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*A*fter successful implementation of the program of fiscal consolidation in the 2014-2017 period, what new policy challenges await Serbia? When thinking about growth, most macroeconomists probably perceive the problem of sustainability of fiscal balance. Besides sustainability of fiscal balance, the core challenge for microeconomists is implementation of the new model of economic growth. The leitmotif of this edition is related to the question: Is the global economy moving too fast for Serbia to keep up? Without adequate growth, structural inflation could easily return. Transition and restructuring are in the spotlight of this issue of *Ekonomika preduzeća*. The purpose is to promote a new way of thinking about economy in the era of the Fourth Industrial Revolution.

Acknowledging the shift in the theory, a duo of authors, *D. Đuričin* and *I. Vuksanović Herceg*, present the heterodox view. They argue that the new model of growth is moving beyond neoliberal framework with the aim of keeping the fiscal balance sustainable and implementing a new policy set, with industrial policies for tradable sectors in the center and automatic stabilizers for core macro policies in the background. The Chairman of the Fiscal Council *P. Petrović*, in collaboration with *D. Brčerević* and *M. Gligorić*, argues that the current output gap in Serbia is a combining effect of underperforming institutions, low investment and education gap. In his paper, *M. Labus* introduces statistical and analytical novelty into input-output analysis with the aim of calculating investment multipliers. The main conclusion is that in the last period FDI has not been directed towards sectors with the greatest investment multiplier. In the counterargument, *D. Malinić* states that infrastructure development, and particularly its model of financing, has a critical role to play in the new model of growth. This time, *D. Vujović*, the architect of fiscal consolidation, pointed out to two great challenges in the Fourth Industrial Revolution: the struggle to turn vast amounts of information into useful insights and the mounting fear that automation is going to wipe out current jobs.

As *J. Tabaković*, the Governor of NBS, explains, full-fledged inflation targeting has, as a key policy tool, impacted price and financial stability, particularly in the last five years. It is a prerequisite for the reduction of imbalances (both internal and external), as well as investment intensification (investment follows confidence). *N. Savić* and co-authors argue that, in time of digital disruption, business organizations need to constantly launch strategic initiatives so that they can exploit transient advantages before they disappear. *J. Atanasijević* and co-authors particularly stress the role of digitalization in tax reform. *G. Pitić* and co-authors explore the same territory in their article. *S. Kisić* and *S. Petković* have advocated the causes that are not obviously related with the fiscal stability mantra, but are crucially important for sustainable and inclusive growth. Entrepreneurial education in the digital era is in the spotlight of this article. *M. Obradović* and co-authors are in the antitrust territory, exploring the link between protection of public interest and protection of competition. *G. Petković* and co-authors stress the role of cultural tourism in the new model of growth as a valuable initiative correlating Roman emperors and the Danube wine route.

We hope that all articles will deepen the discussion about the growth model and economic policy platform in the context of the new normal and accelerate the government's search for a better solution.

Prof. Dragan Đuričin, Editor in Chief

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THREE THINGS AN ECONOMY NEEDS IN THE ERA OF THE FOURTH INDUSTRIAL REVOLUTION

Tri stvari koje su potrebne ekonomiji u eri četvrte industrijske revolucije

Abstract

After the fiscal consolidation is successfully over, what new policy challenges await Serbia? In the following period, beside sustainability of fiscal balance, the core challenge is going to be the implementation of the new model of economic growth. Without adequate growth, structural inflation could easily return. A new model should provide sustainability and inclusivity proposals.

Before we define the new growth model, we yearn to understand the causes of vulnerability and risk exposure, as well as what underpins the recent shift in the economic and development paradigm. Also, we intend to find answers to related questions as follows. Are we ready to embrace new normal in defining economic rules based on a heterodox approach? Have we made progress in creating an environmentally friendly model of economic growth that can ensure Serbia's convergence to the EU income levels? How would a new set of policy choices impact the long-run GDP growth and wellbeing?

Our intention is to provide the new growth model (and related policy platform) which would become a true force for a better Serbia capable of overcoming persistent economic imbalances and fault policy lines and forming a foundation of a sustainable and inclusive economy, both toward the people and nature.

Keywords: *fiscal consolidation, growth model, the fourth industrial revolution, new normal, combinatorial innovation, industrial policy, hard macroeconomic policy regime.*

Sažetak

Posle uspešnog završetka programa fiskalne konsolidacije, koji novi izazovi očekuju Srbiju na polju ekonomske politike? U narednom periodu, pored održivosti fiskalne stabilnosti, ključni izazov je sprovođenje novog modela ekonomskog rasta. Bez odgovarajućeg rasta, strukturna inflacija bi lako mogla da se vrati. Takodje, nov model rasta bi trebalo da ispuni uslove održivosti i inkluzivnosti.

Pre nego što definišemo novi model rasta, želimo da shvatimo uzroke ranjivosti i izloženosti riziku, kao i šta to podupire nedavni zaokret u ekonomskoj i razvojnoj paradigmi. Takođe, nameravamo da pronađemo odgovore na sledeća povezana pitanja. Da li smo spremni da prihvatimo nove normalnosti u definisanju novog skupa ekonomskih politika zasnovanih na heterodoksnom pristupu? Da li smo ostvarili napredak u kreiranju modela ekonomskog rasta koji vodi računa o ekologiji i koji Srbiji može da obezbedi konvergenciju sa EU u pogledu nivoa dohotka? Na koji način bi novi skup politika uticao na dugoročni rast BDP-a i blagostanje?

Namera je da pružimo novi model rasta (i povezane ekonomske politike) koji bi postao istinska snaga za bolju Srbiju sposobnu da prevaziđe uporne ekonomske neravnoteže i pogrešne koncepcije i da postavi temelje za održivu i inkluzivnu ekonomiju, kako u odnosu na ljude tako i u odnosu na prirodu.

Ključne reči: *fiskalna konsolidacija, model rasta, četvrta industrijska revolucija, nova normalnost, kombinatorna inovacija, industrijska politika, čvrst režim makroekonomskih politika.*

Introduction

After spending more than three years in fiscal consolidation, Serbia's economy should address another grand topic, growth and its sources. Why is growth so important? Because the growth has become a primary necessity in an era of radical change inspired by a new normal not only for prosperity, but also for survival. In economic orthodoxy, the GDP regularly represents a good proxy for prosperity (or welfare increase), where more is always better. Such line of reasoning, actually, leads to the treatment of growth as a double-edged sword. Under the neoliberal model of growth, the "ill growth" is possible. Also, after some episodes of exponential growth, overshooting becomes a real threat.

In the new growth model, growth has to be part of the solution rather than part of the problem. Namely, in an economy burdened with future consequences of high public debt, past social expenditure commitments, and a dire need to respond to new but usually disruptive technologies [3], it is reasonable to rather look for the ways to enhance smart growth than to resort to austerity measures influencing negative (eventually, slow but unsustainable) growth.

Politicians are regularly obsessed with robust growth. The political need for high growth rates requires from the ruling party commitment to service the outstanding debt, secure social inclusion, and support the idea of intergenerational equity. This is particularly relevant for countries like Serbia where current generations are expected to honor the commitments of the previous turbulent years. Moreover, the benefits of economic growth have been unequally distributed across different social and skill groups due to slower dynamics of real labor incomes in older style routine and repetitive jobs caused by rapid technology change and growing global competition. Additional reason for robust growth (and faster job creation) is the rapid deterioration of competences after years of waiting for the first job (the lost generation). Finally, robust economic growth provides a greater cushion to address the potential post-crisis deflation threat, clean up banks from non-performing loans (NPL), and restructure debt-ridden publicly-owned companies.

The paper covers two interrelated segments. The first segment provides situation analysis in Serbia at the end of 2018. It is crucial to project sustainability of fiscal consolidation and the growth prospects in terms of where we are right now and where we are going. Hence, there are three main issues we intend to address in this segment: strategic audit of Serbia's economy, progress report on the effectiveness of key policy measures implemented in the program of fiscal consolidation 2014-17, and factors of vulnerability related to the major risk stressors. After the diagnosis, we will define possible solutions using four scenarios. More precisely, in the second segment we intend to illuminate three more issues: the impact of paradigm change in business economics and economic theory (or economics) on economic policy choices, bold ideas for future growth model and growth-enhancing policies with industrial policy as a core concept of the double paradigm shift.

Strategic assessment of Serbia's economy

Serbia's current economic and institutional problems can be traced back to the beginning of the 1990's when the economy, after geopolitical crisis, entered transitional recession. The crisis for the most part could be explained by political and professional inability to find the right answers to inherited and evolving geopolitical challenges as well as limited economic policy capacity to respond quickly and adequately to old and emerging macroeconomic imbalances.

Serbia lost time because political leaders did not understand that with the fall of the Berlin wall the geopolitical map of Europe changed dramatically and permanently. Almost three decades later, Serbia's transition architects misread the deep concerns of influential economic scholars and wrongly concluded that the 2008 global financial and economic crisis, known as the Great Recession, was, actually, an opportunity for Serbia. The reality was quite different. External shock only exacerbated internal imbalances in the economy which was unable to restart sustainable economic growth for too long.

Cumulative external deficits (current account and capital balance) as well as the fiscal balance deficit during

a long period of time led to debt overhang and strongly eroded not only investor's expectations but also, and primarily, the demographic position of the country [6]. In the last period, Serbia moved from high unemployment rates before the program of fiscal consolidation initiation to factual scarcity of human capital (both basic and advanced).

During the last four years, a consensus among law makers and policy makers sustained that a fiscal consolidation program was needed as the very first step to take the economy back on a path of sustainable growth [21]. Figure 1 portrays key macroeconomic data for five years, precisely the last two years, along with current year and projections for the following two years.

Fiscal discipline enabled improvement of public revenues. Favorable revenue performance contributed to the reduction of both fiscal and external deficits. Continuous fiscal consolidation has led to budget surpluses in the last two years (+1.2 percent in 2017 and +0.5 percent of GDP in 2018). In 2018, despite increased public spending in nominal terms, including upward adjustments in pensions and public sector wages, after the initial reduction on the start of the program, we had the overall budget surplus. It was the result of a combining effect of growth, visible decline of interest payments, and under-execution of forecasted public investment.

In 2018 we see budget surplus on strong tax-reach domestic demand and lower interest rate expenditures,

followed by a return to balance in 2019 forecast influenced by public CapEx acceleration, wage/pension hikes, and tax cutting. Also we see lower current account deficit around -5.5 percent of GDP, moving towards -5.0 percent of GDP in 2019, and -4.5 percent in 2020, based primarily on the strong export growth, lower investment income deficit, and higher remittances forecast.

Lower interest payments were a direct benefit of the improved country's credit rating (and a huge reduction in interest rate spreads) as well as fewer activated guarantees to utility and state-owned companies. Taken together, these savings increased over time and were 0.5 to 1.0 percentage points higher in 2018 than in the previous year.

At the end of the year 2018, public debt ceases at 57.2 percent of GDP. Average 6M BELIBOR decreased from 3.65 percent in 2016 to 3.60 percent in 2017, and 3.03 percent in 2018. RSD 5Y Bond Yield (average) was also decreasing from 6.34 percent in 2016 to 5.50 percent in 2017 to 3.91 percent in 2018.

Inflation was low and stable during the whole period of fiscal consolidation. Final CPI in 2018 of +2.0 percent y-o-y is in line with preliminary estimation. Despite net wages hike of +7.9 percent, growth contributed to a lower inflation. The increase recorded in the private sector was bigger than in the public sector.

Lower average inflation is owed to decreasing pressure from fuel prices and a stable RSD. Relative increase in

Figure 1: Macroeconomic data

Macroeconomic data	Historic data		Current year	Forecast	
	2016	2017	2018	2019	2020
Consolidated Budget Balance (% of G DP)	-1.3	1.2	0.5	0.0	0.5
6M BELIBOR (average, %)	3.65	3.60	3.03	3.00	3.25
RSD 5Y Bond Yield (average, %)	6.34	5.80	3.91	3.55	3.60
Public debt (% of GDP)	71.9	61.3	57.2	53.5	50.1
Inflation (CPI, average, yoy %)	1.1	3.1	2	2.2	2.5
Net wages (EUR, nominal, yoy %)	1.8	3.5	7.9	4.5	3.4
Private consumption (real, yoy %)	0.8	1.8	3.3	3.4	3.4
EUR/local currency (year average)	123.47	118.47	118.20	117.45	117.00
NPL ratio (average, %)	17.0	9.8	6.4	6.0	5.8
Real GDP (constant prices, yoy %)	2.8	1.9	4.5	4	3.5
Nominal GDP (EUR bill)	34.6	36.8	40.1	42.9	45.7
GDP per capita (EUR)	4,889	5,226	5,696	6,088	6,495
Unemployment rate (ILO, %)	15.3	13.5	12.5	11.5	10.6

demand for foreign goods has come from capital goods related to new investments dominantly financed by FDI. Relatively large capital inflow allowed the National Bank of Serbia (NBS) to moderately appreciate the nominal and the real effective FX rate. More precisely, in December 2017, the local currency appreciated against the euro by 4.0 percent in nominal terms and remained broadly stable throughout the 1Q 2018. In the start of 4Q 2018, both the nominal and the real FX rate appreciated y-o-y on average by 0.7 percent.

The cost of capital is decreasing. After holding the prime rate at 4.0 percent for 13 months, the NBS lowered it successively to 3.75 percent in September 2017, 3.25 percent in March 2018, and 3.00 percent in April 2018. Prime rate decrease contributed to a lower cost of capital and price stability, as well. We see in 2018 a credit growth of around 8.0 percent y-o-y, driven by private sector lending amid stronger final and investment demand. Nominal credit growth to the general government remained sluggish, while credits to the local government even decreased. Net interest margin is relatively low and decreasing. In 2018 it ceases at 3.7 percent level.

The stability of the financial system improved as commercial banks have written off and/or sold bad loans more aggressively. The share of gross NPLs declined from 17 percent at the 4Q 2016 to a more tolerable level of 9.8 percent at the 4Q 2017, and 7.8 percent at the 3Q 2018. As commercial banks continue to clean their balance sheets, it is expected to decline further toward 6.4 percent till year-end, 6.0 percent in 2019, and 5.8 percent in 2020.

Job creation is in progress. In the period January-August 2018, total employment increased by 3.7 percent y-o-y, driven entirely by growth of formal employment in the private sector (5.9 percent). Public sector employment decreased by 1.4 percent as a result of rightsizing. Creation of new jobs in services (particularly, retail, wholesale trade, and tourism) dominated new employment in real economy. Also, there were more opportunities for self-employment. Concretely, the number of startups increased by 6.0 percent. At the end of 2018, the unemployment rate has reached 12.5 percent. The average employment rate reached a record high of almost 50 percent.

In the analyzed period, the growth was continuously in a positive territory, but sluggish. The exception is the year 2018. More precisely, GDP growth in constant prices y-o-y in 2018 was 4.5 percent. In the same year, nominal GDP amounted to EUR 40.1 billion. Simply put, this means that GDP per capita was EUR 5.696.

Despite over-performance in most macroeconomic aggregates owed to successful fiscal consolidation and the removal of some of the structural imbalances, many fault lines still exist. They generate fiscal risks and constrain policies supporting sustainable growth necessary to close the transitional output gap, and respond adequately to challenges posed by the paradigm change in economics and impact of new normal, particularly the fourth industrial revolution (4IR), as well as trigger deindustrialization reversal.

Progress report on the impact of recent policies on growth

Echoing of fiscal consolidation on related macroeconomic fundamentals is strong. Actually, the economy reacts quickly and positively on fiscal consolidation. Recovery started in the second year of the fiscal consolidation program. After that, Serbia has been experiencing moderate economic recovery, with notable acceleration of GDP growth in 2018, signalizing sustainability of fiscal consolidation and related reform's achievements.

Concretely, GDP growth accelerated to +2.8 percent in 2016, and ticked down to +1.9 percent in 2017, before improving to +4.5 percent in 2018. The last year growth is above the average for the Western Balkans. In the last year, growth was more robust than originally expected due to significantly stronger expansion in agriculture, as well as the larger volume of construction works than forecasted. Growth is projected to continue to +4.0 percent in 2019 and to +3.0 percent in 2020 due to carryover effect combined with final demand and export growth.

During the last four years, investments, almost equally public and private, have been playing an increasingly important role, both as the sources of expanding the productive capacity and as means of productivity improvements. Investments increased competitiveness of

Serbia's economy that would define its ability to address the challenges inspired by 4IR and secure sustainable long-run growth.

Speed of growth is highly dependent on the structure of the economy. On the supply side, services remain the main driver of growth with a contribution of 1.9 percentage points, followed by agriculture with 0.8 percentage points. Within services, the highest contributions to overall GDP growth came from trade, logistics, and tourism-led exports. In the last three years, agriculture experienced pronounced cyclical movements due to the effects of climate change in the absence of irrigation and flood protection systems. All production sectors have continued to make positive, but not desired contribution to growth. Industry and construction contributed 0.6 percentage points each. Construction sector owed its important role within the real economy to a sharp (double-digit) real increase in the value of completed works.

On the expenditure side, investment activity and final consumption are the most important sources of growth, contributing 2.3 percentage points each. As the result of improved foreign trade, the usual negative impact of net exports on economic growth has been weaker than in the previous period, while government consumption had a positive contribution of 0.9 percentage points. Net taxes also made a positive contribution to growth due to higher personal consumption.

Albeit positive and accelerating, the growth is not significant enough for catching up to the EU or sufficiently vibrant to provide sustainability and inclusivity proposal. Unfortunately, despite substantially exceeding the original growth forecast, the present economic recovery is not strong enough to yield long-run robust growth rates needed to secure the desired income convergence with the EU. Moreover, to succeed in catching up to the EU, Serbia needs not only robust, but also intelligent growth based on the new structure of the economy that enables it to grow faster and smarter to outperform its near competitors. Simply put, the question is how can Serbia gain the competitive edge beyond the traditional industrialization based on the position rent, natural capital, technology transfer and cheap labor? Externally financed consumption-led growth is not sustainable without strong internally generated

investments and exports. Also, Serbia desperately needs investments based on internally developed technology solutions based on ICT breakthroughs and with a stronger multiplier effect, as well.

In the last period, Serbia's economy was successfully escaping double recession (transitional recession and the Great Recession). Albeit welcome, the recovery from recession to moderate growth recorded in the past three years still does not guarantee the sustainable growth dynamics necessary to eliminate the output gap as the great legacy of a long and deep downturn, comfortably spaced to service the accumulated debt, secure convergence to EU income levels, and quell rising social tensions and expectations built up during a long period of economic stagnation strongly impacting demographic risk deterioration.

No doubt, fiscal consolidation was a prerequisite for macroeconomic fundamentals improvement. Related achievements based on fiscal balance are, also, sustainable. The economy is not more out of tune, but it is still impotent. How to energize the economy is a key question for architects of the system, law makers, and policy makers.

Key sources of vulnerability

These days, despite notable improvements in the overall budget management as well as inflation control, recurrent expenditures on subsidies and social benefits remain high and untargeted, while current spending still represents 90 percent of all spending. To keep FX rate stable, the NBS spent almost every year more than the level of FDI. Furthermore, investors' sentiments are fragile due to the Serbia-Kosovo dispute. Previous facts are signaling a serious vulnerability of the economic system.

Structural imbalances, under certain conditions, could cause a downfall. Despite demand inflation, structural imbalances are the second potential cause of downfall. Vulnerability indicators more specifically portray built-in structural imbalances and risk exposure of the economy against some stressors (see Figure 2). These are points of pressure for economic policies.

The output gap is on the top of the list of vulnerability indicators. First of all, Serbia faces the transitional output gap which may continue to be a source of substantial

Figure 2: Vulnerability indicators, 3Q 2018

Operational vulnerability indicators		
Indicators	Value	Reference Value
Transitional output gap	21%	0%
Okun index	13.4%	<12%
(inflation + unemployment)		
Gini coefficient	37.8%	<30%
Current account as % GDP	-4.2%	<5%
Consolidated budget as % GDP	1.5%	<3%
Dependency ratio	0.51*	>1
Youth unemployment	25.3%**	<20%

Financial vulnerability indicators		
Indicators	Value	Reference Value
Indebtedness		
• Public debt/GDP	55.9%	<45%
• External debt/GDP	63.2%	<45%
• External debt/Export	128%	<220%
Credit rating		
• S&P	BB/stable	rank> BB+
• Fitch	BB/stable	rank > BB+
• Moody's	Ba3/stable	rank > Ba+

Competitiveness vulnerability indicators		
Indicators	Value	Reference Value
Export (goods)/GDP	35.1%	>50%
Currency change (Oct2018/Oct2017)		
• Nominal appreciation	0.7%	<5%
• Real appreciation	0.7%	<0%
Global Competitiveness Index	65 of 140	65 - SEE average
Corruption Perception Index	77 of 180	59 - SEE average
Ease of Doing Business	48 of 190	60 - SEE average
Economic Freedom Index	69 of 180	62 - SEE average

*Data for 2017

**The share of young people who are not in employment, education or training (NEET) is 16.3%

systemic risks to the challenging financial sector stability and growth prospects. On balance, this gives greater weight to internal stress factors over external ones, typically faced by emerging and transition economies.

The current account should also be on the radar. During 1H 2018, the current account deficit amounted to EUR 1.17 billion (almost 3 percent of GDP), which is lower than in the same period last year. The trade deficit worsened by 28.3 percent (EUR 0.59 billion), while the surplus in services balance increased by 22.3 percent. Factor income deficit decreased by EUR 201.4 million (i.e., 13.8 percent y-o-y), mainly due to lower interest payments. In this period, exports have increased significantly, partly owed to global commodity prices hike in the segments of base metals, minerals and agricultural goods, which constitute an important share of the export basket. Unfortunately, in 3Q 2018 imports grew even faster widening the current account deficit. In this period, current account deficit amounted to -4.2 percent of GDP. The growth of imports was driven by both capital goods and higher consumer demand. This tendency continued until the end of the year when the current account deficit amounted to -5.5 percent of GDP.

Capital balance is relatively stable but in a negative territory. Foreign exchange reserves fell down from the level of 6.2 months of imported goods and services in 2016, to 5.3 months in 2017, but returned to 6.0 months in 2018 indicating sufficient capacity and resilience of the capital balance despite some appreciation tendencies.

FDI amounted to EUR 1.42 billion, an increase of 0.3 percent compared to the same period in 2017. In recent years, on the global level, FDI fell by almost one quarter particularly in developed and transition economies [22, p. xii]. This trend should be a concern for policy makers and an input for giving greater role to internally generated investments.

The level of debt is also a cause of vulnerability, despite the fact that it shows a decreasing trend. Leaving aside the discussion of the adequacy of long-term debt/ GDP ratio, there is no doubt that the fiscal balance helps reduce debt overhang. Besides evident budget surplus in the last two years, factors like favorable dollar/euro

exchange rate and lower cost of capital also helped reduce the share of public debt in GDP from 67.8 percent in 2016 to 57.9 percent in 2017, and to 55.9 percent in 3Q 2018. The current debt overhang is below threshold applicable for the EU economies (60 percent of GDP), but significantly above the comfortable zone of less than 40 percent of GDP, applicable for economies in this stage of economic development (US$ 3.000-9.000 per capita). No doubt, debt overhang is a great concern policy makers need to watch out for.

To complete the picture about risk exposure toward the outstanding debt, we must say that in the following period cash outflow from the budget would be significantly higher due to repayment of EUR 1.5 billion eurobonds in 2020 and EUR 2.0 billion in 2021. Eurobond issue is primarily motivated by debt repayment, not by providing yield benchmark for FDI. Debt tranches due in the following two years will increase pressure of the new eurobond issue this year.

Soft data based on perception indexes are solid, not signalizing stronger vulnerability. Serbia apparently leaves the best impression on the list of the World Bank's Ease of Doing Business, where it takes 48th place out of 190 countries. The perception of corruption prevalence is relatively good, but still far from the desired place. Economic freedom and broadly defined competitiveness of the country are visibly improving compared to the previous year. In 2018, Serbia's GCI puts it on the 65th place, roughly the average score of the SEE countries.

In professional circles, the sentiments about sustainability of reform achievements and growth prospects are not positive as they should be. Also, there are some misinterpretations of the facts. Combining hard and soft data about vulnerability, we do not see a strong indication that the economy would fall again from the cliff due to internal reasons. More precisely, a new recession due to structural imbalances is highly unlikely. Government positivity in reform promotion and business community response through investments could relax inherited uncertainty. Normally, previous standpoints require continuation on the current path of a hard macroeconomic policy regime and the search for the new growth model.

Impact of the new normal

The 4IR, known as Industry 4.0, is a major underlying force of the new normal. It is an ambivalent phenomenon. It simultaneously gives rise to considerable hope, and feeds our deepest fears. In the modern era, along with water, land and air, connectivity became the ultimate free good. Ingeniousness of the new free good is zero marginal cost, after some set-up costs.The amalgam of technological breakthroughs in key fields (ICT from one side, and physical and/or biological sciences, from the other) considerably exceeded the transformative power of the 4IR. Advanced manufacturing, genomics, green energy, and circular economy are particularly important concepts in this regard. Combinatorial innovations are a key driver of growth.

It is a revolutionary change in organization and functioning of business organizations inspired by a reversal of conventional production processes logic in terms of connections of embedded production technologies and artificial intelligence. Simply put, this means that machinery no longer simply processes the product, but that the product (embedded human desire) communicates with the machinery to tell it exactly what to do.

4IR has emerged in business organizations by impacting business economics rules and micro management tools (primarily activity-based costing and value-based management). Actually, it is happening in the production stage and spreading up, both toward the upstream and downstream across the value chain (connected products, clients and supply chains), industries, and economy as a whole. A vast network of cyber-physical systems like synthesis of frontier technologies in combinatorial innovations, fully decentralized production with cognitive capabilities, augmented reality, etc. leads to structural changes in economy and society too.

In 4IR, creativity is a consequence of ever-broader range of requirements. Universal connectivity and a synthesis of breakthroughs from variety of technology fields stay behind almost endless combinatorial innovations. Combinatorial innovations are a point of view in 4IR that comes into play through daily practice of business organizations. Production and customer engagement were

early adopters, but it did not take long for other stages of the (exponential or extended) value chain to climb on board. Their application is growing in complexity at an ever-increasing pace.

As always, big tech means big impact, particularly vis-à-vis incumbents, the existing way of work and way of life. High tech companies have disruptive impact on incumbents. Namely, combinatorial innovations outperform sustaining technologies causing new entrants to take over business from incumbents. Also, new skillsets will make a lot of jobs redundant. As the nature of work evolves, different kinds of professions are needed, including data scientists, service designers and experts for cognitive technology who are great storytellers, turning communication from insight into impact. Powering the digital economy, from bitcoin mining to cloud computing and 5G network, digital infrastructure that powers our constant connectivity will consume more than 10 percent of current use of electricity and could rival the energy demand, particularly in small economies. This may have a lasting impact on the outlook for energy as well as all renewable natural resources.

Except the 4IR, the real world is full of other mega trends exacerbating disruptive character of combinatorial innovations [8]. They create the new normal. Trends like greater impact of geopolitics on economy inspired by changing balance between economic core and periphery, climate change, a global demographic explosion, population ageing in core economies, middle class expansion in peripheral economies, income inequality, etc., additionally exacerbate the impact of digital disruption. It is projected that by 2050, almost 41 percent of the world's population, or more than 4 billion people, might belong to upper or middle class, while 80 percent of the world's population will live in 600 mega cities [10]. Emergence of a large urban middle class is a powerful force for transformation of economy and society as a whole and the real threat to incumbents and environmental sustainability, as well.

Geopolitics or impact of politics on trade and investment is important not only due to the fight for ultimate resources by non-economic means, but particularly due to transformation of global free trade order into serial wars (currency, trade, and, most recently, technology). Geopolitics reemerged on multiple fronts, with major political, economic, and social consequences. At the end of the day, the global economic order was transformed from a multilateral liberal trade framework into a deal-based system. The resulting policies aimed at diverting growth from others through geopolitical leverage, rather than through creation of value added from new sources of growth, are obviously not sustainable. Moreover, new shifting alliances of interest frequently outweigh geography and history, and generate additional instability. Last but not least, income inequality becomes global phenomenon.

Combinatorial innovations are not a panacea for structural problems of an economy. Combinatorial innovations trigger new challenges. Also, they deserve important political concerns due to a deepening skills gap and massive job displacement. The trade-off between labor and machines generates impact that is not always socially affordable.

In the new context, there is a growing gap between the character of emerging technologies and growth model and economic policy platform for their implementation. Namely, the intensity and scope of disruptive innovations are dismantling not only the traditional institutional choices based on market mechanisms, but also governance mechanisms and institutions. In defining national standards for emerging technologies, the process of trial and error in the market is being replaced with government initiatives and feedback loops from emerging industries. Also, new technologies must meet the circular economy and low carbon emission requirements.

If current models of growth and policy platform continue to exist, more growth leads to more wealth concentration, more carbon emission, more waste, as well as less clean water and air, and less free space. Government must develop policies and protocols for using technology and science in serving local public interests and obligation vis-à-vis global interest.

The 4IR needs new economic rules as well as new tools in micro and macro management. Non-evolutionary change is happening in the production stage of the value chain of industrial organizations and is influencing primarily changes in industrial structure. Consecutively, it is spreading out on other stages of the value chain, both downstream and upstream. Radical change in the way

of functioning of business organizations inspired by the new normal requires adjustments in their behavior (or strategy), business model of industry leaders, and rules of competition. Finally, it requires macroeconomic rules change.

Double paradigm change

To complete the strategic outlook for the Serbia's economy, double paradigm change in business management as well as in economic theory also needs to be considered. The former is fundamentally important because economic policy measures inspired by a financially centric growth model in the last period have increased risk exposure to many stressors, particularly visible in an economy like Serbia's, which is not only out of tune, but also with sizable output gap and low competitiveness.

In choosing the vision of an ideal economic system, the neoliberal model of growth, as the last release of the free market economy model, treated the state property as "necessary evil", which could be terminated. Namely, the best thing the state can do is to give up any intention of steering the economy through its involvement. In such theory, the government intervenes in the economy only if market mechanism fails to internalize negative externalities. But, in reality, political lobbying permanently postpones or redirects counteractions.

With the intention to save the planet from a rapidly growing influx of negative externalities, the UN recently defined 17 global sustainability goals [19]. This set of goals represents a widely accepted set of multidimensional objectives against which the effectiveness of the growth model and an economic policy platform can be evaluated achieving long-run sustainable growth [4]. The message of this document is that today's prevailing economic model of growth must be replaced by the new one that gives priority to circular economy concept and puts ecological and social goals at the forefront.

Obviously, basic propositions of the neoliberal model do not respect microeconomics reality. For example, neoliberal macroeconomics ignores the possibility that the change in strategy and organization inspired by technology change and business model redefining can be far more effective for company's performance than, for example, fiscal stimulus and interest rates cut.

Moreover, as we pointed out in previous papers, for example in [7], the premises of neoliberal economic model of growth no longer hold. Actually, the evolution of the environment impacted by the new normal shows that the neoliberal model set of premises is defined for an "empty world". We are not living in the world of ample space and resources, where private property is universally better (including high tech sector and combinatorial industries), and growth rate and GDP per capita are preferable proxies for wellbeing [5], [9].

The problem with such line of reasoning is that maximizing economic capital at the microeconomic level often derogates natural capital and cultural capital at the macroeconomic level. In the quest for the higher growth (meaning greater wealth), neoliberals forget that the limit of such world is the existence of the "full world", or world itself. Moreover, growth based on the neoliberal model is not continuous. Economic history teaches us that in each economy there are some episodes of strong growth followed by a much stronger fall, or overshooting. Cyclical forces that propelled growth were weakening faster than architects of the neoliberal economic system thought. Namely, exponential growth (compound average growth rate in the range 5-7% and more) provoked an overshooting effect, particularly if the economy had some structural imbalances. Moreover, due to cultural differences, in defining the model of growth, there is no universal approach. The exaggerated emphasis on economic systems came along to the detriment of natural systems and cultural system [21].

After digital disruption has deepened the negative effects of the Great Recession, the global economy has entered in secular stagnation. It was the crisis within a crisis. Now we are at a tipping point. If such a combined crisis is likely to be more prolonged than in the past, the economic system has to change, if only because the conventional economics paradigm is breaking down. To save the future, market fundamentalism is likely to be reversed soon. What is not sustainable will not sustain.

While core economies in the post-crisis period lose the time with unconventional policy measures, emerging

economies from the periphery of the global economy intensified the search for an alternative growth model and often experimented with alternatives [11], [13], [16] and [17]. Results of alternative concepts will rejuvenate the role of the heterodox approach and industrial policy doctrine in core economies too, with the emerging imperative to put growing emphasis on combinatorial innovations as the core driver of growth.

Figure 3 depicts a heterodox economic model of growth. Different combination of vertical and horizontal industrial policies should be used in different sectors and policy areas ("one size does not fit all"). In the new model of growth, environmental sustainability of some investment proposals is the filter preceding the market filter.

If progressive forces prevail, new economics paradigm could change the slope of the recovery trend. Paradigm change could accelerate the speed of technology development particularly in the areas of the intersection of cyber and physical (or biological) innovations as well as increase the size and scope of implementation of emerging combinatorial innovations. More importantly, new ways of using technological capabilities will offer opportunity for supporting the preservation and regeneration of nature rather than creation of hidden cost of economic development in the form of externalities [14, p. 2].

Incidentally, the neoliberal economic model of growth continues to act in many economies, often with excuse of

policy makers that there is no better model. Many policy makers have remained on the sidelines, skeptical about the possible alternative. But, an alternative still exists. Actually, there are four scenarios of possible futures. Two of them are based on the old model of growth, and two are based on the new one. Holding back the old model of growth, in case of Serbia, the first possibility assumes that the growth rate achieved in 2018 (+4.5 percent) can be sustained over the long term based on the existing set of policies and partial structural reforms coupled with sustained effort aimed at attracting FDI, infrastructure development, and promoting investments and exports. Alternatively, higher long-run growth rates (5-7 percent) could be achieved based on domestic investment, without much change in the policies or the speed of structural reforms. This scenario depends on fiscal stimuli, investment promotion, and clear political commitment to faster development.

In the case of a new growth model adoption, Serbia has two alternative futures. First, high but sustainable growth with faster GDP growth (5-7 percent growth rate annually) enabled by greater investment from large foreign investors attracted by faster and effective implementation of the necessary structural and institutional reforms aligned with the EU standards and regulations (total compatibility). Yet, this is not the optimal future scenario. A smart growth would be an ideal scenario depicted

Figure 3: The heterodox economic model of growth
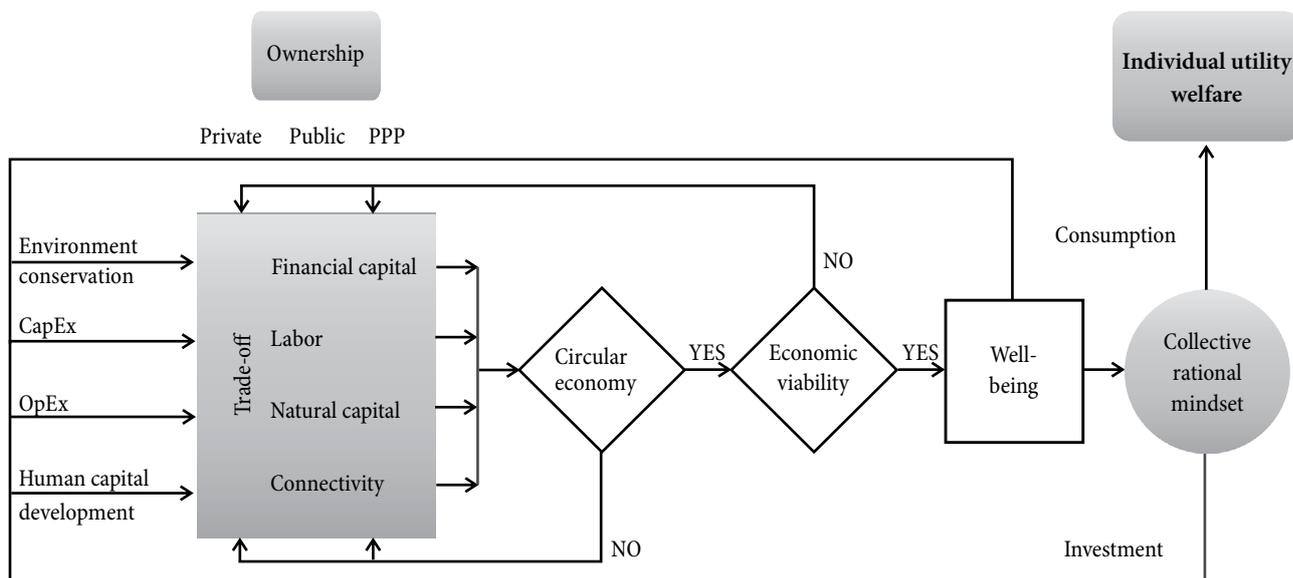
by elimination of all structural imbalances and full implementation of institutional reforms. These reforms would be supplemented by smart industrial policy that would enable transformations necessitated by the ensuing global changes and disruptions triggered by the 4IR.

Albeit the most demanding and ambitious, the fourth scenario offers a framework to address present institutional and structural weaknesses and promote smart growth that would enable Serbia not only to survive, but to actively address the coming global challenges and prosper in the long term.

Quick transformation of an economy is extremely complex with rapidly rising number of mutually related elements. Previous analysis confirms that complexity and uncertainty are so strong that the conventional paradigm in economics could not provide the platform for managed change. When combinatorial innovations dominate environment, industry leaders need to get ahead of the competitive game and ensure they are not left behind. The 4IR happened, but the new theory in economics and business management has not emerged yet.

Industrial policy centric approach

Five processes impacted Serbia's economic reality: attempting to overcome transitional recession, attempting to overcome the Great Recession, 4IR, new normal, and paradigm change in business management and economics. With so many factors and relevant dimensions, it is critical that the new growth model for Serbia earns a full public trust needed to create a shared future in a sustainable economy, inclusive both toward people and nature. With climate change representing an existential challenge to the entire world, no responsible growth model and developmental strategy should ignore their impact on the environment.

After success in fiscal consolidation, Serbia is on the path of recovery. But, very solid GDP growth rates in the last period are not a guarantee for a sustainable growth. The policy of inflation targeting is not a solution for output gap [1] and [2]. Industry-related growth and industrial policies make a difference. In the future, we need the economy to accomplish five goals:

- Output gap (low and stable)
- Inflation (low and stable)
- Sustainable debt
- Competitiveness based on combinatorial innovations
- Circular low-carbon economy

The mission of the new model of growth and related economic policy platform is achieving these goals. Figure 4 portrays the impact of key processes on major goals of future economic development.

The industrial policy-related growth model is based on horizontal and vertical industrial policies. Vertical policies are focused on the promotion of a particular sector

Figure 4: Key processes and goals of future economic development
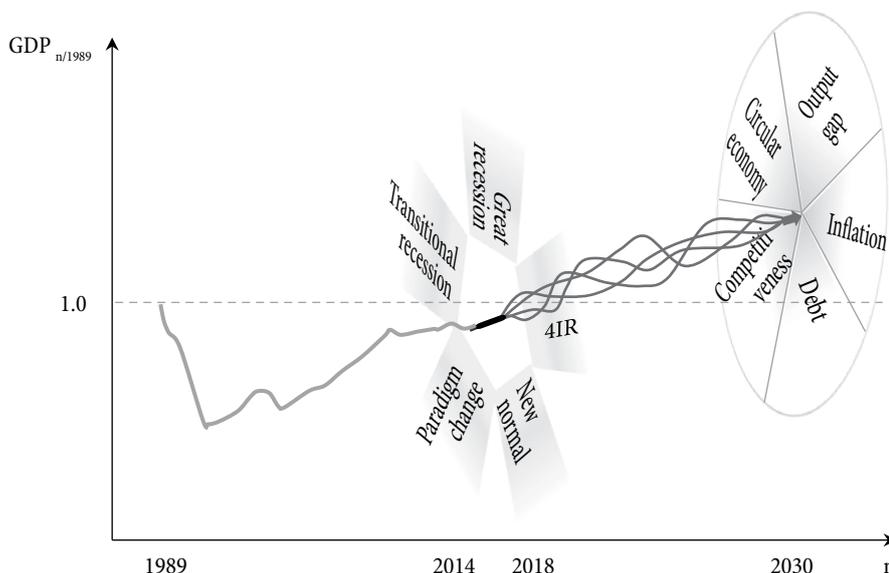
of the economy. Horizontal policies aim at providing better conditions for all sectors in the economy. Also, the model requires harmonization with core macroeconomic policies (monetary and fiscal) using automatic stabilizers [7].

Industrial policies aspire to structurally change an economy's production structure and trajectory of growth. Consistent with the broader definition of industry, industrial policy represents a set of actions aimed at enabling and facilitating structural changes, and steering industrial development in desired directions. As J. Stiglitz [15] points out, there is no development without structural transformation. The growth without structural transformation will be neither sustainable nor inclusive.

UNCTAD's [20] global survey of industrial policies shows that, over the past five years alone, at least 84 countries, accounting for about 90 percent of global GDP, have adopted formal industrial development strategies. Countries at all levels of development are using targeted industrial policies, not only for economic development purposes, but also to respond to a myriad of contemporary challenges, such as creating new jobs, participating in the 4IR and in global value chains, promoting circular economy, etc. [15]. Unfortunately, Serbia is not yet on this map, but this does not necessarily mean lagging substantially behind all the countries that declared having industrial policy in action. As D. Rodrik [13] points out, it is not a matter of whether industrial policies should be implemented but how to do it.

There is a general consensus that very few countries have developed successfully without passing through a manufacturing-based, and often export-driven, industrialization phase in the past [13]. Today, industrial policies are largely driven by the need to offset the decline of manufacturing experienced during the period of rapid globalization in the 1990s and 2000s, as well as during the period of the Great Recession. Incentives, subsidies, public investment in the new technology frontier to rejuvenate internal production capacity are typical implemented measures. In case of developing countries, comparative advantage in manufacturing, arising out of cheap labor, will diminish. Consequently, a success in shifting toward horizontal policy measures promoting

modern infrastructure (both hard and soft) as well as to other sectors of the economy with potential for competitive advantage will be of paramount importance.

