. [11, pp. 20-27]. Lucas [13] points out that economic growth has traditionally been attributed to the accumulation of human and physical capital, and increased productivity arising from technological innovation. In empirical analysis, Kormendi and Meguire [10], Barro [4], Levine and Renelt [12] conclude that the rate of physical capital formation influences the rate of a country's economic growth.

Blomstorm et al. [5] also note a one way causal relationship between fixed investment and economic

growth. They conclude that changes in capital formation rates do not have any significant influence on future growth rates. On the other hand, Ghali and Al-Mutawa [8] apply time series analysis on G-7 countries and report that the causality between fixed investment and economic growth is country specific and may run in both directions.

ICOR has been used since the 1950s, and is still used by the World Bank and other international organizations, for instance, to measure the investment required to reach the targeted GDP growth (for more information, see [6], [19], [14]).

## Methodology

The incremental capital-output ratio (ICOR) is a summary expression for the existing technical conditions and structural configuration of the economy which captures the relationship between investment and additional productive capacity. ICOR is commonly measured as the ratio of investment rate to growth rate for a particular period. Some of the standard assumptions in the traditional Harrod-Domar framework [2] of calculating ICOR include, inter alia, the following: (a) the economy is on a steady growth path, (b) there is no lag between investment and setting up of additional capacity, i.e., investment instantaneously translates into additional productive capacity, (c) there is a full capacity utilization, (d) unchanging production structure within a sector. While these assumptions overlook the rigidities as well as flexibilities in the real world, the overall framework is a reasonable tool for providing overall benchmarks for assessing investment requirements [20].

Hence, the so-called 'law of motion of the capital-to-output ratio' is given as:

$$\begin{aligned} \frac{\partial \left( \frac{K_t}{GDP_t} \right)}{\partial t} &= \frac{\frac{\partial K_t}{\partial t} GDP_t - \frac{\partial GDP_t}{\partial t} K_t}{GDP_t^2} = \\ &= \frac{\dot{K}}{GDP_t} - \frac{GDP}{GDP_t} \frac{K_t}{GDP_t} = \frac{I_t}{GDP_t} - g \frac{K_t}{GDP_t} - \partial \frac{K_t}{GDP_t} \end{aligned}$$

Where  $I$  denotes gross investment,  $g$  growth rate of GDP and, in the last part of the equation, it is assumed that capital depreciates at a rate denoted by  $K = I - \delta K$ . The time change of the capital-to-output ratio can thus be

written as a function of the investment rate  $I/GDP$  and the present capital-output ratio:

$$\frac{\partial \left( \frac{K_t}{GDP_t} \right)}{I''} = \frac{I_t}{GDP_t} - (\delta + g) \frac{K_t}{GDP_t}$$

This implies that one can compute the capital-output ratio at the steady state as a simple ratio:

$$\frac{K_t}{GDP_t} \Big|_{ss} = \frac{I_t}{(\delta + g)}$$

and that the ratio of investment to GDP that keeps the K/GDP ratio constant is given by:

$$\left[ \frac{I_t}{GDP_t} \right]_{ss} = (\delta + g) \left[ \frac{K_t}{GDP_t} \right]_{ss}$$

where the subscript *ss* denotes steady state variables<sup>5</sup>. A higher capital stock should lead to higher output. If one takes this consideration into account, the link between growth and the investment rate will be affected by the ICOR or more generally the marginal productivity of capital. The ICOR calculation will be performed separately for the public and private sectors.

Despite the fact that we did not address the impact of depopulation in this paper, it could be posited that output growth is a function of the capital stock and a remainder that conflates TFP and population growth:

$$GDP = \varphi K + g$$

This implies that the first equation can be rewritten as:

$$\begin{aligned} \frac{\partial \left( \frac{I_t}{GDP_t} \right)}{\partial t} &= \frac{\dot{K}}{GDP_t} - \frac{(\varphi K + g)}{GDP_t} \frac{K_t}{GDP_t} = \\ &= \frac{I_t}{GDP_t} \left[ 1 - \varphi \left( \frac{K_t}{GDP_t} \right) \right] - (\delta + g) \frac{K_t}{GDP_t} \end{aligned}$$

Where  $I$  denotes as before gross investment and now represents no longer overall GDP growth, but the sum of TFP and population growth (the other exogenous growth factors).

The investment rate which will keep the output ratio constant will thus be given by:

$$\left[ \frac{I_t}{GDP_t} \right]_{ss} = (\delta + g) \left\{ \left[ \frac{K_t}{GDP_t} \right]_{ss}^{-1} - \varphi \right\}_{-1}$$

A higher value of  $\varphi$ , i.e., a higher ICOR will increase the steady-state investment rate because for any given investment rate it increases the growth rate of GDP.

If it were possible to increase the ICOR by some policy measures one could thus justify a lasting increase in the investment rate. The problem is that it is difficult to find simple and easily enforceable policy measure that would have this impact.

## Results

### Investment rate and recommended structure

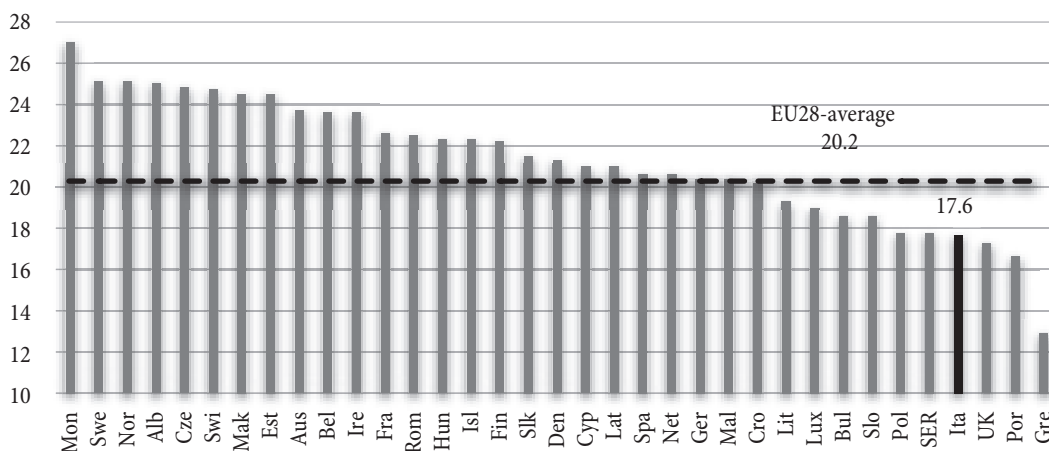
The difference between the fast-growing, prosperous countries in comparison to those less progressive is reflected not in the quantity, i.e., volume of investments, but in their quality<sup>6</sup>. Naturally, assumed are also all other factors that starting from the classic theory of economic growth up to the present day have been described by the production function that includes the quantity and quality of labour force, i.e., human capital, technological progress, institutions, etc., which are here assumed *ceteris paribus*; namely, those other variables are considered unchanged.

It is an undoubted fact that for a dynamic economic growth, more investment is required. However, this is an anticipated, but not a sufficient prerequisite. The attainment of high and sustainable GDP growth rates is related to large volume investment only when investment is directed properly and carried out in an appropriate manner; namely, if investment is effective and efficient.

<sup>5</sup> Given that analysts usually take that  $K/Y$  for the euro area is close to 2.5, assuming a fall in growth from 2% to 1% would imply a fall in the steady state investment rate from 20% to 17.5% [9, p. 12].

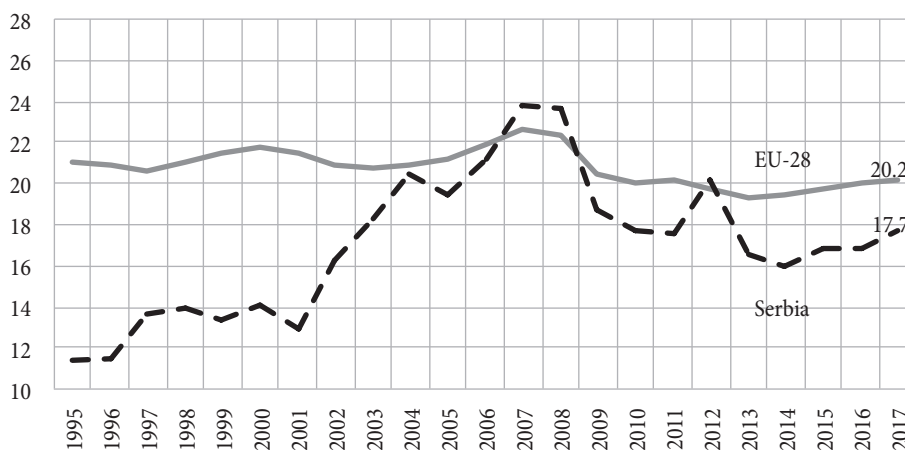
<sup>6</sup> The most expressive indicator of the problems characterizing the pre-transition system of the former SFRY is low investment efficiency. For several decades (starting from the '50 of the 20th century) this efficiency had been declining and entered the negative zone during the '80. The development was relied on the strategy: energy, raw materials and food, which required more intensive investment and formidable foreign debts. The fixed investments in 1979 recorded the share of 38.4% of the social product, while about 40% of industrial production was directed to the investment demand (equipment and construction material and raw materials for equipment production). Already in mid-'80 the fixed investments fell to only 15-16% of the social product, their structure deteriorated as regards the technological renewal, while their efficiency became negative, i.e., the dinar invested had not been returning through increased social product [23].

Figure 1: Gross fixed capital formation (% of GDP), in 2017



Source: Authors' calculation; data provided by Eurostat.

Figure 2: Gross fixed capital formation (% of GDP), changes recorded from 1995



Source: Authors' calculation; data provided by Eurostat.

Otherwise, our neighbouring countries Montenegro, North Macedonia and Albania would hold the European records as regards the GDP growth. In the last ten years all three countries were stable in recording the investment rate above 25%. In 2017, for Montenegro and North Macedonia expressive was gross capital formation above 30% of GDP. The average inter-annual economic growth rate in this period was 2.1%, 2.4% and 3.1%, respectively. In 2017, North Macedonia was practically stagnating, with GDP growth of merely 0.2%.