In this context, the main challenge will be to create sufficient internal capacity to design and implement appropriate industrial policy that would enable timely institutional and policy changes to keep the Serbian economy competitive. Breakthroughs in science and technology have introduced disruptive changes across practically all industries. However, one must bear in mind that developed and developing economies do not share the same prospects and opportunities given by 4IR. Though, because of robotization and artificial intelligence, developing countries' advantage in manufacturing, arising out of cheap labor, will diminish, and even if there is some success in expanding manufacturing, in most countries this expansion will not suffice to create enough jobs for those seeking employment in the modern economy [18]. The real challenge lies in providing good physical and 'institutional' infrastructure, which enhances the productivity of the economy.

New services will be the growth sector of the future. Healthcare tourism, education, software industry are possibly good choices for Serbia. But, there are certain peculiarities about service sector that developing countries like Serbia need to be aware of.

Production units are smaller, in general, and more resilient. For developing countries, this is a good thing: it is easier to manage SMEs. Unfortunately, with smaller production units, companies have less incentive for investment in R&D, and the benefits of learning by doing are less widely shared [18], especially in business ecosystems with increasing number of innovative start-ups. On the other side, many services can be more easily inserted into the global economy through the internet which makes it easier for developing economies to compete on the global scene (agglomeration effect).

To enable the economy to efficiently and effectively respond to past and forthcoming challenges, an adequate macroeconomic and industrial policy will have to be accompanied by a significantly improved public and private investment effort. Presently, the size is too small, the structure is not aligned with likely infrastructure

and human capital or knowledge gaps, the efficiency is too low, and the efficacy in achieving stated objectives is inadequate.

To conclude, the emerging economic and business ecosystems strive to embark on an innovation-driven global economy based on universal mobility. The intention is to promote the idea of exponential value chains, particularly in the context of ongoing scientific and technological transformations, by engaging business leaders from different industries, along with their peers from government and regulatory bodies in an effort to define sustainable and inclusive development trajectories. In these interactions under new rules of the game, scholars are expected to play the role of a catalyst, while politicians will act as integrators and visionaries defining the scope of relevant impact. Serbia looks as if it were still far away from this path. Serbia has not incorporated even the previous industrial revolution properly. However, the opportunity 4IR brings is skipping the missing stages of development and embarking on a dynamic trajectory of growth and development together with more developed countries. The opportunity Serbia must not miss.

Besides disruptive character of combinatorial innovations as a key legacy of 4IR, on top of challenges posed by the new normal, there is a possible hike of the cost of capital, particularly from the perspective of a eurobond due in the two following years. The design of a smart growth model that can address the problem of impotency faced by Serbia's economy and be capable of resolving major structural imbalances and institutional gaps is paramount.

If anything, it gave rise to improbable political and social desires of doubling the level of GDP per capita in as short as possible period of time. To reach the level of GDP per capita Croatia had when it joined the EU, Serbia's economy would need a 5 percent compound average growth rate over the next 15 years, or a 7 percent rate over the next 10 years. Also, to achieve income convergence with the most developed part of the EU (EU-15), Serbia would need to sustain 7 percent average annual growth rate for more than 20 years and it would need more than 40 years at real income growth rate of 5 percent. To achieve 5-7 percent growth, the sources of growth and the structure

of the economy would need to change dramatically, while continuously controlling the risks of potential reemergence of fiscal deficit and twin external deficits often associated with expansionary fiscal and pro-growth policies.

Is this possible? Maybe yes. Maybe no. Probably yes. If we stand behind the positive answer, we need new growth model and related economic policy platform based on a new set of propositions.

Conclusion

After fiscal consolidation 2014-2017, Serbia's economy came back on the path of growth the new reality, in global economy, is like a cubistic picture with shifted, but highly interrelated elements. In quickly transforming world, business organisations are in interception of virtual and physical/biological worlds. Business ecosystem is becoming digitalized. Business model will be challenged by digital disruption and will be more technology driven. The explanatory elements related to the title of this paper refer to the following. First, industrial policy related growth model. Second, continuity in practicing hard macroeconomic policy regime. Third, inclusiveness toward nature and people based on heterodox economic policy platform. In heterodox approach, free market, infrastructure (both physical and digital*, and technology development join together. The new role of the government is to define industrial policy that uses education, science and technology to nourish competitiveness and collective rationale.

Beside the big changes in microeconomics impacted by 4IR and other elements of the new normal, the very essence of macroeconomics remains almost unchanged. The growth is in the spotlight again. Today's growth should not be slow, because such growth causes rapid social collapse in a growing and more complex society. Also, growth should not be exponential due to environmental limits to growth and overshooting threat. In 4IR, growth has to be high enough, but intelligent. Intelligent growth has to be not only sustainable, but inclusive toward the people and nature both.

Achieving such a growth requires paradigm change in micro and macro management. In a truly digital

environment, competitors continually experiment with combinatorial innovations with the aim to revolutionize the economy and society as a whole. As digital disruption transforms the paradigm in microeconomics, the assurance of a new paradigm in macroeconomics has never been more essential.

In short, what the global economy really needs after a 40-year old experiment with neoliberalism is the circular economy new deal. The heterodox approach with industrial policies for tradable sectors in the center and automatic stabilizers for core macro policies is a reasonable alternative to neoliberal orthodoxy, maybe.

After fiscal consolidation, Serbia's economy achieved stability, but people did not. A mindset has to evolve from confusion, inspired by differences between hope and ambiguity, to clarity and give rise to prosperity. Such change, in itself, requires new mindsetting. Vulnerability is high even thought the economy logged 4.5 percent growth in 2018. The central message of this paper is one of hope: there is hope for growth, both sustainable and inclusive. It takes time, it requires good allies and, most of all, it requires good politicians.

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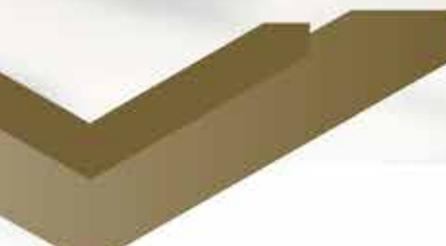
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WHY IS SERBIA AN ECONOMIC GROWTH UNDERACHIEVER?

Zašto privredni rast Srbije zaostaje?

Abstract

In a nutshell, Serbia is an economic growth laggard due to deficient institutions, specifically lacking rule of law and control of corruption, and due to low investment, which itself is curbed by corruption and poor rule of law. The gap in education achievement also hinders Serbia's long-term growth. We asses that Serbia is currently growing 2 percentage points below its potential: above 3% instead of around 5%. Roughly one half of the growth gap could be explained by underperforming institutions (1 p.p.), and the other half by low investment (0.7 p.p.) and education (0.2 p.p.). These results are obtained by estimating the empirical growth equation for EU countries and using it as a benchmark to assess growth performance in Serbia. Our findings conclusively point to reforms of social and economic fundamentals if Serbia is to achieve its potential growth and catch-up with comparative countries of Central and Eastern Europe.

Keywords: *economic growth, convergence, empirical growth equation, rule of law, Serbia*

Sažetak

Empirijski rezultati u ovom radu pokazuju da je privredni rast Srbije ispod svog potencijalnog nivoa pre svega zbog slabih institucija – posebno vladavine prava i kontrole korupcije. Sledeći činilac koji koči privredni rast su niske investicije, ali pokazujemo da su i one, naročito privatne, nedovoljne dobrim delom usled slabe vladavine prava i korupcije. Najzad, nedostaci obrazovnog sistema su takođe faktor koji usporava rast privrede Srbije. U radu pokazujemo da privreda Srbije trenutno raste gotovo 2 procentna poena ispod svog potencijala, tj. trenutno nešto iznad 3% umesto potencijalnih 5%. Naši rezultati pokazuju da, grubo, polovina zaostajanja (1 p.p.) može da se objasni slabom vladavinom prava i korupcijom, dok druga polovina potiče od niskih investicija (0.7 p.p.) i nedostataka obrazovnog sistema (0.2 p.p.). Prethodne rezultate smo dobili ocenjujući jednačinu rasta za zemlje članice Evropske Unije. Ovu jednačinu smo onda koristili kao normu da utvrdimo prvo, koliki je potencijalni rast Srbije, a zatim koji faktori i za koliko smanjuju njen stvarni rast ispod potencijalnog. Dobijeni empirijski rezultati nedvosmisleno ukazuju da su reforme u oblasti vladavine prava i obuzdavanja korupcije, kao i reforma obrazovanja, osnovni preduslovi da Srbija ostvari svoj potencijalni rast i počne da sustiže uporedive zemlje Centralne i Istočne Evrope.

Ključne reči: *privredni rast, konvergencija, jednačina rasta, vladavina prava, Srbija*

1. Introduction and main findings

Low economic growth is Serbia's main structural problem. Serbia ranks at the very bottom, when compared to EU countries, with respect to its economic development and living standard. Its GDP *per capita* (in PPP) is half that of Central and Eastern European countries (and a mere third of the developed Western European countries). To start catching up to CEE countries, Serbia needs to have a lasting economic growth that is substantially higher than theirs - but this is not happening. Serbian economic growth has been slower than the growth in CEE countries for many years now, which only increases the gap between Serbia and these countries, instead of decreasing it. In this paper we demonstrate (based on the estimated empirical growth equation in European countries) that the low economic growth in Serbia is not caused by transient factors limited to individual sectors, but by the fundamental economic and social issues: pervasive corruption, gap in rule of law, low level of state and private investments and poor education system quality. What is of particular concern is the fact that these indicators of institutional quality – rule of law and corruption – have deteriorated in the previous four to five years.

To assess and analyse Serbia's economic growth we used long-term empirical growth equations for European countries. Using standard approach (e.g. [17] and [1]) we estimated the economic growth equation on a panel of 26 EU countries with series running from 1995 to 2017 (Section 2). We then plugged in the data for Serbia into the estimated economic growth model (Section 3.1), which yielded two main results: 1) the magnitude of Serbia's economic growth underperformance and 2) the specific determinants driving Serbia's underperformance. In the same section (Section 3.1), we quantified the impact of these drivers on economic growth deceleration and showed that pronounced corruption and inadequate rule of law were the factors that reduced Serbia's economic growth the most. Subsequently (Sections 3.2 - 3.4), we analysed each factor individually, and based on that, proposed advanced crucial reforms and economic policies that could foster long-term growth in Serbia.

We assess that, in terms of the GDP growth rate, Serbia's structural gap amounts to 1.5-2 p.p. This assessment is based on the estimated rate of beta convergence in a panel of EU26 (Section 2). It shows that less developed European countries exhibited faster growth than the more developed countries (see Figure 1), with the catch-up rate of 2% (see eq. 1). The obtained convergence rate of 2% is in line with numerous other empirical studies (e.g. [1], [13], [2]), and is often referred to as "the iron law of convergence" ([1]). Using this "iron law of convergence", i.e. convergence rate of 2%, we found that Serbian long-term economic growth should be by about 1 p.p. higher than that of CEE countries - as Serbia's GDP *per capita* is half that of CEE country average. However, since Serbia's trend growth is by 0.5-1 p.p. lower than that of CEE countries, Serbia's growth is actually lagging 1.5-2 p.p. behind the one in CEE countries.

The estimated empirical growth equation (eq. 1) applied to Serbia shows that the greatest single negative impact on economic growth (almost 1 p.p.) comes from corruption and the rule of law gap, while the rest can be attributed to low investment and the poor educational system (up to 1 p.p.). Thus, these factors almost entirely explain Serbia's economic growth gap identified above, strongly suggesting that these are the factors that obstruct economic growth in Serbia.

Starting with corruption and rule of law, Serbia has scored very low according to the World Bank research (Worldwide Governance Indicators - WGI) measuring different parameters of institution quality. On a scale from -2.5 to +2.5, Serbia is one of the rare European countries that was in the negative zone in 2017, with a score of -0.28. On the other hand, countries surrounding Serbia (Bulgaria, Romania, Hungary and Croatia) have the average score of +0.16 while CEE country average stands at +0.56. Similar negative scores for corruption and the rule of law in Serbia have been reported in other relevant international studies (Transparency International, World Justice Project, World Economic Forum etc). The estimated growth equation (eq. 1, Section 2) shows that Serbia's economic growth would increase by about 0.5 p.p. just by improving the corruption and rule of law indicators only to the level of the surrounding countries (average for Bulgaria, Romania, Hungary and Croatia). However, if Serbia were to reach the average level for all

CEE countries, its economic growth would most probably accelerate by about 0.9 p.p. However, troubling as the lagging behind comparable countries is, it is even more troubling that Serbia reversed the trend since 2014: from gradual improvement in control of corruption and rule of law, to their deterioration. Thus, according to WGI data, Serbia's score in corruption and rule of law deteriorated from 2014 to 2017 from -0.19 to -0.28, while, at the same time, CEE countries achieved a mild improvement from +0.54 to +0.56 (see Section 3.3)

Currently, Serbia is investing about 18% of GDP, which is 5-6 p.p. lower than it should be considering its level of economic development (Figure 2, Section 2) and investments in comparable CEE countries. The estimated growth equation (eq. 1, Section 2) implies that the subdued investment reduces growth rate in Serbia by approximately 0.7 p.p. Both public and private sector in Serbia invest less than required. We have shown that government investment into infrastructure should be increased by at least 1 p.p. of GDP, investment of central-level and local public enterprises should also be raised by a little over 1 p.p. of GDP, and the private sector investment by the remaining 3-4 p.p. of GDP. The Government can directly affect the increase in its own investment and investment of public enterprises. Furthermore, it can stimulate private investments by improving the currently very poor business climate in Serbia, specifically control of corruption and rule of law (see Figure 3). Namely, we found that the latter two have positive, significant impact on private sector investments (eq. 2, Section 2). Government can also boost private investments by improving poor quality of basic infrastructure (roads, railroads, communal infrastructure) in Serbia, and by raising its current low credit rating.

To assess education, the mean years of schooling in the population over 25 as reported in UNDP Human Development Reports is used. With regard to this indicator as well, Serbia is an underachiever among CEE countries (Figure 4). According to the data for the previous three years, adult Serbian citizens have, on average, 11.1 years of schooling which is by about a year less than the average in CEE countries (12.2 years). Estimated growth equation (eq. 1, Section 2) indicates that this gap in the years of schooling translates to about 0.2 p.p. lower economic

growth in Serbia compared to other CEE countries. It is, however, likely that the impact of better education on growth in Serbia would exceed the obtained 0.2 p.p. Namely, the indicator used (mean years of schooling) doesn't capture the quality of an educational system that may well vary across individual countries considered. An additional problem with this indicator is that it does not vary across the sample of countries used. All CEE countries fall within a very narrow range from 11 to 13 years in mean years of schooling, which can be attributed to the common tradition of a relatively good reach of the educational system, originating from socialist times. Still, in spite of these shortcomings, the estimated equation undoubtedly confirms the relation between human capital and economic growth - and this relationship could only be stronger if a better indicator were to be found to measure education quality of European countries.

2. Framework for assessing Serbia's economic growth performance

In evaluating economic growth in Serbia, we turned to long run empirical growth equations that tend to explain most of the variations in *per capita* GDP growth across countries. We used them to estimate the growth equation for EU countries, employing the latter as a benchmark to asses growth performance in Serbia.

While reviewing empirical growth equations Wolff [17] points out that certain factors systematically appear as statistically significant and with the expected sign in these regressions, explaining the vast majority of long-run variation in economic growth[1]. These "strong forces" of growth are: catch-up effect, investment, education, institutions, and research and development.

Experimenting with different sets of variables explaining variation in economic growth raises the issue of robustness of alternative specifications, leading to attempts to consolidate diverse results (see [8], [14]). Thus, Becker and Olofsgard [3] looking for a parsimonious empirical growth equation that is robust to different permutations of sets of explanatory variables opted for Levine and Renelt

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1   See [17, p.2].

[8] equation that encompass catch-up effect, investment, education and population growth[2].

In a series of papers Barro with co-authors (e.g. [1], [2]) examined empirical growth equations focusing on existence and size of catch-up effect, i.e. beta convergence – unconditional and conditional. The latter boils down to growth regression that, in addition to the catch-up effect, includes investment, education, and institutions among other explanatory variables (see [1]).

Against this background we opted for the specification where the growth in *per capita* GDP depends on initial GDP *per capita* level (encompassing catch-up effect or beta convergence), investment rate, education and institutions. The first growth factor listed above is often referred to as 'advantages of backwardness'[3], i.e. countries that are not greatly distant from a leader, can learn substantially from, and catch-up with the latter through the constant transfer of new technology. Thus, a country with a lower initial GDP *per capita* has a higher growth potential via catch-up process. This is also known as beta convergence, implying that coefficient (beta) on initial *per capita* GDP should be statistically significant and negative. If the latter is obtained

solely with initial *per capita* GDP in regression, then beta convergence is unconditional, whereas it is conditional when additional explanatory variables are required to obtain a negative and significant beta.

Higher investment drives economic growth through accumulation of physical capital, i.e. via its quantitative increase but also, more importantly, through introduction of new technologies in use. The latter propels the country's productivity growth and competitiveness by boosting technical progress. In the context of economic growth, education could be viewed as investment in human capital, being another important determinant of technical progress that fosters increase in labour productivity and hence economic growth. The role of institutions as economic growth factor is originally investigated in the work of North and Thomas [11], and later empirically assessed. The rule of law, protection of individual property rights etc., turned out to be essential determinants of economic growth[4].

The growth equation explained above is estimated using a panel of EU countries apart from Malta (due data availability) and UK, i.e. EU 26, in the period 1995-2017.

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2   [8, p.946], equation 2.
3   Also known as Gerschenkron [7] effect.

4   See [17] section 9.9 for a review.

Figure 1: Dependence of growth rate on initial *per capita* GDP: beta convergence
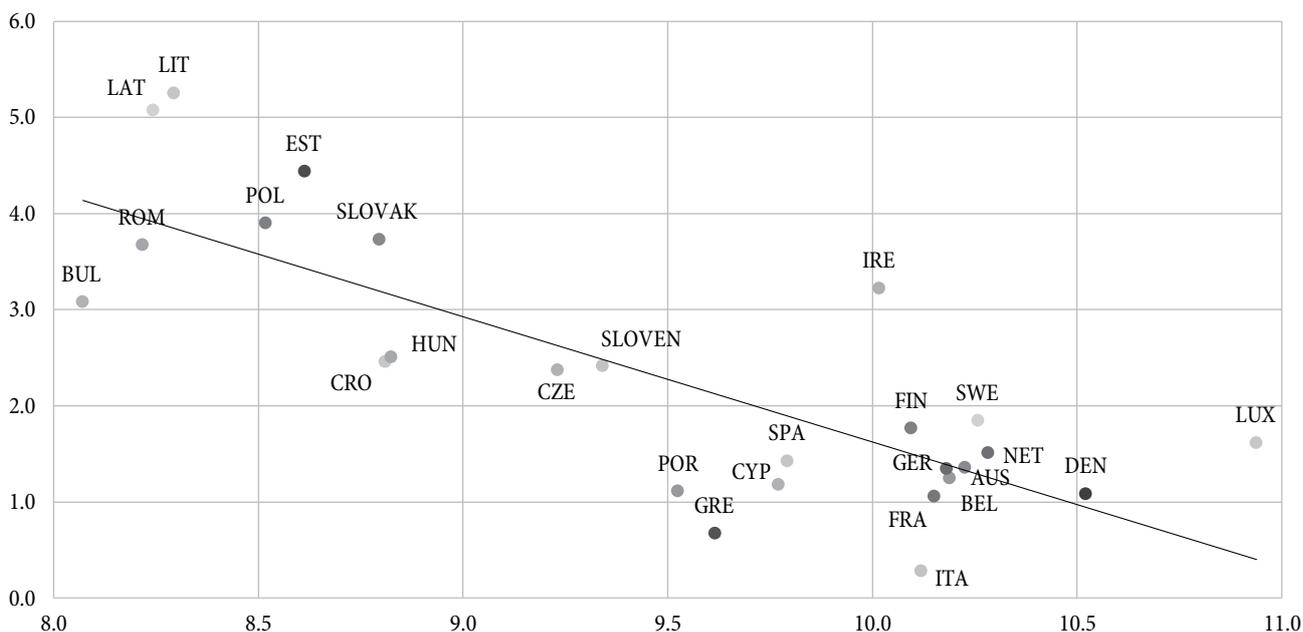
Source: Authors' own calculation and representation based on Eurostat data.
Note: Average annual growth rate 1995-2017 (Ireland: 1995-2014) is on the y-axis and initial (1995) ln GDP *per capita* on the x-axis.

Standard procedure is followed (e.g. [13], and [1]) where growth rate is taken as average over several (e.g. five) year periods, to capture medium term growth, hence avoiding short-term fluctuations.

The variables used to estimate EU26 growth equation are summarized in the Figures below.

Average annual growth rates and initial level of GDP *per capita* across EU26 countries are given in Figure 1, indicating that lower initial (ln) GDP *per capita* correlates with higher growth over the period 1995-2017.

Thus Figure 1 suggests the presence of a catch-up effect, i.e. beta-convergence, even unconditional one in this case. Nevertheless, we shall later include additional explanatory variables to explain variations in growth rates across EU26, thus ending up with conditional convergence.

Figure 2 reviews investment rate across EU26, again placed within a framework of beta convergence. It turns out that at lower level of GDP *per capita* countries tend to invest a larger share of their GDP in order to catch-up. Hence Figure 2 can be seen as the flip side of beta convergence observed in Figure 1, i.e. at lower income levels, countries grow faster (Figure 1) and invest more (in relative terms) (Figure 2) in order to achieve higher

growth. This conjecture is confirmed by the estimated equation (eq. 2) below.

Overall average investment rate in EU26 is 22.4%, and it varies from 19.5% in Italy to 28.4% in Czech Republic, with a number of the Central and Eastern European countries being on the high side (see Figure 2). Against this backdrop, Serbia, with investment rate of 17% in recent years (2015-2017), is tailing well behind.

Quality of institutions, reviewed in Figure 3, is captured by the rule of law and control of corruption, as followed by World Bank's the Worldwide Governance Indicators (WGI). Once more Serbia is underachiever.

Education is captured by mean years of schooling, and Figure 4 reviews it across EU26 and Serbia for the latest period 2013-2017.

Yet again Serbia is at the lower end, but this time variations across countries are not that large, meaning that this indicator might not discriminate well among the considered countries with respect to education achievement. Although one would like to look also at the quality of education, the long series of the corresponding indicators are unavailable; hence we opted for the 'second best' solution of mean years of schooling.

Figure 2: Dependence of investment rate on initial *per capita* GDP
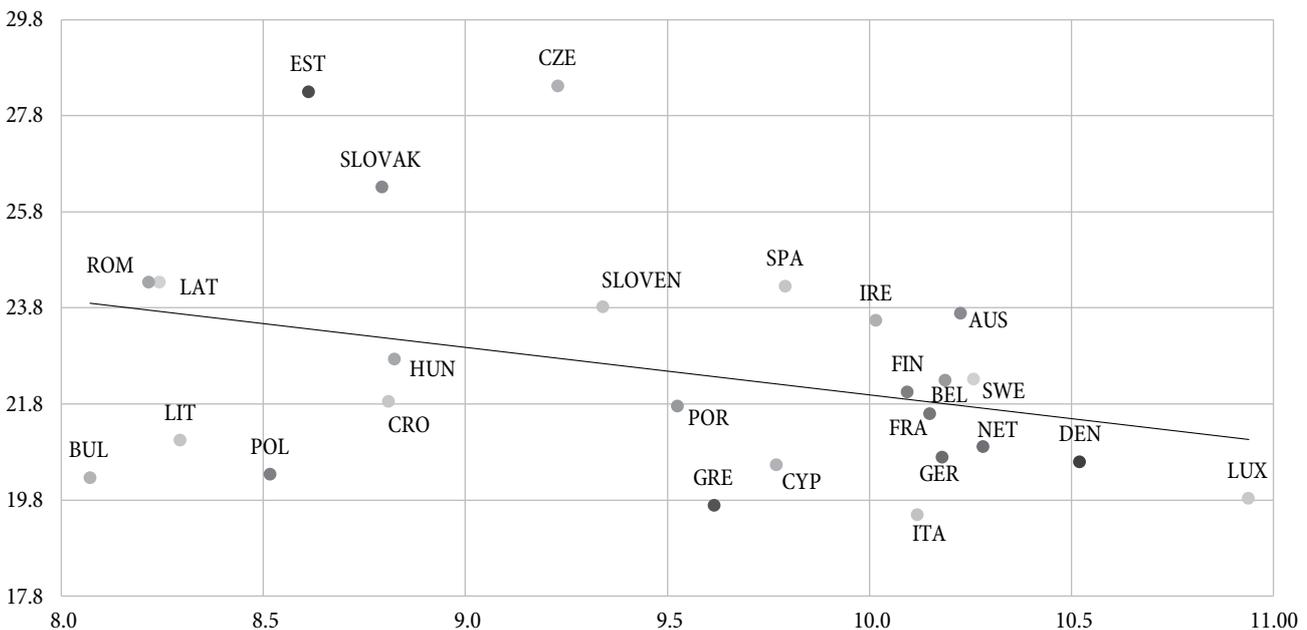
Source: Authors' own calculation and representation based on Eurostat data.
Note: Average investment rate 1995-2017 is on the y-axis and initial (1995) ln GDP *per capita* on the x-axis.

Figure 3: Rule of Law and Control of Corruption: Mean value of the two
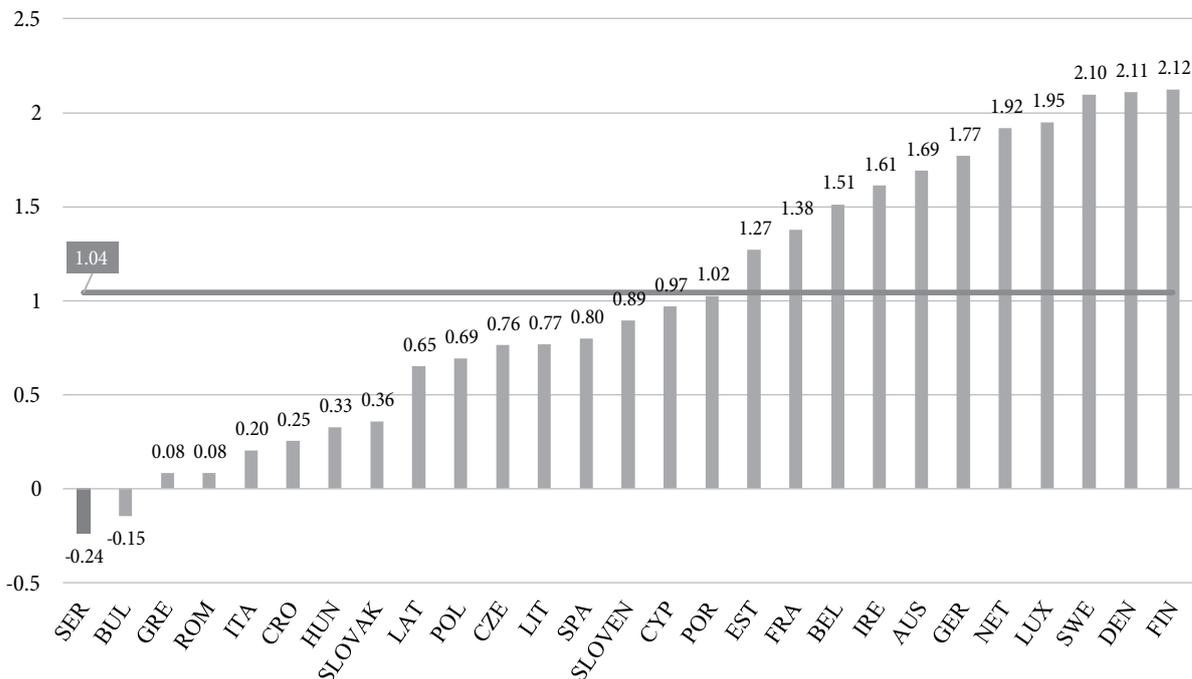
Source: World Bank data, http://info.worldbank.org/governance/wgi/#home
Note:
1) Data are respective 2013-2017 average for each country. Average across all EU26 is 1.04.
2) The Worldwide Governance Indicators (WGI) are a research dataset summarizing the views on the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. These data are gathered from a number of survey institutes, think-tanks, non-government organizations, international organizations, and private sector firms.
3) Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.
4) Rule of Law - Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
5) Control of Corruption - Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Figure 4: Mean years of schooling
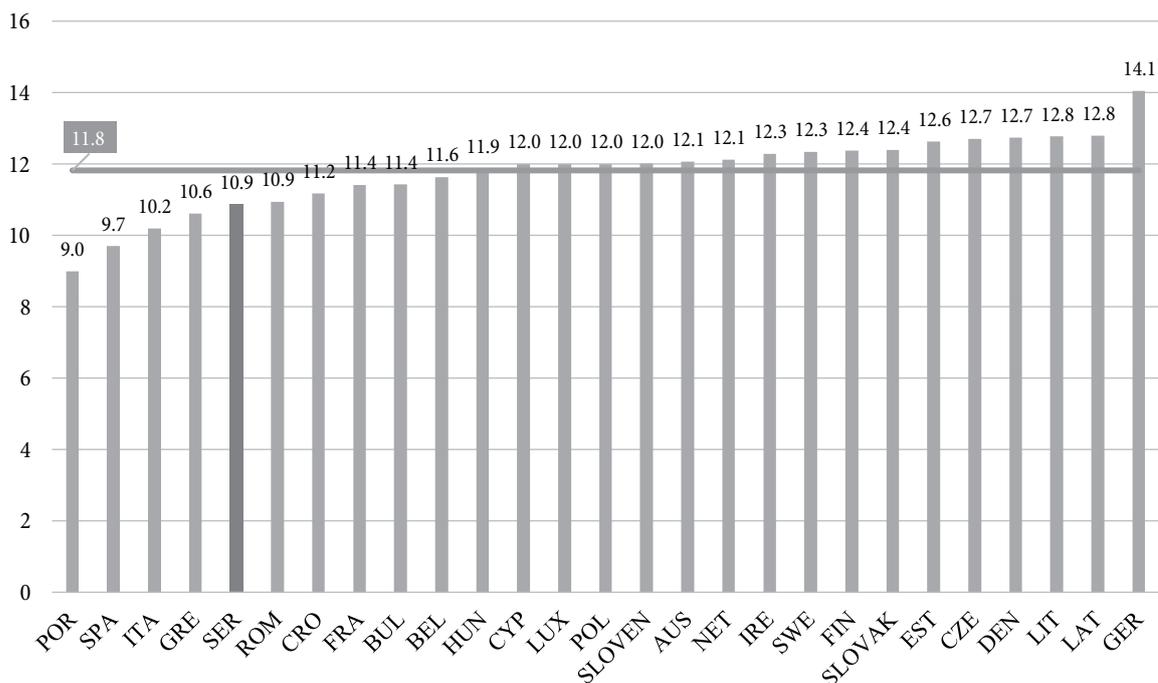
Source: United Nations Development Programme, Human Development Reports, Human Development Data, http://hdr.undp.org/en/data
Note: 11.8 is average for EU26. Mean years of schooling {\displaystyle ({\textrm {MYS}})}is a calculation of the average number of years of education received by people ages 25 and older in their lifetime based on education attainment levels of the population converted into years of schooling based on theoretical duration of each level of education attended. Average 2013-2017.

As explained above the following equation is estimated using OLS:

$$GDP_{pc}\_growth = 14.72^{***} - 2.29^{***} \cdot Initial\_GDP_{pc} +$$
$$(5.331) \qquad (0.427)$$

$$+ 0.13^{***} \cdot \frac{Inv}{GDP} + 1.13^{**} \cdot Institutions + \quad (1)$$
$$(0.046) \qquad (0.446)$$

$$+ 2.78^{**} \cdot Education - 2.15^{**} \cdot d$$
$$(1.250) \qquad (0.418)$$

$$R^2 = 47\%$$

1) *GDP_{pc}_growth* – average annual growth rate of GDP *per capita*, periods: 1996-2000, 2000-2004, 2004-2008, 2009-2013, and 2013-2017; *Initial_GDPpc* – (ln) level of GDP *per capita* in 1996, 2000, 2004, 2009, and 2013; *Inv/GDP*– share of investments in GDP (in %) and *Education* – (ln) mean years of schooling, averages for periods: 1996-1999, 2000-2003, 2004-2007, 2009-2012, and 2013-2016; *Institutions* – mean value of rule of law and control of corruption estimations, averages of data: 1996 and 1998; 2000, 2002, and 2003; 2004-2007; 2009-2012; and 2013-2016; *d* - time dummy, refers to 2009-2013 period and captures the corresponding recession.

2) ***, ** and * denotes 1%, 5% and 10% significance level respectively.

3) Standard errors in parentheses.

The obtained results (see eq. 1) concur with empirical growth equations previously found (see [17]) and discussed above. As expected, coefficient on initial (ln) level of GDP *per capita*, i.e. beta, is significantly negative, showing the presence of (conditional) beta convergence. Also, it is close to -2, thus concurring with results obtained in other studies (e.g. [1], [13], and [2]), the result often referred to as 'the iron law of convergence' ([1]). Other variables: investment rate, rule of law and control of corruption, and average number of years of schooling have, also as expected, positive and statistically significant effects on economic growth (see eq. 1). Moreover, an estimated regression explains 50% of variations in growth rates across EU26 countries. All this suggests that the obtained empirical growth equation can be taken as a reasonable empirical framework for assessing economic growth in general, and specifically in Serbia in our case.

While hypothesizing that the low rate of investment in Serbia might be due to underperforming institutions, we also estimated an auxiliary, investment rate equation for EU25 (EU26 w/o Croatia, due data availability), where beside the initial level of GDP *per capita* (motivated by Figure 2 above), the rule of law and control of corruption variable (institutions) is also included. We looked at private investment as it should be affected by the quality of institutions; however, similar estimates are obtained for overall investments as well.

$$\frac{Inv\_p}{GDP} = 40.35^{***} - 2.45^{***} \cdot Initial\_GDP_{pc} +$$
$$(6.330) \qquad (0.725)$$
$$(2)$$

$$+ 1.99^{***} \cdot Institutions + 2.34^{***} \cdot d_1 - 1.38^* \cdot d_2$$
$$(0.780) \qquad (0.728) \qquad (0.742)$$

$$R^2 = 0.21$$

1) *Inv_p/GDP*– share of private investments in GDP (in %) averages for periods: 1996-1999, 2000-2003, 2004-2007, 2009-2012, and 2013-2016; *Initial GDPpc* – (ln) level of GDP *per capita* in 1996, 2000, 2004, 2009, and 2013; *Institutions* – mean value of rule of law and control of corruption estimations, averages of data: 1996 and 1998; 2000, 2002, and 2003; 2004-2007; 2009-2012; and 2013-2016; *d1* - time dummy, refers to 2004-2007 period and *d2* - time dummy, refers to 2013-2016 period.

2) ***, ** and * denotes 1%, 5% and 10% significance level respectively.

3) Standard errors in parentheses.

Estimated equation (eq. 2) above confirms that the quality of institutions has a statistically significant, positive effect on investment rate. Also, as suggested by Figure 2, the lower the initial of GDP *per capita* level, the higher the investment rate. Thus, our conjectures that institutions and initial level of GDP *per capita* affect the magnitude of relative investment are validated, although there are also other factors affecting investment since the included two variables explain just 21% of its variations.

3. Social and economic fundamentals are behind low economic growth in Serbia

Subdued economic growth in Serbia is its main issue, as it prevents a substantial increase of the living standard of its citizens and catching up to the economically more developed European countries. In this section, we estimate the extent

of Serbia's underachievement in terms of economic growth and identify and assess the main causes that lead to it. For this analysis, we used the estimated economic growth equation for 26 EU countries presented in Section 2. In the remainder of this chapter, we analyse individually each of the identified fundamental elements that are slowing down Serbia's economic growth. Based on latter we shall then point to the crucial reforms and economic policies that could facilitate a permanent acceleration of Serbia's economic growth.

We assess that the growth rate gap in Serbia amounts to 1.5-2 p.p. as it is currently growing at rate of 3-3.5%, while its medium-term GDP growth potential is about 5%. The latter is obtained using estimated growth equation for EU26 (eq. 1, Section 2) which points to presence of conditional beta convergence. Consequently, less developed European countries, such as Serbia, should systemically grow faster than more developed economies, catching-up at an estimated annual convergence rate of about 2%. The convergence rate of 2% has come up as a result of several previous empirical studies, which is why it is also referred to as "the iron law of convergence"[5]; in our research, we have obtained it as well (eq. 1, Section 2). Hence, it is pointless to compare Serbia's current economic growth rate of 3 to 3.5% with that of rich European countries, such as Germany or the Netherlands, whose GDP growth rate currently amounts to about 2%, as it has been often done in politically motivated discourse in Serbia. It is only relevant to compare Serbia with the more similar, CEE countries. However, even compared to CEE countries, Serbia's economic growth is lagging. Serbia's GDP *per capita* is half that of CEE average, thus (applying the obtained convergence rate of 2% per year), Serbia's GDP growth should outpace theirs by about 1 p.p. Since the medium-term growth of CEE countries currently amounts to about 4%, it follows that Serbia's economic growth should be 5%, instead of the current 3-3.5%.

The main factors preventing faster economic growth in Serbia, i.e. lowering GDP growth by 1.5-2 p.p. pertain to pervasive corruption, weak rule of law, low level of state and private investment and poor quality of the educational

system. The estimated growth equation for 26 EU countries (eq.1, Section 2) shows, that in addition to the catch-up effect, these factors have also statistically significant effect on growth. The worse off the aforementioned variables in a given country, the lower its economic growth. When data for Serbia are run through the estimated growth model (with Serbia being practically at the very bottom of the European ranking order for each of these indicators), it transpires that these fundamental factors can almost completely account for Serbia's estimated growth rate gap of 1.5-2 p.p. The estimated equation shows that the largest impact on slowing down economic growth in Serbia (by almost 1 p.p.) comes from the observed gap in corruption and the rule of law, while the remainder of Serbia's estimated underachievement can be explained by the insufficient share of investments in GDP and the disadvantage in educational system.

3.1 Just how far is Serbia lagging in economic growth and why?

To assess Serbia's underachievement in economic growth, it is first necessary to accurately determine the current growth trend. Namely, one of the characteristics of Serbia's economic growth is its significant year-on-year oscillation, noticeably larger than those of other comparable countries. For example, 2018 GDP growth, which we estimate at 4.3%, is over double the one achieved in 2017 (2%). On the other hand, the economic growth in 2017 was 1.3 p.p. lower than that in 2016 (3.3%). A more detailed analysis, however, shows that there were no lasting changes in GDP growth trends behind such large oscillations in annual GDP growth - they were rather the result of temporary factors, primarily varying agricultural seasons.[6]

Thus, for the proper estimation of underlying trends in economic activity in Serbia, one needs to correct for one-off factors in previous years which temporarily increased or decreased the annual GDP growth rate leaving no permanent effect on its trend in the medium term. We

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5   See [1].

6   Agriculture takes up 8% of Serbian GDP, whereas in other CEE countries its share is, on average, below 4%. This is why the impact of varying agricultural seasons (drought, flood, extremely good seasons) on Serbian GDP growth is so significant, having twice as much effect on GDP growth as in comparable countries.

Table 1: Serbia: GDP growth trend, 2014-2019

	2014	2015	2016	2017	2018[1]	2019[2]
GDP growth (%)	-1.6	1.8	3.3	2.0	4.3	3.5
Impact of one-time factors on GDP growth (p.p.)	-0.6	0.8	-0.4	-1.2	1.0	0.0
GDP growth trend	-1.0	1.0	2.9	3.2	3.3	3.5

Source: SORS, Fiscal Strategy.
1) Authors' assessment based on the official data on GDP growth in the first three quarters and the flash estimate of GDP growth in Q4 published by the SORS.
2) Authors' assessment based on the official GDP growth forecast for 2019 from the Fiscal Strategy.

especially emphasize this due to public debates being prevalent with over-optimistic and unfounded assessments of the relatively high headline GDP growth of over 4% in 2018. In Table 1, in addition to the headline growth rates in Serbia since 2014, we depicted the contributions of one-off factors and based on these, in the last row of the Table 1, the true trend of economic growth, "cleaned" from one-offs. It can be inferred from the Table 1 that there has been no substantial acceleration of economic activity in 2018 compared to the previous year, despite the fact that the overall GDP growth amounted to 4.3%, which is over twice as high as that from 2017. An additional argument to support the claim that acceleration of growth in 2018 was temporary comes from the (credible) government GDP growth forecast for 2019 that currently amounts to 3.5%, which is markedly lower than the growth achieved in 2018 and in line with the estimated medium-term economic activity growth rate.

Table 1 shows two different periods in the GDP growth trends in the previous five years. The period prior to 2016, when economic activity was practically stagnant, even at times, in recession[7] - and the period after 2016. The subject of this analysis is the second (currently relevant) period following 2016 when, with the stabilization of public finance, a relatively stable economic growth trend ranging from 3 to 3.5% was established (even though the overall GDP growth rate oscillated under the influence of the aforementioned one-time factors).

As per the convergence (catch-up) process, less developed countries should have a consistently faster economic growth than the developed countries - proportional to the difference in their development. The catch-up effect is the consequence of the fact that the undeveloped countries can get a significant portion of their economic growth from the transfer of technologies and know-how from the developed countries, whereas the economic growth of the developed countries depends, to a greater extent, on their own innovation and technological advancement, which is significantly slower. In simple terms, it is easier and quicker to learn from others, adopt ready-made, contemporary technological processes and purchase contemporary equipment that already exists - than to discover and develop these on your own.

Several empirical studies have shown that the gap between the lesser developed countries and the developed countries (as measured by GDP *per capita*) decreases with their convergence at a rate of about 2% per year, on average. Since the 2% convergence has been confirmed in different empirical studies, due to its constancy it is frequently also referred to as "the iron law of convergence". The econometric analysis we conducted in this paper has also confirmed this result on a sample of 26 (current) EU countries, with the data from 1995 to 2017.[8]

The relationship between the level of economic development and the rate of economic growth for the different groups of European countries is illustrated in Table 2, using data for the last three years.[9] We selected two groups of EU countries with the largest difference between them (in terms of GDP *per capita* measured in PPP) – Western Europe[10] and CEE. In the first column of the Table, the GDP *per capita* is expressed in PPP Eur. In

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7 Serbian economy was practically stagnating since the end of the first wave of global economic crisis in 2009, but in this paper, we look at the present, currently relevant economic growth trend in Serbia, in the macroeconomic environment in which there is no explicit threat of a public debt crisis.

8 Our sample yields a statistically significant convergence coefficient of 2.29, which is fully in line with the findings in other studies reporting the coefficient being around 2 (see Section 2).

9 This relationship can be seen in Figure 1 for each EU26 country in the period of 1995-2017.

10 The following countries have been included as Western European countries: Austria, Belgium, Denmark, Germany, Spain, Ireland, France, Italy, Luxembourg, the Netherlands, Finland and Sweden.

**Table 2: Western European countries, CEE countries and Serbia:
GDP *per capita* and GDP growth, average 2016-2018**

	GDP *per capita* (in PPP EUR)	GDP growth
Western Europe (weighted average)	33.400	2.1
Central and Eastern Europe (weighted average)	20.500	4.0
Serbia	11.400	3.2

Source: Authors' calculation based on Eurostat data.
Note: Since there are still no data for GDP *per capita* for 2018, data in the first column are calculated as an average for 2015-2017.

addition, in the second column of the Table, we present the average growth rates for these groups of countries in the period 2016-2018. Below this data, we also present the values for GDP *per capita* and the achieved economic growth in Serbia - which does not fit the expected pattern, as will be discussed in greater detail later.

Data on the level of economic development (GDP *per capita*) from Table 2 show major discrepancies that should reflect on the economic growth rate, as well. Level of economic development in CEE countries is currently at the level of about 60% of that in the Western European countries, which, applying the convergence rule should mean that CEE countries should have a significantly faster economic growth. On the other hand, in terms of the level of economic development, Serbia is significantly lagging behind not only Western European countries, but also behind CEE countries. Serbian GDP *per capita* is at 55% of CEE country average, and compared to Western European countries, Serbian GDP *per capita* is at a mere 35% (Table 2).

From the Table 2, it can be seen that, in line with theoretical expectations, economic growth in CEE countries significantly outpaced the growth of developed Western European countries in the previous three years.[11] The issue, as we have already mentioned, is that Serbia completely diverges from this rule. According to the convergence law, Serbia should have significantly higher economic growth rates compared not just to the developed Western European countries, but also compared to the CEE countries, since it is lagging far behind in economic development. If we were to apply this "catch-up" rule, i.e. convergence rate of 2%, Serbia's economic growth should be approximately 1

p.p. higher than the average growth in CEE countries, due to the current gap in economic development. This means that when CEE countries are achieving 4% growth, the average Serbian growth should be about 5%. However, average economic growth in Serbia in the period 2016-2018 was at a mere 3.2% (Table 2), i.e. it was approximately 1.8 p.p. lower than the growth forecast using economic convergence.[12] Therefore, Serbia is not only failing to catch up to the economically more developed CEE countries - it is actually increasing its gap.

The main question raised in this paper is why Serbia is failing to catch up to the more developed countries, even though it should be doing so, i.e. why is its trend growth significantly lower than that of CEE countries, even though convergence dictates otherwise? In answering this question, we should first point out that there are not any major exogenous reasons why Serbia is failing to converge to CEE countries. Despite the fact that it is still not formally an EU member state, Serbia practically has a free access to the Union's economy and market, which should be a sufficient precondition for economic integration and convergence. Other CEE countries converged towards the more developed EU countries in their pre-accession periods (prior to 2003), exactly in line with expected catching-up process, even though they had not yet been members of the Union. Thus, in conditions similar to those Serbia faces today, these countries did show a catch-up effect. All this clearly indicates that the reasons for the absence of Serbia's expected convergence should be sought primarily among the internal, not the external factors.

Our empirical analysis on a sample of 26 EU countries (Section 2) showed that, in addition to the convergence

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11 In the observed period, CEE countries even had a somewhat faster growth than that implied by estimated rate of convergence i.e. 2%, but still within the expected range.

12 This effect relates directly to the increase of GDP *per capita*, so the results for GDP growth are obtained after adjustments for different demographic trends.

effect, the following factors play a major role in the economic growth of the observed country: corruption and rule of law, level of investment and education achievements. The worse off the aforementioned indicators in a given country, the lower its economic growth. In extreme cases, the negative impact of the aforementioned factors on GDP can completely stall the expected economic convergence of the less developed country towards the more developed countries. In simpler terms, since the catch-up effect is realized through the transfer of technology and know-how from the more developed to the less developed countries, it depends on the ability of the less developed country to absorb this technology and know-how, i.e. on its level of investment and on its human capital (education). If, in addition to these barriers, there is also an issue of pronounced corruption and deficient rule of law (which also obstruct the possibility of fast economic growth), the underdeveloped country can easily move in the opposite direction than expected, i.e. instead of catching up, it can fall even further behind.

The estimated growth equation (Section 2) applied to Serbia yields exactly this result, i.e. that Serbia falls behind. By indicators used to quantify corruption, rule of law, share of investments in GDP and the achievement of the education system, Serbia is at the very bottom of the European ranking lists. When these indicators for Serbia are put into the estimated growth equation, the result is a jointly yielded negative effect on the country's economic growth amounting to 1.5-2 p.p., i.e. exactly the magnitude of Serbia's estimated underachievement gap. In other words, these factors are most to blame for the fact that Serbian economic growth, in the long run, is lower than that of CEE countries, even though it should be the opposite.

The estimated equation also shows that among individual factors, the greatest negative impact on Serbian economic growth comes from corruption and poor rule of law. If Serbia were to decrease the level of corruption and improve the rule of law to the level of CEE country average, its economic growth would accelerate by 0.9 p.p. based on estimated growth equation. Increase in investments from the current 18% of GDP to 23% of GDP would add another 0.7 p.p. to economic growth, while the increase

in educational achievement to the level of CEE average would add another 0.2 p.p.[13] The estimated impact of each of these indicators should, of course, be taken as an indication and not as exact numbers. In continuation, we shall look into each of these factors impeding Serbia's economic growth in detail.

3.2 Investments

Investment increases quantity of physical capital, but also introduce technical progress, all together leading to increased economic growth. Relation between the magnitude of investment and economic growth is as direct as it can be. Countries with lower investments, as a rule, achieve lower economic growth rates. In line with the theoretical expectations, we statistically confirmed the positive relation between the level of investment and GDP growth (see Section 2). Since Serbia stands out in terms of its low share of investment in GDP relative to other CEE countries, it is one of the major reasons why Serbia's economic growth is so low. Starting from the estimated relation between investments and the level of economic development (see eq. 2, Section 2), we shall now estimate the level of warranted investment in Serbia. In addition, based on the estimated economic growth equation (eq. 1, Section 2), we shall provide an estimate on the deceleration of Serbia's economic growth due to the fact that the investment is not at the necessary level. Finally, by analysing individual components of investment (government investment, public enterprise investment and private sector investment), we identified the main reasons why the current level of investment in Serbia is insufficient, and advance the measures and reforms that can be implemented by the Government to increase investment in the medium term.

Magnitude of investment, similar to the GDP growth rate, depends on the level of economic development of the observed country. Less developed countries, as a rule, set aside a greater share of their GDP for investment. We

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13 The indicator for education that we used in the equation is actually the mean years of schooling among persons over the age of 25. Although it is proved to be statistically significant for GDP growth, some other indicators are probably better descriptors of education quality. This will be analyzed further in a separate section in this paper.

Table 3: Western European countries, CEE countries and Serbia:
GDP *per capita* and share of investments in GDP, average for 2015-2017

	GDP per capita (in PPP EUR)	Share of investments in GDP (%)
Western Europe (weighted average)	33400	20.4
Central and Eastern Europe (weighted average)	20500	21.0
Serbia	11400	17.1

Source: Eurostat.
Note: In 2018, Serbia achieved a significantly faster investment growth than GDP growth, which is why its current share of investments in GDP is probably somewhat over 18%.

tested this conjecture by exploring whether the share of investments in GDP depends on GDP *per capita*, as well as on rule of law and corruption. Using a sample of EU countries (with data from 1995 to 2017) the estimates show statistically significant of GDP *per capita* level on the size of relative investments (see eq. 2, Section 2). We then combine the estimated equation, with the current level of GDP *per capita* in Serbia and obtained that investments in Serbia should be about 2 p.p. of GDP higher than those in CEE countries.

In Table 3, we report GDP *per capita* and the share of investments in GDP for the period 2015-2017 for the different groups of EU countries (Western Europe and CEE) and for Serbia. Table 3 shows that, as expected, the 21% share of investment in GDP in CEE countries was higher than in more developed Western European countries (20.4%). Serbia, however, diverges from this rule completely, as its investments share was even lower than that in the developed Western European countries. According to the estimated model (eq. 2, Section 2), for a country at Serbia's level of development, the share of investment should be around 23% of GDP - i.e. about 2 p.p. higher than in CEE countries. However, the average share of investment in Serbian GDP in the period of 2015-2017 was at a mere 17.1%, i.e. about 6 p.p. lower than necessary. Due to such a low share of investment in GDP, we estimate that Serbia is losing between 0.5 and 1 p.p. of annual GDP growth.

Total investment represents the sum of a number of heterogeneous components (government investment, investment of public enterprises, investment of the domestic private sector and foreign direct investment). Hence, to assess total investment in Serbia, each of these segments must be analysed separately. Such analyses have shown that foreign investment is the only investment segment that is

currently at a satisfactory level (and shall not be discussed further in this paper). Of the remaining components, we estimate the necessary increase of public (government) investment in infrastructure to be at least 1 p.p. of GDP, investment of central and local public enterprises also somewhat over 1 p.p. of GDP and the investment of the domestic private sector 3-4 p.p. of GDP.

Government investment in Serbia in 2018 amounted to about 3.8% of GDP which is insufficient, as it is significantly lower than the corresponding public investment level in other CEE countries (amounting to about 4.5% of GDP). To make matters worse, the current public investment structure in Serbia is not satisfactory either, since an unusually high share of public investments pertains to the purchase of equipment for the military and the police, which have no significant positive effect on economic growth, while too little is spent on investment into infrastructure - especially in environment protection, education and healthcare. Serbia allocates only a third of the funds allocated by CEE countries for environment protection, education and healthcare (Table 4).

Comparative analysis shows that Serbia should increase public investment (excluding the security sector) by at least 1 p.p. of GDP i.e. investment into roads, railroads, environment protection, education, health care etc.[14] In the upcoming years there is fiscal space for such an increase, provided the Government (and Local governments) reform their loss-making public enterprises and change their economic policy priorities. More specifically, this

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14 Although Table 4 shows that Serbia has already reached the average share of investments in road and railroad infrastructure in CEE countries, we would also note that these countries, unlike Serbia, already have the basic infrastructure developed. At the time of the increased development of road and railroad infrastructure, as is the case in Serbia at the moment, investments for these purposes significantly exceed the usual level of about 1.5% of GDP.

Table 4: Serbia and CEE countries: share of pubic investments in GDP and their structure (in % of GDP)

	CEE average: 2006-2016	Serbia: Estimated budget execution in 2018	Serbia: Budget proposal for 2019
Total general government public investments	4.6	3.8	4
Defence and police	0.3	0.7	0.9
Public investments excluding the security sector	4.3	3.1	3.1
Road and railroad infrastructure	1.5	1.6	1.6
Health care, education and environment	1.3	0.4	0.4
Other	1.5	1.1	1.1

Source: Author's calculation based on Eurostat and Serbian Ministry of Finance data and Fiscal Council of Serbia reports.

means that the reforms should: cut down subsidies for local and national public enterprises (GSP – Belgrade public transport company, Resavica coal mine, etc), end excessive (economically unjustified) salary increases for the employees in general government (which had been the practice in the previous two years) and revise the unusually high government expenditures for the security sector.

As a rule, central and local public enterprises, even when they are not a direct cost to the budget, perform poorly and invest less than they should. Thus, for example, by far the largest of all public enterprises, EPS – electrical power company, has been investing less than its depreciation for years; therefore, not only has it failed to increase its production capacities, it has been decreasing them for years. Current estimates indicate that EPS should increase its investments by over 200 million Euros per year (about 0.5% of GDP) to increase production capacities and to reach EU environmental standards.[15] At that, there are also estimates that show that local public enterprises should increase their investments by over 100 million Euros (0.25% of GDP).[16] Since EPS and the local public enterprises (which employ about two-thirds of the overall number of employees in public enterprises in Serbia) should increase their investment by about 0.75% of GDP in total, we estimate that the total investment increase from all central and local public enterprises should amount to about 1 p.p. of GDP (and this estimate is probably conservative, as well).

Funds for the increase of investment of central and local public enterprises can be obtained through structural reforms which have been put off for years. These reforms are: downsizing the number of employees, increasing the collection rate for provided services (GSP), decreasing

technical losses in production and distribution (EPS and water supply companies), shutting down the non-viable departments (Resavica, EPS), decreasing corruption, in some cases increasing the prices for products and services etc. Public enterprise reforms are, therefore, an extremely important factor in accelerating the country's economic growth and the Government should finally put serious effort into this issue, instead of merely announcing reforms for years.

The largest investment gap (3 to 4 p.p. of GDP) in Serbia pertains to the domestic private sector. Although the private sector decides on its investment independently, the Government can have a significant positive effect by improving the currently very poor business climate. The business climate is comprised of a large number of different factors. For the purposes of this research, we tested via the impact of rule of law and corruption on the magnitude of private investment, and that proved to be statistically significant (eq. 2, Section 2). This means that the private sector in Serbia would be investing far more if there were less corruption and if the rule of law were to improve. The estimated equation for private investment explains just part of its variations indicating that, in addition to corruption and the rule of law, there is a whole range of other factors influencing the level of private investment. The obvious candidates are the country's low credit rating, poor quality of basic infrastructure etc.

3.3 Corruption and the rule of law

The high prevalence of corruption and low level of the rule of law significantly lowers economic growth. Corruption distorts the level playing field, encourages rent-seeking behaviour etc., leading to inefficient use of resources. In addition, the insufficiently efficient and independent judicial

15 [12].
16 [5].

**Figure 5: Serbia and CEE countries: World Governance Indicators
(mean value of the Control of Corruption and Rule of Law), 2010-2017**
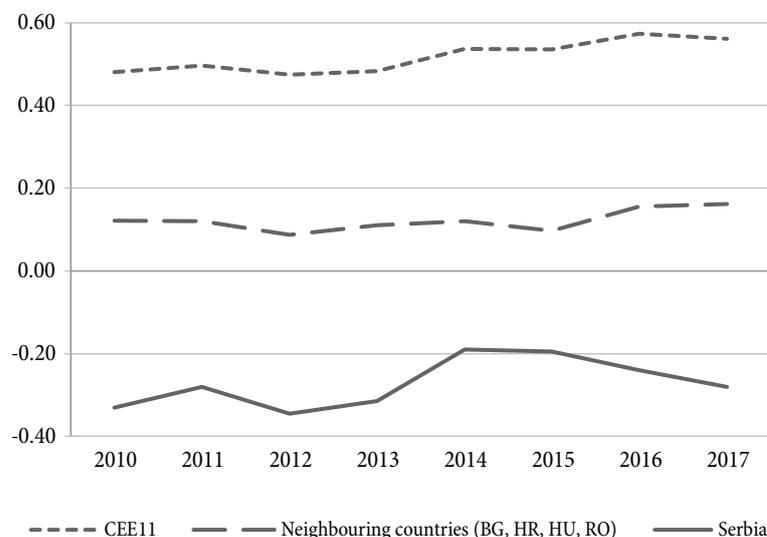
Source: World Bank, World Governance Indicators.

system places a major obstacle to businesses. If the legal protection of signed contracts isn't completely reliable and the collection on outstanding receivables through courts is inefficient, economic activity is stifled. Corruption and the rule of law variable[17] proves to be significant in our estimated growth equation (eq. 1, Section 2).

By its pronounced corruption and poor rule of law, Serbia ranks at the very bottom among European countries. This is indicated not only in the World Bank reports that we used for our quantitative analyses, but also in a whole range of other relevant international research (Transparency International, World Justice Project, World Economic Forum etc). Combining the estimated model (eq. 1, Section 2) and the corresponding indicator for Serbia, Serbia's economic growth would accelerate by about 0.5 p.p. just by improving the corruption and rule of law indicators to the level of the surrounding countries (average for Bulgaria, Romania, Hungary and Croatia). Let us stress that these four countries have practically the lowest scores for these indicators in the entire EU. If Serbia were to reach the average level for all CEE countries, its economic growth would most probably accelerate by an entire percent point.

In Figure 5 we have shown WGI indicators for corruption and rule of law for Serbia, EU countries surrounding

Serbia (Bulgaria, Romania, Hungary and Croatia) and CEE11 countries. In addition to Serbia's significant lag behind comparable countries, a particular concern when it comes to corruption and the rule of law, is the fact that the previous trend of their gradual improvement in Serbia was interrupted in 2014, when they started deteriorating. According to WGI data, Serbia's score in corruption and rule of law deteriorated from 2014 to 2017 from -0.19 to -0.28, while, at the same time, CEE countries achieved a mild improvement from +0.54 to +0.56 (Figure 5)[18] Other relevant international indicators measuring corruption and the rule of law show almost identical trends. Thus, according to Corruption Perceptions Index, published by Transparency International, Serbian score decreased from 41 to 39 from 2014 to 2018,[19] while in terms of relative ranking compared to other countries, Serbia fell from rank 78 (out of 174) to rank 87 (out of 180 countries). Similarly, according to the World Justice Project research, the total rule of law score in Serbia decreased from 2014 to 2018 from 0.51 to 0.50[20], while Serbia's standing decreased from rank 54 (out of 99 countries) to rank 76 (out of 113 countries).

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17 To assess corruption and rule of law, we used the World Bank data – Worldwide Governance Indicators (WGI).

18 WGI scores are estimates of governance: ranges from -2.5 (weak) to 2.5 (strong) governance performance.

19 Corruption perception is measured in the range from 0 to 100, wherein lower scores indicate higher corruption.

20 Overall Scores of the WJP Rule of Law Index are measured from 0 to 1, wherein countries with poorer rule of law show lower scores.

Finally, we would like to emphasize that the World Bank dataset (WGI), which we used for our analysis and econometric assessments (Section 2) practically consists of six individual indicators: 1) Voice and Accountability, 2) Political Stability and Absence of Violence, 3) Government Effectiveness, 4) Regulatory Quality, 5) Rule of Law and 6) Control of Corruption. Overall WGI score for a given country can be calculated as the average of these six indicators. However, in our research, we tested not just the impact of overall WGI score on GDP growth, but also the impact of its individual components. We got the best results using only the indicators of corruption and the rule of law in the estimated equation, i.e. out of the six individual governance indicators, these two have the greatest and the most direct impact on GDP growth.[21] The result we got is quite indicative as it shows that the decrease of corruption and improvement of the rule of law are fundamental channels through which the Government can influence the acceleration of economic growth. For example, adopting good EU regulations to improve the country score by the Regulatory Quality indicator cannot have a major impact on economic growth acceleration on its own, if the adherence to such regulations is not satisfactory (i.e. if there is pronounced corruption in the country and the rule of law is at a low level). Therefore, our analysis shows that, in order to accelerate economic growth, it is insufficient to simply copy the good laws and regulations from the EU (which is relatively easy to do), but that a progress in the fundamental indicators - decrease of corruption and the rule of law - is also needed in order to ensure efficient and consistent implementation of the good legislation.

3.4 Education

Economic theory recognizes at least three channels through which education impacts economic growth. First, better education increases labour productivity, leading to a greater value added per employee (classic growth theory). Second, education contributes to a greater innovative capacity of the economy, leading to faster economic growth (endogenous growth theory). Third, improved education facilitates the transfer of know-how and of new technologies from the more developed to the less developed countries (convergence theory). In line with such theoretical expectations, we included the education parameter in the estimated equation of economic growth for 26 EU countries, which revealed a statistically significant relation - i.e. better education increased the economic growth of the analysed countries (eq. 1, Section 2).

As for the education indicator per country, in the estimated equation we used the "mean years of schooling" as reported by UNDP within their Human Development Reports. Mean years of schooling is the average number of years of schooling among the population older than 25. In terms of this indicator, Serbia performs worse than other CEE countries. According to the data from the previous three years, adult Serbian citizens have, on average, 11.1 years of schooling which is by about a year less than the average in CEE countries (12.2 years). Estimated economic growth equation (eq. 1, Section 2) indicates that this gap in the years of schooling among the population translates to about 0.2 p.p. lower economic growth compared to other CEE countries.

The results for the effects of education on GDP should, however, be viewed with a certain reserve. Namely, the use of the indicator "mean years of schooling" in the estimated equation has its advantages, but it also has certain disadvantages. The advantages are that there are reliable annual series for this indicator coming from the same source (UNDP) for all countries included in the sample for the observed period since 1995. In addition, this indicator is simple and hasn't changed over time, i.e. it had always been measured using the same, completely comparable methodology in previous decades.[22] Finally, the estimated equation confirms that there is a statistically significant relation between the mean years of schooling and economic growth - implying that this indicator can somewhat approximate the human capital. Still, there are

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21 With the increase in the number of indicators, the relation with GDP growth became somewhat less clear - which is why our estimated equation only uses these two indicators and not the overall WGI score.

22 For the use of some other indicators in the estimated economic growth equation, which probably better reflect the quality of education than the Mean years of schooling (e.g. the PISA tests implemented by OECD), there is insufficient comparable annual data by countries in the last 25 years.

two important disadvantages of this indicator, which are important to note as, we believe, they affect the results derived from the econometric analysis.

First of all, the time spent in schooling, by definition, is not the best reflection of the quality of the educational system. The quality of a single year of schooling in Finland and Bulgaria are quite different (as indicated by other relevant research), which means that two countries with the same mean years of schooling do not necessarily have identical human capital quality. In simpler terms, it is not very likely that Serbia will accelerate its economic growth to a significant degree by having its population spend more time in school, without the improvement of the educational system. The second issue with the used indicator is the fact that data shows that CEE countries actually do not differ much in the mean years of schooling of their population. All CEE countries fall within a very narrow range from 11 to 13 years, and this small range can be attributed to the common legacy of a relatively good reach of the educational system, originating from socialist times.

Because this indicator, which we used in our model, fails to capture all quality characteristics of educational systems in individual countries, and because the data does not vary significantly, the estimated impact of education on the economic growth is probably somewhat underestimated. In other words, the relation between the quality of education and the economic growth is indisputable and we have confirmed it in our model. However, since we have not managed to capture all of the properties of a good educational system in a single indicator, the coefficient in our model is probably somewhat underestimated, i.e. the impact of education improvement on acceleration of Serbia's economic growth is probably somewhat higher than the 0.2 p.p. resulting from the estimated model.

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MULTIPLIERS AND FOREIGN DIRECT INVESTMENT IMPACT ON GROWTH

Multiplikatori i uticaj direktnih stranih investicija na rast

Abstract

One way to achieve high and sustainable growth is for the government to use subsidies and tax incentives not only for foreign investments, but also for domestic investments, in sectors where multipliers justify such a policy. In this paper, we introduce two novelties into practical input-output analysis: statistical and analytical. We have presented multipliers which were never before calculated for Serbia, and analyzed sectoral impacts of investment based on their partition into domestic and foreign investments. On the basis of preliminary data from the Statistical Office of the Republic of Serbia, we have compiled an input-output table for 2014 and estimated the multipliers of production, employment, income and investment. These results were compared with the National Bank of Serbia (NBS) data on foreign direct investment (FDI) in the 2010-17 period. Those information provide evidence about the economy-wide efficiency of FDI. Our conclusion is that FDI does not go into sectors where the greatest effects are on output and employment. Investors take care of their own commercial interests, which do not necessarily coincide with social interests. We recognize the efforts the government has put into promoting economic growth by subsidizing FDI, which has an unintentional side effect of depressing domestic investment. Our analysis shows that encouraging domestic investment through reduction in corporate income tax would be a useful complement to promoting FDI through subsidies. Also, on the basis of multipliers, the government could better define sectoral priorities in fostering FDI.

Keywords: *input-output tables, multipliers, foreign direct investment, growth.*

Sažetak

Jedan od načina da se postigne visok i održiv rast jeste da Vlada koristi subvencije i poreske podsticaje, ne samo za strane investicije, nego i za domaće investicije i to u sektorima u kojima multiplikatori opravdavaju ulaganja. U ovom radu uveli smo dve novine u praktičnu input-output analizu: statističku i analitičku. Po prvi put smo obračunali za Srbiju multiplikatore, jer ranije nije postojala statistička osnova za to, i analizirali smo sektorski uticaj investicija na osnovu njihove podele na domaće i strane investicije. Na bazi preliminarnih podataka Republičkog zavoda za statistiku formirali smo našu input-output tabelu za 2014. godinu i ocenili multiplikatore proizvodnje, zaposlenosti, dohodaka i investicija. Ove rezultate smo uporedili sa podacima Narodne banke Srbije (NBS) o stranim direktnim investicijama (SDI) u periodu 2010-17. godine. Na osnovu tih informacija mogli smo da izvedemo zaključke o opštoj efikasnosti SDI. Naš zaključak je da SDI ne idu u sektore gde postoji najveći efekat na proizvodnju i zaposlenost. Investitori vode računa o svojim komercijalnim interesima, što nužno ne mora da se poklapa sa društvenim interesima. Mi smo prepoznali činjenicu da Vlada vodi računa o razvoju privrede i da shodno tome podstiče SDI, ali previđa da time depresira domaće investicije. Naša analiza pokazuje da bi podsticanje domaćih investicija preko smanjivanja poreza na profit moglo da predstavlja neophodnu dopunu za podsticanje SDI putem subvencija. Takođe, na bazi multiplikatora, Vlada bi mogla bolje da odredi sektorske prioritete u podsticanju SDI.

Ključne reči: *input-output tabele, multiplikatori, strane direktne investicije, rast.*

Introduction

The government can partially - but not entirely - influence the inflow of FDI with its policy of subsidies and tax incentives. The remaining factors influencing investment decisions depend on the commercial conditions, development of the market and risk assessment of the investors by themselves. When they decide on new investments, data on multipliers are extremely important in order to assess the overall effects which such investments will make to their business. In this sense, multiplier analysis from input-output tables is crucial for the correct assessment of investment impacts.

That equally applies to the government. If it is trying to determine the differential effects of FDI spending on the output and employment of a sector, comparison of related multipliers will show where this spending will have the greatest impact generated throughout the economy. If maximum total employment effects are the exclusive goal of FDI spending, it would always be rational to channel all the money to the sectors with the largest employment multiplier. This, *mutatis mutandis*, holds for the output. Of course, there might well be other reasons – taking into account strategic factors, equity, capacity constraints for sectoral production, regional development – for directing some of the new FDI to the output and employment of other sectors. However, the lack of information on multipliers and their size precludes the government from assessing correctly which sectors to channel new FDI into.

Serbia has neither input-output tables nor estimated multipliers, despite the relatively advanced status of statistics in Serbia. In this paper, we will provide estimates of those multipliers[1]. The Statistical Office of the Republic of Serbia (RZS), in cooperation with Eurostat, is currently working on compiling I-O tables for the 2016-17 period. Input-output tables for 2014-15 already exist, but are not yet ready for official publication[2]. In such a situation, we used these

raw data; where balancing was needed we mathematically reconciled imbalances, and we added our estimates for the sectoral distribution of income from work and property, operating surplus, as well as employment distribution by sectors and products. On that basis we have compiled a 25x25 I-O table for 2014 from the original 65x65 table. Any errors or omissions are entirely ours.

In 2012, the RZS made an extensive survey among 17,627 undertakings in Serbia on the structure of business revenue and costs for 2011, with the assistance of Eurostat. This survey created a principal data set for assessment of Serbia's economic structure [9].The survey has provided data that enable observation of the structures of the production processes of all the activities of the national economy (NACE classification) and products (CPA classification). The data collected by this survey were later updated and used by the RZS for calculation of the production and technical coefficients needed for compiling supply and use tables as well as the symmetric input-output matrices for 2014-15.

On the other hand, the National Bank of Serbia (NBS) records FDI data within its balance of payments account [7]. These data have been disaggregated to the level of 25 branches of activity over the past eight and a half years (from the first quarter of 2010 to the second quarter of 2018). For that reason, we have compiled a parallel I-O table of 25x25 that fully corresponds to these accounts. A period of eight years is long enough to reveal trends in the allocation of FDI. During this period, a total of EUR 15.7 billion was invested or an average of EUR 2 billion per year. These figures are gross data that do not take into account the outflow of capital from the country. According to these data, the most FDI was invested in the sectors of financial services, trade and transportation, construction, mining and food processing.

Based on the I-O matrix, we have calculated multipliers of output, employment and income. These multipliers show how many units change output, employment, or income, if the final demand increases for one unit. Final demand or final use includes private personal consumption, government consumption, investments and exports.

In our analysis, we proceed in three steps. In the first step, we adopt the assumption that all components of final demand are exogenously determined. This cannot be

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1   For theoretical background, see [3], [4] and [5].

2   The draft version of use, supply and I-O tables was prepared under the IPA project *The Strengthening of the Serbian Statistical System by Upgrading Methodologies and Standards and by the Appliance of Good Practice.* The project was implemented by a consortium led by GOPA, Worldwide Consultants, Bad Homburg, Germany. We were on the team as a short-term consultant with the task to calculate input-output multipliers and assess whether there are any inconsistencies in I-O tables from that point of view.

taken for granted because, for example, export depends on transformation of gross product to domestic product and export. However, this cannot be modelled on the basis of an I-O analysis. It requires a CGE model that will have an I-O table, but also other relationships that allow modelling export as an endogenous variable. A similar objection could be raised with respect to personal consumption. Nevertheless, we temporarily treat all components of final demand as exogenous variables. In this sense, we have calculated multipliers of type I or simple multipliers.

In the next step, we calculate multipliers of the type II or total multipliers. They imply that personal consumption is endogenized and bound to gross income. The underlying assumption is that there are no changes in consumption unless they are generated by additional income, which will have repercussions to inter-industrial flows of goods and services. Other parts of final demand are held as exogenous variables.

It is not entirely correct to assume that all investments are exogenous. In the third step, we recognize that domestic investments depend on domestic savings, or on operating surplus (including depreciation allowances), which is an element of the I-O table. It still makes sense to treat foreign investments as exogenous, because in the I-O framework they do not react to changes in inter-industrial flows of goods and services in the domestic economy. In standard I-O tables, FDIs are not separated from domestic investment. Since we are particularly interested in assessing effects of FDIs, we endogenize domestic investment, while leaving FDIs as exogenous. When modelling investment multipliers, we will bear in mind this double nature of investment. Please notice that under this assumption all remaining components of final demand remained exogenous variables. We call this type of multipliers type III or investment (induced) multipliers.

Three different types of multipliers are based on three different analytical assumptions. Irrespective of that, each of these multipliers points to the same conclusion. We have found that there was no statistically significant relation between the FDI structure and the I-O multipliers. We illustrated this conclusion with Spearman's correlation coefficients of rank-order. None of these correlation coefficients was statistically significant. In other words,

the zero hypothesis that there is no statistically significant relation between these indicators could not be rejected with a significant degree of probability. Statistical analysis disclosed that FDIs were not invested in the sectors where they generate the greatest direct and indirect effects.

The paper is organized in the following way. In the first part, we present the design of the I-O table for 2014. In the second and third sections, we explain the calculation of simple and total multipliers. In the fourth part, we show the dynamics of investment, its partition into domestic and foreign parts, and calculate investment multipliers. In the fifth part, we explain the related economic concept of elasticity of output. In the sixth part, we compare FDI with corresponding multipliers and assess their efficiency. Also, we estimate the impact of FDI on output by using the I-O framework. We give a brief conclusion and propose how to improve the public policy of promoting investment.

Input-output table

The input-output framework consists of three types of tables: supply tables, use tables and symmetric input-output tables. The supply and use tables enable detailed analysis of industries and products through a breakdown of the production account, the goods and services account and the generation of income account. These tables show the structure of the costs of production and income generated in the production process, the flow of goods and services produced within the national economy, and the flows of goods and services with the rest of the world.

A supply table has the format of "product by industry" and shows the supply of goods and services by product and by type of supplier, distinguishing supply by domestic industries and imports from other countries. In the production matrix (transposed make matrix), the domestic output of industries is shown by products. The vector of import shows total imports of the country by products. The last row of the supply table records total output by sector, total imports and total supply by product. In the last column of the supply table, total supply by product is reported consisting of domestic and imported products. The supply table is compiled at basic prices.

The use table has the format of "industry by product" and shows how value added components (compensation of employees, net taxes on production, consumption of fixed capital, net operating surplus) are generated by industries in the domestic economy and provides a detailed picture of the use of goods and services for intermediate consumption and final use (consumption, gross capital formation and exports).

A symmetric input-output table has the format of "product by product". Transformation of use and supply tables into input-output tables is illustrated in Figure 1. *Exempli causa*, we use only four sectors (agriculture, mining, manufacturing and services). The classification in the symmetric input-output tables coincides with those in the supply and use tables. The symmetric input-output table is accompanied by a symmetric input-output table for domestic output and a matrix showing the use of imports. The symmetric input-output table at basic prices is our main target for analysis.

The number of products and sectors do not have to be equal. In practice, there often are many more products than sectors. Hence, two rectangular matrices should be transformed to a square or symmetric input-output matrix.

This transformation requires a set of supply and use tables at purchasers' prices and valuation matrices from which supply and use tables at basic prices can be compiled with separate results for domestic output and imports.

As emphasized by Eurostat, the input-output tables and in particular the supply and use tables serve two purposes: statistical and analytical. They provide a framework for checking the consistency of statistics on flows of goods and services obtained from quite different statistical sources, and for calculating much of the economic data contained in the national accounts. As an analytical tool, input-output data are conveniently integrated into macroeconomic models in order to analyze the link between final demand and industrial output levels. Input-output analysis also serves a number of other analytical purposes such as impact analysis, productivity analysis, employment effects, analysis of interdependence structures and analysis of price change [2, p. 297].

For analytical purposes we reduced the original size of the I-O matrix from 65x65 sectors to 25x25 sectors. We have done this in order to work with the same homogeneous sectors for which NBS provides data on FDIs. Also, we wanted to have the same aggregates as used by the RZS in

Figure 1: Transformation of use and supply tables to an input-output table, product by product

Products \ Products	Homogeneous units of production				Final use			Total
	Agriculture	Mining	Manufacturing	Services	Final consumption	Gross capital formation	Export	Total
Agriculture Mining Manufacturing Services	Intermediate consumption by products and homogeneous units of production				Final use by products and categories			Total use by products
Value added	Value added by components and homogeneous units of							GDP
Import by similar products	Total import by products							
Supply	Total supply by homogeneous units				Total final use by categories			Total supply

its quarterly GDP accounts. For that reason, we selected 13 broad classification divisions, and then disaggregated manufacturing into 12 sectors. This resulted in an input-output matrix with different levels of aggregation from the original one, but comparable to the FDI figures and quarterly GDP.

We present in Table 1 a part of the input-output table for 2014, with figures for only the first three sectors and the last three sectors. The complete table is too large to be published here.

Simple multipliers

The input-output matrix for 2014 was estimated in a reduced-form format as reported in Figure 1. Value added was not separated into key factor income accounts, but aggregated into a single account. The final use part also was not disaggregated into components, but compiled as a single account. Such a table allows us to calculate output and employment multipliers per RSD 1.0 change of final demand.

Input-output simple multipliers have been defined in a standard way [5]. Let's define intermediate inputs' transaction matrix $\mathbf{Z}$ as:

$$\mathbf{Z} = (z_{i,j}) \quad , \quad for \ _{i,j} = 1,\dots,25 \qquad (1)$$

and technical coefficients:

$$a_{i,j} = \frac{z_{i,j}}{x_j}, \quad \mathbf{A} = (a_{i,j}) \qquad (2)$$

where vector $\mathbf{x} = (x_j)$ is the vector of output by j sectors.

If we define the vector of final demand $\mathbf{y} = (y_j)$, then we got a standard Leontief system (3):

$$\mathbf{x} = \mathbf{A} \bullet \mathbf{x} + \mathbf{y} \qquad (3)$$

with the solution:

$$\mathbf{x} = (\mathbf{I}\text{-}\mathbf{A})\text{-}1 \bullet \mathbf{y} = \mathbf{L} \bullet \mathbf{y} \qquad (4)$$

$\mathbf{L} = (\mathbf{I}–\mathbf{A})^{-1} = (l_{i,j})$ is the Leontief inverse matrix of total input requirements per a unit of output $\mathbf{x}$, which depends on the vector of final demand $\mathbf{y} = (y_j)$.

Simple output multipliers

An output multiplier for sector j is defined as the total value of production in all sectors of the economy that is necessary in order to satisfy a dinar's worth of final demand for sector j's output. The simple output multiplier is one out of several closely related types of multipliers and input-output effects. For the simple output multiplier, this total production is obtained from a model with households deemed to be exogenous. It is calculated from the Leontief inverse $(\mathbf{I}\text{-}\mathbf{A})^{-1}$ as the column totals:

$$m(o) = u \bullet L \qquad (5)$$

where $\mathbf{u} = (1,1,\dots,1)$ is the unit row vector.

As Table 2 reveals (the first row on the left), the simple multiplier for the agricultural sector in Serbia shows that RSD 1.6212 of extra output will be induced in the economy by investing one additional dinar in agriculture (consumption or investment). In other words, to produce RSD 1 of output in 'Agriculture', aside from the Agriculture's additional unit of output, the economy's

Table 1: Extract from the input-output matrix

			1	2	3	...	23	24	25					
	CPA		A	B	C10	...	M,N	O,P,Q	R,S,T	Con-		Gross		
							Profes-	Public	Arts	sump-	Government	capital	Total	Total
		Sectors	Agriculture	Mining	Food	...	sional	Public	Arts	tion	consumption	formation	exports	supply
1	A	Agriculture	53,760	33	298,055	...	982	1,938	692	152,799	59	19,528	70,780	642,740
2	B	Mining	158	25,876	431	...	148	641	150	17,093	0	-3,277	5,932	306,259
3	C10	Food processing	20,423	12	153,899	...	129	7,493	272	484,006	0	3,360	173,576	877,336
...	...	...	...	...	... ...	...	...	...	...	...	...	...	...	...
23	M,N	Professional services	6,601	4,553	32,179	...	90,423	32,486	27,012	75,109	9,226	40,148	83,047	602,848
24	O,P,Q	Public services	94	124	583	...	722	7,604	775	103,057	585,712	0	3,281	706,404
25	R,S,T	Arts&Others	298	102	573	...	1,684	5,900	16,666	196,340	13,307	3,414	5,928	259,394
		Value added, gross	343,494	44,733	463,814	...	298,726	486,250	145,010					
		Output	575,945	112,926	752,565	...	509,580	700,156	257,582					
		Imports cif	66,797	193,333	124,776	...	93,268	6,248	1,813					
		Supply at basic prices	642,742	306,259	877,341	...	602,848	706,404	259,395					

ESA2010 Questionnaire 1700 - Symmetric input-output table at basic prices (product x product), 2014, mil.RSD

Table 2: Simple output multipliers effects

Sectors	Simple multiplier	Initial effects	Direct effect	Indirect effect	Sectors	Simple multiplier	Initial effects	Direct effect	Indirect effect
Agriculture	1.621	1.000	0.362	0.260	Transport vehicles	1.363	1.000	0.209	0.154
Mining	1.368	1.000	0.223	0.145	Furniture	1.787	1.000	0.468	0.320
Food	2.450	1.000	0.770	0.680	Electricity & gas	2.603	1.000	0.670	0.933
Textile	1.511	1.000	0.316	0.195	Water supply	1.914	1.000	0.494	0.420
Wood	1.800	1.000	0.444	0.356	Constructions	2.098	1.000	0.585	0.513
Coke & petroleum	1.673	1.000	0.466	0.207	Trade & transportation	1.899	1.000	0.505	0.394
Chemicals	1.471	1.000	0.282	0.189	Information	1.628	1.000	0.372	0.255
Pharmaceutics	1.496	1.000	0.299	0.197	Financial services	1.645	1.000	0.387	0.258
Rubber & plastics	1.845	1.000	0.477	0.368	Real estate	1.487	1.000	0.246	0.240
Metals & metal products	1.830	1.000	0.464	0.366	Professional services	1.597	1.000	0.350	0.247
Electrical eqipments	1.401	1.000	0.234	0.167	Public services	1.550	1.000	0.303	0.247
Machinery	1.189	1.000	0.150	0.039	Arts & others	1.752	1.000	0.434	0.318

output will increase by an additional RSD 0.6212. That increase is composed of RSD 0.3617 of inputs from the suppliers to the 'Agriculture' in order to satisfy its additional demand, and RSD 0.2595 to provide inputs to the suppliers to the 'Agriculture'. The effects encompassed by the simple multiplier are the initial effect (RSD 1.00), the first round effect or direct effect (RSD 0.3617) and the industrial support effect or indirect effect (RSD 0.3617)[3].

The sectors of mining, machinery and production of other transportation vehicles have lower simple output multipliers than agriculture: 1.3680, 1.1891 and 1.3629, respectively. The sectors with the highest simple output multipliers are: food processing (2.4498), electricity and gas (2.6027) and construction (2.0978).

The direct effects can be read from the matrix of the technical coefficients A. The initial effects are equal to 1.00. The direct effects are the column sums of the direct requirement matrix A. Then the indirect effects are easily calculated as: *Indirect effects = Multiplier type I - Initial effects - Direct effects*. The indirect effects and the direct effects are shown in the second and third column of the Table 2 for all production activities. We can also

calculate the production induced effects from Table 2. The formula is: *Production induced effect = Direct effects + Indirect effects*. In the case of the agriculture sector, the production induced effect was 0.6212.

Simple employment multipliers

Employment effects have also been defined in a standard way. Let's define the row of employments by sectors as $\mathbf{h} = (h_j)$. The row vector of employment per unit of output e is:

$$\mathbf{e} = \mathbf{h} \cdot \hat{\mathbf{x}}^{-1} \qquad (6)$$

where matrix is a diagonal matrix of output by sectors. Employment as a function of final demand is:

$$\mathbf{h} = \mathbf{e} \cdot \mathbf{L} \cdot \mathbf{y} \qquad (7)$$

Employment direct effects are defined by matrix multiplication $\mathbf{e} \cdot \mathbf{A}$, employment indirect effect by $\mathbf{e} \cdot (\mathbf{L} - \mathbf{A})$, and employment overall effects by $\mathbf{e} \cdot \mathbf{L}$. We call them effects rather than multipliers because their value depends on the unit of measure. In order to neutralize the impact of measurement, multipliers are defined per unit of employment per unit of output (e_j) in equ. (9). Direct and indirect employment effects are obtained by equ. (8) and (10).