However, before we proceed to a more detailed elaboration of the phenomenon of efficiency, it is of importance to define the structure of investment we tend to achieve. Namely, as regards technical characteristics, gross fixed capital formation is usually distinct as investment into: (a) buildings and other constructions (dwelling construction and other construction, such as

infrastructure and commercial objects); (b) machinery and equipment; (c) cultivated biological resources; and (d) intellectual property. The volume of investments and their efficiency determine the dynamics of GDP.

Gross fixed capital formation (GFCF) needs to be distributed on an equal basis to: construction, on one side, and investments in machinery, equipment and other, on the other side. Within a short time, due to different developing priorities, it is possible that this ratio is distributed in whichever direction of the two. On long-term basis, the quotient tends to converge to 1, i.e., the ratio 50:50. Even at this point it is easy to understand the importance of construction for economic growth, and why the developed countries take efforts at all costs that construction is never neglected.

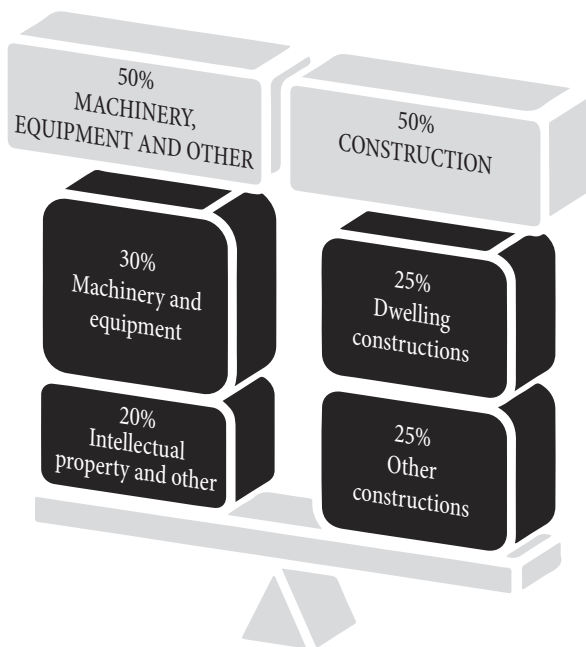
The results of the implemented international comparative survey of investments by technical structure

indicate another important ruling proportion. Construction works, regarded in total, on a long-term basis are equally generated by:

- A. dwelling construction, i.e., buildings, and
- B. other constructions, such as infrastructure works, as well as commercial buildings and objects.

Therefrom we can conclude that on a long-term basis the sustainable GDP growth can be achieved only with sound construction activity, where one quarter of GFCF comes from dwelling construction.

Figure 3: GFCF: proper structure



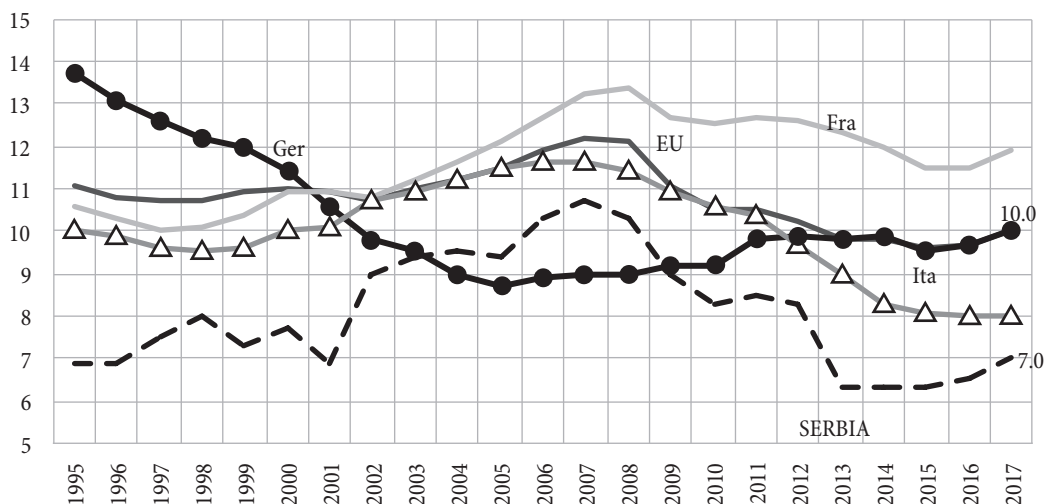
Source: [16].

In the last three decades Serbia achieved the desired share of constructions works in GFCF only at the dawn of the world economic crisis (Figure 2 and Figure 3). Then it equalled about 48% of the GFCF which came as a consequence of the massive programme of dwelling loans subventions. Resulting from the expedient actions of narrowing the fiscal space and also the public debt escalation, these active dwelling policy measures gave place to savings. Soon, in 2012 the share of construction works was reduced to 40.2% of the GFCF, in 2013 to 37.1%, and at this level, with negligible oscillations, it has remained until the present day. Here it is worthwhile stressing that the declining results of the construction activity came owing to dwelling construction; however the other construction activity, even from the mid-'90, has been sustained at the level of about one-third of gross investments.

In 2017, investment in dwelling construction equalled only 7.3% of the GFCF. Relative observations indicate that among the EU Member States only Greece makes less investment into dwelling construction than Serbia. The disadvantage of 3.5 to 4 percentage points of the Serbian GDP in comparison to the EU average is at the same time the key discrepancy between the actual and the desired share of the GFCF in GDP.

Seemingly, the trends have achieved positive direction, since in the last two years the growth of the GFCF was accelerated. According to our estimations, at the end of 2018 the investment in dwelling construction and other

Figure 4: Share of construction activity investment in GDP, %



Source: Authors' calculation; data provided by Eurostat.

construction activity will reach the share equal to 42.1% of the GFCF; this can be regarded as a positive sign, however still far from the desired and needed structure where construction activity would generate one half of all investments.

It is not advisable to estimate the share of dwelling constructions here, since no reliable indicators are at disposal for doing that. However, we are on the safe side to say that also in 2018 the share of dwelling construction remained low. The construction activity is mainly relied on erecting infrastructure objects and commercial premises [16].

Simultaneously with the needed restructuring, a lot of work has to be done in order to upgrade the investment efficiency. ICOR stands for over two-thirds of variations of the real economic growth of the European countries in transition on mid-term basis [15].

It soon becomes clear why Macedonia, in spite of the high investment rate, cannot achieve a considerable GDP dynamics. This comes as a consequence of the extremely low investment efficiency. On the other side we find Romania, which in the period 2014 – 2017 recorded the average inter-annual GDP growth of 4.8%; in 2017 it equalled even 7.0%. Serbia with the average share of gross investments in GDP features below average investment efficiency, and within the observed set of countries is ranked side by side with Macedonia.

The obtained results indicate the fact that total ICOR in Serbia in the period 2014 – 2017 was on average by 29.1% lower in comparison to the EU countries. According to the

weighted average of the observed fast-growing EU countries, the Serbian investment efficiency is lower by even 54%.

From the equation of ICOR it is easy to calculate the percentage share of GDP that needs to be invested in order to achieve certain targeted GDP growth rate, while assuming the present investment efficiency. For example, the attainment of the long-term economic growth of 3% annually, under the present investment efficiency implies the increased investment rate from the present 20% approximately to 39.5% of GDP; however, to achieve the growth of 4%, the required investment rate equals precisely 52.6% of GDP.

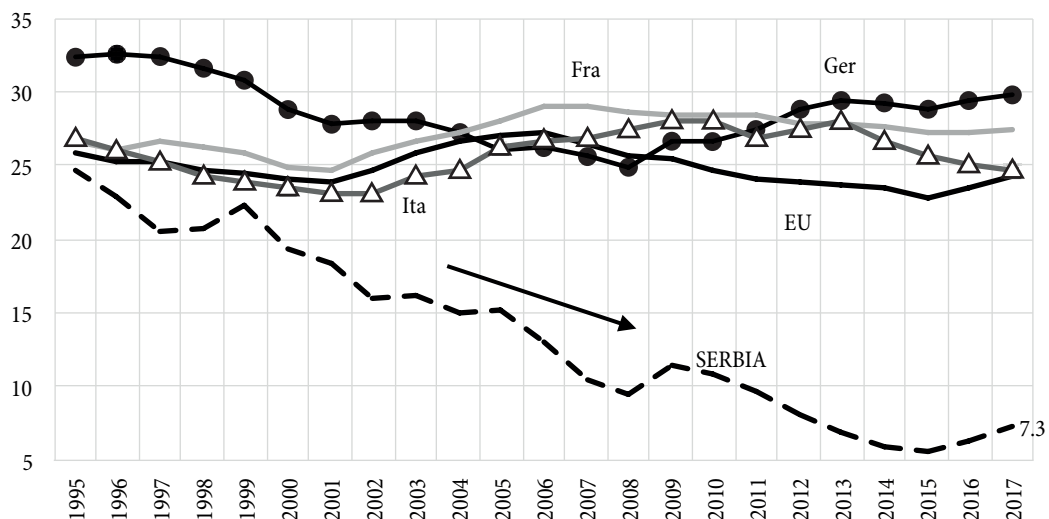
Since this is unattainable, a sustainable economic growth has to be relied on much more efficient utilization of the existing capital assets. Besides, if we consider the

Table 1: ICOR, for the period 2014-2017

|                           | Total | Public sector | Private sector |
|---------------------------|-------|---------------|----------------|
| Macedonia                 | 0.072 | 0.561         | 0.082          |
| Serbia                    | 0.076 | 0.507         | 0.089          |
| Croatia                   | 0.108 | 0.675         | 0.129          |
| Estonia                   | 0.128 | 0.641         | 0.160          |
| Latvia                    | 0.131 | 0.659         | 0.163          |
| Czech Republic            | 0.140 | 0.882         | 0.166          |
| Slovakia                  | 0.143 | 0.733         | 0.178          |
| Cyprus                    | 0.153 | 1.036         | 0.179          |
| Bulgaria                  | 0.159 | 0.678         | 0.208          |
| Hungary                   | 0.160 | 0.711         | 0.206          |
| Lithuania                 | 0.160 | 0.866         | 0.196          |
| Slovenia                  | 0.169 | 0.761         | 0.218          |
| Poland                    | 0.187 | 0.910         | 0.236          |
| Romania                   | 0.197 | 1.090         | 0.241          |
| Weighted regional average | 0.165 | 0.857         | 0.205          |

Source: Authors' calculation; data provided by Eurostat as of 15/01/2019 [7].