Employment simple direct effects: $\mathbf{e} \cdot \mathbf{A} \cdot \hat{\mathbf{e}}^{-1}$ (8)

Employment simple multipliers: $\mathbf{m}(\mathbf{e}) = \mathbf{e} \cdot \mathbf{L} \cdot \hat{\mathbf{e}}^{-1}$ (9)

Employment simple indirect effects: $\mathbf{e} \cdot (\mathbf{L} - \mathbf{A}) \cdot \hat{\mathbf{e}}^{-1}$ (10)

We report employment simple multipliers and related effects in table 3. How should multipliers of employment be interpreted? If, at a given level of final demand, employment in a sector increases, for example

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3 Figures for the Australian economy in 1990 were rather similar: "The simple multiplier for Agriculture shows that $1.6281 of extra output from the Australian economy is induced by an additional output of $1.00 in the Agriculture. In other words, to produce an additional unit of output in 'Agriculture', aside from Agriculture's additional unit of output, the economy's output must increase by an additional $0.3719 in order to provide inputs to 'Agriculture', and in turn to increase by $0.2562 to provide inputs to the suppliers to 'Agriculture'. The effects encompassed by the simple multiplier are the initial effects ($1.00), the first round effects ($0.3719) and the industrial support effects ($0.2562)". See [1].

Table 3: Employment simple multipliers and effects

Sectors	Simple multiplier	Initial effects	Direct effects	Indirect effects	Sectors	Simple multiplier	Initial effects	Direct effects	Indirect effects
Agriculture	1.217	1.000	0.140	0.077	Transport vehicles	1.309	1.000	0.178	0.131
Mining	1.698	1.000	0.392	0.306	Furniture	1.869	1.000	0.524	0.345
Food	3.256	1.000	1.466	0.791	Electricity & gas	3.666	1.000	0.968	1.698
Textile	1.590	1.000	0.384	0.205	Water supply	1.536	1.000	0.311	0.225
Wood	2.390	1.000	0.780	0.610	Constructions	1.670	1.000	0.387	0.283
Coke & petroleum	2.648	1.000	0.981	0.667	Trade & transportation	1.511	1.000	0.304	0.206
Chemicals	2.501	1.000	0.750	0.750	Information	1.425	1.000	0.277	0.148
Pharmaceutics	2.930	1.000	1.046	0.883	Financial services	1.626	1.000	0.387	0.240
Rubber& plastics	2.229	1.000	0.651	0.578	Real estate	2.965	1.000	1.219	0.746
Metals & metal products	2.049	1.000	0.561	0.488	Professional services	1.802	1.000	0.477	0.325
Electrical eqipments	2.013	1.000	0.574	0.439	Public services	1.391	1.000	0.230	0.161
Machinery	1.353	1.000	0.247	0.106	Arts & others	1.197	1.000	0.135	0.063

by 100 jobs, how much will this sector induce new jobs in the whole economy, bearing in mind the production-technological linkage of the economy? In agriculture, another 21.75 jobs will be created, as multiplier I is 1.2175. In the economy as a whole, that is the smallest effect. The largest effect takes place in electricity and gas, where 266.62 jobs will be created if the initial employment rises by 100 jobs. The feedback effect on the sector itself is that an additional 96.82 jobs will be generated, but in the rest of the economy, as many as 169.80 jobs will be created. After electricity and gas, the next greatest promoters of additional employment are food processing (3.2561), real estate (2.9651), pharmaceuticals (2.9296) and production of motor cars (2.9120).

Total multipliers

The household sector receives wages and salaries for work done in the production process and spends some or all of this income on goods and services. If we add to the previously defined **A** matrix the remuneration row and the personal consumption column, we will augment that matrix and obtain the **B** matrix, which in effect adds a "household" sector to the production side of the economy.

By this modification to the input-output table, we are in position to calculate total multipliers. They change the analytical treatment of personal consumption. Instead of being treated as an exogenous variable, it is now endogenized and linked to employee remunerations. This means that

we introduce an assumption that personal spending is financed by employee compensation for work done. In this sense, there is no increase in consumption without a corresponding increase in salaries and wages. Previously, in calculating the simple multiplier, we effectively assumed that the spending of households took place outside the model and there was no feedback between the household sector and other sectors. However, in calculating now the total multiplier, we allow the feedback to occur, and the input-output table is said to be closed with respect to households.

It is obvious that total multipliers cannot be estimated without data on labour compensation. In the augmented input-output table, the consumption column matches the remuneration row. The augmented input-output table for Serbia has the format as reported in Table 4. The shadow areas indicate the adjustments made in the previous input-output table. Subscripts i,j represent rows and columns respectively, and Σ summation.

Types of total multiplier

Let's mark the vector $\mathbf{w} = (w_j)$ employee remuneration per unit of output, and matrix **B** as the augmented technological matrix. Then the total income multiplier has the form as in the equation (11). At the same time, the previously defined simple output and employment multipliers change their form according to equations (12) and (13), respectively. The matrix $\overline{\mathbf{B}} = (\mathbf{I} - \mathbf{B})^{-1}$ is the Leontief inverse of the **B** matrix.

Total income multipliers $\quad \overline{\mathbf{m}}(\mathbf{w}) = \mathbf{w} \cdot \overline{\mathbf{B}} \cdot \hat{\mathbf{w}}^{-1}$ (11)

Total output multipliers $\quad \overline{\mathbf{m}}(\mathbf{o}) = \mathbf{u} \cdot \overline{\mathbf{B}}$ (12)

Total employment multipliers $\overline{\mathbf{m}}(\mathbf{e}) = \mathbf{u} \cdot \overline{\mathbf{B}} \cdot \hat{\mathbf{e}}^{-1}$ (13)

The consumption induced effects can then be calculated as: *Consumption induced effects = Total multiplier type – Simple multiplier*. Table 5 shows total multipliers for output, employment and income. Endogenization of consumption caused an increase in output multipliers. The average total multiplier is 2.2781, while the average simple multiplier is 1.7123. This means that consumption induces an increase in output multipliers by 0.5658 on average. The branches where this effect is greatest are: food (3.8203, induced for 1.3706), electricity (3.3541, induced for 0.7515), construction (3.0828, induced for 0.9850), trade (2.7864, induced for 0.8878) and finances (2.6352, induced for 0.9905).

The effect of consumption spending on total multipliers is lower for employment and income than for output, but it is also significant here. In principle, consumption increases the multiplier effect everywhere, except for income multipliers in the case of textile, pharmaceutics, metals and metal products, and food sectors.

Table 4: The format of augmented input-output table

Products	Agriculture	Mining	Manufacturing	Services	Consumption	Investment	Export	Government	Total
Agriculture									Total gross output
Mining			Intermediate inputs			The net final demand			
Manufacturing									
Services									
Compensation		Compensation of employees by products			0				Σj
Operating surplus		The net value added by products							
Depreciation allowances									
Import		Import by products and tariffs							
Total		Total gross output							

Table 5: Consumption induced multipliers

	Output multipliers		Induced effects	Employment multipliers		Induced effects	Income multipliers		Induced effects
	Simple	Total		Simple	Total		Simple	Total	
Agriculture	1.6212	1.9910	0.3698	1.2175	1.2643	0.0468	1.3876	2.2490	0.8614
Mining	1.3680	1.6386	0.2706	1.6976	2.0278	0.3302	1.6577	1.8092	0.1515
Food	2.4498	3.8203	1.3706	3.2561	3.7896	0.5334	2.1767	1.8467	-0.3300
Textile	1.5105	1.9894	0.4788	1.5896	1.8050	0.2153	1.7462	1.7149	-0.0312
Wood	1.7997	2.1937	0.3940	2.3898	2.7301	0.3403	2.1933	2.4656	0.2723
Coke/petroleum	1.6728	2.0516	0.3787	2.6481	3.3576	0.7095	1.7090	1.9304	0.2214
Chemicals	1.4714	1.6229	0.1515	2.5007	2.9518	0.4510	2.3425	3.0552	0.7127
Pharmaceutics	1.4961	1.7690	0.2729	2.9296	3.6190	0.6894	2.2545	2.1127	-0.1418
Rubber/plastics	1.8451	2.2511	0.4061	2.2292	2.6236	0.3944	2.0213	2.3611	0.3398
Metals	1.8296	2.2971	0.4674	2.0491	2.4268	0.3777	2.4007	2.2477	-0.1530
Electrical eqipments	1.4012	1.7188	0.3176	2.0128	2.4631	0.4503	1.8021	1.8077	0.0056
Machinery	1.1891	1.3523	0.1632	1.3528	1.6451	0.2923	1.2594	1.4494	0.1901
Motor vehicles	1.8314	2.3598	0.5284	2.9120	3.6716	0.7596	1.9470	2.0828	0.1358
Transport vehicles	1.3629	1.7120	0.3491	1.3094	1.4786	0.1692	1.5589	1.6117	0.0528
Furniture	1.7874	2.4541	0.6667	1.8688	2.2184	0.3496	1.8009	1.8019	0.0010
Electricity/gas	2.6027	3.3541	0.7515	3.6662	4.8991	1.2329	2.5899	3.0548	0.4650
Water supply	1.9136	2.5218	0.6082	1.5365	1.7218	0.1853	1.7051	2.0357	0.3306
Constructions	2.0978	3.0828	0.9850	1.6697	1.9440	0.2743	1.8751	1.8886	0.0135
Trade	1.8986	2.7864	0.8878	1.5109	1.7135	0.2026	1.7667	1.7886	0.0219
Information	1.6275	2.4273	0.7997	1.4245	1.6117	0.1871	1.5317	1.6289	0.0973
Finance	1.6446	2.6352	0.9905	1.6261	2.0063	0.3802	1.5523	1.5811	0.0288
Real estate	1.4867	1.9184	0.4318	2.9651	3.5839	0.6188	1.2394	2.2522	1.0128
Professional	1.5969	1.8992	0.3023	1.8016	1.9823	0.1807	1.4866	2.8120	1.3254
Public	1.5496	2.2237	0.6741	1.3912	1.6061	0.2149	1.2870	1.5745	0.2875
Arts	1.7522	2.8817	1.1295	1.1972	1.2936	0.0963	1.5678	1.5047	-0.0630

Investment induced multipliers

We will measure the impact of FDI on development by two methods. The first method is to compare multipliers and FDI directly by branches of activity. What we want to discover is whether the priorities in allocating investments and total, direct and indirect multipliers coincide or not. In the previous section, we provided data on multipliers, and the next part of the paper will show how FDI was allocated across branches. On the basis of this information, we will conclude whether the investments could have influenced development better than they actually did.

The key fact of this approach is to treat all investments as exogenous variables that are part of the final demand in input-output matrices. In this sense, the model is "open", because funding investment and investment allocation are completely independent of the inter-industrial links described by the matrix of technical coefficients. In the second method, however, we will partially "close" the model and separate the investments into FDI and DI (domestic investment). For DI, we will assume that it is financed out of operating surplus, including depreciation allowances. In this sense, any change in operational surplus will affect the level of DI that, in return, will affect sectoral production and additional generation of operating surplus.

Technically speaking, the whole analysis resembles the method of endogenization of consumption spending in an input-output framework. Instead of expanding the matrix **B**, we will form an augmented matrix $\mathbf{D} = (d_{i,j})$. In it, the salary row will be replaced by operating surplus, and the column of consumption with domestic investments. FDI is still a part of the final demand that we treat as an exogenous variable in the usual manner for I-O analysis.

If we mark with $\overline{\mathbf{D}} = (\mathbf{I} - \mathbf{D})^{-1}$ the Leontief inverse of the augmented matrix **D**, the output multiplier based on induced investment is defined as:

Total output multipliers
(induced by domestic investment) $\quad \overline{\mathbf{m}}\,(\mathbf{d}) = \mathbf{u} \bullet \overline{\mathbf{D}} \quad$ (14)

We report in Table 6 (the first column) total output multipliers induced by DI under the hypothesis that the surplus for 2014 remains as provided by the RZS. Then we made a simple, but highly important counterfactual experiment. We inflated surplus across the sectors by 10 percent, and recalculated multipliers. The outcome is reported in the second column of Table 6. All multipliers increased more or less, but by 4% on average. More funding for domestic sources for investment will further promote growth and consequently employment and income.

This counterfactual experiment demonstrated one important fact. The impact of FDI on output can be improved by a corresponding policy of distribution that promotes savings from the operating surplus.

Multipliers and elasticities

Multipliers are closely related to coefficients of elasticity, but are not identical concepts. The difference arises from different units of measure and interpretation. If, for

Table 6: Total output multipliers induced by investment

Sectors	Total output multipliers			Sectors	Total output multipliers		
	Normal surplus	Inflated surplus by 10%	Difference		Normal surplus	Inflated surplus by 10%	Difference
Agriculture	2.247	2.275	0.028	Transport vehicles	1.434	1.459	0.025
Mining	1.465	1.485	0.020	Furniture	1.902	1.950	0.048
Food	2.850	2.950	0.100	Electricity & gas	3.017	3.072	0.055
Textile	1.578	1.612	0.035	Water supply	2.246	2.290	0.045
Wood	2.011	2.040	0.029	Constructions	2.262	2.333	0.071
Coke & petroleum	1.831	1.859	0.028	Trade & transportation	2.231	2.295	0.065
Chemicals	1.567	1.578	0.011	Information	1.988	2.046	0.058
Pharmaceutics	1.573	1.593	0.020	Financial services	1.986	2.058	0.072
Rubber& plastics	2.077	2.107	0.030	Real estate	2.299	2.333	0.033
Metals & metal products	1.914	1.948	0.034	Professional services	2.265	2.289	0.024
Electrical eqipments	1.4581	1.4811	0.0230	Public services	2.1311	2.1812	0.0501
Machinery	1.2755	1.2875	0.0120	Arts & others	1.9960	2.0779	0.0818
Motor cars	1.9537	1.9920	0.0383	Average	1.9822	2.0237	0.0414

example, the final demand in agriculture is increased by one million dinars, the simple multiplier shows how many million dinars must be generated in output, both in agriculture and in related sectors, in order to produce output that will meet such an increased demand. The total increase in production will amount to RSD 1,621 million. Initially, agriculture itself has to produce one million dinars of output, and then an additional 362 thousand dinars to meet the increased demand from other sectors. Other sectors, however, need to produce additional 260 thousand dinars of their output in order to meet all inter-industry demands.

However, the mining sector is five times smaller than agriculture. One million dinars of new demand in this sector is higher, relatively speaking, than the same investment in agriculture. In order to avoid differences in the size of the sectors, coefficients of elasticity are needed. They show how much a one percent increase in final demand increases production in agriculture. The same applies for all other sectors. A coefficient of elasticity is the measure of responsiveness that has no dimension. It indicates the percentage change that will occur in one variable when another variable changes one percent. In the input-output framework it is always important to underline how the final demand is compiled. With three different technological and augmented matrices (**A**, **B** and **D**), there are three different compositions of the final demand vector, and consequently three interpretations of output elasticity.

For the simple output multiplier, the formula for output elasticity is presented in equation (15) [5, p. 283]:

Simple output elasticity $\lambda(\mathbf{o}) = \mathbf{m}(\mathbf{o}) \cdot f \cdot \hat{x}^{-1}$ (15)

Matrices with a cap over them are diagonal matrices, $\mathbf{f} = (f_j)$ is the column vector of final demand in absolute terms. Other coefficients of elasticity can be appropriately defined.

Interpretation of coefficients of elasticity in an input-output framework must be cautious. This is the percentage change in total output (or income or employment) due to a percentage change in the final demand of the given sector (agriculture, etc.). The idea is to express both the stimulus (change in final demand) and its effect (change in output, income or employment) in percentage terms.

We showed in Figure 2 simple output multipliers and related coefficients of elasticity. The latter should be called coefficients of elasticity of "output with respect to the final demand". All multipliers must be larger than one unit. This is not the case for coefficients of elasticity. If it is larger than one, we say that this is a case of "elastic" output with respect to the final demand. If it is smaller than one, we say that this is the opposite case of an "inelastic" output with respect to the final demand.

In the food processing sector there is a high simple output multiplier and a high elasticity of output with respect to the final demand (larger than 1). In contrast, mining has a low multiplier and low elasticity (smaller than 1). Electricity and gas sector has a high multiplier,

Figure 2: Multipliers and coefficients of elasticity
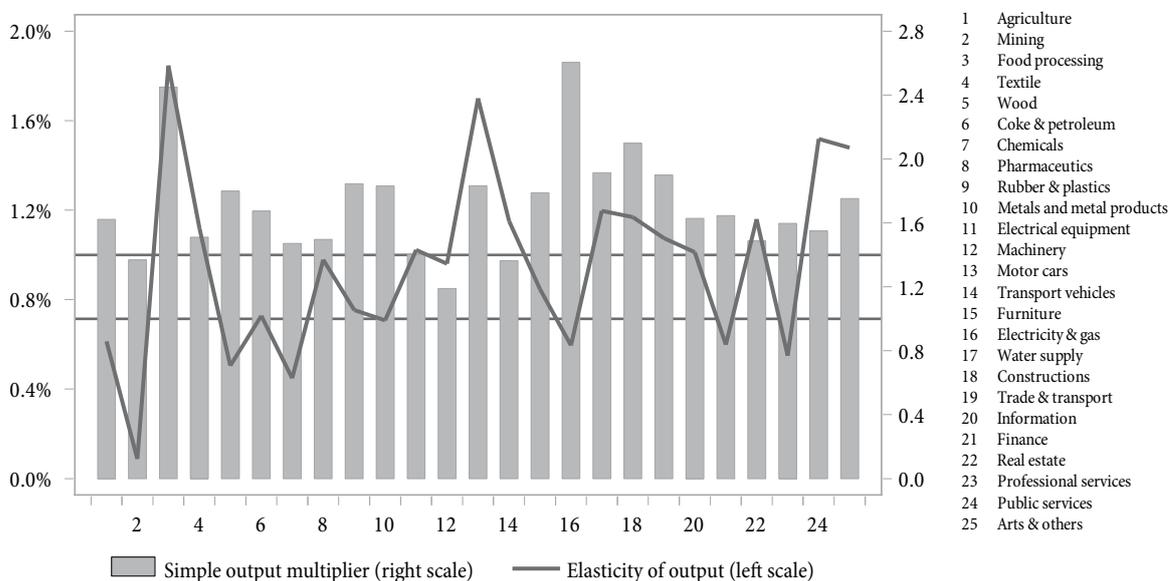
but low elasticity. In terms of numbers, there are more "inelastic" sectors than "elastic" sectors.

Foreign direct investments

According to our estimation, the FDI in 2014 represented 22%-27% of total investments, and the DI 78%-73% (depending on the data source). However, throughout the period 2010-17, accumulated DI amounted to EUR 32,627 bil., while FDI accumulated to EUR 15,993 bil. This means that DI accounted for 67% of total investment, while FDI accounted for 33%. There is a low but significant correlation between them -0.3906 [t statistics -2.4002]. The negative coefficient of correlation reveals that there was a substitution of DI for FDI in the observed period. Hence, the growth of FDI pushed down the growth of DI. Although we do not believe the government was aware of this substitution, an excessive focus on FDI, to the neglect of DI, does not seem to us a good policy.

Table 7 shows the FDI (in EUR) and the assessment of DI and FDI in 2014. These data were compiled by using information from the NBS report on FDI and the I-O matrix with respect to gross fixed capital formation in 2014. In the period of eight years, FDI was mostly invested in financial sector (EUR 3,361 million), trade and transportation (EUR 2,923 million), construction (EUR 1,320 million), mining (EUR 1,198 million) and food processing sector (EUR 1,082 million).

The last two columns on the right in Table 7 report corresponding cross-section data for 2014. They show separation of investments with respect to domestic ("Total minus Domestic", which corresponds to data in column "2014") and foreign origin[4]. Within a single year, the investment structure can differ from the multiyear average. However, between foreign investment and DI, there is a rank coefficient of correlation of 0.91. In some sectors, gross fixed capital formation was zero in 2014, but foreign investments were positive. This indicates that in these sectors there was domestic disinvestment (water supply, financial services, real estate, and public services).

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4   The underlying average annual exchange rate is RSD 117.3662 for one EUR.

Table 7: Breakdown of foreign direct investment by activities, mil. EUR

	Annual investment									2014	
	2010	2011	2012	2013.	2014.	2015.	2016.	2017.	Total	Domestic	Total
Agriculture	19.84	30.90	9.22	65.80	-0.33	63.85	43.34	71.96	304.58	166.72	166.39
Mining	204.25	478.11	218.83	179.87	26.03	22.15	-33.00	102.45	1,198.68	-53.95	-27.92
Food	38.02	249.26	157.83	166.18	108.52	122.94	145.70	93.94	1,082.39	-79.90	28.63
Textile	10.47	26.63	8.04	44.91	67.47	65.06	5.34	27.93	255.86	-14.30	53.16
Wood	20.07	12.86	9.48	26.76	15.11	22.48	3.54	21.27	131.57	-6.38	8.73
Coke and petroleum	4.57	0.82	-0.10	2.46	-0.11	0.01	-0.01	-0.13	7.52	22.34	22.23
Chemicals	38.17	51.21	31.20	45.76	46.30	66.62	42.70	45.91	367.87	-39.48	6.82
Pharmaceutics	12.36	-24.70	45.61	41.38	28.25	65.02	31.99	43.56	243.46	-21.25	7.00
Rubber and plastics	67.21	93.24	151.14	186.82	172.56	141.89	39.96	97.47	950.30	-155.83	16.73
Metal products	28.54	18.76	20.72	25.77	2.95	5.89	241.36	86.42	430.40	199.06	202.01
Electrical eqipments	2.20	4.93	4.40	5.48	2.09	2.15	4.04	6.88	32.16	666.30	668.39
Machinery	4.70	19.42	21.73	20.14	9.62	21.56	22.43	28.32	147.92	952.20	961.83
Motor vehicles	10.49	70.61	14.93	31.22	37.78	140.46	118.73	107.81	532.03	262.39	300.17
Transport vehicles	10.01	0.97	-0.68	8.07	-1.56	1.03	-3.25	1.61	16.21	43.70	42.14
Furniture	82.29	107.11	56.94	73.92	46.19	66.36	96.99	73.44	603.25	36.15	82.33
Electricity and gas,	5.97	2.85	3.76	9.01	9.90	12.84	15.03	52.21	111.57	-12.93	-3.03
Water supply	3.78	6.02	5.88	12.10	17.68	17.90	13.59	11.06	88.01	-17.68	0.00
Constructions	35.30	91.59	19.44	67.14	162.66	264.51	272.85	406.81	1,320.30	1,958.74	2,121.40
Trade	159.80	1,100.05	238.21	367.76	213.46	283.90	209.77	351.00	2,923.95	1,674.79	1,888.24
Information	-8.19	125.61	-479.95	28.54	46.81	108.14	120.72	197.92	139.59	113.89	160.71
Finance	432.75	840.44	290.56	141.45	357.96	484.04	446.99	367.49	3,361.67	-46.81	311.14
Real estate	-19.88	72.08	22.06	-55.73	24.72	57.57	124.46	221.75	447.03	-357.96	-333.23
Professional	33.43	83.24	125.33	34.29	73.95	41.34	152.97	104.48	649.04	268.12	342.07
Public	0.04	0.64	0.21	1.24	1.47	0.23	-0.09	2.21	5.94	-1.47	0.00
Arts	81.91	81.82	34.01	17.22	30.93	36.65	10.84	24.49	317.86	-1.84	29.09

Figure 3: Foreign and domestic investment
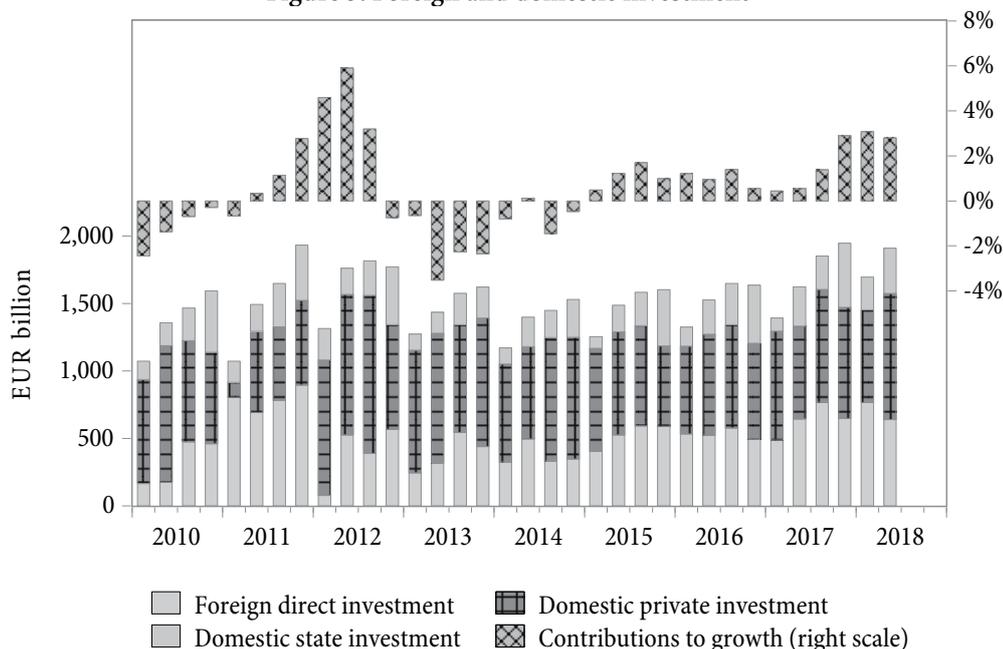
The time series on investments is presented in Figure 3[5]. The upper part of Figure 3 shows the contributions of investment to the GDP growth rates. These contributions have a cyclical pattern. After the outbreak of the Great Recession, the contributions were negative, but they changed to positive in a short period between 2011 and 2012. Subsequently, the investments were downgrading the GDP growth rate until the beginning of 2015. From then until the second quarter of 2018, it is evident that there are positive contributions of investment to growth, especially in the last three quarters. However, these contributions still have cyclical oscillations.

With the exception of the short period between 2011 and 2012, the share of foreign investment in the total investment has not exceeded one third. These shares, also, depict a cyclical pattern. On the other hand, between the total investment and its contribution to growth there is a significant positive correlation, but of a moderate size (0.4931 [t statistics 3.2067]). Such a correlation does not exist for any particular type of investment by three different sources of funding. The investment contributions to growth depend more on the total size of investment

than on its structure. Surprisingly, between domestic private investment and FDI there is a high and negative correlation coefficient (-0.5940 [t statistics -4.1705]). This suggests, importantly, that rather than synergy there is rivalry between private DI and FDI. Such a rivalry does not exist between state DI and FDI, where there is a moderate, but positive correlation coefficient (0.4102 [t statistics 2.5443]). Between private DI and state DI there is no significant correlation (-0.1012, [t statistics -0.5756]).

Ranking and sector impacts

Multipliers and FDI have different units of measures. Irrespective of this, it is possible to monitor their relationship through correlation coefficients. We here provide the structure of FDI by sectors and the size of multipliers by sectors, also. It seems to us that there is one very simple way to show the connection between these two variables. To this end we will use ranks of those variables. Table 8 (in the first column) shows the ranking of all sectors according to the size of FDI invested in them. Then, in the next four columns we show ranks by multipliers of output, employment, income and investments. We compare these figures and their mutual correlation.

We see, for example, that the financial sector had the highest FDI in the period 2010-17. It is ranked first by

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5 Data on the total investment are taken from RZS [10], and converted to euro terms by the nominal exchange rates. The Ministry of Finance provided data on public investment [6]. Data on FDI are from the NBS [7], while the remaining data on the domestic private investment have been compiled as residuals.

this criterion. However, its output multiplier is lower and according to it, this sector ranks in 6th place. It is ranked even worse with respect to multipliers of employment and income (14th and 22nd place). However, according to the induced investment impact, its multiplier is somewhere in the middle (14th place).

Another striking example is the construction sector. It is placed to the third position in attracting FDI with equally efficient impact on output. However, it did not provide much additional employment or income (16th and 13th place, respectively).

If the government was trying to determine the differential effects of FDI spending on the employment of a sector, comparison of employment multipliers would show where this spending would have the greatest impact generated throughout the economy. If maximum total employment effects are the exclusive goal of FDI spending, it would always be rational to spend all the money in the sectors with the largest employment multipliers. Of course, there might well be other reasons – taking into account strategic factors, equity, capacity constraints for sectoral production, and so on – for using some of the new FDI on the output and employment of the other sectors.

The correlation coefficients - the ordinary coefficients and the Spearman rank order coefficients - do not indicate that there is a link between FDI and the sector multipliers or contributions, direct and indirect, to production, employment, and earnings. This is important information. It points to the fact that the sectoral allocation of FDI does not support development of the relevant sectors in the most efficient way. For example, the Spearman coefficients between FDI and output, employment and investment multipliers are: 0.2992 (t-value 1.5039), 0.1276 (t-value 0.6174) and 0.2538 (t-value 1.2586), respectively. None of them is significantly different from zero. The ordinary coefficients of correlation point out to the same conclusion: 0.3396 (t-value 1.7319), -0.1262 (t-value -0.6103) and 0.1751 (t-value 0.8533), respectively. Hence, investments as a whole contribute to the GDP growth, as shown in Figure 3, but their sector allocation does not provide the most efficient use within the framework of the economy's technological linkages, as shown in Table 8.

There is another way to measure impact of FDI on output in the input-output framework. Based on the assumption of a linear technology, equation (4) can be used to define impacts of a change in FDI (**fdi**) on net changes in output (16):

$$\Delta x = (I–A)^{-1} \bullet \Delta fdi \qquad (16)$$

Both GDP and FDI can be divided into two equal subperiods: until 2014 and since 2014. Based on the equation (16), we can determine how much the increase in FDI in the second period affected the increase in outputs in the same period. Strictly analytically speaking, we should have two **A** matrices for 2010 and 2014, compiled on the assumption that they did not change in the subsequent period of four years. However, we only have matrix **A** for 2014, so we cannot check if the multipliers altered from one period to the next. Additionally, our presentation of results should be partially modified. Quarterly data on GDP are not available at the disaggregated level for manufacturing, so we had to aggregate 13 sectors, which

Table 8: Ranking of activities by FDI and multipliers

Sectors	FDI	Output II	Labor II	Income II	Investment
Agriculture	14	16	25	7	6
Mining	4	23	13	15	22
Food	5	1	2	14	2
Textile	15	17	17	19	19
Wood	19	14	8	4	11
Coke and petroleum	24	15	6	12	18
Chemicals	12	24	7	1	21
Pharmaceutics	16	20	4	9	20
Rubber and plastics	6	12	9	5	10
Metal products	11	11	11	8	16
Electrical eqipments	22	21	10	16	23
Machinery	17	25	20	25	25
Motor vehicles	9	10	3	10	15
Transport vehicles	23	22	23	21	24
Furniture	8	8	12	17	17
Electricity and gas	20	2	1	2	1
Water supply	21	7	18	11	7
Constructions	3	3	16	13	5
Trade	2	5	19	18	8
Information	18	9	21	20	13
Financial sector	1	6	14	22	14
Real estate	10	18	5	6	3
Professional services	7	19	15	3	4
Public services	25	13	22	23	9
Arts and others	13	4	24	24	12

comprise manufacturing, into the only one sector. Instead of 25 sectors, we present 13 sectors in Figure 4.

Regardless of all the above mentioned restrictions, the conclusion from Figure 4 is rather convincing. As with the ranking in Table 8, there is not a strong connection between the multipliers and historical GDP growth based on FDI. The mining, water supply and financial sector are good examples for such an outcome. In those sectors, the GDP increase due to FDI is far greater than it would be expected from the corresponding multipliers. By contrast, the multipliers for manufacturing, electricity and gas, and construction are much larger than the percentage of corresponding contribution of FDI. Those should be sectors for attracting much more FDI, if the overall impact on the economy would be the main criterion for investing. Again, the correlation coefficients do not indicate that there is a link between FDI and the sector multipliers or the sector contributions, direct and indirect, to output. The coefficient is -0.2866 (t statistics -0.9921).

Conclusions

In this paper, we introduced two novelties from the perspective of input-output analysis: statistical and analytical. For the first time we have presented multipliers for Serbia and analyzed the sectoral effects of investment based on their partition into domestic and foreign investments.

Serbia still does not have official I-O tables; although there is quite well prepared a draft of these tables for 2014 and 2015 for 65 sectors. We used the preliminary data for 2014, and based on them compiled our I-O table for 25 sectors. We also allocated the value added to its components, partitioned the investment to domestic and foreign parts, and carried out employment allocation across sectors, i.e., by products or homogenized sectors of activity.

On this ground, we calculated three types of multipliers: simple, total and investment multipliers: $m(o)$, $m(e)$, $\overline{m}(o)$, $\overline{m}(e)$, $\overline{m}(w)$ and $\overline{m}(d)$. We then compared these multipliers with the sectoral FDI structure and contribution of FDI to growth. We concluded that the allocation of investments by sectors does not follow the contribution of these sectors to the formation of output or employment. In other words, the most optimal social investment structure is far from reality, and it is still a task that has to be achieved in Serbia. In this sense, awareness of multipliers is the first necessary step in this direction.

The government can partially, but not completely, influence the inflow of FDIs with its policy of subsidies and tax incentives. The remaining factors are the commercial conditions, development of the market and risk assessment of the investors by themselves. However, when investors decide on new investments, data on multipliers are extremely important in order to assess the overall effects which such investments will cause to their business and the entire economy. In this sense, multiplier analysis is crucial for the correct assessment of the investment impacts, both by private investors and the government.

Figure 4: FDI impact on GDP and multipliers

1 Agriculture
2 Mining
3 Manufacturing
4 Electricity & gas
5 Water supply
6 Constructions
7 Trade & transportation
8 Information
9 Financial sector
10 Real estate
11 Professional services
12 Public services
13 Arts & others

Multipliers (left scale)   FDI impact on GDP in percentage (right scale)
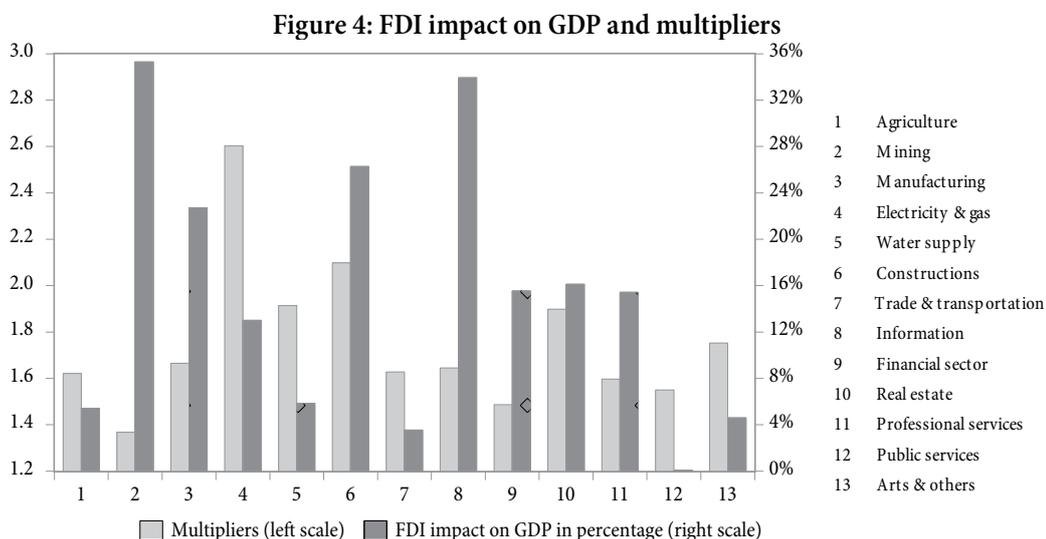
The final point is equally important. Domestic investors should not be left behind from the policy of attracting new investment. That is particularly important, since we discovered that there was no synergy, but rivalry, between domestic private investment and FDI. The government can use tax incentives and corporate income tax framework for that purpose. Our counterfactual experiment strongly supports this proposal.

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CHALLENGES OF CREATING SUSTAINABLE GROWTH IN INFRASTRUCTURE SECTORS: THE GAP BETWEEN AMBITIONS AND CAPABILITIES

Izazovi kreiranja održivog rasta u infrastrukturnim sektorima – jaz između želja i mogućnosti

Abstract

It is generally accepted that growth should be knowledge-based, sustainable and inclusive. Due to their direct and indirect impact on growth, as well as the fact that infrastructure sectors are often referred to as the cornerstones of the development of national economies, special attention is drawn to infrastructure investments and the ways of their financing. They are considered as very complex issues of investment and financing, which can be addressed from both macroeconomic and microeconomic perspective. The reason for that is a different understanding of the sustainability of growth and different methods of measuring growth. From the macroeconomic standpoint, growth is primarily associated with the growth of gross domestic product and creation of long-term competitiveness of national economies, without recourse to external borrowing. Besides, growth has its social and environmental dimensions. Some authors point out that this concept of growth is rather "soft" and inadequate from the perspective of companies. Namely, the presence of economic growth does not automatically mean that it will be transformed into profitable and sustainable growth at the level of individual companies, infrastructure sectors and the economy as a whole. Of course, there are several reasons for that, from low efficiency, through poor quality of corporate governance and inadequate financing, to inadequate prices. Moreover, the sustainability of the company's growth is assessed based on the quality of the capital structure and the ability to create value. Financing of infrastructure projects involves complex processes, such as provision of capital, diversification of sources of financing and their adequate combination, which also have their macro and micro aspects. However, it does not just relate to the problem of providing capital. It always also implies a question of giving priority to particular sources of financing. The possibilities of financing infrastructure projects from the budget are limited, while government-backed credit sources have their own price and can also put pressure on the budget. Also, credit sources

may cause different forms of dependency. The problem appears even more obvious at the level of individual companies. External sources of financing are necessary, but their availability also depends on borrowing capacity, which is, among other things, determined by the ability to generate internal sources. Furthermore, it is assumed that there is enough capacity for achieving expected returns in order to attract the interest of private investors in this type of investment. The foregoing and similar issues, seen through the prism of the financial position of infrastructure sectors, have been brought up and partially analyzed in this paper.

Keywords: *infrastructure investment, infrastructure sectors, sustainable growth, sources of financing, free cash flow, capital structure, retained earnings, value creation.*

Sažetak

Generalno je prihvaćeno da rast treba da bude zasnovan na znanju, održiv i inkluzivan. Zbog svog direktnog i indirektnog uticaja na rast, kao i zbog činjenice da se infrastrukturni sektori često označavaju kao stubovi razvoja nacionalne ekonomije, posebna pažnja se poklanja infrastrukturnim ulaganjima i načinima njihovog finansiranja. Reč je o veoma kompleksnim problemima investiranja i finansiranja, u okviru kojih se prepliće makroekonomska i mikroekonomska perspektiva njihovog posmatranja. Razlog tome je drugačije gledanje na održivost rasta i drugačije merenje rasta. Sa makroekonomskog stanovišta rast se vezuje primarno za povećanje bruto domaćeg proizvoda i stvaranje dugoročne konkurentnosti nacionalnih ekonomija, bez povećanja spoljnog zaduživanja. Uz to, on ima svoju socijalnu i ekološku dimenziju. Neki autori ističu da je ovo ipak jedan „soft" koncept gledanja na rast koji iz perspektive preduzeća nije zadovoljavajući. Naime, ekonomski rast ne znači po automatizmu da će se on sam po sebi transformisati u profitabilan i

održiv rast na nivou pojedinačnih preduzeća, infrastrukturnih sektora i ekonomije u celini. Naravno, za to možemo pronaći više razloga, počev od nedovoljne efikasnosti, preko niskog kvaliteta korporativnog upravljanja i neadekvatnog finansiranja, pa sve do neadekvatnih cena. Pri tome, održivost rasta preduzeća se ocenjuje na osnovu kvaliteta strukture kapitala i sposobnosti kreiranja vrednosti.

Pribavljanje kapitala, diferenciranje izvora finansiranja i njihovo adekvatno kombinovanje su kompleksni procesi kada je reč o finansiranju infrastrukturnih projekata, opet sa svojom makro i mikro dimenzijom. Ipak, to nije samo problem pribavljanja kapitala. To je uvek i pitanje davanja prioriteta pojedinim izvorima finansiranja. Mogućnosti finansiranja infrastrukturnih projekata iz budžeta su ograničene, kreditni izvori iza kojih stoji država imaju svoju cenu i takođe mogu stvarati pritisak na budžet. Uz to, kreditni izvori mogu stvarati različite vrste zavisnosti. Sa nivoa pojedinačnih preduzeća problem je još eksplicitniji. Eksterni izvori finansiranja su neophodni, ali je njihovo pribavljanje vezano i za kapacitet zaduživanja koji je, između ostalog, determinisan mogućnošću generisanja internih izvora. Uz to, podrazumeva se mogućnost dostizanja očekivanih stopa prinosa, kako bi privatni investitori bili zainteresovani za ovakvu vrstu ulaganja. Ova i slična pitanja, posmatrana kroz prizmu finansijske snage infrastrukturnih sektora, otvorena su i delimično analizirana u ovom radu.

Ključne reči: *infrastrukturna ulaganja, infrastrukturni sektori, održiv rast, izvori finansiranja, slobodni novčani tok, struktura kapitala, neraspoređeni dobitak, kreiranje vrednosti.*

Introduction

The need for infrastructure investment varies in amount and structure across countries depending on their development levels. Naturally, infrastructure is less developed in developing countries, which leads to a conclusion that the impact of infrastructure investment on the growth in these countries should be higher. Moreover, substantial investment in infrastructure projects is often hampered by lack of capital for financing such projects. Thus, financing of infrastructure investment is considered as one of the key issues in developing economies.

The issue of infrastructure investment is multifaceted. Infrastructure investment has a direct impact on growth rates of national economies through the output growth of infrastructure sectors in the respective year. The indirect impact can be even more significant. By providing energy, logistics and ICT support, infrastructure investment fosters economic activities of other industries and sectors in the long run. On the other hand, the fact is that there are considerable financial constraints in providing financing for these projects, which are especially faced by public utilities and state-owned enterprises. Therefore, governments of some countries turn to budgetary financing of infrastructure projects with the idea that by stimulating growth of infrastructure sectors they will also provide impetus for the growth of the national economy. However, the fiscal constraints, imposed to developing countries in their most severe form, limit the likelihood of providing this type of financing.

The issue of financing can also be addressed from different perspectives. Providing the necessary sources is certainly the first important step. In this context, it is evident that the government has a crucial role in creating adequate macroeconomic conditions, i.e., investment-friendly environment. Besides, given the importance of infrastructure development in invigorating economic activities in times of crisis and its potential impact on growth, governments have recognized an interest in funding certain infrastructure projects. The impact of infrastructure investment on improving the quality of people's lives, poverty reduction and more equitable distribution of income has contributed to taking political decisions in this direction. However, budgetary financing has also its downside. Fiscal constraints and fiscal consolidation requirements limit the availability of budgetary sources of financing in emerging markets and developing economies (EMDEs). The inability of some companies from EMDEs to bear the burden of this type of financing creates a need to consider alternative solutions and diversify sources of financing. In this regard, the alternatives such as the use EU pre-accession funds, commercial loans from international financial institutions and the creation of public-private partnerships are widely used.