Figure 5: Share of dwelling construction in the GFCF



Source: Authors' calculation; data provided by Eurostat.

restrictions concerning the physical volume of labour force (the problem of depopulation and therefore reduced working active population [17]), it is an unavoidable conclusion that increased dynamics is achievable only through technological progress, innovations and creative approach to production.

Table 1 presents the investment efficiency of the public and the private sector. In the last three years, the average investment efficiency in the public sector has been by 30.9% lower than in the EU, and in comparison to the group of the observed countries (new and potential EU Member States) by considerable 40.8%. On the other side, the private sector investment efficiency is lower by 18.6%, i.e., 56.4%, respectively. The worse relative results of Serbia when compared to the subset of new EU Member States resulted from their more dynamic economic growth in relation to the EU average.

How to interpret these results? It is known that investment efficiency depends on the economic and technical structure. A larger part of investment directed towards the capital-intensive economic sections (transport infrastructure, energy, etc.) would lead to the increased value of marginal capital coefficient, namely, lower investment efficiency on the overall economic level. The Serbian investments are to the considerable extent directed just towards the mentioned economic sections (transport infrastructure is constructed and modernized: roads, railways, etc.). This is a suitable practical explanation of the relatively poor results of the investment efficiency of the Serbian public sector.

However, the question is what lies hidden behind the low efficiency of private investment. Firstly, observed was the period 2014 – 2017, which coincides with the severe restrictions of demand as a consequence of the implemented measures of fiscal consolidation. In the circumstances like these it is impossible to make true the full effect of investment in expanding economic activity, and exports could only partly compensate for the subject restrictions. Higher GDP growth rates are sustainable on a long-term basis only if we utilize all three growth sources: net exports, investments and final consumption. By no means should final consumption be the key point; however, it is indispensable.

For example, in the period 2014–2017, Romania recorded the average annual GDP real growth of 4.8%, but while expressing the final consumption growth of 6.2%, i.e., of household final consumption expenditure equalling 7.1% annually. In the same period, the inter-annual real growth of final consumption in Serbia equalled 0.6% only. In relation to the level noted in 2013, household final consumption expenditure in Romania at the end of 2017 increased by 31.5%, and in Serbia by 2.6%. Regarded on a cumulative basis, during this period Romania recorded household final consumption expenditure increased by 54.5% more than the economic activity. On the contrary, an inadequate policy was led in the past in Serbia and this was paid by severe deprivations, through the fiscal policy of saving, namely, resulting in the cumulative real stoppage of household final consumption expenditure in relation to the GDP dynamics by 54.1%.

Another reason for low efficiency of private investment in Serbia is related to structural economic problems that are mainly characteristic for the divisions with low value added. The low technological level of production simply cannot generate the growth that may keep pace with fast growing economies. Namely, this is not the issue of wrong allocation of resources, but the existing production structure, the change of which takes time. Possibly we may consider the above phenomenon only applied on certain cases of foreign direct investment supported by the government; however, even this needs to be examined in detail. Therefore, we should rather stick to the previously expressed viewpoint that subsidies for employment, i.e., opening new jobs are not to be included among the determinants of growing investment that would create a competitive economy; however, to this effect they may be counterproductive [18].

### Investment efficiency: Manufacturing

Within the existing investment capacities, the searching for the best solution how to direct the Serbian growth and development can be based on the information on the values of the ICOR in various economic domains. The existing correlation between the subject indicator and the real growth rates is a mechanism ensuring that



investments become a strategic instrument for attaining the projected macroeconomic objectives. Interdependence of investments and economic growth can be illustrated by significant compliance of the relevant economic indicators in the divisions of manufacturing.

Certain expressive deviation, noted only in the division 29 – *Manufacture of motor vehicles, trailers and semitrailers*, was caused by intensive capitalization in the car industry that occurred in the observed period midterm.

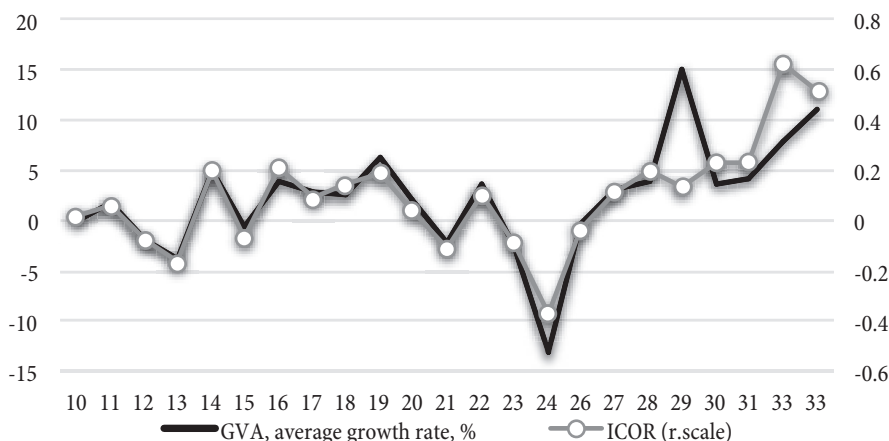
By opting for investment in machinery, equipment, software, etc., the production capacities of a country are increased, while, e.g., investment in transport infrastructure, dwelling and other constructions, etc. will increase the social wealth and is seen as prerequisite for the efficiency of all other investment categories on a long-term basis (less expensive and efficient transport, better communications, developed and reliable information systems, etc.). By directing resources to capital-intensive economic sections (heavy industry, energy, transportation) or manufacturing and service activities, which require less capital investment, we can influence the extent of investment efficiency within the overall economy. The capital relocation through investment can lead to economic restructuring aimed at achieving economic optimization.

The investment in the industry sector generates relatively less GVA in comparison to the section of services – in the period observed, on average 40% of all capital investments produce less than 30% of GVA. In spite of this, the analysis of economic processes on lower

activity level tends to indicate that certain activities of this section, with the existing level of technical capacities, may significantly add to the GVA growth with anticipated minimal investment. This is especially applicable to certain divisions of *Manufacturing*, while the sections of *Mining and quarrying, electricity, gas, steam and air-conditioning supply, and Water supply, sewerage, waste management and remediation activities* record above average values of the ICOR. Low investment efficiency in the manufacturing industry is primarily the result of being directed to large infrastructure projects, energy and other capital-intensive activities that are characteristic of this section. However, despite the low investment cost-effectiveness, the implicit contribution of the manufacturing section is far-reaching; the leading national investors belong to this section and they not only model the investment activity, but also direct the overall economic development.

The existing versatility of the economic activities of manufacturing contains in itself the potentials for spurring the economy to faster growth. With the same volume of capital formation, it is possible to suppose their varying composition, which results in different production growth. By considering the variations of investment efficiency by certain manufacturing divisions ensured is a sound starting point for economical and effective investment. Since the production efficiency, at least on a short-term basis, does not tend to change, by taking into account the relevant empirical results on the capital capacities of the Serbian economy it is possible, by relocating the

**Figure 6: ICOR vs. value added (GVA) growth rate, by economic divisions of manufacturing, average for period 2006-2016\***



Note: \*x-axis: NACE Rev. 2 – Manufacturing divisions  
 Source: Authors' calculation; data provided by the Statistical Office of the Republic of Serbia (SORS) [22].

development resources into the divisions with low ICOR, to spur the GDP dynamics.

In order to develop a more efficient model of sectoral specification, the manufacturing divisions were ranked by the extent of investment efficiency, calculated for the period 2006 – 2016<sup>7</sup>.

Production effects of invested capital are most expressive in the divisions *Repair and installation of machinery and equipment*, *Other manufacturing*, and *Manufacture of fabricated metal products*. The extension of their production capacities with minimal investment and increased relative significance in manufacturing would create a substantial value added and result in growing economic investment efficiency on the overall economic level.

A specific challenge for economic policy creators are activities with (marked) negative investment efficiency, i.e., those where invested assets do not return through increased GVA, but, on the contrary, induce its decreasing movements (manufacture of computers, textiles, tobacco, leather and fabricated metal products). The potential factors causing the falling investment efficiency in these industries are transition changes, the great financial crisis in 2009 and/or, eventually, wrong decision making, investment failures and irrational spending above economic criteria or real needs, etc.

With the existing level of technological progress, investment decisions, led by pure economic reasons, need to be directed to propulsive industries from the point of capital assets efficiency. However, it is not always possible to ignore the social and economic development interest for certain divisions, which despite the low efficiency on a long-term basis, bear the national strategic importance (e.g., pharmaceutical industry in some economies). In this case, only the strategic economic policy makers on the national level could undertake the role of development

directing through long-term anticipations of real and sustainable progress, which is hard to conceive from a micro aspect.

Taking into account that the rational usage is a priority with limited resources, when allocating capital assets it is necessary to observe the relationship between capital equipment and actual growth rates. By the means of referent coefficients, it is possible to make the reliable anticipations as regards the percentage share of production to be invested in certain industries in order to create 1% of their growth.

If as an indicator of efficiency of capital assets observed is the movement of the ICOR, i.e., its increase in the period 2001 – 2016, then we may assume that the manufacturing section, on the overall level expresses a growing investment efficiency (0.11 in the period 2011 – 2016 in comparison to 0.09 in the period 2006 – 2016).

For the needs of an efficient and optimal direction of economic relocation of fixed assets, offered is a comparative review of the manufacturing divisions ranked by investment efficiency in the two observed periods:

Regarding the share in manufacturing, *Manufacture of food products* is far above all other divisions (21.8%), however it is at the bottom of the list by investment efficiency (coefficient equals 0.02), which considerably affects the sector efficiency as a whole. *Manufacture of basic metals*, *manufacture of tobacco products* and *manufacture of basic pharmaceutical products* had their average shares in the manufacturing section decreased by one-third in the post-crisis period when related to the whole period observed, which came as a consequence of rather low efficiency, i.e., negative investment efficiency. In similar cases, the movements of the ICOR can be regarded as an indicator of severe problems in which certain economic activity is found. In the process of transition, *Manufacture of basic pharmaceutical products* was displaced in the international division of labour, and its new start requires extreme efforts and the government interventions. Basically the development of this industry requires the readiness for large volume investments in research and development potentials (which produce no immediate effects) and the stoppage in the outflow of human resources, namely, the employment on a long-term basis of high professional

<sup>7</sup> For practical reasons, investments and the respective production growth were observed in the same period, i.e., calculated was the respective ICOR. Following the ratio of the relevant aggregates on long-term basis, partly neutralized were the delayed effects resulting from the time gap between the realization and activation of certain investment types, so that technological marginal coefficient was not taken into account. The time difference, i.e., gap between the period of an investment implementation or construction and the moment of its transformation into active production assets is characteristic of the activities with dominant construction works in the investment technical structure

**Table 2: Comparative review of the Serbian manufacturing divisions ranked by investment efficiency in the two observed periods**

| Divisions  | 2006-2016                     |             |                                  | 2011-2016                     |             |                                  |
|--|-------------------------------|-------------|----------------------------------|-------------------------------|-------------|----------------------------------|
|  | Rank by investment efficiency | ICOR        | Share in GVA of manufacturing, % | Rank by investment efficiency | ICOR        | Share in GVA of manufacturing, % |
| <b>C Manufacturing</b>   |                               | <b>0.09</b> | <b>100</b>                       |                               | <b>0.11</b> | <b>100</b>                       |
| 10 Manufacture of food products  | 17                            | 0.02        | 21.8                             | 15                            | 0.02        | 21.4                             |
| 11 Manufacture of beverages  | 15                            | 0.06        | 5.6                              | 18                            | -0.19       | 5.1                              |
| 12 Manufacture of tobacco products                                     | 20                            | -0.08       | 1.3                              | 23                            | -0.32       | 0.8                              |
| 13 Manufacture of textiles   | 23                            | -0.16       | 1.2                              | 21                            | -0.28       | 1.1                              |
| 14 Manufacture of wearing apparel                                      | 8                             | 0.20        | 3.8                              | 3                             | 0.47        | 4.1                              |
| 15 Manufacture of leather and related products                         | 19                            | -0.07       | 1.5                              | 20                            | -0.26       | 1.5                              |
| 16 Manufacture of wood and products of wood and cork, except furniture | 6                             | 0.21        | 2.1                              | 14                            | 0.03        | 2.3                              |
| 17 Manufacture of paper and paper products                             | 14                            | 0.09        | 2.5                              | 8                             | 0.15        | 2.5                              |
| 18 Press and audio and video recording                                 | 10                            | 0.15        | 2.1                              | 5                             | 0.38        | 1.9                              |
| 19 Manufacture of coke and refined petroleum products                  | 9                             | 0.19        | 9.1                              | 9                             | 0.15        | 10.5                             |
| 20 Manufacture of chemicals and chemical products                      | 16                            | 0.04        | 4.0                              | 2                             | 0.47        | 4.8                              |
| 21 Manufacture of basic pharmaceutical products                        | 22                            | -0.11       | 3.2                              | 16                            | 0.02        | 2.4                              |
| 22 Manufacture of rubber and plastic products                          | 13                            | 0.10        | 6.6                              | 10                            | 0.12        | 7.0                              |
| 23 Manufacture of other non-metallic mineral products                  | 21                            | -0.09       | 5.1                              | 22                            | -0.29       | 4.3                              |
| 24 Manufacture of basic metals   | 24                            | -0.37       | 3.3                              | 24                            | -0.36       | 2.3                              |
| 25 Manufacture of fabricated metal products except machinery           | 3                             | 0.26        | 8.4                              | 12                            | 0.09        | 8.5                              |
| 26 Manufacture of computer, electronic and optical products            | 18                            | -0.04       | 2.7                              | 17                            | -0.18       | 2.4                              |
| 27 Manufacture of electrical equipment                                 | 12                            | 0.11        | 2.9                              | 11                            | 0.10        | 2.8                              |
| 28 Manufacture of machinery and equipment, n.e.c.                      | 7                             | 0.20        | 3.8                              | 6                             | 0.22        | 3.9                              |
| 29 Manufacture of motor vehicles, trailers and semi-trailers           | 11                            | 0.14        | 3.6                              | 7                             | 0.19        | 5.1                              |
| 30 Manufacture of other transport equipment                            | 4                             | 0.23        | 0.5                              | 19                            | -0.21       | 0.4                              |
| 31 Manufacture of furniture  | 5                             | 0.23        | 2.2                              | 13                            | 0.05        | 2.1                              |
| 32 Other manufacturing   | 2                             | 0.52        | 1.4                              | 1                             | 0.53        | 1.4                              |
| 33 Repair and installation of machinery and equipment                  | 1                             | 0.62        | 1.1                              | 4                             | 0.40        | 1.3                              |

Source: Authors' calculation; data provided by SORS.

research staff. Simultaneously, *Manufacture of chemicals and chemical products* considerably upgraded investment efficiency and thereby this division was ranked second in the last period observed (in relation to the place 16 when regarding the whole period observed) and its share was increased by 21.7%. The increased share and a large step forward – the third place as regards the attained level of capital profitability within the section - was achieved by *Manufacture of wearing apparel*. Considering the investment efficiency, *Manufacture of textiles* and *Manufacture of wearing apparel*, even though seemingly closely related, indicate quite opposite trends regarding the economic indicators. In difference to *Manufacture of wearing apparel*, *Manufacture of textiles* is stagnating and experiencing severe difficulties (negative efficiency coefficient, -0.28), which is reflected in, among other things, the reduced

share in the manufacturing value added. *Car industry (Manufacture of motor vehicles, trailers and semitrailers)*, as a result of the large volume capitalization implemented in the post-crisis period, upgraded the investment efficiency and almost doubled its share in the section.

### Investment efficiency: Services

The modern economic flows are characterized by all-encompassing structural processes aimed at strengthening the dominant status of service activities. Apart from the new trends causing these movements (economic market changes, breakthrough of new technologies, rising living standards, life style changes), a key cause for the expansion of the services sector lies in the high productivity of its business operations. Having in mind

**Table 3: GDP Sectorial structure in 2016, %**

|                        | Services    | Industry    | Agriculture |
|------------------------|-------------|-------------|-------------|
| Luxembourg             | 86.8        | 12.9        | 0.3         |
| Cyprus                 | 86.6        | 11.3        | 2.1         |
| Malta                  | 85.1        | 13.7        | 1.2         |
| Greece                 | 79.7        | 16.3        | 4.0         |
| United Kingdom         | 79.6        | 19.8        | 0.7         |
| France                 | 78.7        | 19.7        | 1.6         |
| Netherlands            | 78.3        | 19.7        | 2.0         |
| Belgium                | 77.1        | 22.2        | 0.7         |
| Denmark                | 75.6        | 23.5        | 0.9         |
| Portugal               | 75.5        | 22.3        | 2.2         |
| Latvia                 | 74.7        | 21.3        | 3.9         |
| Sweden                 | 74.2        | 24.5        | 1.3         |
| Italy                  | 74.0        | 23.9        | 2.1         |
| Spain                  | 73.8        | 23.5        | 2.8         |
| <b>European Union</b>  | <b>73.7</b> | <b>24.8</b> | <b>1.5</b>  |
| Switzerland            | 73.5        | 25.8        | 0.7         |
| Montenegro             | 71.8        | 19.1        | 9.0         |
| Iceland                | 71.8        | 22.4        | 5.8         |
| Austria                | 71.0        | 27.7        | 1.2         |
| Estonia                | 70.5        | 26.9        | 2.6         |
| Finland                | 70.2        | 27.1        | 2.7         |
| Croatia                | 69.6        | 26.6        | 3.8         |
| Germany                | 68.9        | 30.5        | 0.6         |
| Lithuania              | 68.0        | 28.7        | 3.3         |
| Bulgaria               | 67.0        | 28.3        | 4.7         |
| Norway                 | 65.6        | 32.0        | 2.4         |
| Slovenia               | 65.5        | 32.3        | 2.2         |
| Bosnia and Herzegovina | 65.3        | 27.3        | 7.5         |
| Hungary                | 65.1        | 30.5        | 4.4         |
| Poland                 | 63.8        | 33.5        | 2.7         |
| Romania                | 61.8        | 33.7        | 4.6         |
| Slovakia               | 61.5        | 34.8        | 3.7         |
| North Macedonia        | 61.1        | 28.4        | 10.5        |
| Turkey                 | 61.0        | 32.0        | 7.0         |
| <b>Serbia</b>          | <b>60.8</b> | <b>31.3</b> | <b>7.9</b>  |
| Czech Republic         | 59.9        | 37.6        | 2.5         |
| Ireland                | 59.7        | 39.3        | 1.0         |
| Albania                | 53.2        | 24.1        | 22.7        |

Source: Authors' calculation; data provided by Eurostat [7].

that services ensure the basic economic, financial, business and social infrastructure, they may be regarded also as a generator of the overall economic development nowadays. By ensuring the necessary inputs for production and adequate human resources, they considerably determine the flows of the primary and secondary sector, at the same time exceeding their values in the summarized amount in the GDP creation.

As a global phenomenon, the Serbian economy also has been overcome by the process of deindustrialization, however not to the extent as seen in the developed world economies.

In 2016, the share of the services sector in the GDP creation equalled 60.8%, which is by 12.9 percentage points less than the EU average. However, regardless of the mentioned low ranking, the Serbian sector of services gradually becomes more competitive and creates an expressive surplus in external trade. In the last decade, the share of exports of services in GDP has increased by 6.4 percentage points and reached 14.2% in 2017, while the resumed increase of relative importance is expected.