Infrastructure sectors are often referred to as the pillars of the development of national economy and the society at large. Substantial investment in new infrastructure projects and, sometimes, even investment in infrastructure maintenance represent a major challenge for some domestic companies, from both operational and financial aspects. It is obvious that only financially sound companies can afford such investments. Sustainable growth, based on sustainable financing, profitability and the creation of value added, should be seen as the right long-term orientation.

The link between infrastructure and growth

Today, there is no particular need to prove the interdependence between infrastructure and growth. Numerous research studies from around the world have confirmed this link, i.e., infrastructure has a positive and significant impact on growth. Straub points out that about two-thirds of the research studies that were the subject of his analysis have clearly confirmed this link [26, p. 33]. Although the issue of infrastructure investment is undoubtedly relevant in developed countries, where the focus is primarily on the improvements in the existing infrastructure, in this paper the spotlight will be on the problems related to the infrastructure investment in developing countries which will be most often analyzed through the prism of problems in the Republic of Serbia. In these countries, infrastructure is underdeveloped and new investments significantly improve the lives of citizens and create better prospects for companies and national economies. This implies a more room for investing in this area. Infrastructure investment opens up the opportunities for achieving higher growth rates relative to developed countries and contributes to closing the development gap. After all, it is often emphasized that differences in levels of development are partly a consequence of differences in infrastructure development.

Infrastructure investment can be defined as "gross fixed capital formation by the public and private sectors on fixed, immovable assets that support long-term economic growth" [10, p. 152]. In accordance with this definition, apart from new investments, infrastructure investment also includes replacement investment and spending on maintenance of the existing infrastructure with the aim of extending its life span.

Infrastructure is an umbrella term for numerous activities. We usually make a distinction between economic ("hard") and social ("soft") infrastructure. Economic infrastructure improves economic activities and encompasses physical components, such as roads, tunnels, bridges, railways, airports, ports, underground railways and tramlines, waterways, dams, irrigation and drainage systems, water pipes, wastewater treatment plants, sewers, power plants, transmission lines and distribution

networks, solar panels, oil pipelines, gas pipelines, telephone exchanges, telecommunication networks, district heating systems, etc. With this in mind, it follows that energy sector, water supply and management, information and communications technology sector and transportation sector are usually identified as infrastructure sectors.

There are several key features that characterize "hard" infrastructure. First, it refers to capital goods which in combination with labor and other inputs provide services to a broad range of users. Second, the construction of "hard" infrastructure takes many years while its benefits are often equal to zero in the construction period (for example, there will be no benefits from the construction of dams, bridges, tunnels, etc., despite the fact that they are 80% completed). Third, the life span of infrastructure is often very long, which implies high maintenance costs. Forth, "hard" infrastructure is space-specific. The combination of its long-lasting durability and usual immobility shapes the economic geography and regional development. Fifth, infrastructure and the services it provides are sometimes associated with some forms of market failures, such as natural monopolies. Sixth, the relative importance of the consumption of services by households and companies varies depending on the type and location of infrastructure, but the consumption of companies seems to be somewhat greater than that of households [22, pp. 4-6].

On the other hand, "soft" infrastructure comprises a set of institutions (financial system, health care system, education system, libraries, theaters, courts, museums, etc.) responsible for advancing standards in the areas such as health care, education, culture, and so on. They are directed at energizing economic activities, but they primarily contribute to the improvement in the quality of life [8, pp. 531-532]. The above-mentioned distinctive features can help to define "hard" infrastructure, but due to the different nature of services (services are a result of workforce activities rather than of infrastructure), they cannot be used for precisely defining "soft" infrastructure.

The impact of infrastructure on growth can be direct and indirect. It is evident that infrastructure investment directly affects the amount of output in the respective year. Accordingly, there is a direct link between the growth of infrastructure investment and the level of gross domestic

product (GDP). Also, governments of some countries often undertake infrastructure investment in times of crisis to stop negative effects and revive growth. Such a decision is aimed at raising the level of activities in the national economy, increasing employment and reducing poverty.

The fact is that infrastructure investment gives a boost to the activities of other sectors and industries, and that these effects are long-lasting and far-reaching. Economic infrastructure drives the growth of private sector. Better infrastructure lowers the cost of production per unit and enhances productivity. Reliable energy supply, high-quality transportation networks and digitization of the economy increase the safety and stability of production, facilitate access to new markets, ensure greater labor mobility, and raise the competitiveness of the national economy. In such circumstances, it is clear that the development level of economic infrastructure may be considered as enabling or limiting factor of the country's attractiveness for investment, especially from the standpoint of foreign investors [31, pp. 42-43]. At the same time, economic infrastructure drives the efficiency of other inputs. A good example is a workforce which, with better infrastructure, can provide a significantly higher volume and quality of products and services. In addition, the availability of better transportation and telecommunication infrastructure enables employees to better organize themselves and save time. Economic infrastructure also stimulates the growth of social infrastructure. For example, investment in telecommunication infrastructure affects the quality of education and health services, which may also have a positive domino effect on the productivity of private investment [1, pp. 407-410].

Infrastructure development helps reduce transportation costs and contributes to closer integration of developing countries into regional and global trade flows. Better integration enables the extension of value chain to a broader spectrum of suppliers, on the one hand, and customers, on the other. The reduction in transportation costs as a result of the construction of road, rail and water infrastructure is not only important because of potential market growth and increase in return on equity, but also due to its contribution to the transformation of economic geography and more uniform regional development. Also,

we shouldn't lose sight of the fact that the obstructions in the area of investment in the infrastructure development, conditioned by political decisions, can lead to the exclusion of whole regions or even some national economies from the global production network, which may have tremendous consequences [18, pp. 23-24]. The development of individual regions can be similarly affected by the wrong political decisions taken at the country level.

It is important to emphasize that the development of infrastructure contributes not only to the increase in revenue and income, but also to their more equitable distribution. In general, high-quality infrastructure expands the possibilities of more equitable access to infrastructure services, including telecommunications, power supply, road infrastructure, water supply, etc. Consequently, it becomes much easier to integrate poor individuals as well as underdeveloped regions into the economic and social life. In this regard, "soft" infrastructure has a crucial role to play, which especially refers to the development of education system that tends to significantly increase the value of human capital. These are just some of the reasons explaining why infrastructure development has become a policy priority. Namely, some studies show that infrastructure has absorbed 40% of fiscal stimulus in emerging and developing countries and 21% in developed countries [3, p. 2].

Infrastructure maintenance can also have indirect effects on growth. In developing countries, it is often the case that infrastructure network is in very bad condition and that its maintenance requires substantial investment. Inadequate maintenance shortens the life span of infrastructure. Moreover, inadequate maintenance also causes indirect damage. For example, inadequate power supply may provoke the equipment breakdowns and production halts, which leads to a shrinking return on equity of the companies from other sectors. The same applies to transportation vehicles which may have higher maintenance cost and shorter life span due to poor road infrastructure. On the one hand, investment in the maintenance of the existing infrastructure will have a positive impact on output growth in the respective year as well as on the elimination or reduction of indirect damage to private sector. Otherwise, there will be negative effects [26, pp. 7-9].

Bearing in mind the previous observations, we can conclude that the level of infrastructure development also affects the competitiveness of national economies. It is quite logical that the competitiveness of the national economy will be determined by institutional development, economic infrastructure, macroeconomic stability, quality of education, technical and technological development, and the like. In this regard, the achieved level of infrastructure development can also have an impact on the formulation of industrial policies [19, p. 168].

Without calling into question the foregoing findings concerning the impact of infrastructure on growth, it should be pointed out that infrastructure is not the only determinant of growth that matters. For instance, some research studies show that transportation sector represents a determinant of growth and more balanced regional development. It is undeniable that the development of transportation will ensure more efficient market functioning, greater labor mobility, integration of less developed regions into all economic flows, emergence of competitive advantages, etc. However, we should not overlook some other factors, such as innovation, migration, local socio-economic conditions and so on, that can also have an impact on growth and regional development [5, p. 3], [11, pp. 495-498]. Accordingly, despite its great importance, infrastructure must be regarded as just one of the dimensions of economic growth.

Trends in infrastructure investment financing

Developing countries are faced with a substantial infrastructure deficit. This deficit is partly due to a lack of infrastructure facilities (lack of transport network, insufficient and unstable electricity supply, lack of telecommunications networks, unresolved problems in the area of water supply, etc.), while the rest is mainly a consequence of poor quality of the existing infrastructure (obsolescence, inadequate maintenance, etc.). Besides, we must add that mass migrations of population between different parts of the world as well as migrations toward larger cities, due to an increasing demand for infrastructure services, present additional challenges to the renovation and expansion of the existing infrastructure. According

to some estimates, the urban population in developing countries will grow by 2 billion people by 2030 [9, p. 1]. All this makes dealing with the problem of infrastructure deficit even more difficult.

Companies that operate within infrastructure sectors are often state-controlled, and they are not able to bear considerable infrastructure expenses alone. These companies usually have many other problems, such as weak profitability, lack of internal sources of financing, inefficient corporate governance, inability to borrow without government guarantee, etc. The reluctance of governments to start with the privatization of such companies, as well as the underdevelopment of capital markets and the consequent inability to provide additional sources of financing through primary issues, further complicates the undertaking of major investment projects. Also, the government's direct financial support is quite limited. The priority of having a sustainable budget considerably narrows down the possibilities for direct financing of capital investments.

In the current circumstances, the diversification of sources of financing and their effective use are becoming indispensable. The availability of non-refundable sources of financing from EU funds can somewhat facilitate the closure of infrastructure gap. Commercial loans from powerful financial institutions, such as the European Investment Bank Group (EIB), World Bank (WB), European Bank for Reconstruction and Development (EBRD), etc., significantly expand the possibilities in this area. We should also mention the loans from other countries. However, commercial lending sources may also put pressure on the budget, thus hampering growth prospects.

Furthermore, the contemporary global trends point to the necessity of a greater presence of private investment in the area of infrastructure projects financing. Public-private partnerships provide the opportunity for sustainable financing of infrastructure projects, reducing the impact of these projects on the country's liquidity. In this context, there are opinions that public-private partnerships should become predominant models of financing in this area [7, p. 46]. The structure of sources of financing for infrastructure projects with private participation in emerging markets and developing economies (EMDEs) is shown in Figure 1 [30].

Figure 1: Sources of financing for infrastructure projects with private participation in EMDEs in 2017
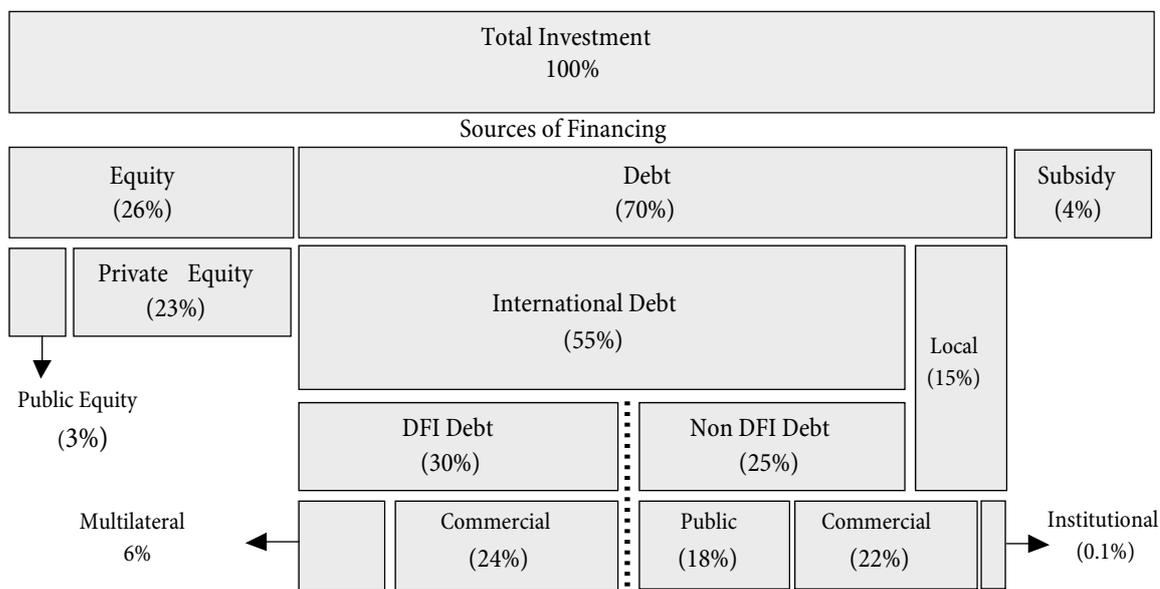
☐All figures as a percentage of total investment

Source: PPI Database, World Bank, April 2018.

In 2017, according to the World Bank's data, detailed information on the financing for infrastructure projects with private participation (Private Participation in Infrastructure - PPI) was available for approximately 74% of PPI projects (168 out of 232 projects). The financing for these 168 projects came from the combined sources of financing in the amount of USD$ 61.6 billion [10, pp. 14-15]. As can be seen in Figure 1, out of the total investment of USD$ 61.6 billion, 25% of investment was financed from public sources, 45% from private sources, and 30% by development finance institutions (DFIs). Besides, of the total equity (US$ 14.2) provided for financing these projects, 89% came from private equity, while the remaining 11% was financed by the state-owned enterprises that participated in joint venture projects. Despite the significant private investment, debt still has a high share (about 70%) and comes primarily from international sources. This trend can be explained by the fact that the interest rates charged are lower than in EMDEs.

Financing infrastructure projects from private equity alleviates problems associated with financing from the budget. However, despite a growing importance of private equity, it is evident that its role is still not dominant. Overcoming the gap between the need for the implementation of infrastructure projects and the possibilities of their financing still requires considerable reliance on a direct or indirect government support.

The direct support of the government implies its active participation in providing financing for infrastructure projects from the budget or its participation in providing land, infrastructure, and the like. The indirect support of the government is not less important, particularly when the government assumes contingent liabilities, which may not arise, in the form of loan guarantees or provides tax reliefs, etc. Finally, we should not neglect the importance of the government's support in creating an attractive environment for foreign direct investment. The structure of government support for infrastructure projects with private participation is presented in Figure 2.

Figure 2 shows that, in almost all years, the share of projects without government support is greater than one half. In the period from 2012 to 2015, the share of projects receiving government support gradually dropped, so that in 2015 about 70% of the projects were implemented without direct and indirect government support. However, at the same time, the number of infrastructure projects decreased from 614 in 2012 to 280 in 2016. It is interesting to note that the upward trend in investment levels in 2017 correlates with the increased government's role in financing infrastructure projects [10, p. 18]. Moreover, it should be taken into account that investment in energy sector, especially in renewable energy sources, dominated over the entire period.

Figure 2: Breakdown of government support for infrastructure projects with private participation in EMDEs, 2012–2017
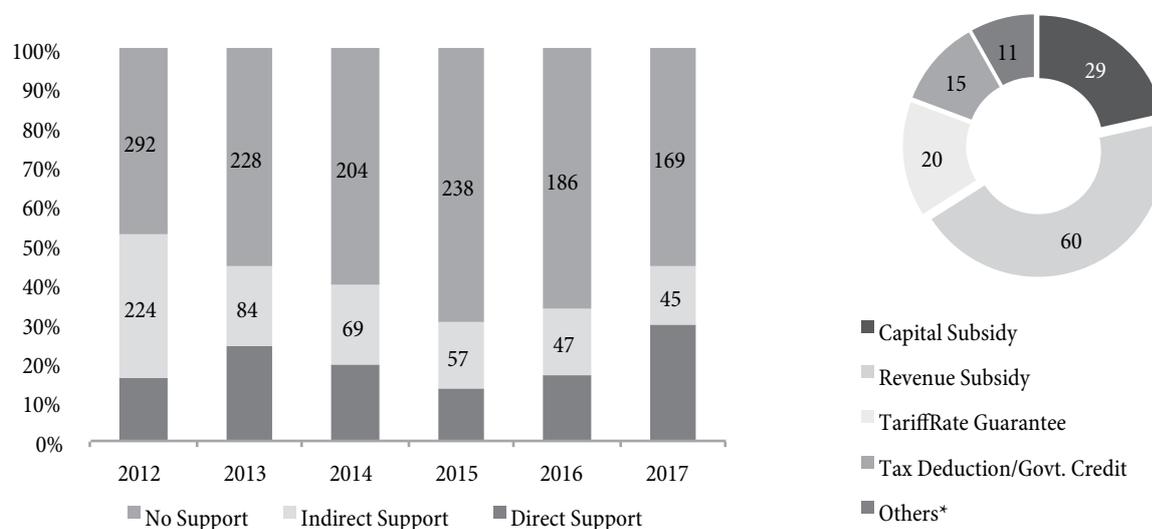
When it comes to infrastructure investment, it is obvious that the provision of sources of financing represents one of the priority issues that need to be addressed. Expanding a range of sources of financing is beneficial for boosting infrastructure investment and achieving higher growth rates. Financing from the budget is limited and entails its own risks. The provision of funds from international financial institutions or by taking loans from particular countries requires an appropriate credit rating. In both cases, the risks related to profitable exploitation of infrastructure services are borne by the beneficiaries of these funds. When the implementation and exploitation of infrastructure investments are carried out by the companies with a full or majority state ownership, the risks of failing to achieve desired performance are significant. The low quality of corporate governance in these companies, lack of the sense of responsibility for the project implementation efficiency and inadequate control can lead to insufficient profitability and absence of value creation. This raises the questions about the sustainability of growth and the price being paid for growth.

Value creation and sustainable growth

The term growth is widely used, but in many contexts its exact meaning remains unclear. We usually talk about the growth of the national economy, business growth, sales growth, revenue growth, and the like. From a macro

perspective, the conventional wisdom is that growth should be smart (implies the development of a knowledge-based economy), sustainable (calls for promoting a more efficient use of resources, competitive economy and corporate social responsibility), and inclusive (supposes the equal opportunities for everyone, high level of employment, social protection, and fight against poverty). Sustainable growth of the national economy is often associated with long-term competitiveness and sustainable financing. Penman points out that growth is generally seen as a result of long-term competitive advantages, technological innovation, investment opportunities and entrepreneurial capabilities. He also emphasizes that similar ideas are valuable, but they nevertheless present a "soft" concept, which is not satisfactory [20, p. 82]. In the context of our research, we can say that increased levels of infrastructure investment and increased growth rates of the national economy are not always followed by the necessary growth of individual companies or sectors, i.e., there is a divergence between the growth of the national economy and a potential growth of the real sector. This situation arises from different attitudes to the sustainability of growth and different methods of measuring growth.

It could be said that growth is with the same ambition pursued from the perspective of individual companies as well as from the perspective of the national economy. Managers favor growth because they see it as an opportunity to preserve and improve their positions in the company,

shareholders recognize the potential for future profitability and future dividends, while lenders perceive it as a promise of safe investment. However, we must keep in mind that, from the perspective of a company, not all growth is attractive. Overestimating the importance of growth and unfoundedly associating it exclusively with the growth of revenues or assets, while neglecting profitability and value creation, may have serious implications for a company and its stakeholders. Oversized growth, in financial terms, may cause a lot of trouble for individual companies. Many technology companies have paid dearly for an extreme arrogance of their managers in pushing for unfounded growth [16, p. 12]. In this regard, state-owned companies, whose losses will be covered from the budget, are in a more favorable position. Unlike them, other companies will pay a high price for potential losses in the form of loss of equity, absence of future returns or disappearance from the market.

Growth also has its micro dimension that is equally important for the successful functioning of the national economy. Besides, the problem of sustainability of growth is much more challenging when private companies are concerned. The key requirements can be described by two terms: profitability and value creation. A well-recognized need for increasing the participation of private sector in infrastructure investment financing, primarily with the aim of reducing reliance on the budget, could be successfully met only if the essence of these two terms is properly understood. Of course, it's not that we have forgotten that sustainable growth also implies adequate financing and sustainable capital structure, only we will discuss those topics in the last part of the paper.

Achieving expected returns requires managing the key components of return on equity (ROE), as the most popular and widely used measure of profitability. The links between return and growth are fairly obvious. Profitability reflects the company's ability to generate returns for its shareholders. Since the amount and level of retained earnings in a company determine its borrowing capacity and potential for sustainable growth, profitability has direct impact on the possibilities of internal financing. Finally, profitability lies at the core of value creation, so that it represents an important criterion when deciding on the justification for growth. The complexity and close link between operational, financial and tax decisions in this area are presented through the prism of key drivers of profitability in Figure 3.

Figure 3: The drivers of return on equity
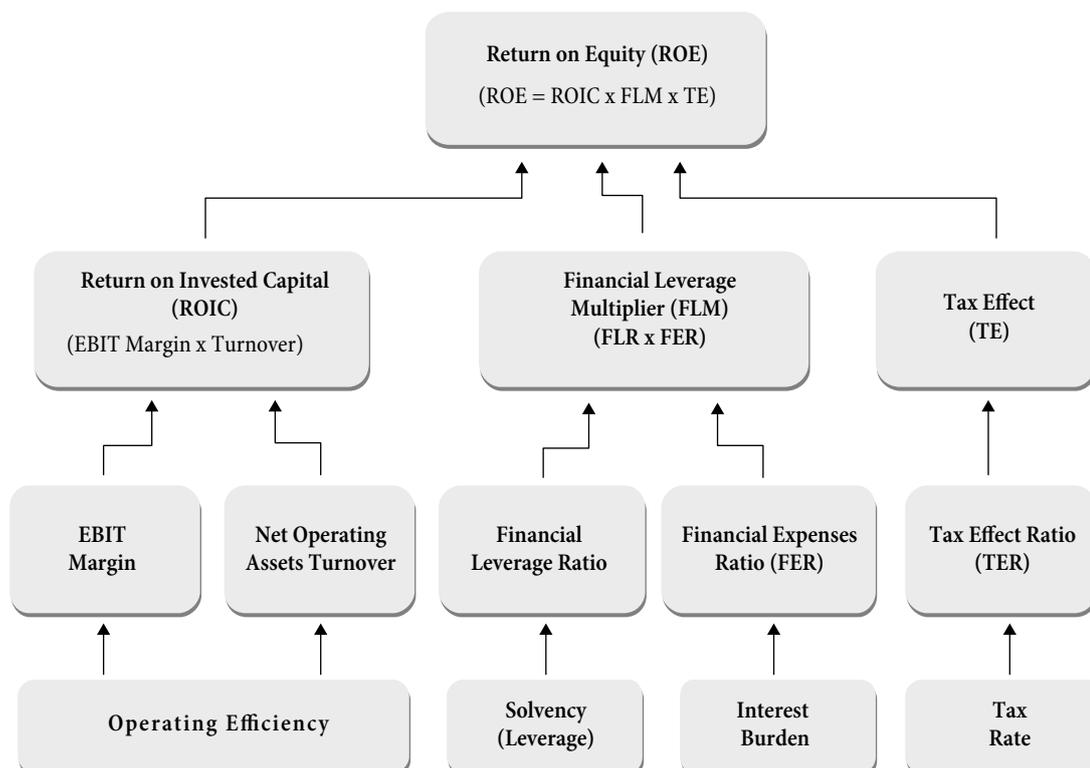
Return on invested capital (ROIC), as a measure of the company's operating efficiency and a real source of value creation, has a decisive impact on return on equity. EBIT margin and turnover, as key components of return on invested capital, point to the prospects for its increase. Since return on equity is equal to return on invested capital when a company is totally financed from internal sources, it is logical that a difference between these returns arises as a result of borrowing. A rising level of debt leads to greater indebtedness, which has a positive multiplicative effect on return on equity as long as ROIC is higher than cost of capital. The problem is that a growing debt increases the exposure of a company to financial risks, which means that a positive effect of financial leverage is limited. Nevertheless, we should not overlook the effects of taxes, which due to the differences between accounting and taxable income, i.e., nominal and effective tax rate, could be significant [23, pp. 663-672].

However, profitability is a necessary but not sufficient condition for creating value added. The reason is that the calculation of accounting income, as well as the calculation of return on equity, takes into account only explicit costs. Cost of equity is not included in the calculation. Anyway, it is logical that shareholders, who bear the greatest risk, expect to receive returns that will exceed those of creditors. Calculation of cost of equity accounts for opportunity cost that is equal to the income that shareholders would achieve by investing in other company with comparable level of systematic risk. Therefore, it is not enough for a company to generate any kind of income and return, but its income has to be at the level that allows covering the total cost of equity. If the company's income exceeds this level, we can conclude that the company creates value added, which will have a positive impact on its market value and its attractiveness to investors [16, pp. 20-21].

Consequently, from the shareholders' point of view, growth is attractive only if return is higher than weighted average cost of capital – WACC. A significant interdependence between profitability, economic value added, cost of capital and growth can be illustrated by the calculation of market value added (MVA):

$$MVA = \frac{(ROIC - WACC) \times Invested\ Capital}{WACC - Growt\ Rate}$$

Given that the nominator includes economic value added (EVA), it follows that market value added represents the present value of future expected economic value added. The value is created only when the spread between return on invested capital and weighted average cost of capital (WACC) is positive. In other words, a positive spread is the source of value creation, while a negative spread is the source of value destruction. This fact confirms the above-mentioned statement that growth by itself does not necessarily create value. Sometimes, high-growth companies may even destroy value. By contrast, companies with lower growth may create value. Only the growth that is accompanied by a positive spread can generate value [13, pp. 530-531].

The idea that any growth is good if it comes from investment opportunities is very dangerous. It's just not good enough to claim that growth leads to revenue growth, asset growth or income growth. For instance, the company Tyco International, through a series of acquisitions in the 1990s, increased its book value from US$ 3.1 to US$ 31.7 billion in 2001, while the company's earnings per share rose from 8 cents in 1996 to US$ 7.68 in 2001, and the share market price increased from US$ 53 to US$ 236 in the same period. However, in 2002, Tyco reported a loss of US$ 18.48 per share, and in the subsequent years the share price dropped to US$ 40. Only residual income, as one of the measures of value creation, did not show a similar optimism about the growth [20, pp. 84-84]. It turned out that the price that Tyco paid for such growth was too high.

If a company generates income that does not provide for the above-mentioned positive spread, shareholders will not be able to receive the expected return. The criterion of performance is definitively raised to a higher level in relation to accounting income and accounting rate of return. That means that managing growth at the company level requires the management to ultimately create value for all stakeholders, including shareholders. Otherwise, a price paid for growth may turn out to be too expensive.

Why is the previous story about the relationship between growth and value creation at the company level so important? In the first place, due to the need for

making realistic assessments regarding the possibilities of attracting private equity in the area of infrastructure investment. Private investors look at growth in the context of a company's ability to create long-term value. It is nothing else but a request that their interests, in the form of expected returns, must be respected when making decisions on new investments. Otherwise, there will be no motives for investment. Moreover, the inability to achieve expected returns is not caused solely by lack of efficiency. There is also a problem with selling prices of some infrastructure services, which is sometimes a political rather than an economic issue.

Financial strength of infrastructure sectors

After the above consideration of the importance of infrastructure sectors to the growth of the national economy, a logical next step would be to assess the financial position of these sectors in the Republic of Serbia. Many countries, particularly in crisis situations, are looking for strategic ways to create growth and revive the economy by undertaking large investments in these sectors, especially in energy sector and ICT sector. Of course, only financially healthy companies can successfully carry out the implementation of major investment projects.

Since the World Bank in its surveys identifies as key infrastructure sectors the energy sector, water supply and management sector, transportation sector and ICT sector, our analysis will be focused on these four sectors, in accordance with their scope, as defined in the Decree on the Classification of Activities [27]. The share of all these sectors together in the total number of companies is not significant. According to the report of the Serbian Business Registers Agency [25], in 2017 these four sectors accounted for 12.91% of the total number of 101,012 companies, with their respective shares being as follows: energy sector 0.82%, water supply and management 0.91%, transportation 6.20%, and ICT sector 4.98%. These sectors recorded a considerably greater share in total employment (1,072,557 employees in 2017), all four sectors employing slightly more than one-fourth of the total number of employees (25.55%). Energy sector had 40,877 employees (3.81%), water supply and management

sector 36,146 (3.37%), transportation sector 97,383 (9.07%), and ICT sector 46,238 (4.31%).

Our analysis is tailored to the specific characteristics of these sectors. We must not lose sight of the fact that infrastructure sectors are capital-intensive sectors with a very large share of fixed assets in total assets of companies. Low values of turnover ratios are also a distinctive feature of most infrastructure sectors. Consequently, their flexibility is not significant. Also, it happens quite often that prices are an uncontrollable variable for the company's management. On the other hand, individual sectors that belong to the group of infrastructure sectors differ markedly from one another in the structure of assets, sources of financing, revenues and expenses. Therefore, we think that it only makes sense to include an analysis based on financial performance measures.

The database consists of summary financial statements for a five-year period (2013-2017) [25], [6]. However, due to insufficient reliability of information for 2013, resulting from a shift in the content of financial reporting, we will present the results for just four years. Also, in the analysis we opted for some standard performance indicators that are typically used in all financial statements analyses, but for the purpose of this paper we combined them with some specific indicators which portray more clearly the particularities of the financial position and performance of these sectors.

The starting point for the analysis of financial positions of companies is the assessment of their exposure to short-term and long-term risks. The key indicators are displayed in Table 1. A company's liquidity is the best measure of short-term risks. As a measure of its ability to meet its liabilities until maturity date, liquidity is directly related not only to the smooth functioning but also to the very survival of a company. According to the Law on Bankruptcy (Article 11), some of the reasons for initiating bankruptcy proceedings are as follows: permanent illiquidity (if a company cannot meet its financial obligations within 45 days of the date they become due or completely ceases all payments for a consecutive period of 30 days), pending illiquidity (if a bankruptcy debtor makes it apparent that it will not be able to pay its existing debts as they become due), and over-indebtedness (if the liabilities of

Table: 1 Indicators of short-term and long-term risks

| Indicators / Sectors	Energy				Water Supply and Management				Transportation				ICT Sector				Economy			
	2014	2015	2016	2017	2014	2015	2016	2017	2014	2015	2016	2017	2014	2015	2016	2017	2014	2015	2016	2017
Current Ratio	0.95	0.73	0.68	0.63	0.76	0.78	0.73	0.73	0.60	0.89	0.84	0.79	0.91	0.91	0.95	1.03	0.89	0.87	0.91	0.95
Quick Ratio	0.70	0.49	0.50	0.43	0.53	0.55	0.50	0.49	0.45	0.70	0.65	0.59	0.60	0.64	0.66	0.72	0.52	0.52	0.55	0.56
Cash Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cash Flow from Operations Ratio	(0.01)	0.03	0.23	0.14	0.13	0.13	0.18	0.23	(0.06)	0.01	0.24	0.19	0.32	0.34	0.30	0.31	0.01	0.04	0.07	0.06
Risky Assets Conversion Ratio (%)	57.4	73.3	75.8	76.9	76.0	76.1	76.0	75.0	71.4	72.1	71.3	72.0	51.5	50.6	51.2	49.2	48.6	50.4	50.4	50.6
Solvency																				
Fixed Assets Coverage Ratio	0.84	0.76	0.75	0.74	0.85	0.85	0.84	0.81	0.64	0.85	0.81	0.80	0.63	0.67	0.71	0.72	0.77	0.79	0.80	0.82
Fixed Assets and Inventories Coverage Ratio	1.00	0.96	0.95	0.92	0.88	0.89	0.87	0.86	0.93	1.01	0.98	0.96	1.10	1.12	1.15	1.17	0.92	0.93	0.95	0.95
Debt to Equity	0.57	0.76	0.72	0.71	0.53	0.53	0.56	0.65	1.39	0.68	0.77	0.78	1.63	1.55	1.40	1.35	1.38	1.37	1.32	1.27
Cash Flow from Operating to Debt	(0.01)	0.02	0.13	0.16	0.11	0.10	0.14	0.35	(0.04)	0.00	0.14	0.25	0.14	0.16	0.15	0.30	0.01	0.02	0.04	0.08
Debt Repayment Ratio	(162.7)	66.6	7.8	6.4	9.4	9.8	7.3	2.9	(23.2)	215.4	6.9	4.0	6.9	6.2	6.7	3.4	100.3	41.1	22.9	12.2
Cash Flow from Operations to Financial Expenses	(0.13)	0.36	4.29	4.13	3.10	4.96	6.23	10.99	(0.42)	0.10	4.25	3.41	2.47	4.17	3.99	4.67	0.16	0.61	1.41	1.44
Financial Expenses Coverage Ratio	0.11	0.59	0.93	2.49	0.55	1.03	1.53	2.50	(0.94)	1.10	1.39	1.58	1.14	2.33	2.33	3.85	(0.11)	0.35	0.84	1.89
Deficiency Net Working Capital Ratio (%)	(3.0)	(4.5)	(7.3)	(9.4)	(5.7)	(5.0)	(6.4)	(8.4)	(4.3)	1.7	(0.1)	(1.9)	12.2	12.4	14.7	15.6	5.1	5.8	7.1	7.7
Net Working Capital to Inventories (%)	(178.9)	(101.9)	(269.0)	(312.6)	(130.1)	(109.1)	(129.0)	(158.2)	(124.4)	54.9	(3.7)	(61.4)	244.1	311.6	374.7	400.3	43.6	47.4	59.1	61.5
Efficiency																				
Assets Turnover	0.41	0.38	0.33	0.34	0.41	0.41	0.40	0.42	0.66	0.64	0.71	0.73	0.61	0.63	0.66	0.70	0.67	0.69	0.71	0.72
Capital Turnover	0.62	0.61	0.53	0.56	0.62	0.62	0.60	0.67	1.40	1.16	1.16	1.21	1.34	1.44	1.42	1.44	1.46	1.47	1.48	1.48
Current Assets Turnover	1.85	1.85	1.79	2.05	1.92	1.85	1.79	1.88	2.57	2.56	2.81	2.85	2.06	2.03	2.10	2.22	1.68	1.74	1.78	1.80
Inventory Turnover	23.78	12.73	9.23	11.98	9.21	9.06	8.29	8.29	16.54	19.24	22.87	23.60	11.46	14.25	16.73	17.80	5.70	5.76	5.80	5.81
Accounts Receivable Turnover	2.47	2.81	3.34	4.02	3.09	3.23	3.32	3.58	3.99	4.35	5.40	5.68	3.62	4.11	4.66	4.75	3.47	3.92	4.41	4.53
Accounts Payables Turnover	3.47	6.79	9.72	9.34	1.14	2.12	7.90	7.82	4.17	6.95	13.55	14.65	0.84	3.72	8.48	8.02	4.20	6.31	10.17	11.18
OPEX Ratio	0.95	0.92	0.88	0.93	0.95	0.93	0.92	0.94	0.97	0.95	0.95	0.95	0.86	0.88	0.88	0.88	0.96	0.95	0.95	0.95

a bankruptcy debtor exceed its assets) [32]. The risks of illiquidity, by definition, are perfectly clear.

Liquidity is traditionally viewed as an issue associated with the financial structure, but nowadays cash flow measures are predominantly used to test the synchronization between inflows and outflows. Standard liquidity measures, such as current ratio (CR), quick ratio (QR) and cash ratio (CaR), take into account the relationships between working capital (total or individual portions) and short-term liabilities. As a matter of fact, the obtained results are not encouraging. The results presented in Table 1 clearly show that, in the analyzed period, all average values of these indicators are below 1 for CR, between 0.52 and 0.65 for QR, and just somewhere on the fourth decimal greater than zero for CaR. Given that in business practice, especially in banks, the ratios of 2:1 for CR and 1:1 for QR are usually considered as normal, we can easily conclude that the risk of threatening illiquidity is considerable. Truth be told, maybe we could attach less weight to these widely used standards. There are two arguments in support of the previous viewpoint. First, today companies are relying

heavily on the strategy of delaying the payments of account payables to suppliers and use those funds for financing working capital. Second, companies manage inventory more efficiently than before. In such circumstances, we might say that investors could tolerate CR values around or slightly above 1, and QR values of slightly below 1 [28, pp. 363-36]. The problem is that even with this relaxation our indicators remain significantly below newly established criteria, which points to the gravity of risks arising from illiquidity.

The final conclusions could be drawn by including some additional argumentation that comes from the assessment of liquidity on the basis of cash flow analysis. This analysis is valuable because liquidity can exist only if there is a match between cash inflows and outflows. In this regard, the most important measure is a ratio of cash flow from operations and average short-term liabilities. Cash flow from operations represents the amount of cash from business activities that remains after providing financing for net working capital requirement. The graphical representation of the results by individual

Figure 4: Liquidity analysis based on cash flow
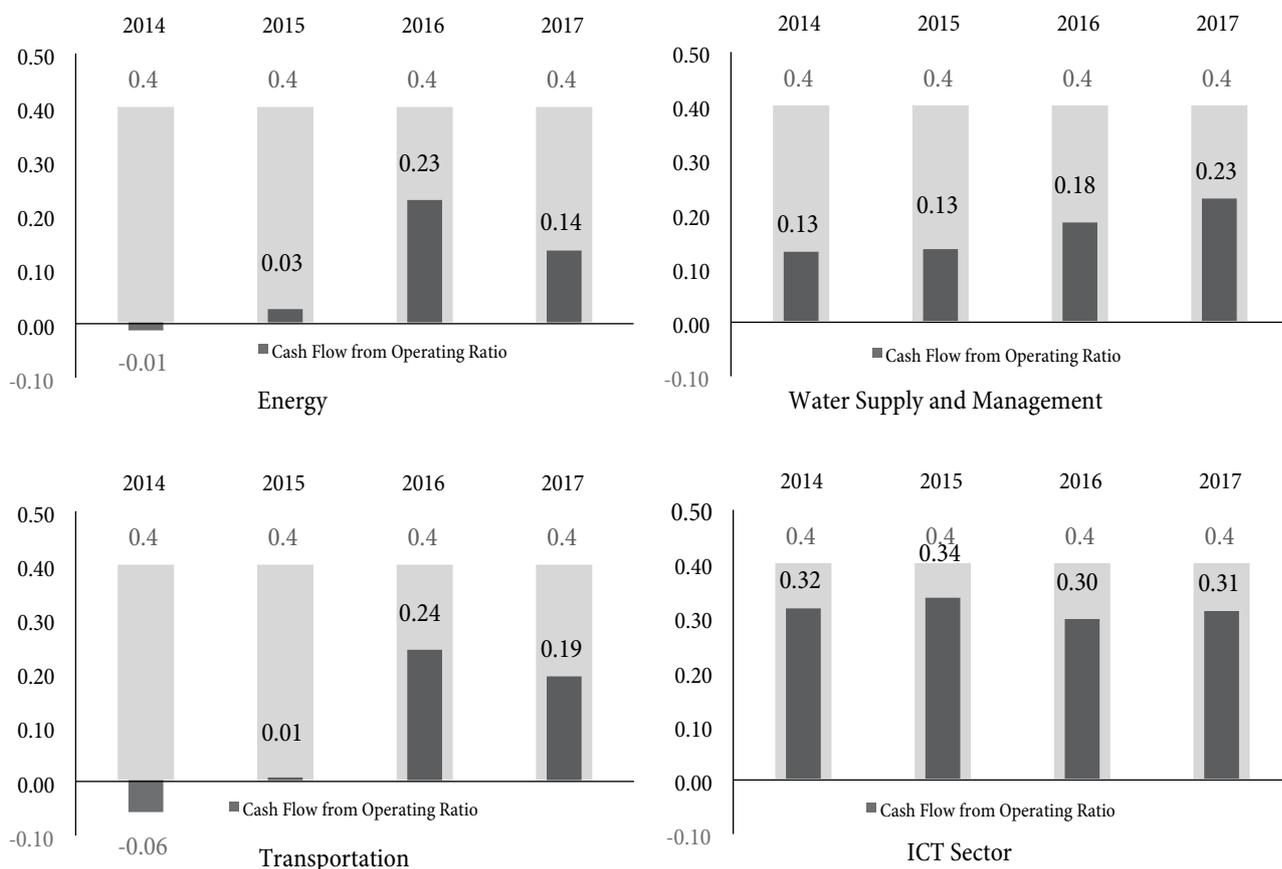
sectors is shown in Figure 4. If we take into consideration the general opinion that financially healthy companies have the value of this ratio that is greater than 0.4, then the conclusion seems obvious. All infrastructure sectors have much lower values in relation to this reference value. The value of this ratio for energy sector and transportation sector on average amounts to 0.10, for water supply and management sector is 0.17, while only ICT sector, with the value of 0.32, is coming closer to a desirable value. The great importance that is attached to this indicator of liquidity arises from the fact that empirical research has shown that even 90% of companies that for four consecutive years recorded the values of this ratio below 0.4 went bankrupt [4, pp. 61-66].

Finally, let us take a look at the results of risky assets conversion ratio, which is calculated as a ratio of the most risky assets (including intangible assets, property, plants and equipment) and total assets of a company. So, the calculation includes the most risky assets that are unlikely to be easily converted into cash. A greater share of such assets tends to erode the company's liquidation value. In addition, the risk of bankruptcy increases with a sudden occurrence of cash outflow that cannot be covered from current assets. High values of this ratio indicate that the risk related to the conversion of these assets into cash is significant and, consequently, the risk of illiquidity is also high. That risk is at the level of average values for the economy (which are also high) only in ICT sector (about 50%), while in other analyzed sectors it is much higher, exceeding 70%. These results additionally confirm the finding that the risk of illiquidity in the analyzed sectors is at a very high level.

Long-term financial risks are determined by financial structure, financial flexibility and financial leverage. Many companies use financial leverage to boost shareholder returns [2, pp. 529-532]. That is possible if returns on new investments are higher than cost of capital, as only in such conditions shareholder returns can increase. Of course, the effect of leverage is related to an increased share of debt in the capital structure. Long-term financial risks are precisely a result of the likelihood that cash flow from operations would not be sufficient to cover increased borrowing expenses and a principal payment.

Accordingly, a company's financial flexibility reflects its ability to use the creditors' sources of financing to enhance profitability and prevent the risks that arise when increased cost of capital is greater than generated return. The close interdependence between profitability and long-term financial risks is evident, as only profitable companies can provide sufficient amount of cash to creditors and owners. This topic will be further discussed later.

Financial flexibility is linked to the financial structure and borrowing capacity, in the sense that a better financial structure increases borrowing capacity and creates space for a positive effect of financial leverage. The existing risks in this area are assessed on the basis of the solvency indicators presented in Table 1. The above-mentioned fact that infrastructure sectors are capital intensive implies the requirement that companies belonging to these sectors must have a substantial amount of long-term capital and, primarily, owner's equity as the best source of financing. The analysis clearly shows that fixed assets, as the most risky part of total assets, are not entirely covered by equity. For all four analyzed years, the average values of fixed assets coverage ratio range between 0.68 in ICT sector and 0.84 in water supply and management sector. These results clearly indicate the presence of negative net working capital in all four sectors. The situation seems slightly brighter if we add long-term liabilities to equity in order to assess the extent to which fixed assets and inventory are covered by total long-term sources of financing. Nevertheless, in this case average values are greater than 1 only in ICT sector, while in other sectors they fall below 1, which means that net working capital is negative. That happens when a part of fixed assets is financed from short-term sources, which is not a characteristic of well-structured companies. If we observe the relationship between net working capital and inventory, we will find out that deficient net working capital is several times greater than inventory, which could be a cause for concern. However, this picture appears less gloomy if we take into consideration the fact that companies from these sectors have relatively low inventory levels. Deficiency net working capital ratio shows the extent to which assets are inadequately financed.

Debt ratio, as a generally accepted measure of the quality of long-term financial structure, also reveals the

exposure to risks. The first conclusion is that the level of debt varies considerably across sectors, while it is usually stable within individual sectors. Water supply and management sector had the lowest level of debt (average value of 0.57 in the analyzed period), energy sector (0.69) and transportation sector (0.91) were in the middle, while the highest level of debt was recorded by ICT sector, whose liabilities exceeded equity by 1.48 times. This situation is certainly also related to the ability of companies to deal with the debt burden. It is important to point out that the energy sector, in relation to the period 2007-2011, has significantly increased its debt from an average of 0.4 to 0.69, which is still below the average value in the economy, amounting to 1.33 [17, p. 20].

Financial expenses coverage ratio and cash flow from operations to financial expenses show the extent to which financial expenses are covered by EBIT and cash flow from operations, respectively. Namely, a greater level of the coverage of financial expenses implies a greater safety or less exposure to long-term financial risks. In the relevant literature, the values of financial expenses coverage ratio in the range from 5 to 7 are seen as desirable, which means that the interests of creditors are quite well protected. However, there are opinions that companies are exposed to high risks when the values of this ratio are lower than 2 [28, p. 373]. In our case, the previous problem exists with average values for a four-year period in all sectors, excluding ICT sector. An encouraging sign is that the values of this ratio are showing an upward trend, reaching their peaks in 2017. The values of cash flow from operations to financial expenses exceed those of financial expenses coverage ratio, which is not very common in practice. In addition, these values oscillate significantly across periods. That may be an indication of inadequate quality of information in financial statements.

Finally, for the purpose of assessing the company's ability to repay its debts we use cash flow from operations to debt or, even better, its reciprocal value which we call debt repayment ratio. The values of cash flow from operations to debt are, on average, below a normal reference value of 0.2. Good news is that in 2017, the values of this ratio exceeded 0.2 in all sectors, excluding energy sector in which this ratio amounted to 0.16. Debt repayment ratio shows

how many years it will take to repay all debts if a company generates cash flow from operations in the respective year. The values for the last two years are acceptable and range between 3.4 and 7.8 years in all sectors. Also, there is an upward tendency with regard to the ability to repay debts. Bearing all that in mind, we can conclude that long-term risks exist, but that they are not so dramatic. These risks result mainly from a specific financial structure, marked by a dominant share of long-term fixed assets, and inflexibility of these sectors. Certainly, these risks have to be managed more efficiently.

The assessment of the exposure of companies (and sectors) to risks has several aspects. One of the key aspects is profitability. There are many reasons for that. Profitability determines the company's exposure to short-term and long-term financial risks, which we have already discussed from the perspective of the company's financial structure. Profitability is the basis for creating value for shareholders, but also a key precondition for the company's survival. It represents the main driving force in market-oriented economies. Profitability determines the attractiveness of companies, industries and sectors to investors. On the other hand, a potential occurrence of losses could cause financial and structural problems, jeopardize survival, hamper growth prospects, increase investment risk and discourage investors [17, pp. 24-25].

As far as the profitability assessment is concerned, good news is that in the last three years of the observed period all sectors generated profits, which was rarely seen in the years preceding that period. However, we should not jump to the final conclusion because the forgoing fact does not tell the whole story of the profitability and attractiveness of these sectors for investment. In this analysis, we will rely on a five-component disaggregation of ROE, as a reflection of generated shareholder returns. We will use this analysis to make a comparison between ROE and ROIC (return on invested capital) and then, based on its results, we will perform an analysis of financial leverage. The results of the analysis are presented in Table 2.

Several conclusions can be drawn from the presented results. First, according to the results based on ROE, profitability is unsatisfactory in all analyzed infrastructure sectors, except in ICT sector. In the first three sectors,

Table 2: Five-component disaggregation of ROE and financial leverage effect

Energy

	EBIT Margin	Invested Capital Turnover	Return on Invested Capital	Financial Leverage Ratio	Financial Expensive Ratio	Financial Leverage Multiplier	Pretax Return on Equity	Tax Effect	Return on Equity	Interest Expense Ratio	Financial Leverage Index
	1	2	3 = 1 x 2	4	5	6 = 4 x 5	7 = 3 x 6	8	9 = 7x8	(10)	11 = 9 / 2
2014	4.23	0.54	2.29	1.14	0.00	0.00	0.00	(31.78)	(0.12)	15.58	(0.05)
2015	6.46	0.50	3.25	1.20	0.35	0.42	1.37	0.95	1.31	9.28	0.40
2016	8.23	0.42	3.45	1.27	0.57	0.72	2.48	0.70	1.74	5.14	0.50
2017	8.38	0.44	3.67	1.27	0.75	0.95	3.49	0.92	3.20	3.32	0.87

Water Supply and Management

	EBIT Margin	Invested Capital Turnover	Return on Invested Capital	Financial Leverage Ratio	Financial Expensive Ratio	Financial Leverage Multiplier	Pretax Return on Equity	Tax Effect	Return on Equity	Interest Expense Ratio	Financial Leverage Index
2014	4.09	0.54	2.22	1.14	0.38	0.43	0.97	0.77	0.74	10.52	0.33
2015	3.76	0.54	2.05	1.14	0.57	0.65	1.33	0.77	1.03	6.79	0.50
2016	5.86	0.53	3.12	1.13	0.68	0.77	2.41	0.76	1.82	7.83	0.58
2017	5.49	0.59	3.24	1.13	0.77	0.87	2.81	0.84	2.37	5.86	0.73

Transportation

	EBIT Margin	Invested Capital Turnover	Return on Invested Capital	Financial Leverage Ratio	Financial Expensive Ratio	Financial Leverage Multiplier	Pretax Return on Equity	Tax Effect	Return on Equity	Interest Expense Ratio	Financial Leverage Index
2014	(1.43)	0.92	(1.31)	1.53	5.93	9.05	(11.87)	1.07	(12.65)	13.13	(9.65)
2015	6.22	0.86	5.37	1.35	0.59	0.79	4.26	0.78	3.34	5.70	0.62
2016	5.57	0.95	5.31	1.22	0.64	0.78	4.14	0.82	3.38	7.51	0.64
2017	6.53	0.99	6.44	1.23	0.68	0.84	5.40	0.78	4.23	7.84	0.66

ICT Sector

	EBIT Margin	Invested Capital Turnover	Return on Invested Capital	Financial Leverage Ratio	Financial Expensive Ratio	Financial Leverage Multiplier	Pretax Return on Equity	Tax Effect	Return on Equity	Interest Expense Ratio	Financial Leverage Index
2014	14.46	0.79	11.46	1.69	0.58	0.97	11.13	0.86	9.53	8.36	0.83
2015	14.69	0.84	12.34	1.71	0.75	1.28	15.80	0.86	13.62	5.22	1.10
2016	13.13	0.87	11.45	1.63	0.75	1.23	14.05	0.84	11.75	4.93	1.03
2017	15.48	0.91	14.03	1.59	0.83	1.33	18.59	0.87	16.22	4.27	1.16

Economy

	EBIT Margin	Invested Capital Turnover	Return on Invested Capital	Financial Leverage Ratio	Financial Expensive Ratio	Financial Leverage Multiplier	Pretax Return on Equity	Tax Effect	Return on Equity	Interest Expense Ratio	Financial Leverage Index
2014	4.10	0.99	4.04	1.48	(0.25)	(0.36)	(1.47)	1.57	(2.31)	10.95	(0.57)
2015	4.72	1.01	4.76	1.46	0.30	0.44	2.08	0.54	1.13	7.06	0.24
2016	5.29	1.03	5.43	1.44	0.53	0.77	4.16	0.71	2.97	5.42	0.55
2017	7.36	1.04	7.62	1.43	0.71	1.01	7.72	0.84	6.49	4.92	0.85

return on equity was below 4.5% in all years. That is certainly not something that would satisfy the interests of investors. In the last three years, return on equity was greater than 10% only in ICT sector, which is significantly above the average in the Serbian economy. Second, the already mentioned possibility that debt increase can have both positive and negative effects has been confirmed in practice. The effect of financial leverage is negative in energy sector, water supply and management sector and transportation sector. The following conclusions can be made based on the results presented in Table 3: return on invested capital (ROIC) is greater than return on equity (ROE), a ratio of ROIC and ROE is less than 1, financial leverage multiplier is less than 1 and, finally, interest expense ratio exceeds return on invested capital. In such circumstances, negative effects of financial leverage lead to a decrease in return on equity. In other words, the interest for borrowing exists as long as return on invested capital exceeds cost of debt. Just as the excess that remains after covering cost of debt belongs to shareholders, negative

effects arising when cost of debt is greater than return are also borne by shareholders. Given that ROIC results from operating and investment activities and ROE from all activities (including financing activities), financial leverage is a consequence of the presence of financial risks. The situation is quite the opposite in ICT sector, concerning both profitability and the effects of financial leverage. By the way, all that takes place in the conditions of a significant drop in financing costs.

The performed analysis also points to the major causes of unsatisfactory profitability in the above-mentioned three infrastructure sectors. In addition to a negative effect of financial leverage, the second cause is very low values of asset turnover ratio, which is a consequence of high capital intensity. In similar circumstances, the space for profitability improvement could be found in an increase in activity levels and degression of fixed costs. High fixed costs are usually accompanied by a high operating leverage, which means that slight increases in revenues could lead to a significant increase in profitability, and

vice versa, a fall in revenues could easily take a company and the entire sector from the profit zone to the loss zone. New profitable investments that will lead to an increase in revenues are seen as a logical opportunity to improve the sectors' performance. The third important cause of low profitability is an insufficient level of operational efficiency. This can be concluded by looking at the values of OPEX ratio (see Table 2). We can see that the share of operating expenses in operating revenues is very large in all sectors, excluding ICT sector. That means that profit margins from core business are too narrow, i.e., operational efficiency is at low level. Of course, one should not lose sight of the fact that selling prices are also an important determinant of the level of profit margins. Since high capital intensity of infrastructure sectors tends to limit competition, according to economic theory, that should lead to higher profit margins [29, pp. 147-148]. This opinion proved to be true in the case of ICT sector, where a remarkable progress was made toward market liberalization and greater competition. Still, profit margins are relatively high due to high profit potential. However, this practice is not widespread in energy sector due to the existence of a monopoly, but EBIT margin is lower. The problem is definitely related to efficiency, but it has also something to do with pricing policy.

Our story about the profitability of infrastructure sectors and their attractiveness to investors does not end with this brief analysis. It will be continued in the last part of the paper.

Prospects for sustainable growth in infrastructure sectors

Let us go back to the subject of sustainable growth. Namely, we have decided to shorten our story and focus only on the capacity of the existing infrastructure sectors to bear some burden of infrastructure investment. There are many open issues in this area and we will briefly look at some of them.

Growth is an essential prerequisite for the prosperity of the national economy, as well as of individual companies and their profitability, but its presence does not automatically mean that growth will be sustainable and that companies

will be profitable. In this paper, the sustainability of growth is considered in relation to the structure of sources of financing and value creation. Growth is always associated with the problem of providing financing, which becomes a burning issue under conditions of strong growth. Maintaining a sound financial structure, especially in the case of large investments, requires an adequate combination of internally generated sources and external sources of financing. In order to assess the investment possibilities of the existing infrastructure sectors, we will use several key indicators that are presented in Table 3.

Table 3: Indicators of investment possibilities

Energy	2014	2015	2016	2017
FCF to Debt (%)	(27.27)	(77.08)	(18.24)	(11.80)
CAPEX Ratio (%)	(9.22)	4.87	58.73	57.75
CAPEX to Fixed Assets (%)	3.54	17.49	12.75	7.37
Internal Growth Rate (%)	(0.88)	1.17	(0.09)	2.33
Sustainable Growth Rate (%)	(1.34)	1.84	(0.15)	3.76
Water Supply and Management				
FCF to Debt (%)	29.30	(29.31)	(8.21)	38.03
CAPEX Ratio (%)	422.26	57.48	87.47	200.73
CAPEX to Fixed Assets (%)	1.14	8.81	8.15	4.56
Internal Growth Rate (%)	2.03	0.60	0.84	0.43
Sustainable Growth Rate (%)	3.06	0.90	1.28	0.68
Transportation				
FCF to Debt (%)	(28.33)	21.99	0.61	(10.46)
CAPEX Ratio (%)	(29.58)	(3.29)	101.66	75.05
CAPEX to Fixed Assets (%)	10.87	(7.65)	9.66	11.15
Internal Growth Rate (%)	1.44	(0.71)	1.68	2.21
Sustainable Growth Rate (%)	3.04	(1.28)	2.72	3.69
ICT Sector				
FCF to Debt (%)	9.93	1.85	5.89	6.02
CAPEX Ratio (%)	169.38	107.80	134.10	134.55
CAPEX to Fixed Assets (%)	9.21	16.24	11.17	11.04
Internal Growth Rate (%)	2.26	4.71	1.63	3.24
Sustainable Growth Rate (%)	4.97	10.65	3.51	6.72

CAPEX ratio shows the extent to which investments in intangible assets, property, plant and equipment are financed by cash flows from operations. The results differ significantly between the sectors and fluctuate widely, from being quite worrisome to extremely favorable. This is a consequence of cash flow volatility and variability in investment levels (investments are expressed as net amount, which means that inflows from sales of intangible assets, property, plant and equipment were subtracted). Due to high volatility of this indicator, the conclusions on the availability of internally generated sources cannot be

made without some further research. CAPEX to fixed assets ratio shows the intensity of investment in new intangible assets, property, plant and equipment or in the replacement of the existing assets. The obtained results for the whole analyzed period are, on average, mostly around 10% in energy sector and ICT sector, while they are, on average, two times lower in the remaining two sectors.

The assessment of growth opportunities is usually performed by using internal growth rate and sustainable growth rate, which reflect the sustainability of growth depending on the selected sources of financing. In this regard, internal growth rate shows the dynamics of growth in these sectors in the conditions of exclusive reliance on internal sources of financing, while sustainable growth rate points to the prospects for growth when both internal and external borrowed sources of financing are used in a sustainable manner. Naturally, sustainable growth rate is always higher than internal growth rate, which our results have confirmed. The analysis shows that these rates are extremely low (in some years even negative) and only sometimes slightly higher than 1 in all observed sectors, except for ICT sector. It is now becoming clear that sometimes unrealistically high values of CAPEX ratio, recorded in the past periods, are a consequence of insufficient level of investment rather than of substantial cash flow. Also, it should be taken into account that our calculations of these rates were based on the assumption that generated retained earnings are not used to cover incurred losses but exclusively to support growth, which is not so realistic.

Growth that goes beyond a sustainable rate may adversely affect the company's financial structure and increase the risks of bankruptcy. Thus, the structure of sources of financing determines the sustainability of growth. Also, we should keep in mind that all sources of financing are not always equally available and attractive. Financing growth solely from debt is not sustainable. By the way, financing through the issuance of shares is not always a viable option, since it entails the risks of less or more significant dilution of control. The cost of equity is higher than the cost of other sources of financing. The reluctance of companies to issue new shares may come from the fact that new issue causes a drop in earnings per share in the first couple of years, which is not the case with borrowing. If shares are overvalued, the news on new issue is interpreted by potential investors as an intention to sell shares above their real value. On the other hand, if shares are undervalued, there is no interest in raising finance by issuing new shares because the existing shareholders would suffer loss. A long duration of issuance procedure (several months) entails an additional dose of uncertainty. On the basis of the previous facts, Higgins concludes that some companies may express reservations when considering whether to base their growth strategies on this source of financing [14, pp. 144-145].

The forgoing observations again turn the spotlight on the crucial role of internally generated sources in growth financing. Internally generated sources of financing are a precondition for sustainable growth and, therefore, one of the most important sources of financing [12, pp. 79-91]. In this regard, the position of infrastructure sectors is very bad, no matter whether the availability of internally generated sources is assessed based on retained earnings or generated free cash flow. In accordance with the pecking-order theory, the first rule of investment project financing calls for the use of internal sources of financing. The second rule states that, in the absence of internal sources of financing, a logical decision should be to resort to external sources of financing, starting from the least risky to the most risky ones from the perspective of investors. That means that, in the first place, companies have to rely on borrowing, but in the right order, including traditional debts first (loans and bonds) and then convertible debts, as long as there is a borrowing capacity, which could depend on the value of collateral, financial distress costs or burdensome safeguard contractual clauses. After that, they can start issuing shares, also respecting the order: preferred shares first and then ordinary shares [24, pp. 450-453]. Bearing all that in mind, we can say that the analyzed sectors do not have many options in terms of providing adequate financing for their growth. This conclusion can be made based on the information in Table 4.

A common characteristic of many well-positioned companies is a significant share of retained earnings (as an internal source of financing) in equity. The situation is markedly different in the case of infrastructure companies

Table 4: Availability of internal sources of financing

Years	Energy			Water Supply and Management			Transportation			ICT Sector		
	RE/TL*	RE/E**	FCF/D***	RE/TL	RE/E	FCF/D	RE/TL	RE/E	FCF/D	RE/TL	RE/E	FCF/D
2014	17.65	3.97	(27.27)	101.27	15.11	29.30	17.36	30.28	(28.33)	43.41	60.53	9.93
2015	13.22	7.17	(77.08)	103.41	15.34	(29.31)	33.24	19.13	21.99	52.19	68.05	1.85
2016	13.90	6.38	(18.24)	98.94	16.34	(8.21)	38.64	22.15	0.61	53.89	68.46	5.89
2017	22.65	10.26	(11.80)	77.52	17.76	38.03	45.28	25.13	(10.46)	64.15	70.98	6.02

Note:
*Retained earnings & Reserves to Total Losses (%)
**Retained earnings/Equity (%) (equity is reduced for all losses)
***FCF to Debt (%)

in Serbia, especially in energy sector (on average, close to 17%). On the other hand, ICT sector is the exact opposite. There are two possible explanations: whether profitability is unsatisfactory or there is an outflow of retained earnings from the company as a result of distribution. We think that both explanations are valid. The fact that retained earnings cannot cover accumulated losses (including losses over equity) is even more worrisome. That problem was found even in ICT sector. Therefore, it seems highly questionable whether significant internally generated sources for financing growth actually exist. Finally, the percentage of the coverage of debt by free cash flow confirms the previous findings. A half of analyzed years were marked by negative free cash flow, while in other years it was quite modest, which also points to the threats to shareholder interests.

An assessment of the quality of equity is also important for the analysis of the existing growth and evaluation of prospects in the area of growth financing. For that purpose, we decided to considerably simplify the structure of equity and make the problem much more apparent. Given that all sectors record losses and that these losses, to a greater or lesser extent, exceed equity, as well as that losses are first covered at the expense of reserves and retained earnings, we added (or deducted) repurchased shares, reserves, unrealized profits (losses) from securities and retained earnings to the existing common equity. Then, we deducted reported losses and losses over equity from the obtained amount. In this manner, we reduced total equity to only two items: common equity and revaluation reserves. The results are displayed in Table 5.

The conclusions that arise from this analysis are not very encouraging. A share of revaluation reserves in total equity is on average about 65% in energy sector, in

water supply and management sector about 37%, and in transportation sector about 31%. A share of these reserves is small only in ICT sector and, on average, accounts for about 5%. Since an increase in assets is on the opposite side of revaluation reserves, it follows that a significant portion of the increase in assets does not result from actual investment, but rather from the correction in their value. An additional problem is that a part of revaluation reserves may end up in retained earnings, which can explain why in some years net earnings were lower than the increase in retained earnings. That changes the perception of real growth. Neither the growth of a considerable part of assets comes from an actual increase in investment activities, nor on the side of sources of financing there are actual cash inflows. These are examples of quasi-investment and quasi-financing, which do not result from cash inflows or outflows. An actual increase in activity level would require a substantial investment and greater presence of real sources of financing.

Table 5: Equity structure (%)

Energy	2013	2014	2015	2016	2017
Equity	100.00	100.00	100.00	100.00	100.00
Common Equity	51.90	51.84	31.30	29.07	29.34
Revaluation Reserves	48.10	48.16	68.70	70.93	70.66
Water Supply and Management					
Equity	100.00	100.00	100.00	100.00	100.00
Common Equity	63.29	62.81	64.57	63.91	62.44
Revaluation Reserves	36.71	37.19	35.43	36.09	37.56
Transportation					
Equity	100.00	100.00	100.00	100.00	100.00
Common Equity	63.06	51.48	72.59	76.96	76.40
Revaluation Reserves	36.94	48.52	27.41	23.04	23.60
ICT Sector					
Equity	100.00	100.00	100.00	100.00	100.00
Common Equity	94.60	93.88	94.84	95.16	95.66
Revaluation Reserves	5.40	6.12	5.16	4.84	4.34

Finally, let us return to the analysis of sustainable growth from the perspective of the ability of companies and sectors to create value added. The accounting concepts of income do not have the right answer to this question. The problem is that net income does not take into account all costs of capital. The calculation leaves out cost of equity. It is true that shareholders bear the greatest risk, but that does not mean that they will invest and then wait to be left without returns. The respect for the interests of investors implies accounting for their expected return. Companies do not create value unless they can also provide the expected returns to their shareholders. This way of thinking requires raising the bar regarding the targeted profitability. Accordingly, shareholder returns are equated with opportunity cost of equity, i.e., profits that investors would make by investing in another company of comparable risk. Growth that ignores the need for creating shareholders returns cannot be sustainable in the long run.

The growth is definitely at risk, since there is a probability that the equity value will not increase as expected [21, pp. 694-696]. On the one hand, growth is directly linked to the increase in asset investment and, on the other, asset growth largely depends on the possibilities of increasing sales and recorded earnings. Poor sales performance leads to modest earnings as well as to a low level of their retention in a company for the sake of financing profitable projects. Insufficient revenues, especially if they are influenced by inadequate sales prices,

will not provide satisfactory profitability, which will not stimulate investors.

In the absence of space for more thorough elaboration of this issue, we will use a "trick". To avoid required calculations of cost of equity due to lack of space, let us suppose that shareholders expect a minimum return which would be equal to the cost of debt, i.e., equal to the rate of financial expenses. Although this is far from a perfect substitute for cost of equity, this approach will help us to see what will happen to the reported earnings in infrastructure sectors if we include these additional costs in the calculation of residual income, as a measure of value creation. Bearing in mind that investors expect greater returns than creditors, the actual results, summarized in Table 6, could turn out even more disappointing.

Based on the presented results, we can easily draw a conclusion that these sectors recorded positive results in 14 out of 16 analyzed years. However, the situation became completely opposite with the inclusion of cost of equity in the calculation. Now there is a negative presumed residual income in 12 of 16 analyzed years. More precisely, it existed in all sectors and in all years, excluding ICT sectors. In such circumstances, there are no grounds for talking about value creation, but rather about its destruction.

The key conclusion is that investors have no interest in investing, especially in infrastructure projects, if they cannot achieve the expected returns. In practice, it is hard

Table 6: Presumed residual income

Energy	2014	2015	2016	2017
Net Income	(1,352,027)	13,851,733	17,938,028	34,364,502
Minimum Required Return	176,362,989	93,133,192	55,164,540	36,221,658
Presumed Residual Income	(177,715,016)	(79,281,459)	(37,226,512)	(1,857,156)
Water Supply and Management				
Net Income	1,326,972	1,852,421	3,421,418	4,407,292
Minimum Required Return	18,568,689	12,573,192	14,884,089	10,713,754
Presumed Residual Income	(17,241,717)	(10,720,771)	(11,462,671)	(6,306,462)
Transportation				
Net Income	(49,993,408)	14,664,729	16,013,844	20,570,056
Minimum Required Return	53,519,922	27,007,370	35,723,646	39,060,620
Presumed Residual Income	(103,513,330)	(12,342,641)	(19,709,802)	(18,490,564)
ICT Sector				
Net Income	22,403,140	33,061,886	31,174,980	45,536,417
Minimum Required Return	19,183,731	13,410,437	13,526,323	12,270,741
Presumed Residual Income	3,219,409	19,651,449	17,648,657	33,265,676

to imagine a situation where creditors, who bear lower risk, would achieve higher returns than shareholders, who bear the greatest risk. The unsustainability of that situation is more than obvious. Therefore, one should not overlook this fact when talking about private investment in infrastructure projects. There is a need for a shift in mindset when it comes to creating a stimulating environment for attracting capital. Of course, it is also necessary to ensure legal security, political stability, developed capital market, risk sharing, and the like. However, all that will not be enough if there is no capacity for creating value added. Foreign investors will not understand that. If their motives are disregarded, there will be no inflow of infrastructure investments. Only the growth that is connected with the increase in residual income or economic value added can be considered as relevant.

Conclusion

Growth is undoubtedly the cornerstone of the prosperity of national economies and individual companies. In this context, infrastructure investment is of utmost importance, as it has direct or indirect impact on economic growth. Infrastructure investment directly affects the growth of infrastructure sectors in the respective year. Indirectly, it affects long-term growth through fostering the economic activities of other companies and sectors. Large infrastructure investments are often out of reach of some companies due to the difficulties in providing financing. In order to overcome this problem, there is a need for the diversification of sources of financing, starting from budgetary sources, through providing loans, borrowing from international financial institutions and capital markets, to private investment. Strategic partnerships as well as public-private partnerships could play a significant role in the process of the implementation of large infrastructure investments.

A portion of infrastructure investment should be borne by the companies belonging to the existing infrastructure sectors. However, the analysis has shown that some companies do not have a sufficient financial capacity to bear the burden of large capital investments. They are not able to provide a part of the funds needed for their financing from available cash flow or to enhance

their borrowing power. The key reasons are related to unsatisfactory liquidity, exposure to long-term financial risks, low profitability and a lack of internally generated sources for ensuring sustainable growth. State-owned enterprises and public utilities that operate within infrastructure sectors deserve special attention. Raising their performance requires a wide range of carefully selected measures, such as an improvement in corporate governance, differentiation of the government's ownership function from its regulatory function, full or partial privatization with different dispersion of ownership, operational and financial restructuring, inclusion of some companies in the capital market, and so on [15, pp. 48-55].

All growth entails certain risks. Growth at the level of national economy does not necessarily lead to the profitable growth at the level of individual companies. The absence of sustainable growth is an additional problem. On the one hand, the sustainability of growth is related to the problem of maintaining the desired financial structure. Borrowing is useful as long as there is a positive effect of financial leverage. In this regard, the combination of financial sources must be selected in such a manner to prevent that a company, due to increased debts and threat of heavy costs of financial distress, faces bankruptcy. Another important determinant of sustainable growth is the ability to create value added. This means that not all growth is attractive, but only the growth which makes it possible to cover the expected shareholder returns from generated income. Unless this condition is fulfilled, private investors will have no interest in infrastructure investment. Growth should not be pursued at all costs. Unfounded growth may cost too much.

In general, when it comes to developing countries, the problems of financing infrastructure projects are due to a lack of private capital. It could be said that the problem primarily comes from the lack of confidence in institutions and the consequent unwillingness to undertake long-term and more risky investments. Attracting private capital calls for creating an adequate business environment and solving some serious problems. Stable regulations and legal security must be provided if there is an orientation toward attracting investment. The implementation of projects in many cases lasts for several years, while the

effects usually become visible only after the completion of projects. This implies a long-term engagement of sources with delayed effects, which increases risks and requires resorting to long-term hedging mechanisms.

Besides, the sustainability of growth is not only a question of the efficiency of individual companies. It is also a matter of political will to create a favorable climate for achieving sustainable growth. Profitable growth will depend on a number of factors, including the attractiveness of investment projects, profit potential, operational efficiency, etc. Nevertheless, growth may be hampered by pricing policy. Since these investments most often result in the provision of infrastructure services to the broadest spectrum of users, political and social circumstances in developing countries are the reason why decisions on the prices of services are not made based on their commercial values. Of course, it is not easy to make these tough decisions, but it is also obvious that the inability to achieve expected returns discourages private investors. Only the growth that leads to the creation of value added matters. Foreign investors will be motivated only by the opportunities coming from that growth.

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THE CHALLENGES OF INCOME CONVERGENCE AT TIMES OF THE FOURTH INDUSTRIAL REVOLUTION

Izazovi konvergencije dohotka u vreme četvrte industrijske revolucije*

Abstract

The paper argues that Serbia must address a complex set of challenges as it prepares for the EU accession and seeks convergence to the European quality of life within a reasonable timeframe. To successfully close institutional, infrastructure and income gaps with core EU countries, while, at the same time, responding to likely pressures from the Fourth Industrial Revolution requiring profound social, industrial and organizational changes, the country will have to first address the institutional legacy of the past which now stands in the way of introducing modern, efficient and transparent governance systems into the state, public and private sector. The only institutional and policy scenario that supports this growth path may be more demanding, but it offers relatively fast convergence based on a smart industrial policy and deep structural changes of economic organization, education and social systems. New social consensus may not be easy to reach, but it will be well worth the effort if it offers a base to fend off future governance risks and ensure prosperity in the challenging new digital world.

Keywords: *Fourth Industrial Revolution, income convergence, smart growth, industrial policy, institutional development, governance.*

Sažetak

U radu se pokazuje da Srbija mora da razreši kompleksan skup izazova koji je čekaju na putu Evrointegracija i približavanja evropskom kvalitetu života u razumnom roku. Da bi eliminisala kašnjenje u domenu institucija, infrastrukture i dohodaka u odnosu stare članice EU, i istovremeno uspešno odgovorila na verovatne pritiske koje će stvarati četvrta industrijska revolucija tražeći duboke socijalne, industrijske i organizacione promene, Srbija će morati pre svega da se izbori sa institucionalnim bremenom prošlosti koje se danas direktno suprotstavlja uvođenju modernih, efikasnih i transparentnih upravljačkih sistema u državi, javnom i privatnom sektoru. Institucionalni i ekonomsko-politički scenario koji podržava takvu putanju razvoja je zahtevniji od alternativa, ali on nudi relativno brzu konvergenciju dohotka na osnovu pametne industrijske politike i dubokih strukturnih promena ekonomske organizacije, obrazovnog i socijalnog sistema. Novi društveni konsensus neće biti lako dostići, ali je on vredan truda pošto će konačno ponuditi osnovu da se minimiziraju budući rizici lošeg upravljanja i osigura trajni prosperitet u stalnim izazovima novog digitalnog sveta.

Ključne reči: *četvrta industrijska revolucija, konvergencija dohotka, pametan rast, industrijska politika, institucionalni razvoj, upravljanje.*

Introduction

Based on the 2017 Eurostat data, Serbia lags more than seven times behind core European countries (EU-15) in GDP per capita. In purchasing power parity (PPP) terms, the gap is smaller, but still large (over three times). More importantly, both nominal and PPP income gaps have been quite persistent in the past decades. Based on the actual growth rates recorded since the beginning of the global crisis, Serbia will need about 185 years to converge to nominal and PPP incomes of the EU-15. By contrast, the countries of Central and Southeast Europe which recently joined the EU will close the PPP income gap with the EU-15 in less than 20 years.

To achieve the same result – income convergence with the EU-15 in 20 years – Serbia would need to sustain an 8 percent average annual GDP per capita growth in PPP terms. At somewhat lower and more realistic growth rates, the time needed to close the real income gap would increase to 24 years (at 7 percent average annual growth), 30 years (at 6 percent), and more than 40 years at real income growth of 5 percent.

Obviously, dynamic and sustainable economic growth represents the key for income convergence with Europe and the basis for a better quality of life in Serbia and the Western Balkan (WB) region as a whole. This view is shared by almost all rational economic, social and political stakeholders. Real differences in views emerge as soon as we address the practical institutional and policy issues that would represent the basis for achieving such dynamic and sustainable long-run economic growth in real domestic and international circumstances.

The European and global economic context. The European and global context gains importance in an increasingly connected world economy. During 2018-2019 the global economy will continue the steady expansion started in mid-2016, albeit at slightly lower annual growth rates (3.5-3.7%) due to higher oil prices and restrictive trade measures between the US and China. In the medium run, output gaps in the EU and other advanced economies will gradually close and bring down potential growth dynamics in line with the prime drivers: slower expansion in working-age populations and modest productivity gains possibly caused

by the challenges of the ensuing Fourth Industrial Revolution. In addition, US growth will be adversely affected by fading fiscal stimulus and expected tighter monetary policy, while China will continue to grow at high but declining rates.

As a result, in the absence of substantial institutional reforms and policy changes, Serbia and the Western Balkan region are likely to experience a more limited scope for faster real per capita growth over the next five years and, thus, probably face the risk of falling further behind in living standards. Additional risks of trade barriers and reverse capital outflows in response to weaker macro fundamentals and (actual and perceived) political instability are of critical importance. The availability of otherwise ample financial resources for economic growth and development will be progressively limited for countries that do not meet the highest financial regulatory and taxation standards. This includes macro and microprudential policies critical for financial stability and increased resilience, cybersecurity, safeguards against excessive risk taking and application of AML-CFT measures with a clear objective of getting off the FATF (Financial Action Task Force) grey list. Given the legacies of the past, Serbia will also need to monitor very carefully (open and hidden) contingent liabilities and balance sheet mismatches.

Missing institutional reforms. Unfortunately, the status of most institutional reforms necessary for efficient operation of market democracy and free flow of goods, people, and capital is not satisfactory. Institutional weaknesses go beyond the already mentioned financial sector and include the general rule of law (including judicial independence and legal efficiency), protection of property and creditor rights, the quality of public and private sector governance systems, the presence of nontransparent and corrupt practices, etc. Based on the World Economic Forum's (WEF) Global Competitiveness Report 2018 [10], the combined rank across these critical institutional dimensions (106th out of 140 countries) will continue to be a strong deterrent for large institutional investors who require a transparent, stable and efficient legal environment to enter and comfortably operate in Serbia. And a higher level of FDI is a sine qua non for convergence that hinges on efficient infrastructure and sustained productivity growth anchored in innovations.

Availability of infrastructure. A recent IMF staff assessment concluded that, despite strong investment efforts, Serbia and the whole Western Balkan region still face significant public infrastructure gaps which effectively constrain economic growth, private sector development, and continued integration into European supply chains. This conclusion equally applies to inadequate transportation networks (both in coverage and quality), insufficient and unreliable provision of utilities (water, power, district heating, etc.), underdeveloped communication networks, and underinvestment in human capital and innovation capacity for sustained long-term growth.

Despite the fact that, based on [10], Serbia ranks better (71st out of 140 countries) than the rest of the WB region (96th out of 140 countries) in critical aspects of physical infrastructure (transport and utilities), closing the infrastructure financing gap may indeed prove challenging under the conditions of limited fiscal space, constrained access to external financing, and weak domestic private sources. The routine recommendations from the IMF and other IFIs (to mobilize additional domestic revenues, contain domestic spending, and improve the quality of public investment management, especially in the selection and implementation of public and PPP projects) are welcome, but fall significantly short of the infrastructure needs. This is clearly one area where a concerted EU effort in the WB region, along with substantial private sector participation, will be needed to overcome this legacy of the past and an overriding obstacle to growth and EU integration process.

Quality of human capital and innovations for productivity growth. The size of investment in human capital and innovations to close the gap with comparator countries may appear more modest, but the actual task may be even more difficult to design and implement as it requires a change in the value system, work ethic, and corporate culture. Presently (again based on WEF [10]), Serbia ranks much better in terms of education and productive labor skills (72nd place out of 140 countries) than the WB region (92nd position in labor skills), but it lags behind the region in labor market performance (where the WB region holds the 100th position and Serbia ranks 111th). This clearly shows that Serbia continues to value education and skills, but has inherited a strong resistance towards the very concept of labor market and labor force mobility, even in relation to comparator countries in the WB region.

Finally, although Serbia ranks better than the region in innovation capacity (90th versus 103rd position), this is not a very comfortable position to address the likely challenges posed by the Fourth Industrial Revolution (4IR). Tangible improvements in educational achievements, labor-employer relations, and reliance on professional management will be needed to convince foreign investors and managers that productivity gains in Serbia and the WB region can be achieved and sustained for large investments to be profitable in the longer run.

The quality of state, public sector and private sector governance. Serbia presently lags significantly behind the EU countries (both the core 15 members and new accession countries) in terms of income, quality of life, as well as institutions and infrastructure. Convergence prospects for Serbia and other WB countries are of paramount importance and they, first and foremost, critically depend on their own capacity to mobilize domestic and attract foreign resources, spend them efficiently on priority infrastructure and pro-growth human capital and innovation projects, while targeting expenditures to quality social services and poverty reduction within a sustainable fiscal position. External assistance is necessary to close the infrastructure gap and integrate the WB region into the EU value chains. But the whole process hinges on the quality of governance, in the state, public and private sector.

We yearn to understand what underpins the recent shift in the global economic and development paradigm. How would prevailing answers impact the long-run GDP growth and the well-being of citizens? What policy challenges await Serbia once fiscal consolidation is finally over? Are we ready to embrace new business normality established after the global economic crisis? Have we made progress in creating environmentally friendly economy that can generate sustainable and inclusive growth and ensure convergence to EU income levels?

Growth has become primarily a political issue as GDP represents a good proxy for new jobs and increasing welfare, where more is always better. In a world burdened

with future consequences of past social expenditure commitments, high public debt and a dire need to respond to technological changes, it is easier and wiser to look for ways to enhance smart growth than to resort to austerity measures.

The political need for robust growth signals government commitment to service the outstanding debt, secure social inclusion and support the idea of intergenerational equity. This is particularly relevant for countries like Serbia where current generations are expected to honor the commitments of turbulent yesteryears. Moreover, the benefits of economic growth have been unequally distributed across different social and skill groups due to slower dynamics of real labor incomes in older-style routine and repetitive jobs caused by rapid technological change and growing global competition. Additional reason for robust growth and faster job creation is rapid deterioration of competences after years of waiting for the first job (the lost generation). Finally, higher economic growth provides a greater cushion to address the potential postcrisis deflation threat, clean up banks from nonperforming loans, and restructure debt-ridden publicly-owned companies.

The long-run response to weak economic growth requires a new strategy based on smart investment sensitive to key structural imbalances and new business normality. The strategy must account for possible external shocks, including adverse spillovers from cross-border capital flows. At the national level, smart (intelligent) investments will be able to play a paramount role only in the continued presence of sound macroeconomic (macro-prudential, monetary and fiscal) policies that unblock demand-creating transmission channels and allow rational economic decisions at all levels. Additionally, new industrial policies (related to both manufacturing and modern services) are expected to provide businesses with clear longer-term signals where to invest and how to restructure successfully. Their primary focus is to increase the potential of tradable sectors in the fast changing global economy.

In this context, it is crucial to know the starting point, i.e., the status of the Serbian economy today, the effectiveness of past policies and reforms, and options (constraints and challenges) for going forward.

The remainder of this paper will be devoted to the legacy of Serbia's institutional and governance problems (section two), the likely challenges posed by the 4IR (section three) and the proposed policy and reform responses (section four). Section five concludes.

Institutional constraints to faster growth

The roots of Serbia's current economic and institutional problems can be traced back 50 years, to the turning point in the evolution of macroeconomic and microeconomic management.

Collapse of utopian self-management institutions

Complete collapse of microeconomic and macroeconomic management (including the implosion of the communist party in January 1990) and abysmal economic performance during the 1980's were the key factors leading to the disintegration of the country [11] and the start of wars that lasted from July 1991 till June 1999.

In modern terminology, we observed a generalized governance crisis that evolved from consistent application of self-management and the labor theory of value at all levels of economic organization, while ignoring the role of other factors of production (capital, management, land and natural resources), the concept of scarcity and the existence of binding hard budget constraint.[1]

The institutional meltdown first disabled the state governance system (first and foremost at the federal state level which was deprived of its macroeconomic, security, and diplomatic functions). The broadly defined public sector governance, which included all public services (healthcare, education, utilities, etc.), followed next. Finally, the governance of banks, state-owned enterprises, as well as the strategic segments of the socially-owned enterprise sector, completed the process. The jungle of entities legally and commercially connected through a maze of self-management agreements and social compacts could not be untangled, reorganized or restructured. Even the interest-based companies in profitable export trade,

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1   See Županov [13] for elaboration of self-management institutional utopia.

financial services and transport sectors could not be isolated from the devastating annihilation of basic economic rules which sit at the core of the modern concept of institutions. The ability of the economic and social system to fight the onslaught of problems was reduced to zero, just like when a weak immune system can no longer protect individuals with advanced metastatic cancer.[2]

Present institutional weaknesses

Furthermore, after five decades of fanatic application, a skewed and unsustainable value system became a cornerstone of many institutional problems we see today:

(a) wrong work ethic, inadequate valuation of learning and knowledge,

(b) essential disregard of (or lack of respect for) the rules of law and social norms,

(c) refusal to accept competition, meritocracy, and market outcomes in favor of discretionary government decisions and state intervention (i.e., preference for visible hand over invisible hand of the market),

(d) wrong perception of transparency in valuing performance and achieved results,

(e) reluctance to accept (or even refusal of) key institutions of market democracy, especially:

- the rule of law,
- ownership rights, including creditor rights, and
- the legally defined role of managers, workers and labor unions,

(f) refusal to accept some of the widely accepted basic economic results, dating back to Adam Smith and David Ricardo, regarding the benefits/efficiency of markets and trade, on the one hand, and the modern concepts such as corporate social responsibility, on the other.