As a result of the real need to find new sources for growth and attain more favourable position within the international division of labour, the intensive structural alignment of the national economy is in progress, led by directing capital into profitable branches of the services sector. It is a known fact that an active investment policy can influence the structure and volume of macroeconomic aggregates. Namely, the validation of investment activity success is expressed through the economic growth dynamics. The functional relationship between investments and economic growth is determined and measured by the means of conventional macroeconomic indicators, which, essentially, follow the ratio between the invested capital and its productive effects.

Based on these measures we have come to an empirical confirmation that also within the Serbian economic circumstances the services sector is achieving profitability above the average of the overall economy. The allocation of investments to the aggregated sectors of economic activity and their economic efficiency are given in the following table:

**Table 4: Economic indicators by economic sectors (A3<sup>8</sup>) of the Republic of Serbia, average for the period 2006 – 2016**

|             | Average investment structure, % | GVA average structure | Capital-output ratio | ICOR |
|-------------|---------------------------------|-----------------------|----------------------|------|
| Total       | 100                             | 100                   | 15.1                 | 0.07 |
| Agriculture | 3.2                             | 9.6                   | 21.6                 | 0.05 |
| Industry    | 40.3                            | 29.8                  | 18.9                 | 0.05 |
| Services    | 56.5                            | 60.5                  | 12.8                 | 0.08 |

Source: Authors' calculation; data provided by SORS.

8 A3 represents the aggregation of economic activities in three sectors: agriculture (A), industry (B, C, D, E, F) and services (G, H, I, J, K, L, M, N, O, P, Q, R, S, T).

In the Republic of Serbia and when the period observed is regarded, on average the largest share of investments were effected in the services sector, 56.5%, and the smallest in the sector of agriculture, 3.2%. Simultaneously, the average structure of GVA is not in compliance with the investment in these sectors, mainly due to the existing production structure, however also because of the variations of capital productive effects in various economic activities.

Considering the fact that lower values of the ICOR indicate higher capital productivity and technological progress, we may suppose that, on this aggregation level, investment in the services sector will make relatively most significant effects on the overall economy (ICOR noted for this sector equals 12.8). Compared to the services sector, the investment in the sector of industry generates relatively lower GVA, primarily since its considerable part is directed to large infrastructure projects, energy and other capital-intensive industries that are characteristic of this sector.

Surprisingly, apart from the obviously highest investment efficiency, in the period observed the dynamics of investment in the services sector was less expressive. Also regarding the same period, the real growth of gross investment equalled in total 9.9%, and the most significant positive changes of the investment level were noted for the sector of agriculture, 38.1%. The sectors of industry and services recorded growth of 14.0% and 5.8%, respectively; however, on average the investment in the sector of industry was on annual basis more intensive by 2.4 percentage points (average annual real growth rate of 3.8%) in relation to the inter-annual growth of the services sector.

Essentially, apart from the direct contribution of the investment in the services sector to the GDP growth, as its integrating part from the point of demand, for the purpose of anticipating and making economic decisions it is of more importance to examine the extent of profitability of this investment and thereby differentiate the new development potentials. The investment level in itself cannot represent the measure of development, but this is the contribution to production that results from the increased production capacities. Due to the relative lack of capital assets, as well as because of the limited supposed social and economic readiness to invest, their rational and cost-effective allocation

is a prerequisite for the successful implementation of the anticipated macroeconomic objectives.

Within the available investment capacities, the searching for the best solution how to direct the growth and development in Serbia can be based on the information on the values of ICOR in various economic domains. The existing relation between the subject indicator and the real growth rates is a mechanism that ensures that investment is seen as a practical instrument for upgrading the economic activity to the higher level. The interdependence of investment and economic growth is illustrated by a notable correlation of the relative economic indicators by economic divisions within the services sector.

By having inspection into the variations concerning investment efficiency by certain divisions of services it is possible to establish a good starting point for more cost-effective and efficient investment. Bearing in mind that the efficiency of production capacities does not change, at least on a short-term basis, and with the observance of the respective empirical results concerning capital assets of the national economy, by directing the development resources to the divisions marked by low marginal capital coefficient it is possible to spur GDP to faster growth.

The productive effects of the invested capital are most expressive in the divisions of *Employment activities; Legal and accounting activities; Computer programming, consultancy and related activities; Insurance, reinsurance and pension funding; Gambling and betting activities; Advertising and market research; Education; Scientific research and development, etc.* The extension of their fixed capacities and relative importance within the services sector would create, with minor investments, a considerable GVA and would influence the investment efficiency on the overall economic level. On the bottom of the table are found the service activities where the invested assets are not returned through the increased value added, but, on the contrary, induce its decrease. The negative mark of the investment efficiency indicate that certain divisions experience serious developing difficulties caused by economic crisis, transition changes, irrational spending above economic criteria and real needs, or some other negative trends. In cases like these, of vital importance is the society's response to overcoming the limitations of

**Table 5: Services sector – divisions by economic investment efficiency,<sup>5</sup> Republic of Serbia, average for the period 2006-2016**

| Divisions  | ICOR  | Share in GVA – services sector, % | GVA average real growth rate, % |
|--|-------|-----------------------------------|---------------------------------|
| 78 Employment activities   | 1.71  | 0.1                               | 44.0                            |
| 80 Security and investigation activities   | 1.63  | 0.8                               | 3.8                             |
| 69 Legal and accounting activities   | 1.05  | 1.6                               | 1.2                             |
| 62 Computer programming, consultancy and related activities                      | 1.04  | 1.4                               | 15.8                            |
| 63 Information service activities  | 0.72  | 0.2                               | 5.0                             |
| 92 Gambling and betting activities   | 0.71  | 0.5                               | 16.4                            |
| 65 Insurance, reinsurance and pension funding, except compulsory social security | 0.68  | 0.9                               | 7.0                             |
| 73 Advertising and market research   | 0.56  | 0.7                               | 5.5                             |
| 94 Activities of membership organizations  | 0.42  | 0.6                               | 2.4                             |
| 85 Education   | 0.40  | 6.5                               | 1.9                             |
| 72 Scientific research and development   | 0.31  | 0.7                               | 4.1                             |
| 66 Activities auxiliary to financial services and insurance activities           | 0.30  | 0.2                               | 5.0                             |
| 70 Activities of head offices; management consultancy activities                 | 0.26  | 1.6                               | 4.8                             |
| 46 Wholesale trade, except of motor vehicles and motorcycles                     | 0.24  | 10.2                              | 4.4                             |
| 68 Real estate activities  | 0.24  | 17.4                              | 0.7                             |
| 64 Financial service activities except insurance and pension f.                  | 0.22  | 4.8                               | 4.3                             |
| 45 Wholesale and retail trade and repair of motor vehicles                       | 0.22  | 1.5                               | 3.1                             |
| 82 Office administrative, office support and other business sup.                 | 0.18  | 0.5                               | 3.0                             |
| 52 Warehousing and support activities for transportation                         | 0.17  | 1.9                               | 3.5                             |
| 87 Residential care activities   | 0.16  | 0.8                               | 1.4                             |
| 49 Land transport and transport via pipelines                                    | 0.16  | 5.5                               | 3.6                             |
| 75 Veterinary activities   | 0.14  | 0.2                               | 1.0                             |
| 77 Rental and leasing activities   | 0.13  | 0.4                               | 13.2                            |
| 61 Telecommunications  | 0.11  | 5.0                               | 5.0                             |
| 81 Services to buildings and landscape activities                                | 0.07  | 0.6                               | 1.4                             |
| 86 Human health activities   | 0.06  | 7.7                               | 0.4                             |
| 53 Postal and courier activities   | 0.06  | 1.1                               | 0.7                             |
| 55 Accommodation   | 0.05  | 0.9                               | 1.2                             |
| 84 Public administration and defence; compulsory social security                 | 0.02  | 7.5                               | 0.6                             |
| 71 Architectural and engineering activities; technical testing & analysis        | 0.02  | 1.3                               | 1.6                             |
| 47 Retail trade, except motor vehicles and motorcycles                           | -0.03 | 8.0                               | -0.5                            |
| 74 Other professional, scientific and technical activities                       | -0.03 | 0.3                               | -1.8                            |
| 56 Food and beverage service activities  | -0.11 | 1.4                               | -0.5                            |
| 91 Libraries, archives, museums and other cultural activities                    | -0.11 | 0.2                               | -3.1                            |
| 50 Water transport   | -0.13 | 0.1                               | -5.6                            |
| 93 Sports, amusement and recreation activities                                   | -0.13 | 1.0                               | -4.3                            |
| 90 Creative, arts and entertainment activities                                   | -0.23 | 0.3                               | -3.0                            |
| 60 Programming and broadcasting activities                                       | -0.30 | 0.7                               | -15.1                           |
| 59 Recording and music publishing activities                                     | -0.33 | 0.2                               | -5.8                            |
| 58 Publishing activities   | -0.34 | 0.7                               | -2.3                            |
| 79 Travel agency, tour operator and other reservation service                    | -0.92 | 0.3                               | -5.2                            |
| 95 Repair of computers and personal and household goods                          | -1.11 | 0.4                               | -2.9                            |
| 88 Social work activities w/o accommodation                                      | -1.17 | 1.6                               | -6.8                            |
| 96 Other personal service activities   | -3.51 | 1.9                               | -2.1                            |
| 51 Air transport   | ...   | 0.1                               | ...                             |

Source: Authors' calculation; data provided by SORS.

5 The data on investments on the level of divisions of economic activities are provided from *the Annual report on investments in fixed assets of the Republic of Serbia* that covers only legal entities. For practical reasons, the investments and the respective production growth are observed within the same period, i.e., the simultaneous marginal capital coefficient is calculated. By following the ratio of the respective aggregates for a longer period, partly neutralized are the postponed effects resulting from the time gap between the implementation and activation of certain types of investment, so the technological marginal coefficient was not taken into account. The time gap between the period when an investment is implemented or constructed and the moment of its transformation into active production assets is characteristic of the activities with dominant construction works in the investment technical structure.

long-term stagnation. A disregarding approach or missing to respond appropriately may lead the endangered activity to the edge of survival.

The tabular review of the qualitative indicators concerning the service sector functioning in the last decade offers the guidelines for directing business operations, and can be also variously utilized in accordance with the current economic strategy. At the core of all macroeconomic analyses and decisions taken by economic policy creators found is the search for the optimal way how to achieve a sustainable growth of GVA. The management of investments, being the dominant variable of economic development, directs the movements in compliance with the investment economic and technical structure.

The anticipations of the future investment assets and the cost-effectiveness of the implemented investments can be reliably estimated by quantifying the interdependence of investment and economic growth. Naturally, the investment optimum is determined by various priorities of economic policy – higher employment rate, increasing consumption, but usually the focus of our interests is placed on economic growth. The modalities of intensifying the growth of the services sector from the point of ICOR can correspond to any of the proposed scenarios for increasing GVA:

*1. Increased investment rate, i.e., increased volume of capital investments with the given level of technological progress* – Usually, as the first solution for spurring the economy to faster growth we encounter the idea of intensifying investment activity, so that through capital growth the increased production can be achieved in future. Through the referent capital coefficients, it is possible to reliably anticipate the percentage of new created value in certain economic divisions that needs to be invested in order to achieve 1% of the respective growth. The starting assumption for this solution is to have the determined ICOR, which is calculated for a longer period by positioning the ratio of the average percentage share of economic divisions' investment in the respective GVA, and the real growth rate of the new created value in the observed activity.

According to these relations and the determined values of investment parameters, the example of NACE division 52, *Warehousing*, can be indicative of the investment volume required to ensure the anticipated

growth rates. In the period 2006 – 2016, investment in this division equalled on average 20.5% of the actual GDP, which resulted in the inter-annual real growth of 3.5%. The investment efficiency was expressed by the capital-output ratio values of 5.8 units and the ICOR of 0.17. In order to induce the growth by one percentage point, the equivalent of 5.8% of the GDP value is required to be directed in new investments (by definition, marginal capital coefficient indicates the share of production needed to be invested so to ensure the growth rate by 1 percentage point). This implies that at the current production level, the required share of investment in GDP should equal 26.3% (20.5% + 5.8%), and if a more dynamic growth is anticipated, i.e., by 2.2 percentage points, for capital creation it is needed to allocate 32.1% (26.3% + 5.8%) of the new created value.

Put into perspective, forcing the growth in this way could not be sustainable, since it results from the increased input, and not higher productivity. The mechanism of compensating extensive development by increasing accumulation rate is of limited effect and also fast exhaustive. Additional investment efforts, expressed in quantity rather than quality of investment, could possibly postpone and partly alleviate the stagnation, however, thereby the long-term development perspective is closed. Namely, it is not worthwhile to have an isolated view to the relationship between the ICOR and the GVA growth.

*2. Optimal economic allocation of available capital assets* – Another choice for achieving higher growth rates is relied directly on the determined ICOR values, i.e., on the established differences of capital efficiency in various economic areas. Considering the fact that with limited resources the priority is their rational utilization, when allocating capital assets it is necessary to take into account the existent links between the capital equipment and the achieved growth rates. In this case the ICOR is an effective mechanism for the policy of new investments. By changing the economic structure and adopting strategic orientation to profitable services, the appearing dynamic interactions would be transferred to the forthcoming period, thereby ensuring more favourable development performances, not only as an immediate effect, but also in future.

Since this reallocation of fixed assets presents a changed qualitative investment composition, in this

way attained growth can be stable on a long-term basis, but with certain limitations as regards the applicability and social justification under the real circumstances. At the current level of technological progress, the opting for investment, led by purely economic reasons, needs to go in the direction of propulsive industries from the point of capital assets efficiency. However, it could be counterproductive to ignore the social and economic development interest for certain services that, in spite of low efficiency on a long-term basis, require further investment (e.g., investment in preschool institutions, even though the division of *Social work activities w/o accommodation* is found in the negative zone of capital efficiency).

In case we take again the example of NACE division 52, *Warehousing*, in order to select the most favourable production alternative by this approach, the fixed assets from this division should be relocated, for example, to NACE division 46, *Wholesale trade*, which on the scale of capital efficiency has better standing, producing by 0.8 percentage points higher growth rate. By allocating capacities in this manner, in a relatively short time and with the same investment volume it is possible to ensure more profits. An alternative for increasing the GVA of the sector of services would be also the relocation of investment assets from a low efficiency division, e.g., *Postal and courier activities* (NACE 53) and/or *Accommodation* (NACE 55) to the division *Warehousing and support activities for transportation*, which in comparison features three times higher efficiency, so the same added capital would in this way also produce larger profits.

These movements are however usual; the empirical research confirmed the gradually increasing structural share of the activities operating at a higher level of technological progress. With the aim to attain the acceleration of already existing positive trends in certain economic divisions and make use of favourable conditions for producing the maximum GVA with minimum investment, apart from surrendering to the economic rules, the capital assets flows need to be directed also by the adequate economic policy tools, so to lead economic restructuring towards attaining increased investment profitability on the overall economic level.

3. *Increased production efficiency* – Efficiency is a fundamental economic topic, since eventually the quality of all forms of social activities depend on it. It is focused on the effectiveness of utilizing production capacities. In this study we laid particular stress on fixed productive assets. In itself, to force the input quantities cannot be a long-term growth strategy, since it is contrary to the fundamental assumption that the economic growth rates depend upon its quality. Extensive investment cannot maintain the desirable growth rate; however, the context of developing processes necessarily needs to include the profitability of investment capacities.

The interdependence of the quality of investment activity and the GVA real growth in the observed divisions of services can be explained by the linear regression model:  $y = 20.251x - 0.2981$ . The parameters of this linear equation represent valuable information on the phenomena observed, on the basis of which estimated are the required conditions for reaching the desired growth rates. The actual quantitative ratio between the variations of these indicators can be presented in the following manner: if the ICOR is increased by one unit, the GVA growth rate in the observed economic divisions can be expected to increase by 20.251 percentage points, and *vice versa*, if we desire to increase the mentioned growth rate by 1 percentage point, the investment efficiency need to be increased by 0.06 units.

When comparing the changes that were expressive in the two observed periods, it can be noted that in practice the division *Warehousing and support activities for transportation* registered an increased efficiency in the last years; i.e., actually implemented was the third scenario of spurring the GVA rate, where the intensive growth factors were dominant over those extensive. In the example given, the ICOR increased (the ICOR was up by 0.04 units), which resulted in the growth rate rising by 0.62 percentage points (the deviation of the empirical growth rate from the growth rate projected by this model is less than 5%). Even though they are not distinguished in the regression model, i.e., they are not grouped on the capital efficiency axis as the majority of divisions of the observed sectors, the features of the considered activity do not deviate from the established regression line.



Generally speaking, all changes to the realized rates of the new created value resulted from the variations in volume and effectiveness of the engaged capacities. For example, in the observed division the increased real growth rate by 1 percentage point can be ensured by upgrading the efficiency by 0.06 units, without additionally expanding the capital assets volume or, on the contrary, by employing additional fixed assets, which would upgrade the average investment rate from the current 20.5% (period 2006 – 2016) to the required 26.3%, i.e., by 5.8 percentage points that the ICOR equals to. Naturally, in practice it is not possible to define precisely the contribution to the growth of intensive and extensive factors, since they are constantly intermingling and coexistent. In the periods when the positive synergy of the both factors existed, the most intensive effect was produced; this is a valuable guideline for the economic policy conception.

The most worthwhile modality of growth and development can be determined by an integral approach and systematic analysis. By comparing and confronting the presumed effects, distinguished are the solutions that at the moment may render the best positive influence on the dynamics of the sustainable economic growth rate. Economic specialization and redirecting capital flows can often generate long-term positive effects, relatively promptly and with the minimum restrictions. However, the mentioned approach, as well as an extensive capital input increasing, eventually may reach the boundaries of the existing production capacities; therefore the only solution for overcoming the potential stagnation could be to establish the production process on a higher extent of technological progress. The prerequisite for this is the openness towards new ideas, the social orientation to innovations and the acceptance of the global ambience that within the national frames could encourage modern methods of rendering effective services. Also, the unsatisfactory values of the qualitative efficiency indicators in comparison to the developed economies clearly indicate the decelerated economic flows, so it is necessary to turn towards an alternative macroeconomic strategy. Anyway, social and economic responsibility is of utmost importance, since the selection of certain growth modality at the moment is reflected on the potentials of the economic progress dynamics in future.

For analytical purposes we should consider the fact that an important aspect of the capital coefficients is their extensiveness over time, because their values are not always relevant for a significant analytical utilization if they are calculated in short time intervals. When calculating the capital indicators it is necessary to take into account the average quantitative relations between the relevant economic indicators within a relatively long time span, since it is assumed that investment efficiency is generally invariant on short-time basis (except, e.g., in cases of intensive capitalization when the ICOR may be increased over certain period, but then gets stable again on a lower level, i.e., on a higher extent of investment efficiency, etc.). However, we cannot neglect the negative effects of the global economic crisis of 2008 and 2009 on the macroeconomic flows, therefore on the ICOR. The dramatic decreasing of the share of investment in GVA was followed by even more significant slowdown of the GVA real growth rates, which resulted in the higher values of ICOR and decreased investment efficiency. During the crisis time, for the ICOR of services, as noted for other economic divisions, expressive was a sudden jump and it still has not come back to the average value from the time before the crisis. However, on a long-term basis recession is not expected to have a decisive impact on investment efficiency (fall is notable for the rates of all economic indicators), but exclusively capitalization that brings out the changed level of technical progress. In the last three-year period, the aggregated values of capital coefficients indicate the trend of returning to the level before the economic crisis, and the efficiency on certain lower aggregation levels has even surpassed that from the period before the crisis.