As a result, we observed the emergence of deep tectonic fault lines regarding some fundamental issues faced by modern market democracies, such as:

- lack of a clear social contract (in Rawls's sense),

- lack of consensus on the essence of democracy (as opposed to partocracy) and political freedom,

- unclear interpretation of essential rules on the separation of (legislative, executive, and judicial) powers,

- lack of clear (and proper) understanding of the role of markets in reaching efficient outcomes as opposed to state intervention (to correct rather than distort market failure),

- conditional (weak) acceptance of the freedom of speech and free media.

This subset of problems currently affects Serbia and many other countries in the Western Balkans and around the World as analyzed by Sanfey [4]. They are well-documented in multiple sources as analyzed by Vujović [7].

The challenge posed by the Fourth Industrial Revolution

The Fourth Industrial Revolution is in full swing now. It brings the following major developments and challenges, as analyzed by Bianchi [1]:

- *New and efficient technologies* which increasingly enable the reversal of recent massive offshoring of production and related services to China, India, and other emerging economies. To continue to attract FDI, emerging economies will have to be more efficient overall rather than just offer cheap labor. Successful countries will need to provide competitive infrastructure and logistical services, top quality management, and efficient institutional and administrative environment. This will create space for shared prosperity through higher real wages and job security and, thus, reverse past trends of compensating inefficient government and institutional setup through lower wages.

- *Hyperconnectivity* which allows different organization of production, research and marketing functions, and substantially lowers the volumes of shipment demands (ranging from printed documents to spare parts). Financial crisis stopped the exponential growth of global trade due to global recession. Postcrisis revival is increasingly based on data flows: digital

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2 For a review of economic performance see Schrenk et al. [5]. Uvalić [6] provided a detailed overview of the rise and fall of market socialism in Yugoslavia.

globalization proceeds at an extremely rapid pace utilizing the evolution of ICTs into hyperconnected systems. The Internet has become omnipresent in work, leisure and social relations of billions of people.

- *Profound impact on the structure and dynamics of industries.* The term industry has acquired a broader meaning. It indicates a capacity to organize production of goods and services so as to respond to market needs irrespective of the sector, from agricultural to manufacturing and services. Primary sectors (such as agriculture) are now seamlessly integrated with the processing industry and saturated with innovation and knowledge. Likewise, high value-added manufacturing goods are intersecting with services and are often bundled with them.

- *Need for a new industrial policy.* Predictably, this will trigger deep transformations which, based on experience, require a new type of comprehensive industrial strategy and policy. The depth and complexity of ensuing structural changes will require the inclusion of institutions (rules and regulations), social and education policies, and broader citizen participation at the regional and national levels. Consistently with the broader definition of industry, industrial policy represents a set of actions aimed at enabling and facilitating structural changes and steering industrial development in desired directions. Industrial policy looks at innovations, trade, intellectual property rights and antitrust laws, as well as human capital. Human capital in turn requires consideration of social policies, education and training.

- *Digital globalization*, which entails a complex transformation of economy, society and culture, has been based on major scientific and technological developments in high power computing, artificial intelligence, robotics, new materials, genomics and nanotechnologies. In addition to having a profound impact on individual scientific fields, it allows developments across multiple fields that can converge to create completely new products and production processes.

- *Changing roles of training and education, as well as geography and governance.* The entire education, training and learning systems will need to be rethought and adapted to changing circumstances brought about by the ensuing technological revolution. Comprehensive treatment of geography and the linkages to global ecosystem must gain primary importance in order to secure comprehensive competitiveness and long-run sustainability.

The main challenge for emerging economies will be to create sufficient internal capacity to design and implement an appropriate new industrial policy that would enable timely institutional and policy changes to keep their economies competitive despite the likely disruptive changes across practically all industries.

The accelerated creation of new solutions, new products and new processes, albeit impressive, does not represent a distinctive feature of the Fourth Industrial Revolution compared to previous revolutions. Many leading authors in the field have identified similar periods of sustained technological changes, as well as convergence of different fields in the production process, as seen, for example, in the automotive industry. Likewise, each of the previous industrial revolutions introduced new technologies with a profound impact on the manufacturing regimes. The progression goes from the factory system brought by the first revolution, to mass production systems (assembly lines) introduced by the second and flexible production systems enabled by the third to mass customization to meet the demand which will dominate the world of the Fourth Industrial Revolution. They also created unique interactions between economic, social and political conditions.

For example, the mass production system of the Second Industrial Revolution was based on the division of production process into elementary tasks performed by well-trained and relatively low-skilled workers under time constraint. This had predictable consequences on educational requirements, income levels, social structure, organization of the labor force (unions), structure and style of management, as well as the main characteristics of the urban-rural divide and the nature of the polity.

The Third Industrial Revolution in tandem with globalization introduced massive changes in the global division of labor towards emerging market economies.

Starting from 1990's, globalization promoted unprecedented growth of world trade and foreign direct investments in a world characterized by trade liberalization, massive transition from plan to market and birth of emerging market economies. Industrial policy played a major role in facilitating deep structural transformation of the economy. Good examples include China, Slovakia, the Czech Republic, and Slovenia. By contrast, the lack of appropriate industrial policy and the dominance of chaotic and ill-conceived privatizations have been apparent in countries that experienced chronic difficulties during the transition process.

In addition to posing substantial challenges, the Fourth Industrial Revolution offers a great opportunity to resolve the current global societal issues, such as demographic trends of population growth and population ageing, rapid and wide urbanization, as well as preservation of ecosystems and climate change. This opportunity will be realized only if scientific, technical, and economic changes are accompanied by appropriate ethical, cultural, and social changes. To succeed it is critical to develop awareness, build resilience and promote sustainability in policy-making at the national and global levels. In doing that, it is essential to respect and properly address the complexity of deeply related (intertwined) issues. To be successful in facing the sweeping changes likely to come with the Fourth Industrial Revolution, societies will need to enable true ethical, cultural and social metamorphosis.

Therefore, the new industrial policy must be comprehensive and favor adaptation and adaptability, by promoting innovation and adoption of new technologies, adjustment in human capital, and provision of appropriate infrastructure. Information has become the main raw material (input) and output. New technologies allow hyperconnection on a global scale between people, people and machines, and between machines (the so-called IoT – Internet of Things). Global data flows are growing exponentially giving a small number of firms huge market power based on enormous amounts of data. This raises serious privacy and antitrust issues that require new legal solutions and enforcement mechanisms.

The volume of exports and imports in the world has not changed much since 2007, but the share of Asia has increased. China became the leader in global manufacturing value added, both in terms of levels and dynamics. Furthermore, Asian countries are well-positioned to respond to the challenges of the Fourth Industrial Revolution. Based on their strong investment in R&D and skills, they are likely to further strengthen their position in global trade and manufacturing value added.

New globalization is likely to generate exponentially growing data flows and stagnant trade of goods. Leading private companies (CISCO) estimate that mobile data traffic has increased 18-fold during the 2011-2016 period and is likely to experience another 7-fold increase in the future to 49 exabytes per month. Again, the fastest growth is expected in Asia which will account for half of global data traffic by 2021.

Expectedly, smartphones are projected to be the main source of data traffic (43 percent) in 2021 followed by Machine-to-Machine data exchange (over 30 percent) without the involvement of humans. M2M data traffic is in fact the Internet-of-Things (IoT), which is at the core of the Fourth Industrial Revolution. Examples include GPS systems in cars, medical applications, patient health records and citizen data records, home and office security and automation systems, as well as the industrial Internet. In short, while the flows of physical goods and capital have come to a halt in the last decade following the global crisis, globalization has not stopped but has become digital, including substantial portion of huge financial flows which have become digital too.

A more detailed view reveals the supply side changes, as well as deep transformation of the demand side of markets. The revolution in the interaction between consumers and producers has already happened and will continue to evolve based on online platforms. Obvious examples are new businesses, such as Uber and Airbnb, which have deep implications for the operation of markets and position of incumbent firms in the existing industries. Interaction between producers and consumers is also changing, as well as the nature of products and services. Many manufacturers and companies in general claim that they now sell solutions rather than products. Competition intensifies due to low cost of entry through new platforms and ability to customize products and

services to specific needs. This also raises issues of competition policy.

New data platforms are able to create enormous bases of personal information without consumers' consent or awareness, especially information revealed through the use of online markets and applications. This raises issues of product and services regulation, as well as privacy, market and political power. Firms such as Google, Amazon, Facebook and Apple have acquired monopolistic dominance that dwarfs the historical examples of Standard Oil.

Possible policy and institutional responses

In short, the Fourth Industrial Revolution has already had a deep and lasting impact on all industries, on both the supply and the demand side of goods and services. To enable the economy to efficiently and effectively respond to past and forthcoming challenges, adequate macroeconomic and industrial policy will have to be accompanied with a significantly improved public and private investment effort. Presently, the size is too small, the structure is not aligned with likely infrastructure and human capital (knowledge) gaps, the efficiency is too low, and the efficacy in achieving stated objectives is inadequate.

Major improvements are needed in public investment planning, from identification to preparation, appraisal and implementation. Obvious areas for plausible interventions include building capacity for critical stages of selecting investment priorities, doing quality project preparation, competitive financing and implementation. In terms of structure, public investment will be expected to devote an increasing share to human capital development, ICT and connectivity, science, R&D and innovations, while meeting the highest international standards. Finally, public investment must be smart and focused on enabling and crowding in private investment aligned with the demands of the global economy.

In addition, a strong effort will be needed to design and implement a transparent incentive system for efficient private investment that would successfully apply the most recent technological changes and respond to challenges posed by the Fourth Industrial Revolution.

In this context, the main challenge will be to create sufficient internal capacity to design and implement an appropriate new industrial policy that would enable timely institutional and policy changes to keep the Serbian economy competitive. Breakthroughs in science and technology, which rest at the core of the Fourth Industrial Revolution, have introduced disruptive changes across practically all industries.

Future growth-enhancing policies will have to take place in an increasingly complex world characterized by continued globalization and the overpowering impact of the changes brought about by the Fourth Industrial Revolution.

Although postcrisis globalization has slowed down in its initial domain (trade of physical goods and services), it has triggered deep structural changes in companies and industries. It changed the behavior of firms in the areas of R&D and innovations. Rational behavior prevailed over competition and generated cooperation among fierce competitors in searching new solutions. This is particularly obvious in the areas where digital technologies enable not only new forms of market interactions (continuous/online contact with consumers) and efficient search for market equilibria, but also allow better design of market regulation and government interventions in general.

There are four possible long-run growth scenarios.

The first scenario assumes that the growth rate achieved in 2018 (4.5-5 percent) can be sustained over the long term based on the existing set of policies and partial structural reforms coupled with sustained effort aimed at attracting FDI and promoting investments and exports.

The second scenario assumes significantly faster long-run growth rates (5-7 percent) based on much more robust investment growth, without much change in the policies or the speed of structural reforms. This scenario assumes that additional financing will be attracted from both domestic and external (bilateral) sources through extraordinary investment promotion and political commitment to faster development. Securing fiscal space for debt-financed robust investment growth will be the main challenge under this scenario as large borrowing commitments may lead to

unsustainable debt levels in case of implementation delays or unfavorable external developments.

The third scenario also assumes faster GDP growth rates (5-7 percent annually) enabled by greater investment from large western investors attracted by faster and effective implementation of the necessary structural and institutional reforms aligned with the EU standards and regulations. Its main risk is the unpredictability of the speed of the EU integration process and the response of western investors.

The fourth scenario aims to achieve higher growth rates (again 5-7 percent or more) by attracting significant levels of foreign investment based on the elimination of all structural imbalances and the full implementation of institutional reforms. These reforms will be supplemented by a smart industrial policy that would enable transformations necessitated by the ensuing global changes and disruptions triggered by the Fourth Industrial Revolution. These include the changes in the way industrial processes are organized and connected with educational and social systems in the digital economy of the future.

Albeit the most demanding and ambitious, the fourth scenario offers a realistic framework to address present institutional and structural weaknesses and promote smart growth that would enable Serbia not only to survive, but to actively address the coming global challenges and prosper in the long run.

This would require an extraordinary effort to overcome the legacy of the past which creates resistance and outright opposition to social and economic change and institutional reforms indispensable for more efficient policy responses needed to compete in the world driven by the Fourth Industrial Revolution and close the income and quality of life gaps with the core EU countries.

Conclusion

Serbia must address a complex set of challenges as it prepares for accession and seeks convergence with the EU in incomes and quality of life within a reasonable timeframe.

After numerous failed attempts at institutional reforms, it is now clear that the country must first address the heavy institutional legacy of the past and present institutional weaknesses which now stand in the way of introducing modern, efficient and transparent governance systems in the state, public and private sectors.

The legacy includes:
- tangible reluctance to accept key institutions of market democracy and, especially, the rule of law, ownership rights, including creditor rights, and the legally defined role of managers, workers and labor unions; and
- weak acceptance of competition, meritocracy, and market outcomes in favor of discretionary government decisions and state intervention (i.e., preference for visible hand over invisible hand of the market). One often has wrong perception of transparency in valuing performance and achieved results. In addition, weak work ethic and low valuation of learning and knowledge seem to prevail, along with the lack of respect for social norms.

Interestingly enough, there is a widespread refusal of some widely accepted basic economic results, dating back to Adam Smith and David Ricardo, regarding the benefits/efficiency of markets and trade, on the one hand, and the modern concepts such as corporate social responsibility, on the other.

As a result, we observe deep institutional tectonic fault lines and the lack of:
- clear social contract (in Rawls's sense),
- consensus on the essence of democracy and political freedom, essential rules on the separation of (legislative, executive, and judicial) powers,
- clear (and proper) understanding of the role of markets in reaching efficient outcomes and the role of state intervention (to correct market failure), and
- the freedom of speech and free media.

Once an understanding has been reached on these key institutional premises of market democracy, the country can devote its full attention to closing the institutional, infrastructure and income gaps with core EU countries, while, at the same time, responding to likely pressures from the Fourth Industrial Revolution requiring profound social, industrial and organizational changes.

Out of four possible growth scenarios, the only institutional and policy scenario that supports a sustainable

growth path compatible with clear institutional and governance commitments is the fourth scenario. It may be more demanding that other scenarios, but it offers relatively fast convergence based on a smart industrial policy and deep structural changes of economic organization, education and social systems.

The new social consensus underlying this scenario may not be easy to reach, but it will be well worth it if it offers a base to fend off future governance risks and ensure prosperity in the challenging new digital world.

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Jorgovanka Tabaković

National Bank of Serbia

A DECADE OF FULL-FLEDGED INFLATION TARGETING IN SERBIA

Decenija potpunog ciljanja inflacije u Srbiji

Abstract

The aim of this paper is to describe the main postulates of the inflation targeting regime in Serbia and to explain policy responses against the background of domestic and global conditions in which the regime has been implemented. The paper also dwells on the debates about the inflation targeting as a theoretical concept and its "upgrades" arising from the practice. The paper focuses on assessing the performance of this regime after a decade of full-fledged implementation in Serbia.

Serbia may offer responses to policymakers, as a good example of a small and open economy with a legacy of high euroisation, which reduced its external and internal imbalances, stabilised prices and the exchange market, and managed to keep its financial system sound and improve the overall growth prospects. Timely responses, consistent approach, open-mindedness and readiness to use all available instruments, in full coordination with other policies, are the key elements on which the National Bank of Serbia founded the inflation targeting regime and upgraded it along the way, especially in the second period of its implementation. Today, we are speaking about Serbia as a country with low inflation, anchored inflation expectations and credible monetary policy.

In assessing the adequacy of this regime for our economy, based on the results measured by price and financial stability, it may be concluded that for Serbia there is no alternative to the inflation targeting regime. Working through all transmission channels, monetary policy gave the key contribution to more favourable business and investment conditions and to sustainable economic growth. On the whole, the inflation targeting regime was an important and inextricable part of the overall economic policy, which laid the groundwork for a better economic outlook for Serbia.

Keywords: *inflation targeting, monetary policy, volatility, stability, inflation expectations, exchange rate.*

Sažetak

Cilj rada je da se opišu osnovni postulati režima ciljanja inflacije u Srbiji, i razjasne odgovori politike u domaćim i globalnim uslovima u kojima se režim sprovodi. Ukazuje se i na debate koje se vode o ciljanju inflacije kao teorijskom konceptu, i o njegovoj „nadogradnji" koja je proistekla iz prakse. Fokus rada je na ocenama dometa ovog režima tokom decenije punog ciljanja inflacije u Srbiji.

Srbija može da posluži kao dobar primer za dobijanje odgovora na pitanja nosilaca ekonomske politike za male i otvorene ekonomije sa nasleđenim problemom evroizacije, koja je smanjila spoljnu i unutrašnju neravnotežu, stabilizovala cene i devizno tržište, održala zdravim svoj finansijski sistem i unapredila izglede rasta. Pravovremenost u reagovanju, doslednost u pristupu, spremnost i otvorenost za korišćenje svih raspoloživih instrumenata, uz punu koordinaciju sa drugim politikama, ključni su elementi na kojima je Narodna banka Srbije bazirala i „u hodu nadograđivala" režim ciljanja inflacije, posebno u drugom periodu njegove primene. Danas govorimo o Srbiji sa niskom inflacijom, usidrenim inflacionim očekivanjima i kredibilnom monetarnom politikom.

Ocenjujući adekvatnost režima za našu ekonomiju, a sudeći na osnovu rezultata koji se mere cenovnom i finansijskom stabilnošću, može se zaključiti da režim ciljanja inflacije za Srbiju nema alternativu. Preko svih ključnih kanala transmisije, monetarna politika bitno je doprinosila povoljnijim uslovima za poslovanje i investiranje, i za ekonomski rast na održivim osnovama. U ukupnom kontekstu režim ciljanja inflacije bio je važan i neraskidiv elemenat ukupne ekonomske politike, koja je stvorila osnove za bolje izglede srpske ekonomije.

Ključne reči: *ciljanje inflacije, monetarna politika, volatilnost, stabilnost, inflaciona očekivanja, devizni kurs.*

Introduction

In the long monetary history, the question of central bank's role in the economic environment was repeatedly raised, and we are seeing it re-emerge today both at the national and global level. Legal mandates of central banks are being re-examined, as well as their quantitative objectives, the right to choose their tools, etc. Still, the best responses are obtained based on the analysis of past movements and responses, because experience is the best teacher. It is also a sound guide for shaping future measures. An ever-present question, not only in the theoretical domain, but also repeatedly imposed by the practice, is the dilemma on whether the tasks before central banks are unchangeable and known in advance or whether they should be re-examined and adjusted to changing circumstances. These questions do not hinder the work of central banks. Quite to the contrary. In seeking answers to these questions, central banks remain vigilant and try to keep track of and support economic development. The answers to these questions should also be sought in a broad-based consensus – in talks with economic experts, listening to the *vox populi* and also by asking ourselves in an objective, critical and impartial way what it is that we are striving for and what will best contribute to the domestic economy and citizens [8, pp. 12-35].

As of January 2009, the National Bank of Serbia (NBS) has formally applied and improved through practice the inflation targeting regime with all its principles – concerning the manner of setting the target, modern monetary policy framework and transparent communication. In choosing the monetary policy regime for Serbia, the starting assumption was that inflation targeting is a monetary strategy offering the broadest scope of action for addressing the problems of price instability and dented confidence in the national currency and monetary policy. The tenth anniversary of inflation targeting in Serbia provides a good occasion for taking stock of the results and for drawing some conclusions. Practical experiences that we can offer may serve as a good foundation for shaping future strategies and also for improving theoretical thinking about the achievements of monetary policy in general. One decade is a sufficiently long period for deriving reliable conclusions, bearing in mind the fact that important changes in economy, same as in life, cannot happen overnight. Assessing whether the progress is sustainable or whether it came about as a result of temporary circumstances takes time. A decade is a sufficiently long period for making a reliable assessment of policy impact on the economy, population and government.

Serbia may serve as a good example when seeking answers to numerous questions troubling small and open economies with the legacy of high euroisation, because it relatively quickly reduced external and internal imbalances, stabilised prices and the exchange market (hereinafter: FX market), and managed to keep its financial system sound and improve the overall growth prospects. Timely responses, consistent approach, open-mindedness and readiness to use all tools available, in full coordination with other policies, were the key elements by which the NBS upgraded the inflation targeting regime during the decade of its implementation, especially in the second part of this period. On the whole, the inflation targeting regime was an important and inextricable part of the overall economic policy, which laid the groundwork for a better economic outlook for Serbia.

Key postulates of inflation targeting and directions of its upgrading

Shaping and implementing the inflation targeting strategy at the global level came as an expected response to the accelerated development of financial markets and full or partial failure of previous strategies – targeting of nominal interest rate, monetary aggregates, exchange rate, etc. The inflation targeting strategy allowed for greater flexibility in policy creation and use of available tools. Its postulates were in time supplemented by practical experience, which ultimately led us to a contemporary framework of this regime, which takes into account the changed business conditions, a new hierarchy of global risks and new interconnectedness (interdependence) between different economies.

However, the initial postulates of the inflation targeting regime were kept. What are those postulates?

Medium-term price stability, as the main statutory mandate of the central bank and the obligation to announce

inflation targets. Using the key policy rate (hereinafter: KPR) as the main tool for attaining the inflation target and deciding on its level based on the projected inflation movements. Other information is also used for assessing the effects of decisions in a wider context, which proves that this regime is not a set of rigid rules. Inflation targeting particularly strengthens the transparency of communicating the underlying reasons of central bank decisions. Monetary policymakers are also required to explain the factors which caused inflation's deviation from the target and measures which should facilitate its return and maintenance within the target band.

The concept of central bank transparency is one of the important features of this regime, to such an extent that communication itself can nowadays be viewed as part of the monetary toolkit. Its purpose is to better acquaint market participants with the conditions of policy implementation and, particularly, with the prospects going forward. The reason is obvious. If we understand each other well, we increase the chances of the market responding along the expected lines. Thus, central banks use different communication channels in order to bring closer to the public: (1) monetary policy objective(s); (2) monetary policy achievements and interaction with other policies; (3) numerical values for medium-term inflation targets; (4) reasons for deviation of the actual from targeted inflation; (5) tools and measures that are used or will be used for attaining the target. In this way, an efficient communication strategy strengthens monetary policy credibility and helps anchor inflation expectations. Reduced uncertainty regarding monetary conditions, primarily the movement of interest rates and inflation, considerably facilitates planning for market participants. An efficient communication strategy, among other things, answers two key questions: 1. How to say enough, but not too much? 2. How to strike a line between sufficient certainty for others while not making oneself vulnerable by excessive predictability which narrows the manoeuvring space for attaining the target?

Yet, communication in itself is not enough unless corroborated by results. And in order for the results to be achieved, the regime had to be upgraded.

How did the regime evolve? Until the outbreak of the global economic crisis, a large number of central banks endorsed price stability as the primary monetary policy objective to be achieved by the inflation targeting regime. In the first years of its introduction (early 1990s), the prevailing opinion was that inflation targeting, as a monetary policy framework, is compatible exclusively with the free floating exchange rate. Central banks pursued a single objective – low and stable inflation in the medium term and had one main instrument – the KPR [3, p. 4]. Free floating exchange rate was viewed as a sort of a test of dedication to the inflation targeting regime [7, pp. 83-102].

However, as time and practice have unambiguously shown, theoretical models can never account for all real-life premises, so their re-examination, supplementing and adjusting is a modern-day imperative. Guided by practice, economic thinkers have gradually departed from theoretical views prevailing in the first years of introduction of the inflation targeting regime. More and more voices are heard saying that in practice, inflation targeting, in terms of monetary policy response, cannot boil down to rigid implementation of rules. Rather, decision-making must contain a "flexible" component. According to the newly-formed views, monetary policy provides the greatest contribution to macroeconomic stability through inflation targeting if it allows policy flexibility and thus its contribution to the stabilisation of economic flows. With the outbreak of the financial crisis, the flows became more volatile, which aggravated decision-making, especially in emerging economies [6, p. 14]. Thus, the crisis highlighted the need for "upgrading" the initial postulates of the inflation targeting regime, confirming what was clear even before the crisis – while price stability is the primary objective, financial stability is also a necessary precondition of the macroeconomic stability at large [1, p. 4], [2, p. 6], [4, p. 70], [10, pp. 3-4]. However, broadening the objectives as to include financial stability and the entirety of economic flows may raise the issue of prioritisation, due to the potential conflict of objectives in different stages of the business and financial cycle. The solution should be sought in coordination of macroeconomic policies and their responsible implementation, as well as in a proactive communication strategy, which should boost confidence in policymakers and their decisions. Further, in euroised economies with the high pass-through of exchange rate

to prices, FX interventions get the status of an effective additional mechanism for concurrent achievement of two key objectives – price and financial stability. Well-calibrated and timely FX interventions act as an absorber of short-term shocks and, by extension, one of the important factors mitigating the volatility of inflation and creating a more stable investment environment. For this reason, in conditions of volatile capital flows, a large number of emerging economies that are running the inflation targeting regime intervene in the FX market [5, pp. 1-10].

Monetary history has shown that monetary policymakers have upgraded the initial postulates of inflation targeting in accordance with the changing circumstances. In this way, central banks, Serbia's example included, demonstrated in practice their ability to recognise limitations and to overcome them by using all the tools available and by being guided by their overall effects.

Implementation of inflation targeting in Serbia – a brief overview

In the summer of 2006, the NBS opted for inflation targeting as its monetary strategy, as a regime tailored to the characteristics of the domestic economy. At that point, the NBS embarked on "implicit" inflation targeting, intending to lay in the transitional period, until 2009, the necessary groundwork for switching to the formal (full-fledged) inflation targeting regime. In weighing pros and cons of this regime, it was assessed that inflation targeting is a monetary strategy offering the broadest scope of action

for addressing the problems of price instability and weak confidence in the national currency and monetary policy.

The NBS set the first inflation targets in August 2006 when it adopted the "Memorandum of the National Bank of Serbia on the Principles of the New Monetary Policy Framework Aiming at Low Inflation Objectives" laying out the key directions of a gradual shift to the full-fledged inflation targeting. The focus of monetary policy was placed on core inflation, which was appropriate at the time, but also gave rise to some communication difficulties. Still, this was a necessary transitional period that ushered in the practice of the NBS's mandatory intervention in order to bring inflation within the set (targeted) numerical range. In this period also the KPR (first on two-week and later on one-week operations) gained the role of the main instrument for achieving the inflation target, while other monetary policy instruments played a supporting role. Implicit inflation targeting paved the way for full inflation targeting and for shifting the monetary policy focus to the medium term.

With the introduction of the formal (full-fledged) inflation targeting as of January 2009, the headline inflation target was defined as a numerical range, with a central value for each month of the year (Figure 1). This helped to increase the transparency of communication with the public and the impact on stabilisation of inflation expectations. In the initial period of running this regime, objectives were defined as a linearly declining range of the y-o-y headline inflation rates. The path of lowering the inflation target involved gradual adjustments to the target,

Figure 1: Inflation targeting in Serbia – target with a tolerance band since 2009
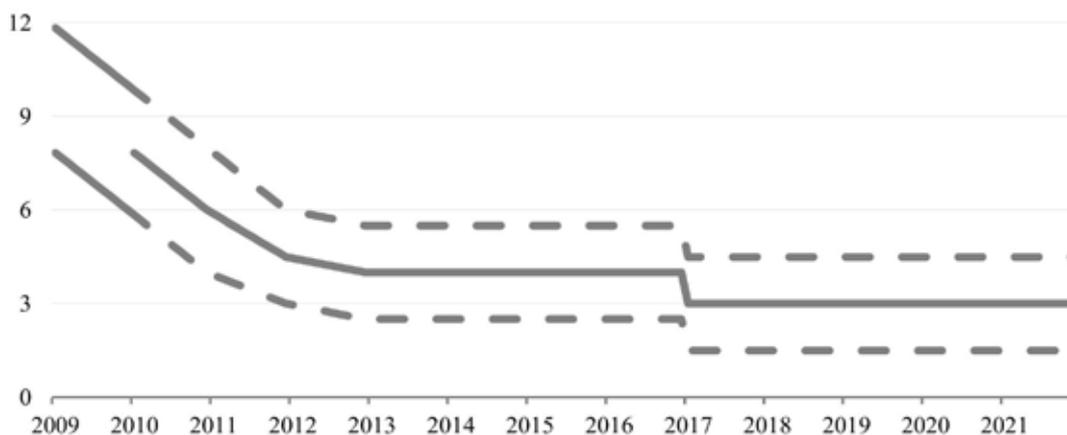
Source: NBS.

typical for initial years of inflation targeting in countries that struggle with the legacy of high and volatile inflation. Such caution was necessary in order to take into account domestic circumstances and ensure that the achievement of target rates results also in a more durable stabilisation of inflation.

The target trajectory (Figure 1) also reflected the intention of the NBS to achieve price stability in the medium term, and to support price and income convergence toward EU levels. In addition, in the third year of full-fledged inflation targeting, as of end-2011, the target range was narrowed from 4 pp to 3 pp (i.e., from ± 2 pp to ± 1.5 pp relative to the target mid-point). Generally, this was supposed to contribute to better anchoring of inflation expectations, where the newly set width of the target range left enough room for the necessary flexibility of monetary policy and preserving of its credibility. This was also important in the context of responding to temporary shocks that may trigger short-term volatility of inflation, to which monetary policy typically does not respond, as this could negatively affect financial conditions in the market and economic growth. In other words, such target tolerance band reduces, in the medium term, the need for frequent monetary policy interventions, and thus increases the predictability of monetary conditions. The NBS started to regularly set and announce inflation targets for two years ahead, which was another component of the predictability of business conditions.

As of end-2012, the inflation target was set in the form of a point value at 4%, while keeping the target tolerance band at ±1.5 pp. This target was kept until end-2016. Setting the target as a single numerical value was motivated by the need to additionally support the convergence of inflation expectations toward the target values. Inflation expectations were anchored in the second period of the regime implementation, owing to the results achieved in bringing inflation to low levels, a process underpinned by improvement of macroeconomic indicators and economic outlook. This also motivated the strategic decision to lower the inflation target to 3±1.5% as of the start of 2017.

Measured by results, a decade of inflation targeting may be divided in two periods.

The beginning of the first period of regime implementation, 2009–2012, coincided with the escalation of the global economic crisis and was marked by high and volatile inflation which stayed only briefly within the target tolerance band (Figure 2). Consequently, in 2011, the financial sector expectations regarding consumer price growth overshot the target tolerance band (Figure 3), despite low aggregate demand. Expectations of the corporate sector were almost constantly above the upper bound of the target. The analysis of inflation factors present at the time shows that apart from the prices of primary agricultural commodities, inflation was also pushed up by a combination of depreciation pressures (Figure 5) and relatively high inflation expectations of economic agents.

The second period, 2013–2018, saw the reduction of inflation and its maintenance at low levels. Stabilisation of movements in the FX market, the beginning of anchoring of inflation expectations, good agricultural season and the still depressed aggregate demand, were the factors that drove inflation down within desirable limits. Within the span of only one year, inflation was lowered from close to 13% to around 2% (October 2012 – October 2013), and was maintained at around 2% thereafter, with much lower volatility (Figure 2). It was in this period that full coordination of monetary and fiscal policy measures began, producing a synergy effect on our economy that was further intensified by the implementation of a credible fiscal consolidation programme. This success in turn bolstered the credibility of monetary policy, as evidenced by the anchoring of inflation expectations [9, Figure 8]. Same as in the case of credibility, low inflation supported gradual development of the dinar financial market and establishment of the benchmark ten-year dinar yield curve.

Adjustment of the monetary toolkit

The adjustment of the monetary policy framework began with the preparations for full-fledged inflation targeting. The KPR assumed the function of the main policy instrument. Open market operations were standardised, with the

establishment of the main operations for one maturity, which gave them the quality of a clear-cut instrument.

The NBS introduced the practice of setting the KPR at regular meetings of the Executive Board. Rate-setting decisions take into account the overall macroeconomic developments and workings of the key inflation factors, both in the domestic and international environment. In order to avoid sudden changes in monetary policy which may trigger macroeconomic shocks, temporary deviations from the inflation target are tolerated, i.e., the emphasis is placed on the medium term. The time lag in the workings of monetary policy is taken into account.

A symmetric interest rate corridor was also established, focusing on overnight maturity. In the prior period, this instrument featured different maturities and interest rates, which made the interest rate corridor asymmetrical and insufficiently transparent. Revision of the corridor was one of the stabilisers of the money market and, by extension, the credit market.

The required reserve instrument was simplified by averaging, which was one of the factors that facilitated liquidity management for banks and contributed to more stable movements in the money market. A policy of differentiated required reserve ratios was introduced, depending on the currency and maturity of bank funding sources, to support long-term dinar sources of funding.

A new policy approach is also visible in the readiness to apply new solutions, always ensuring that they are adjusted to the domestic environment and supportive of the achievement of the desired objectives. A good example of improvements to the market-based toolkit which produced full effect is the changed approach to the dinar and FX market.

As regards NBS activities in the dinar market, at end-2012 the NBS changed the previous model of fixed-rate repo auctions without liquidity limitations and introduced a variable-rate model with a limited volume of liquidity withdrawn. The introduction of this model was a sort of a turning point in acting in the dinar money market, because by encouraging competition, it lowers the costs in the credit market and boosts lending to the private sector. At the same time, the application of this model introduced an additional mechanism for addressing temporary shocks

and reinforced monetary policy flexibility at times of more volatile capital flows [9, Figure 8].

In stable business conditions, the benchmark ten-year dinar yield curve was formed, as a basis for valuing financial assets and a precondition for further development of the dinar market in Serbia.

As regards NBS activities in the FX market, communication with market participants was raised to a higher level (market intelligence function), and the central bank now has information about the transactions that could have a stronger influence on the market. Cooperation with state institutions and public enterprises, as important participants in the domestic market, has improved. This increased the efficiency of NBS activities in the FX market in terms of making timely and appropriate decisions on FX interventions. As a result of mitigating the impact of short-term factors, a smooth operation of the FX market was ensured, with lower exchange rate volatility, which contributed to both stabilisation of inflation and financial stability.

Macroeconomic conditions in Serbia and monetary policy measures

The introduction of inflation targeting in Serbia coincided with the escalation of the global economic crisis, whose repercussions are felt to this day in some areas. During a decade of inflation targeting we learned some important lessons. These lessons partly stemmed from the conditions brought by the crisis and partly from our openness and readiness to introduce new solutions, always ensuring that they are appropriate to the domestic environment and that their application helps to overcome the external challenges and to achieve the desired objectives. Such an approach marked the second period of the regime implementation and the results proved it was justified. Its justifiability can also be measured through the achieved low inflation and anchored inflation expectations. Thus, the practical experience we can offer is a contribution to the monetary practice, but also provides a good foundation for improving theoretical thinking on the scope of achievements of monetary policy in general.

In the text below we will give a brief overview of the monetary policy tools used and the results achieved in terms of delivering low inflation, in order to assess their appropriateness and to draw some conclusions. The instruments and measures applied by the NBS and macroeconomic conditions in which the decisions were taken are analysed in detail in a separate paper [9, Figures 7 and 8].

Monetary policy measures in the 2009-2011 period

The first years of inflation targeting in Serbia were overshadowed by the outbreak of the global crisis. The 2009-2011 period saw low aggregate demand, weakening of the dinar and volatile food prices, as a result of developments in the global market and changeable agrarian conditions at home. Oil price movements in the global market were not conducive to the achievement of low and stable inflation either. In that period, inflation averaged 8.5% (Figure 2). Inflation expectations of the financial sector moved around the same average, while corporates expected a somewhat higher inflation, with a three-year average of around 11% (Figure 3). Apart from running high, inflation and inflation expectations were also volatile. Since the crisis took its toll on economic activity and aggregate demand, in the course of 2010 the NBS lowered the required reserve ratios with a view to supporting credit activity and economic growth.

That year, the KPR was changed 25 times, in both directions (up and down). Until May 2010, monetary policy was relaxed through the KPR. Then, until April 2011 the KPR was increased, while as of June that year the NBS embarked on a cycle of rate cuts. Such frequent changes of the character of monetary policy and the KPR (Figure 4) made monetary conditions unstable.

In that period, the effects of low aggregate demand on inflation were outweighed by the effects of the weakening of the dinar, which in 2008-2010 depreciated by 24.9% relative to the euro (Figure 5). These effects passed through to prices both directly and indirectly, since inflation expectations were not anchored. Namely, a more pronounced volatility of the exchange rate and thus of inflation was what hindered

the anchoring of inflation expectations, which in turn aggravated doing business and investment.

Inflation factors and monetary policy responses in the period since 2012

The lack of results on the plane of inflation stabilisation in the 2009–2012 period did not put into question the implementation of the inflation targeting regime, but it did impose the need to re-examine the approach applied, partly because of the (post)crisis environment.

As of the third quarter of 2012 disinflation took hold, as a result of the synergy of several factors, such as monetary policy tightening through the KPR (concluding with February 2013) and strengthening of the dinar from August 2012 until May 2013. The NBS changed its approach in the dinar and FX market (changed model of repo auctions; strengthening communication with participants in the domestic FX market), intensifying the impact of several transmission channels. Curbing of excessive short-term volatility of the dinar/euro exchange rate and the consequent lowering of inflation expectations contributed to the reduction and stabilisation of inflation. In addition, the effects were amplified by the drop in prices of primary agricultural commodities in the global and domestic market. In the final instance, within the span of one year only inflation was lowered from around 13% to around 2% (October 2012–October 2013).

The environment was additionally enhanced by the anchoring of inflation expectations and rounded off by the adoption and implementation of the fiscal consolidation programme and coordination of monetary and fiscal policy measures. The ultimate effect was the suppression of inflationary pressures on a durable basis, as indicated by the movements of core inflation which from August 2013 until end-2018 on average stood at the headline inflation average of 2.0%.

In the period of disinflation, initial conditions were created for a monetary policy easing cycle, starting from the KPR of 11.75%. Since May 2013, KPR cuts were continuous, enabling the monetary policy to provide stronger support to credit growth and economic recovery via that channel. The rate-setting decisions were made taking into account

Figure 2: Inflation movements in Serbia and euro area (y-o-y rates, in %)
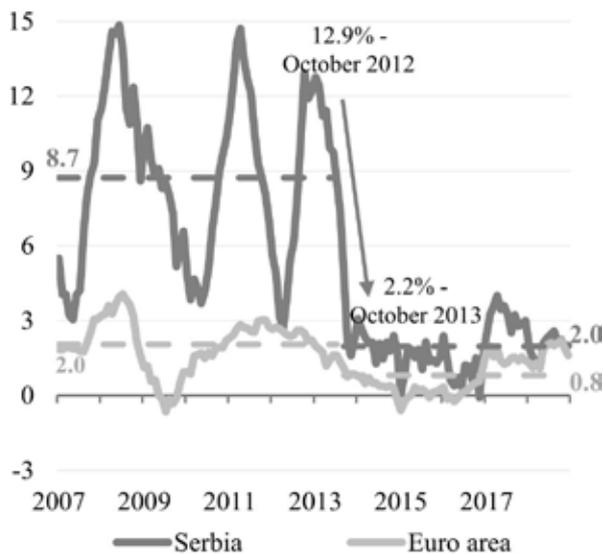
Source: NBS and Eurostat.

Figure 3: Current inflation and inflation expectations (y-o-y rates, in %)
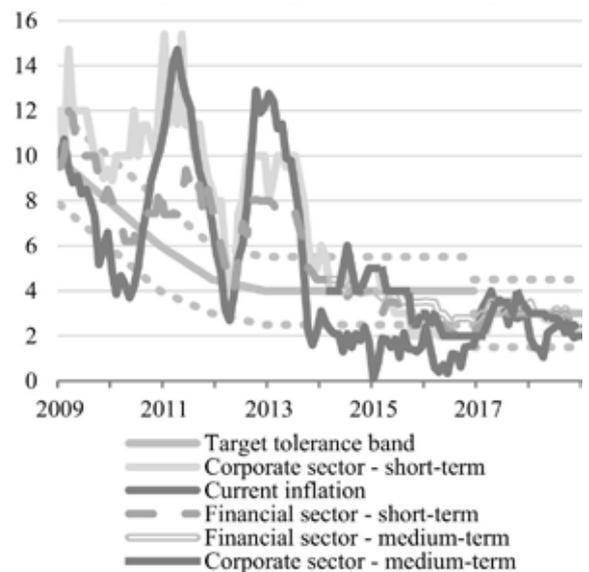
Source: Gallup, Ipsos/Ninamedia and NBS.

Figure 4: NBS interest rates and interest rates in interbank money market (in %)

Source: Thomson Reuters and NBS.

Figure 5: Exchange rate movements and NBS interventions in the FX market

Source: NBS.

the effects of the past monetary policy easing, the expected inflation movements going forward and developments in the international environment. It was the combination of effects of domestic and international factors that determined the scope and dynamics of monetary policy relaxation. In 2013, for the first time since the crisis broke out, the NBS was the net buyer of foreign currency in the FX market (EUR 185 mn).

Monetary policy easing continued into 2014 against the background of disinflationary effects of depressed aggregate demand and low cost-push pressures. Although the strength of disinflationary pressures that year suggested there was more room for KPR cuts, uncertainty in the international financial market mandated caution. It was expected that the FED would embark on a gradual reduction in the volume of quantitative easing, but at the same time, that possibility was also a source of uncertainty. In order to additionally encourage credit and economic activity in conditions of low inflationary pressures, monetary policy accommodation was also increased through the lowering

of required reserve ratios. In 2015, monetary policy easing was stepped up on account of the majority of factors from the domestic and international environment, which was particularly intensified by the implementation of the fiscal consolidation programme adopted in late 2014. Hence, as of that year, monetary and fiscal policy became fully coordinated.

Thanks to that, KPR cuts continued even after 2015, at a cautious pace and as of end-2016 another factor that also played a role was the new, lower inflation target.

During the whole easing cycle, the KPR was adjusted in 21 steps and brought down to 3%, its lowest level in the inflation targeting regime. At the same time, the NBS continued to use the required reserve instrument with a view to supporting credit and, by extension, economic activity.

An important issue discussed during this period was the impact of import prices on inflation at home, and the impact of the exchange rate on prices. The analyses carried out by the NBS suggest that changes in import prices spill over to domestic prices with a one-quarter lag on average. In the period before 2012, the effect of shock of global primary commodity prices on inflation at home could be amplified by the effects of significant depreciation of the dinar. On the other hand, relative stability of the dinar exchange rate in the period that ensued diminished the volatility of imported inflation and its impact on domestic inflation and inflation expectations [12, pp. 12–13].

In the second period of the inflation targeting regime, i.e., from 6 August 2012 until late 2018, the NBS intervened in the FX market, buying EUR 5.860 bn and selling EUR 4.645 bn, i.e., buying EUR 1.215 bn net. The dinar gained 0.3% in nominal terms.