With the aim to isolate the direct effect of recession and ensure a clear overview of the changes to the economic investment efficiency over time, we calculated the capital indicators for the years immediately before and after the economic crisis (2006 – 2010), as well as for the period when the first results of the economic recovery were noted (2011 – 2016). In order to find out the efficient and optimal direction of economic relocation of fixed assets, here below given is the comparative overview of the services sector divisions by investment efficiency in the two periods:

Table 6: Comparative overview: Services sector – divisions ranked by investment efficiency

| Economic activities (NACE Rev. 2)   | 2006-2010                     |       |                                   | 2011-2016                     |       |                                   |
|---|-------------------------------|-------|-----------------------------------|-------------------------------|-------|-----------------------------------|
|   | Rank by investment efficiency | ICOR  | Share in GVA – services sector, % | Rank by investment efficiency | ICOR  | Share in GVA – services sector, % |
| SERVICES SECTOR   | -                             | 0.12  | 100                               | -                             | 0.04  | 100                               |
| G Wholesale and retail trade; repair of motor vehicles and motorcycles  | -                             | 0.13  | 19.5                              | -                             | 0.12  | 19.7                              |
| 45 Wholesale and retail trade and repair of motor vehicles and motorcycles                                    | 13                            | 0.38  | 1.5                               | 24                            | 0.04  | 1.4                               |
| 46 Wholesale trade, except motor vehicles and motorcycles   | 19                            | 0.27  | 9.9                               | 18                            | 0.19  | 10.4                              |
| 47 Retail trade, except motor vehicles and motorcycles  | 33                            | -0.10 | 8.0                               | 23                            | 0.04  | 7.9                               |
| H Transportation and storage  | -                             | 0.24  | 8.9                               | -                             | 0.06  | 8.3                               |
| 49 Land transport and transport via pipelines transport   | 15                            | 0.32  | 6.0                               | 27                            | 0.03  | 5.1                               |
| 50 Water transport  | 34                            | -0.17 | 0.1                               | 26                            | 0.03  | 0.1                               |
| 51 Air transport  | ...                           | -0.02 | 0.1                               | ...                           | ...   | 0.0                               |
| 52 Warehousing and support activities for transportation  | 24                            | 0.13  | 1.6                               | 17                            | 0.21  | 2.1                               |
| 53 Postal and courier activities  | 26                            | 0.07  | 1.0                               | 22                            | 0.04  | 1.1                               |
| I Accommodation and food service activities   | -                             | -0.07 | 2.4                               | -                             | 0.11  | 2.2                               |
| 55 Accommodation  | 31                            | -0.02 | 0.9                               | 19                            | 0.12  | 0.8                               |
| 56 Food and beverage service activities   | 36                            | -0.20 | 1.5                               | 30                            | 0.00  | 1.3                               |
| J Information and communication   | -                             | 0.24  | 7.7                               | -                             | 0.05  | 8.8                               |
| 58 Publishing activities  | 38                            | -0.36 | 0.8                               | 40                            | -0.30 | 0.7                               |
| 59 Motion picture, video and television programme production, sound recording and music publishing activities | 43                            | -1.68 | 0.3                               | 16                            | 0.22  | 0.2                               |
| 60 Programming and broadcasting activities  | 3                             | 1.84  | 0.8                               | 41                            | -0.47 | 0.6                               |
| 61 Telecommunications   | 22                            | 0.18  | 4.8                               | 21                            | 0.05  | 5.2                               |
| 62 Computer programming, consultancy and related activities   | 4                             | 1.74  | 0.7                               | 11                            | 0.65  | 1.9                               |
| 63 Information service activities   | 9                             | 0.58  | 0.2                               | 7                             | 0.89  | 0.2                               |
| K Financial and insurance activities  | -                             | 0.60  | 5.8                               | -                             | -0.22 | 6.0                               |
| 64 Financial service activities except insurance and pension funding  | 10                            | 0.57  | 4.7                               | 37                            | -0.23 | 4.8                               |
| 65 Insurance, reinsurance and pension funding, except compulsory social security                              | 6                             | 1.13  | 0.9                               | 38                            | -0.26 | 1.0                               |
| 66 Activities auxiliary to financial services and insurance activities  | 21                            | 0.19  | 0.2                               | 2                             | 2.17  | 0.2                               |
| L Real estate activities  | -                             | 0.22  | 17.0                              | -                             | 0.35  | 17.7                              |
| 68 Real estate activities   | 20                            | 0.22  | 17.0                              | 15                            | 0.35  | 17.7                              |
| M Professional, scientific and technical activities   | -                             | 0.15  | 6.0                               | -                             | 0.05  | 6.3                               |
| 69 Legal and accounting activities  | 5                             | 1.50  | 1.5                               | 10                            | 0.67  | 1.6                               |
| 70 Activities of head offices; management consultancy activities  | 11                            | 0.49  | 1.4                               | 35                            | -0.17 | 1.6                               |
| 71 Architectural and engineering activities; technical testing and analysis                                   | 28                            | 0.01  | 1.4                               | 29                            | 0.02  | 1.2                               |
| 72 Scientific research and development  | 25                            | 0.13  | 0.6                               | 9                             | 0.78  | 0.7                               |
| 73 Advertising and market research  | 18                            | 0.28  | 0.7                               | 5                             | 1.07  | 0.7                               |
| 74 Other professional, scientific and technical activities  | 40                            | -0.60 | 0.3                               | 31                            | 0.00  | 0.2                               |
| 75 Veterinary activities  | 12                            | 0.44  | 0.2                               | 33                            | -0.09 | 0.2                               |
| N Administrative and support service activities   | -                             | 0.21  | 2.5                               | -                             | 0.04  | 3.0                               |
| 77 Rental and leasing activities  | 17                            | 0.30  | 0.4                               | 34                            | -0.16 | 0.4                               |
| 78 Employment activities  | 7                             | 0.95  | 0.0                               | 1                             | 4.54  | 0.2                               |
| 79 Travel agency, tour operator and other reservation services  | 44                            | -2.37 | 0.2                               | 4                             | 1.13  | 0.3                               |
| 80 Security and investigation activities  | 2                             | 2.62  | 0.7                               | 8                             | 0.82  | 0.9                               |
| 81 Services to buildings and landscape activities   | 23                            | 0.18  | 0.7                               | 39                            | -0.28 | 0.6                               |
| 82 Office administrative, office support and other business support activities                                | 1                             | 5.17  | 0.5                               | 32                            | -0.03 | 0.5                               |
| O Public administration and defence; compulsory social security   | -                             | 0.00  | 7.7                               | -                             | 0.04  | 7.4                               |
| 84 Public administration and defence; compulsory social security  | 29                            | 0.00  | 7.7                               | 25                            | 0.04  | 7.4                               |
| P Education   | -                             | 0.37  | 6.6                               | -                             | 0.43  | 6.4                               |
| 85 Education  | 14                            | 0.37  | 6.6                               | 13                            | 0.43  | 6.4                               |
| Q Human health and social work activities   | -                             | -0.15 | 10.8                              | -                             | 0.15  | 9.6                               |
| 86 Human health activities  | 27                            | 0.03  | 8.3                               | 20                            | 0.09  | 7.2                               |
| 87 Residential care activities  | 37                            | -0.36 | 0.9                               | 3                             | 1.36  | 0.7                               |

| Economic activities (NACE Rev. 2)                             | 2006-2010                     |       |                                   | 2011-2016                     |       |                                   |
|---|-------------------------------|-------|-----------------------------------|-------------------------------|-------|-----------------------------------|
|   | Rank by investment efficiency | ICOR  | Share in GVA – services sector, % | Rank by investment efficiency | ICOR  | Share in GVA – services sector, % |
| 88 Social work activities w/o accommodation                   | 41                            | -1.34 | 1.6                               | 43                            | -0.67 | 1.6                               |
| R Arts, entertainment and recreation                          | -                             | -0.04 | 2.0                               | -                             | 0.00  | 2.0                               |
| 90 Creative, arts and entertainment activities                | 39                            | -0.45 | 0.3                               | 14                            | 0.38  | 0.3                               |
| 91 Libraries, archives, museums and other cultural activities | 35                            | -0.19 | 0.3                               | 28                            | 0.02  | 0.2                               |
| 92 Gambling and betting activities                            | 8                             | 0.67  | 0.3                               | 6                             | 0.95  | 0.6                               |
| 93 Sports, amusement and recreation activities                | 32                            | -0.07 | 1.1                               | 36                            | -0.20 | 0.9                               |
| S Other service activities                                    | -                             | -1.05 | 3.1                               | -                             | -0.46 | 2.7                               |
| 94 Activities of membership organizations                     | 16                            | 0.30  | 0.6                               | 12                            | 0.51  | 0.6                               |
| 95 Repair of computers and personal and household goods       | 42                            | -1.42 | 0.4                               | 42                            | -0.66 | 0.3                               |
| 96 Other personal service activities                          | 45                            | -3.59 | 2.1                               | 44                            | -3.45 | 1.8                               |

Source: Authors' calculation; data provided by SORS.

If as an indicator of capital assets efficiency observed are the movements of the ICOR, namely its rising in the post-crisis period, then we may conclude that increasing investment efficiency in the post-crisis period was notable for the following economic divisions: *Scientific research and development; Advertising and market research; Other professional, scientific and technical activities; Motion picture, video and television programme production; Creative, arts and entertainment activities; Activities auxiliary to financial services and insurance activities; Residential care activities; Employment activities; Travel agency, tour operator and other reservation services.*

On the other side, we found out that the visible results of recovery were missing for the activities that passed to the negative economic zone as regards efficiency: *Rental and leasing activities; Office administrative, office support and other business support activities; Activities of head offices; management consultancy activities; Programming and broadcasting activities; Financial service activities; Insurance, reinsurance and pension funding, except compulsory social security; Services to buildings and landscape activities; Veterinary activities, etc.* In these cases the movements of the ICOR can usually be regarded as an indicator of severe difficulties that certain economic activity of a country experiences in its progress.

As regards the relative share in total investment, the section of *Wholesale and retail trade; repair of motor vehicles and motorcycles* is leading (about 20%), however it was on the average level in the period 2006 – 2010 in the view of fixed assets efficiency. Since the intensive modernization and the establishment of developed information system

as the function of its distributive activities were opted for, the trade profitability (in difference to many other service activities) had not drastically decreased, so in the post-crisis period, as regards capital efficiency, this section was triple the services average, with by 0.7 percentage points more dynamic inter-annual real growth rate (1.4%). In the post-crisis period *Retail trade* left the negative economic zone, and that along with continual real growth rate resulted in the upgraded rank by 10 places. The progress of trade economic section, especially of retail trade, renders the direct and indirect impact on all other economic domains; considering its considerable share and relatively good qualitative economic indicators, we may count on trade becoming an ever more active factor of production development.

By the relative significance, the trade sector is followed by *Real estate activities* (share of 17.7%), which, by upgrading investment efficiency in the post-crisis period by 60%, went five standings up in the sector of services divisions. In difference to *Real estate activities*, the section/division of *Financial service activities* experienced drastic decreasing of its efficiency, which was reflected through negative growth rates, on average down by even 17.2 percentage points in the post-crisis years. An exception here is *Activities auxiliary to financial services and insurance activities* that expressed considerably decreased investment profitability, followed by a significant real growth. Even so, in the last three-year period the financial section activity has been revived and gradually consolidated.

The economic activities related to the growing role of tourism and catering trade have large progress potentials

in Serbia. The section of *Accommodation and food service activities* has left the period of long-term stagnation and recently the results have been on the increase. An immense rising trend has been noted for the division of *Food and beverage service activities*, which managed to upgrade its efficiency from the negative zone to a respectable rank; therefore, with the average value of the ICOR of 1.86 units in the period 2014 – 2016, this division is found among the most profitable in the services sector.

*Transportation and storage (H)* activities in the post-crisis years produced positive growth rates; however, generally the sector as a whole has not attained the economic profitability level registered before 2009. The increased marginal capital coefficient (from 7 to 18 units), and the fall of the section (H) capital efficiency resulted in its decreased share in GVA of the services sector by almost 20% (one-fifth), as well as in the decreased real growth rate by 7.0 percentage points in comparison to the period before the crisis (2006 – 2008). Since the section of *Transportation* is an important strategic factor of progress and economic optimization, this deceleration in growth can be regarded as a worrying signal. However, an impressive turn happened in *Water transport* which, by increasing its efficiency, overcame the two-digit negative rates of economic activity and in the period 2014 – 2016 produced the average real growth of 8.8%, while expressing potentials for further progress.

Within the section of *Administrative and support service activities* two divisions are notable that, by considerably increasing their efficiency (each by 3.5 units), were ranked at the first (*Employment activities*) and the fourth place (*Travel agency, tour operator and other reservation services*) in the services sector. *Travel agency, tour operator and other reservation services* made clearly the best progress among the observed divisions (from the near bottom standing appeared almost at the top), completed consolidation, and from the very low profitability in the negative economic zone (two-digit negative growth rates) reached the efficiency marked by the ICOR of 1.13 units. The expressive recovery and upgraded standing by 40 places indicate that expectedly this division can be a significant source of GVA growth in the forthcoming period.

The sections of *Arts, entertainment and recreation* and *Other service activities* made slower recovery from the negative recession consequences, so regarded as aggregated, in the both periods observed, were found in the negative zone of investment efficiency, which was reflected in their reduced share in the services sector. An exception here is the expanded share of the division of *Gambling and betting activities* (increased by 74%) where, along with the two-digit economic growth, marked was top capital efficiency in the entire sector of services in the last three-year period (ICOR of 1.1).

Generally, the measures of active economic policy in the post-crisis period resulted in the fact that all divisions of the sections *Public administration, Education* and *Human health* had their ranking upgraded as regards the measures of qualitative indicators, and they run with positive economic performances.

The fastest growing capital efficiency, not only within the sector of services, but on the overall economic level, was noted for the divisions *Information and communication* and *Professional, scientific and technical activities*. These activities are primarily related to knowledge and expertise, and their key elements are creativity, originality and innovation. The very concept of growth and progress has been changing nowadays, and the modern allocation of investments is fast going in the direction of increased share of intellectual property in the structure of fixed assets. These trends express strong effect of spurring the activities for which these resources (primarily software and R&D) are relatively more important and thereby represented. *Computer programming, consultancy and related activities*, and *Scientific research and development* in certain time intervals reach the values of the ICOR equalling almost 1, namely they generate high growth rates of GVA, and potentially are the major sources of economic progress. Besides, as an integrating element for many other economic divisions, these activities indirectly provide a stable platform for the overall economic progress in future. In the context of potential profits, the investment in these economic segments is usually relatively small and acceptable. However, further efforts are required in order to ensure the establishing and alignment of legislation that will be able to follow and support the current positive processes in this domain.

Considering the fact that the mentioned activities have been already producing two-digit growth rates, with the envisaged rising of their exports output, by all respective measures they are seen as most prosperous economic industries in Serbia. Therefore, the strategic anticipations need to be aimed at attaining the adequate level of investment in this domain of advanced technologies, where the investment achievements get recognizable, and their influence on economic growth becomes even more expressive. Information technologies, along with education and development, in the recent years have been acknowledged by the state authorities as a major segment of the social and economic progress.

The empirical data, systematized in the above given tables and figures, could serve as the basis for identifying and prioritizing the areas of investment activity in the context of defined strategy. By mapping the economic potentials within the services sector, quantitative analysis clearly indicate where the dynamic progress is envisaged and where, on the existing level of technological development, more GVA is produced with the same amount of investment. Then, by channelling the resources in a worthwhile manner it is possible to implement economic restructuring and achieve economic optimization.

In addition, by applying comparative analyses of the tables it is possible to identify potentially burning issues, so to preclude the possibility of their escalation and eliminate negative effects. The movements of qualitative capital indicators may in due course indicate the serious difficulties encountered in certain economic domain, which may not be neglected in anticipations of future progress (e.g., useful tools of mobilising investments for preschool institutions that thereby left the negative economic zone).

## Conclusion

Studying the complex mechanism of growth rates interdependence and measuring capital investment macroeconomic efficiency are expected to ensure scientific grounds to opting for certain economic structure of national investments. By accenting the divisions with low ICOR ensured is the optimal allocation of resources to the areas

producing the highest profit rates, while it is necessary to observe, apart from the domestic needs, the requirements of the international division of labour as well. By stressing these determined investment priorities the development of technologically advanced sections is directly influenced, whereby produced is higher value added with the same volume of available resources and upgraded is the GDP level. The advances of economic progress directly and/or indirectly result from the implemented allocation of capital investments by types of fixed assets and economic sectors, i.e., they are the outcome of the economic and technical structure of investments.

Since numerous challenges to further economic progress are to be encountered, and with the aim to achieve convergence to more advanced economies, to find the new sources of social and economic progress and prosperity becomes an imperative for the modern society. Besides, even though certain investments do not tend to produce immediate effects, e.g., infrastructure investments, they increase the social wealth and on a long-term basis generate abundant positive outcomes. The investment in these capital-intensive economic domains should not be delayed only because of the fact that these investments do not ensure higher growth rates on a short-term basis.

The modern economic trends, dominated by globalization and severe competition terms, inevitably lead to the orientation towards attaining new knowledge and technologies, as the basic assumptions for the increased total factor productivity and achieved competition advantages. In that context, the strategic orientation of the economic policy makers shall be focused on the upgraded technological progress of the national economy, which is regarded as a key factor of the modern economic development, and thereby of the implementation of macroeconomic objectives. Since the sector of services directly and indirectly generate high rates of GVA and employment, and taking into account the indicative gap as regards its relative share in the Serbian and the EU economy (drawback of 12.9 percentage points in relation to the EU), a logic conclusion is imposed, scientifically supported and based on empirical confirmation, that services are the domain of priority in the contemporary economic flows.

Economic flexibility and cost-effectiveness, simplified usage of the world achievements and easier surpassing of boundary barriers, ensured profitable global business transactions regardless of the location, which could result in a slowed pace of undesired migration, primarily of the young population, these are only some of the comparative advantages that qualify this domain as a driving progressive force.

It is an acknowledged fact that new conceptions of progress have already taken their place in the Serbian economy; however, a prerequisite for gaining considerable profits from their implementation is the accelerated structural distribution in favour of the propulsive service activities. There are no grounds for the worry that the traditional sectors would be thereby put aside and neglected; on the contrary, it is an economic reality, in practice confirmed by numerous examples, that the strong feedback of positive trends rendered by the integrated services sector is actually the most efficient lever of the entire national economic progress.

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**Ivan Nikolić**

is Director of scientific research development at the Economics Institute in Belgrade. He is also a member of the Council of the Governor of the National Bank of Serbia and editor and co-author of the monthly publication *Macroeconomic Analysis and Trends (MAT)*. His research focuses on Serbia's economic policy, development and economic system, macroeconomic environment and international economy. He has been involved in various national and international scientific projects and during his time at the Economics Institute, he acted as team leader in numerous commercial projects as well.

**Miladin Kovačević**

is presently holding the post of the Director of the Statistical Office of the Republic of Serbia and is member of the Council of the Governor of the National Bank of Serbia. He graduated from the Faculty of Mathematics, University of Belgrade, and obtained his BSc degree in Theoretical Mathematics in 1976, MSc degree in Statistics from the Faculty of Economics, University of Zagreb, in 1978, and received his PhD in Statistics from the Faculty of Economics, University of Belgrade, in 1983. He was teaching at both the Faculty of Economics and the Faculty of Mathematics of the University of Belgrade, where he is still engaged as a scientific advisor. He is a member of the International Statistical Institute. In the last decade, most of his work was in the area of macroeconomic analysis; he is a member of several editorial boards of the main publications dealing with current economic movements and economic policy analysis (*Macroeconomic Analysis and Trends*, issuing authority: Chamber of Commerce and Industry of Serbia). Miladin Kovačević is presently a leading expert for the reform of the national accounts, statistical system and the integration of macroeconomic framework. Since 2001 he has been a member of the National Bank of Serbia team involved in negotiations with the Mission of the International Monetary Fund (IMF) that monitors the implementation of Stand-By Arrangements. Currently he is involved in the implementation of the Policy Coordination Instrument arrangement with IMF.