Interventions in the FX market in an environment of volatile capital flows

In small and open economies with a relatively high degree of euroisation, trends in the FX market are in the focus of the central bank as the exchange rate can exert a significant impact on macroeconomic developments. This is why excessive short-term exchange rate volatility is mitigated through interventions in the FX market.

The principles of NBS intervention policy are consistent with the tenets of the inflation targeting strategy – the timeliness and adequacy of interventions, without the intention to impact the level and trend of the exchange rate. The central bank can respond to long-lasting changes in the external position, which trigger durable pressures on the dinar, by implementing targeted structural reforms which enhance the competitiveness of the domestic economy. For its response to be efficient, the NBS must have reliable information about the trends that can cause short-term market volatility, i.e., about their causes, the scope of impact and the period during which the effect will materialise. Thus, more durable external influences can be absorbed by exchange rate changes. Bearing in mind a broader context, we have "upgraded" our approach by ensuring and linking information on intraday trends in the FX market, expected demand of residents, non-residents' behaviour, and assessment of the effect of developments in the global financial market, while at the same time establishing proper coordination with fiscal policy. As a result, in the past six years, NBS interventions in the FX market were efficient and effective – relative stability of the exchange rate was ensured with smaller presence of the central bank, which was consistent – on both the purchase and sale side. The communication about central bank measures and decisions and about current and expected developments also improved, exerting a stabilising effect on market expectations and decisions.

Reducing the inflation target to 3% – a strategic decision

The lowering of the inflation target (from 4%) to 3% starting from 2017 was a strategic decision. Serbia thus became a part of the group of countries which, without looking for any excuses, work on setting a sound foundation for their sustainable growth. At the same time, the new inflation target leaves room for further price and income convergence to EU levels.

The decision reflected the results Serbia achieved in improving macroeconomic fundamentals and the economic outlook, including the fact that inflation was low over the last three years, standing at the levels comparable to

advanced economies. In addition, the inflation expectations of the financial and corporate sectors were relatively stable over a longer period, at the levels consistent with the new target. Also taken into account was the Serbian Government's commitment to set the operation of public enterprises on a sound footing, primarily by reducing the costs of operation rather than by increasing the prices of goods and services of those enterprises, which used to push up administered prices.

Fiscal results and plans, export trends, the implementation of reforms and improvement of the business environment, successful coordination between monetary and fiscal policies, and a reduction in the risk of investment in Serbia – support the assessment that inflation will move within the new, lower target band in the medium run. These factors were also taken into account in setting the inflation target at 3% in December 2018 until end-2021.

Lessons learned during the inflation-targeting decade

The 2009-2012 period during which monetary policy was pursued in a crisis environment, both globally and at home, can serve as an example for the analysis of factors underlying the volatility of inflation. First, inflation displayed volatile movements in the said period, reflecting the volatility of food prices with a relatively high share in CPI and pronounced exchange rate fluctuations. This leads us to conclude how important relative stability of the exchange rate is in the context of price stability in euroised economies. The second conclusion concerns the importance of anchored expectations, to prevent the spillover of growth of some prices to other prices through the inflation expectations channel (second-round effects). The necessary coordination between monetary and fiscal policies did not take place in this period, which is considered the third conclusion, or better to say, the third lesson learned.

The 2013-2018 period, which featured low inflation, confirms the importance of relative stability of the exchange rate, anchored inflation expectations and consistency of economic policy as a whole. It also suggests that global factors play an important role in policy design, particularly when they are a source of uncertainty. Inflation targeting

can yield the expected results to the extent to which monetary policy aims to resolve the key uncertainties, bearing in mind the overall effects of monetary policy decisions. Just like other policies, monetary policy produces the best results if fully coordinated with other policies.

NBS measures impacting and contributing to the overall environment

The scope of achievements of monetary policy in Serbia can be assessed based on the effects produced through the key channels of monetary policy transmission. We have presented here the impact of measures and instruments on interest rates, credit activity and expectations of economic agents. The cost impact of measures on inflation and economic activity is achieved through the impact on interest rates and the exchange rate, while the effect of demand is achieved through the credit channel. The expectations channel also produces cost effects, through demand.

Support to credit and economic activity

The 2009-2012 period of volatile monetary conditions was followed by continuous monetary policy easing by means of the key policy rate. Starting from May 2013, when the easing started, until April 2018, the key policy rate was cut by 875 bp to 3%. The cuts were made at a different pace in different years, depending on the assessment of the strength of (dis)inflationary pressures. The KPR cuts also affected new and outstanding dinar household and corporate loans whose rates fell by over 10 pp (Figure 6) on average as at December 2018. The same period saw a reduction in rates on euro-indexed loans, as a result of a lower country risk premium and developments in the international money market. The effect was further amplified by higher interbank competition. For more information about this channel see a separate paper [9, Figure 8].

Falling interest rates bolstered the recovery of lending (Figure 7), which was reinforced by the release of FX required reserves during two cycles (late 2014 and 2015). Loan demand stepped up as well, reflecting not only

Figure 6: Interest rates on dinar loans to the non-financial sector (in %, p.a.)

Source: NBS.

**Figure 7: Credit growth excluding the effect of NPL write-off and sale (in %)**
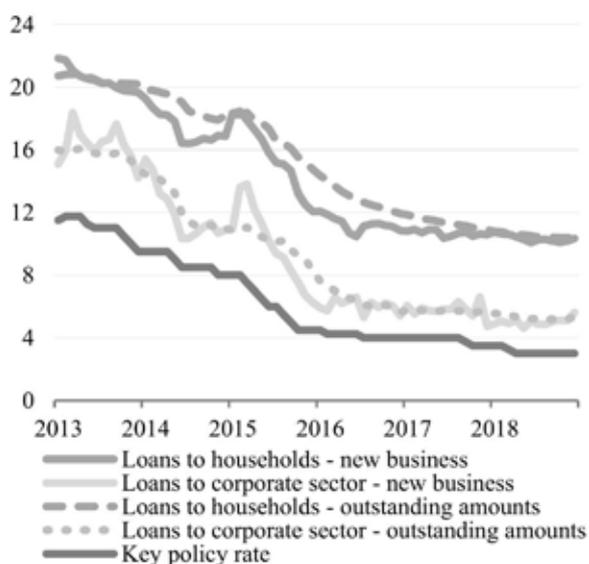
Source: NBS.

lower rates on new and outstanding loans and a higher disposable income, but also positive tendencies in the labour market, supported by economic policy measures. A feedback effect was noted as well. Lending encouraged economic activity, while at the same time the recovery of the economy and labour market spurred economic growth. These are direct and indirect channels employed by the NBS to reduce the negative output gap.

In addition to overall lending activity, equally important, if not more so, is the structure of lending growth. Looking at the sources of growth in the period from 2015, the most important contribution came from the new investment cycle initiated at the time, with cumulative growth in private investment of around 30% in four years. Growth was strongly supported by investment corporate loans whose volumes during the 2015-2018 period were on a par with net FDI inflows into Serbia, exceeding significantly the volumes recorded before. This suggests that private investment growth was financed by bank loans more than before, i.e., that investment loans contributed significantly to the new investment cycle. Owing to low interest rates and labour market recovery, supported by economic policy measures, a part of loans were refinanced under much more favourable conditions, with housing loans returning to the 2011 levels, when subsidised loan programmes were in force.

Given that excessive lending growth can generate inflationary pressures, central banks assess both overall lending activity and its individual segments. This also reflects the hierarchy of objectives defined by Article 3 of the Law on the National Bank of Serbia. The main aim is to achieve and maintain price stability. Without prejudice to this objective, the NBS also contributes to the preservation and strengthening of financial stability. Without prejudice to these two objectives, the NBS supports the Government's economic policy, acting in accordance with market economy principles. This implies full support to economic activity, to the extent that does not jeopardise the achievement of the inflation target and/or financial stability.

Expectations of economic agents

Great importance is also attached to the anchoring of inflation expectations of economic agents, monitored since the switch to the full-fledged inflation targeting regime (January 2009). At the start, only short-term, one-year ahead expectations were monitored, whereas as of March 2014 the coverage was extended to medium-term expectations as well. The survey carried out on a regular monthly basis covered four segments of respondents – the financial sector, corporates, households and trade unions. Their expectations of the main macroeconomic

indicators and the underlying factors are monitored. The content of the survey for each sector is clearly defined, as well as the size of the sample and manner of familiarising respondents with the survey purpose.

The decade of inflation targeting can be divided into two periods also in terms of anchoring of inflation expectations (Figure 3).

The first period of 2009-2012 was marked by high and volatile financial sector expectations which exceeded the upper bound of the target range for consumer price growth, despite subdued aggregate demand. Corporate expectations were at the same time almost constantly above the upper bound of the target tolerance band. The fact that expectations were not anchored aggravated the achievement of the target in this period, with the opposite holding true as well.

The second period of 2013-2018 was marked by bringing inflation to a low level, of around 2% on average. Durable curbing of inflationary pressures, measured by core inflation as well, strengthened further monetary policy credibility. As a result, the period from 2014, i.e., half a decade, featured anchored inflation expectations. As in the case of policy credibility, the continuity of low inflation, amplified with a relatively stable dinar exchange rate, was a necessary cornerstone for the gradual development of

the dinar financial market and creation of the benchmark ten-year dinar yield curve.

The importance of inflation expectations is also signalled by the analysis published in the IMF October World Economic Outlook (Chapter 3), in which inflation factors in emerging and advanced economies are examined as of the mid-2000s. The conclusion contained in the analysis is the following: "Longer-term inflation expectations have been the main factor determining inflation, compared with the considerably smaller role of external conditions" [13, Figure 3].

Creation of the dinar yield curve

The KPR cuts spilled over to the money and capital markets, as evidenced by the sharp fall in interest rates at which the government borrowed in the domestic market (Figure 8). Lower interest expenses, through reduced government financing needs, were one of the factors of fiscal stabilisation. A feedback effect was recorded as well. Achieved stability and predictability of operation led to the lengthening of the dinar yield curve and a rise in the share of dinar in total public debt (Figure 9). The effect is clearly visible by comparing December 2018 and end-2012 data:

Figure 8: Interest rates in the primary market of government securities and NBS key policy rate (in %)
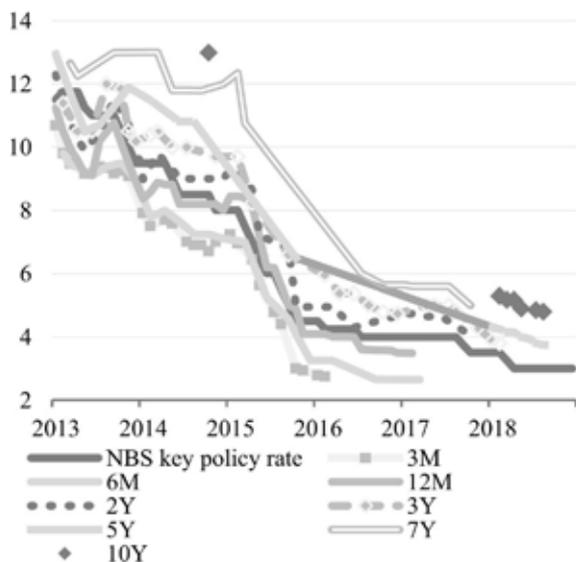
Source: Ministry of Finance and NBS.

Figure 9: Stock of dinar government securities and the share of dinar debt in total public debt (in RSD bn) (in %)
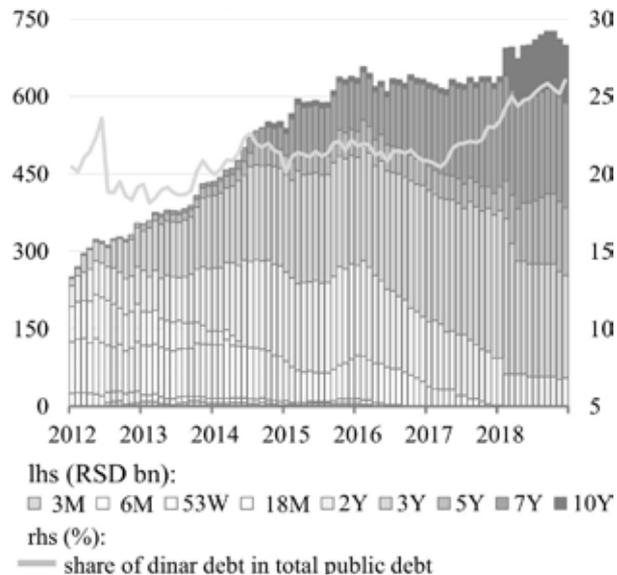
Source: Ministry of Finance.

- the weighted average rate on total sold dinar government securities fell from 13.7% to 6.2%;
- the share of securities with the maturity of five years or more increased from around 2% to over 63%;
- the share of dinar in total public debt rose from 19% to 26%.

Investors are prepared to invest in the long run and at lower returns if they believe that the economic outlook is positive. The sharp fall in Serbia's risk premium and intensive investment in ten-year dinar government securities definitely confirm that there is confidence in the better outlook of our economy.

Stability has no alternative

By preserving low and stable inflation and generally stable conditions, the NBS contributes to better economic prospects and joint results of the overall economic policy. These results are visible, among other things, in rising production and exports, lower current account deficit and sound public finances. All this together is also reflected in a reduction in the country risk premium and Serbia's more favourable credit rating, which leads to new business opportunities, with rising profitability of the domestic economy and FDI propping up investment. The new investment cycle is also supported by favourable terms of funding and higher availability of loans. Therefore, the inflation targeting regime cannot be assessed separately, but as a part of the overall economic policy, since they form an inextricable unity. Our assessments are based on facts and figures.

First, the predictability of prices and favourable financial conditions, together with fiscal consolidation results and structural reforms, make the macroeconomic environment conducive to business and investment. This is also confirmed by Serbia's progress on competitiveness rankings of the World Economic Forum and the Doing Business List of the World Bank in terms of relatively favourable terms to start business. Moreover, three leading global rating agencies (Standard & Poor's, Fitch Ratings and Moody's) upgraded Serbia's credit rating. The most recent outlook upgrade was made by Standard & Poor's in mid-December 2018. This agency particularly highlighted the measures undertaken by the central bank to enhance the credibility and efficiency of monetary policy measures in the inflation targeting regime. According to Standard & Poor's, inflation expectations are anchored, the exchange rate regime is relatively flexible, the financial sector has been further reinforced, non-performing loans are declining sharply and lending is on an upward path. The agency particularly emphasised the NBS's credibility and operational independence. It assessed that well-calibrated monetary policy decisions in the inflation targeting regime, which resulted in years-long successful preservation of low and stable inflation, helped anchor inflation expectations. The agency also emphasised the preserved relative stability of the exchange rate, stating that the current exchange rate regime not only alleviates excessive short-term volatility, but also contributes to Serbia's improved resilience to potential shocks from the international environment, while at the same time enhancing the domestic financial market.

Second, facing higher certainty, domestic and foreign investors are increasingly investing in Serbia. Favourable terms of funding and greater availability of loans raised the disposable income and spurred investment. The new investment cycle began in 2015, when gross fixed investment accelerated, reaching around 30% in 2015-2018. In the four years of the new cycle, the cumulative rate of private investment growth was close to 25% and of government investment over 70%. Increased investment in the expansion and modernisation of capacities was supported by more favourable terms of funding, as well as robust FDI inflows (around 6% of GDP on average in 2015–2018). Investment has further diversified our supply and is financed from long-term sources.

Third, investment, predominantly in tradeable sectors, drove up economic activity. In 2015-2018, investment growth (close to 7.5% on average per year) was the source of two-fifths of the growth recorded in this period. This ensured necessary growth assumptions in the following period – both in terms of capacity enhancement and enlargement and in terms of technological modernisation that contributes to increased efficiency and economic competitiveness.

Fourth, increased competitiveness of an economy is confirmed by its export results. In 2015-2018, goods and

services exports rose at a real rate of above 10% on average per year, attesting to better integration of our economy in global economic flows. As a result, relative to 2014, the share of goods and services exports in GDP increased by more than 9 pp to close to 50% in 2018 (balance of payment methodology). In the same period, the share of goods and services imports in GDP rose by less than 7.5 pp, on account of rising investment and related external procurements of equipment and intermediate goods. The current account deficit stood at around 4.2% on average and was fully covered by net FDI inflows (around 140%).

Fifth, the new investment cycle stepped up structural adjustment of the economy. The key drivers of growth were tradeable sectors, particularly manufacturing, and private sector services. Manufacturing recorded cumulative production growth above 20% and euro exports of around 50% (to more than EUR 15 bn in 2018). Exports increased in all areas of manufacturing, leading to a much better diversification of export supply. A significant rise was also observed in private sector services, whose cumulative euro exports exceeded 55%. In the segment of services, GDP in construction also recorded significant growth, as a result of rising investment.

Sixth, economic growth supported by investment and exports was sustainable in microeconomic terms as well, as confirmed by the increasingly better financial results of companies since the start of the new investment cycle. In the 2015-2017 period, the financial result of corporates improved by RSD 570 bn, reflecting, among other things, plummeting interest expenses (close to 40%), while exchange rate gains and losses fell by around 60%. Interest expenses declined although corporates stepped up the disbursement of loans, with favourable terms of funding contributing to growth in production, turnover and GDP. The improvement in the corporate financial result signals the importance of narrowing imbalances and having a stimulating environment, as well as the corporates' success in using the leeway to increase investment. Owing to this positive synergy, the medium-term economic outlook is more favourable and Serbia is now a desirable destination for long-term investment.

Seventh, growth is accompanied with the recovery of the labour market, which features a pronounced drop in unemployment and rising employment and wages in the private sector. Since end-2014, the employment rate rose by 6.3 pp to 49.2% (Q3 2018). The employment structure suggests a rising share of the private sector, most notably in the industry, construction, catering and trade. At the same time, the unemployment rate declined by 5.7 pp to 11.3%. Compared to H1 2012, the unemployment rate went down by more than 14 pp. In 2015-2018, real wages in the private sector exceeded 10%, with low inflation contributing to the preservation of their value.

Eighth, owing to fiscal consolidation results, by increasing capital expenditure the government was able to support long-term growth assumptions, primarily through infrastructural development. In 2018, government investment increased in real terms by more than 30%, reaching around 3.6% of GDP, which is by 1.3 structural points more than in 2014, when fiscal consolidation started. Progress is particularly important given that the fiscal result improved significantly – from a deficit of 6.2% of GDP in 2014, through a surplus in 2017 and 2018, i.e., fiscal adjustment of close to 8 pp, and a vigorous reduction in the share of general government public debt in GDP to 50% in January 2019.

Ninth, household consumption growth is powered by rising employment and wages in the private sector. In the 2015–2018 period, it recorded cumulative real growth of 6.5%. In the last two years of this period, household consumption grew in parallel with GDP, ensuring a social and sustainable dimension of growth.

Tenth, the achieved results of economic policy and favourable macroeconomic indicators underpin a positive growth outlook of our economy, which is a precondition for a switch to a sustainable growth model, this being, always and everywhere, the objective of economic policy makers.

Concluding remarks

A decade since the introduction of the inflation targeting regime, we have come a long way and have learned important lessons. These lessons have partly arisen from the conditions generated by the crisis, and partly from our readiness and openness to introduce new solutions, invariably adjusting them to the domestic environment,

• **Predictability of prices and favourable terms of funding** • **Fiscal consolidation** • **Structural reforms** ⇩ **Improved macroeconomic indicators** • Serbia's progress on rankings concerning competitiveness and relative ease of starting business • Credit rating upgrade ⇩ **A more favourable business and investment environment** ⇩	⇦ **Monetary policy easing** by the NBS contributes to falling interest rates on dinar loans (they are by around 10 pp on average lower compared to May 2013), which increases the disposable income of the corporate and household sectors, contributes to economic growth and employment, higher investment, and a favourable outlook going forward. ⇦ **By preserving financial stability**, reducing the level of NPLs and undertaking other measures, the NBS contributes to the strengthening of banks' credit potential. ⇦ **In December 2018, Standard & Poor's highlighted the NBS's credibility and operational independence**, as well as the adequacy of monetary policy decisions in the inflation targeting regime, which have resulted in years-long preservation of low and stable inflation and anchored inflation expectations. The agency also emphasised the preserved relative stability of the exchange rate – in addition to mitigating excessive short-term volatility, the exchange rate regime increases Serbia's resilience to potential shocks from the international environment, while at the same time facilitating the development of the domestic financial market.

- **Investment growth**: in the new investment cycle (2015-2018), gross fixed investment accelerated, reaching around 30% in cumulative terms – private investment close to 25% and government investment over 70%.

- **Economic growth** led by investment in tradeable sectors: in 2015-2018, investment growth equalled close to 7.5% on average a year, accounting for two-fifths of GDP growth in that period; this at the same time resulted in the modernisation of production capacities.

- **Growth in competitiveness and exports**: the economy that is now more advanced in technological terms and more cost-efficient increased the goods and services euro exports by around 50%, and the share of exports in GDP rose by around 10 pp to around 50% in 2018 (balance of payment methodology). A support to growth comes from lower costs of funding, notably due to a high FDI inflow and the availability of loans at more favourable terms.

- **Sectoral restructuring:** the 2015-2018 period saw acceleration in tradeable sectors growth – manufacturing (production growth of more than 20% and export growth of around 50%) and services (euro exports rose by over 55%). More favourable general conditions underpin export growth recorded by all areas of manufacturing, with investment contributing to their production and geographic diversification.

- **Microeconomic growth sustainability:** in the 2015-2017 period, the financial result of corporates improved by RSD 570 bn. Interest expenses were lower by close to 40% and exchange rate gains and losses by around 60%. Corporates used the savings to increase investment, and this positive synergy makes the medium-term growth outlook brighter.

- **Labour market recovery**: the employment rate rose by 6.3 pp in 2015-2018 and reached 49.2% (Q3 2018), with unemployment declining from 17% to 11.3%, and real private sector wages rising by over 10%. Low inflation contributed to the preservation of their value.

- **Growth in government capital expenses**: the confirmation of sustainability of balanced public finances opens room for the government to support the growth outlook also by increasing investment in infrastructure – in 2018, government investment will increase by more than 30% in real terms, reaching 3.6% of GDP.

- **A rise in the standard of living**: owing to increased employment and wages, primarily in the private sector, household consumption was up by 6.5% in real terms in 2015-2018.

- **The sustainable growth model** entails a more favourable growth outlook, opening additional possibilities to accelerate growth and ensure a rise in the standard of living, with an expected further rise in investment and narrowing in external imbalances owing to increased competitiveness.

while at the same time overcoming external challenges and achieving the desired objectives.

Aiming to explain these lessons, we have analysed the inflation targeting decade through two periods. In the 2009-2012 period, monetary policy was pursued in a crisis environment, featuring high and volatile inflation and

inflation expectations. This is partly due to volatile food prices with a relatively high share in the consumer basket, as well as to pronounced volatility of the dinar exchange rate. This is a clear confirmation of the importance of relative stability of the exchange rate for the achievement and preservation of price stability in small and euroised

economies. The second lesson concerns the importance of well-anchored expectations, which can prevent the pass-through of growth of some prices to other prices (second-round effects). The fact that expectations were not anchored aggravated the achievement of the target in this period, making monetary conditions volatile as well. Coordination between monetary and fiscal policies was lacking, which is a necessary precondition for the achievement and preservation of price stability. This is our third lesson.

The 2013–2018 period featured low inflation, confirming the importance of relative stability of the exchange rate, anchored inflation expectations and consistency of economic policy as a whole. It proved that global developments, given that they spill over to the domestic market, must be borne in mind when making decisions and designing the policy, particularly when it is a source of instability. Well-calibrated and timely FX interventions absorb short-term shocks and help mitigate inflation volatility and create a more stable investment environment. Therefore, in an environment of volatile capital flows, a large number of emerging economies that pursue inflation targeting regimes intervene in the FX market. It proved that the timeliness of response, consistency of approach, readiness to use all available instruments, in full coordination with other policies, are important elements of the inflation targeting regime.

In early 2017, Serbia lowered the inflation target to 3%. This was an important strategic decision, owing to which Serbia became a part of the group of countries which, without looking for any excuses, work on setting a sound foundation for their sustainable growth. At the same time, the new inflation target leaves room for further price and income convergence to EU levels. Serbia is now considered a safer investment destination. The progress achieved contributed to a higher disposable income, growth in lending and economic activity, and employment and wages. The real life serves as the most obvious proof. One rarely talks about inflation in Serbia. It is also easier to make plans and pursue a business.

However, this does not mean that the job for the central bank is over. Challenges arise all the time, in different forms, with different intensity, which is why we have to strengthen resilience, constantly upgrading our capacity to recognise and respond to challenges in a timely manner. Business and financial cycles are inevitability, which is why economic policymakers must create an environment to significantly reduce the impact of shocks. Although the conflicts between objectives in different phases of the cycle remain, they can be diminished through full coordination of policies, as shown in the Philips curve for Serbia.

Therefore, the inflation targeting regime cannot be assessed separately, but as a part of the overall economic policy as they form an inextricable unity.

Figure 10: Unemployment rate and inflation
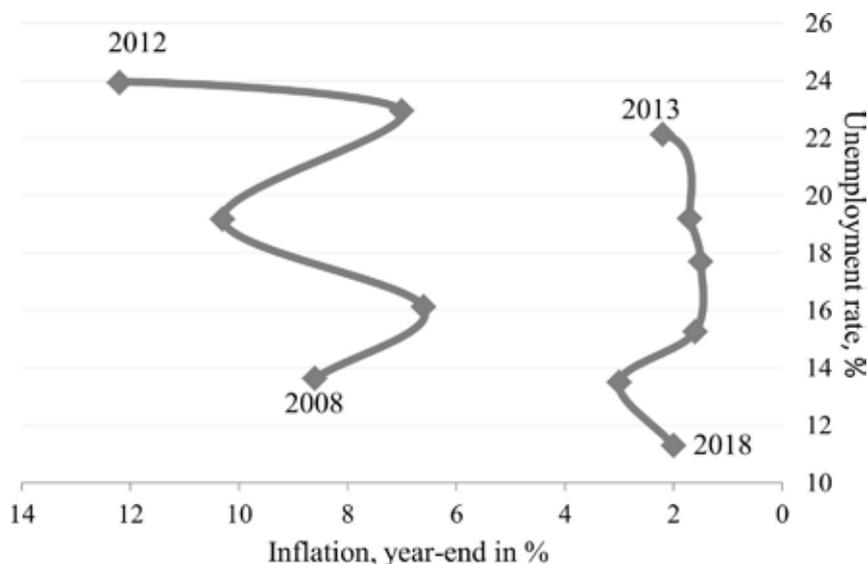
Table 1: Selected indicators in the 2009-2018 period, the case of Serbia
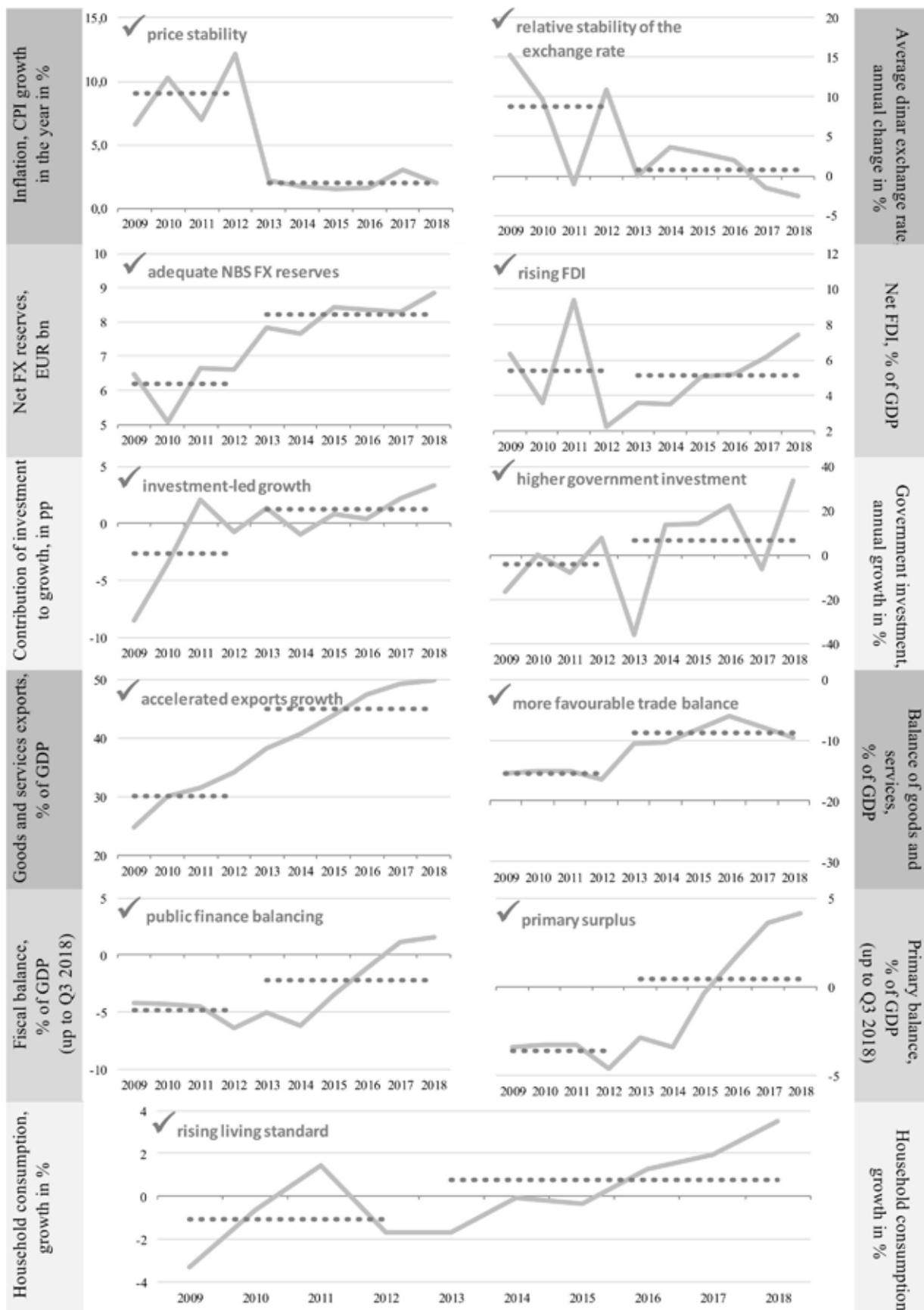
Source: Statistical Office Serbian of the Republic of Serbia, NBS, NBS assessments.

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has been serving as Governor of the National Bank of Serbia since August 2012. In early 1992, she was employed by Prištinska banka a.d., part of the Beogradska banka system, as Deputy General Manager and continued to work in the banking industry until 1999. From March 1998 until October 2000, she served as Minister of Economic and Ownership Transformation in the Serbian Government. Since 1999 until her appointment as Governor, she worked in the Telecommunications Company "Telekom Srbija", initially at the position of General Manager of the Logistics Department (March 2005-December 2008), after which she worked as an expert for economic operations.

She obtained an MA degree in 1999 from the Faculty of Economics of the University of Priština and earned her PhD in Economics from the same university in May 2011. She has authored a number of studies on privatisation and financial markets. In 2006 and 2007, she lectured at the Faculty of Management in Novi Sad.

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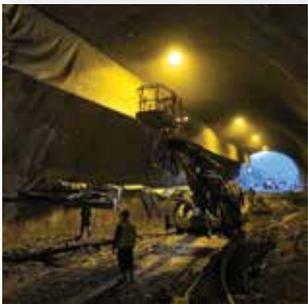
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DIGITAL TRANSFORMATION: CHALLENGES FOR COMPANIES IN SERBIA*

Digitalna transformacija – izazovi kompanija u Srbiji

"We live today, as you know very well, not in the digital, not in the physical, but in the kind of minestrone that our mind makes of the two."

Paola Antonelli, MoMA – Museum of Modern Art in New York

Abstract

Serbian ICT industry has been the fastest growing sector in the last decade after the recession, accounting for 6% of the country's GDP. This provides scope for companies operating in different economic sectors to transform their business, products, and services using digital technologies and, thus, to build their competitive position on knowledge and innovations. However, data show that Serbian companies are investing five times less into ICT than the global average and that the cooperation between the ICT and other sectors in the country is quite low. This paper explored this topic at a company level based on a survey conducted among 218 respondents from companies operating in various economic sectors in Serbia. Data show that digital transformation is recognized as important across all industries and employee levels and is mostly viewed as an opportunity that transforms companies to a large extent. Majority of the companies have implemented at least one project in the area of digital transformation, and more than half of them are developing their own digital products and/or services. Digital transformation in Serbia is implemented by leaders who do not necessarily have a technical background. The survey also shows that domestically-owned companies develop digital aspects of their products internally, in contrast to foreign-owned ones. As skill levels have been recognized as the quality of the Serbian ICT sector and are also key to building a digital economy, this paper assesses the difference between various available and needed skill sets in Serbian companies.

Keywords: *digital economy, digital transformation, innovations, competitiveness, Serbia.*

Sažetak

Deset godina nakon recesije, srpska IKT industrija je najbrže rastući sektor u prethodnoj deceniji, zaslužan za 6% BDP države. Za kompanije iz različitih sektora privrede otvara se prostor da korišćenjem digitalnih tehnologija transformišu svoje biznise, proizvode i usluge, i na taj način grade svoju konkurentsku poziciju na znanju i inovacijama. Ipak, istraživanja ukazuju na to da srpske kompanije u IKT ulažu 5 puta manje od svetskog proseka i da je saradnja između IKT i drugih sektora na prilično niskom nivou. Ovaj rad bavi se ovom temom na nivou kompanije na osnovu upitnika u kome je učestvovalo 218 ispitanika iz kompanija koje posluju u Srbiji u različitim sektorima. Podaci pokazuju da je digitalna transformacija prepoznata kao važna u svim sektorima i od strane zaposlenih svih nivoa, kao i da se na nju gleda kao na priliku koja transformiše kompanije u velikoj meri. Većina kompanija su već implementirale bar 1 projekat u oblasti digitalne transformacije, a više od polovine razvija svoje digitalne proizvode i/ili usluge. Digitalnu transformaciju u Srbiji sprovode lideri, koji ne dolaze nužno iz tehničkih oblasti. Rezultati nam ukazuju i na to da kompanije u domaćem vlasništvu u većoj meri razvijaju digitalne aspekte svojih proizvoda interno, za razliku od kompanija u stranom vlasništvu. Dodatno, s obzirom na to da su dostupna znanja i veštine prepoznate kao kvalitet srpskog IKT sektora, a ujedno su i veoma važne za stvaranje digitalne ekonomije, ovaj rad procenjuje i razlike između dostupnih i potrebnih veština u srpskim kompanijama.

Ključne reči: *digitalna ekonomija, digitalna transformacija, inovacije, konkurentnost, Srbija.*

Introduction

Tumultuous development of digital technologies has not yet generated widespread economic growth and rise in productivity. The emerging digital economy, as a combination of mobile technologies, broadband, and cloud computing, includes a series of disruptive innovations whose full effect on business results is yet to be generated. It is essential that companies develop innovative potential in this process. Therefore, Daniel Newman and Olivier Blanchard emphasize that digital transformation, based on innovativeness and agility, enables acquisition of significant competitive advantages [18, p. 13]. And, in its essence, digital transformation implies the creation of a new business model using IT technologies [29, p. 94, p. 23, p. 131].

Like never before in history, data gathering is now unlimited and its cost is minimal. However, the real challenge is how to rapidly transform data into quality information and, further on, into knowledge. The digital economy caused a significant change, which is reflected in the substantially empowered position of consumers. Attention diverted to the demand side, as opposed to the hitherto tendencies dominated by the supply side.

This paper has two goals: (1) to confirm the importance and characteristics of the process of digital transformation as a significant path of companies in the digital economy and (2) to discover the necessary directions, challenges, and opportunities of companies operating on the domestic market during the implementation of digital transformation. The main conclusions in the paper are based on the survey of more than 200 company managers in Serbia.

Theoretical fundamentals of the digital economy – a key phenomenon

In the present era, which can be defined as the second machine age [2, pp. 119-121], [3, pp. 4-7], organization of production in companies changed [2, p. 79]. Production is less dependent on physical equipment and much more on intangible assets which consist of the following four categories: intellectual property, organizational capital, user-generated content, and human capital. Precisely, this has been in the focus of the conducted survey into

the companies doing business in Serbia and forms a significant part of this paper.

Intellectual property includes patents and copyrights, while probably the largest category of intangible assets is organizational capital that covers new business processes, production techniques, organizational forms, and business models. A change in the functioning method of production models was triggered to a significant extent by the use of new technologies. Effective use of new technologies inevitably requires changes in the organization of work.

User-generated content is a smaller, but fast-growing category of intangible assets. This category is gaining in importance because the users of Facebook, YouTube, Twitter, Instagram, Pinterest and other types of online content use free content and also form it. Every day, tens of thousands of hours of new YouTube videos are created, and hundreds of millions of new images are uploaded to Facebook and Instagram. Companies can use these numerous channels, as well as create their own channels and put user-generated content at the service of creating value added and transforming their products and services — from exchange of experiences and advice about the use of products to promotion.

The fourth and largest category relating to the dependence of production of intangible assets is the value of human capital. With a change in the production model, the skills companies need are also changing. In other words, companies' demand for employees performing routine tasks shifts to the demand for creative employees whose creativity enables the creation of innovative and higher value-added products. This trend is also observed in Serbia given the fact that 30% of respondents have stated that their companies organize their own projects and programs, thus promoting creation of innovation. According to a research conducted by the World Economic Forum [31, pp. 28-33], current accelerated technological development creates new business models which affect the labor market. In Manpower Research [16, p. 2], it has been concluded that employers face challenges in searching for employees with the skills they need. This is mainly observed concerning jobs that require higher qualifications, for which the demand has significantly increased over the past few years. Hanushek et al. [7, p.

24] have established that the possession of cognitive skills contributes to the 18% increase in earnings. On the other hand, labor markets are also recording an increase in the demand for unskilled workers, but without a rise in their earnings. This can be explained by the shortage of skilled workers which is why companies try to attract and retain them by raising their earnings, which is possible thanks to their higher productivity.

According to Sofronijević et al. [25, pp. 273-279], digital transformation can be defined in three ways, depending on the breadth of observation. In the broadest possible context, digital transformation can be described as the change caused by digital technologies or influenced by them in all aspects of human life. In a narrower sense, digital transformation refers to business transformation and is defined as the use of technology to radically improve the performance and achievements of companies. In the narrowest sense, it refers to the use of digital technologies at the service of creating innovations, creativity and promoting significant changes in the professional sphere or the sphere of knowledge. For this paper and analysis, we will focus on digital transformation in a narrower sense or, in other words, on the digital business transformation from the perspective of a company.

Apart from changing the business model of the company, digital technologies exert influence on market transformation in general. In contemporary economy, the crucial role in shifting the emphasis from supply to demand is held by some new phenomena linked to the digital economy. These phenomena extend from the position of a buyer, through the cost structure and character of the product, to the newly emerging market structures, differing from the hitherto dominant ones. In further text, we will analyze only some of the most dominant ones.

From a physical product to digital product and services

Today, the consumer rarely comes upon a supply of a pure physical product. The nature of purchasing has changed in such a way that, before any purchase, consumers are informed about the characteristics of the product and buyers' experiences thanks to the existence of online platforms. For example, IKEA has integrated its physical catalog with a mobile application. The use of the catalog and mobile application together enables obtaining more details and interactive information about an item. This is the process of digital infusion that allows the transformation of traditional retailers with specialized in-store experience, like IKEA, into retailers with online experience.

According to the survey conducted in Serbia and information obtained from the questionnaire, 34% of companies integrate digital products into company products, nearly 50% of them integrate digital products into company's processes, and as much as 57% of all surveyed companies create new digital services. These data just show something that has also been confirmed by the World Economic Forum [32, p. 3]. Namely, the role of digital technologies has significantly changed – from an instrument for marginal efficiency improvement these technologies have become crucial for innovation development [32, p. 3].

The post-industrial economy is shifting its focus from selling the physical product to helping the buyer satisfy their needs. While physical products are tangible, digital product or service also includes experience gained by numerous touchpoints [27]. A good example is air flights. The customer's experience begins with buying a ticket, either over the phone or via website; it continues with the arrival at the airport, luggage check-in, boarding the plane, etc. The flight for which you have the ticket actually begins now. It is followed by some other services, such as landing, disembarking, luggage claim and so on. The flight itself, as the basic service paid for with the ticket, is only a small part of the service included in the overall trip. Such a digital product, in the form of air carrier's service, includes various interactions between the physical product or service (the flight in this case) and series of other services and radically changes the value offered to the customer by this product or service. What we have here is shifting one's business from classical products to service-based models – the process known as "from product to a service-based model". To successfully implement this process in companies, it is necessary to have a long-term strategy which enables adding digital processes to company's products, thus expanding the possibilities for product usage and consumer satisfaction.

One of the crucial phenomena, directly linked to the strengthening of the role of demand, is the development of customer experience, which is derived from the interaction between firms and customers [24]. This interaction consists of three components: the customer journey, the touchpoints the customer interacts with, and the environment the customer experiences. Whether all customers' expectations will be met depends on the respect shown for the significance of customer experience and all points of contact. Therefore, a very strong emphasis is placed on customer experience management [28].

Newly created digital products differ from traditional physical products because their multiplication is much faster and cheaper. Digital products are bit-based, not atom-based, which is why it is possible to make perfect copies of digital products that are completely identical to originals, which is not the case with physical products. Such replicas are practically identical with the originals, can be made at no cost (or at minimum cost) and transmitted almost instantaneously anywhere on the globe. The newly created situation is characterized by "winner-take-all markets". Explaining this phenomenon, Erik Brynjolfsson and Andrew McAfee [2, pp. 154-157] point out that digital goods have much lower marginal costs than physical ones, which results in the emergence of "winner-take-all markets". Digital goods have huge economies of scale, thus enabling the market leader to enjoy a huge cost advantage, coupled with a competitive advantage [9, p.167]. Once fixed costs are covered, production costs of each marginal unit are very low. Very low marginal costs make mass production cheaper. A scaling phenomenon in the digital economy has emerged purely on this basis. A good example of this phenomenon includes disruptive innovations and Alibaba, Netflix, Airbnb and the like. Low marginal costs on the supply side create economies of scale, while widely used networks create "demand-side economies of scale". As was the case with low marginal costs, network effects also create "winner-take-all markets" [1, p. 21].

Bearing in mind the changes brought about by digital transformation and referring to a complete change of product and business model, the process of digital transformation has become imperative. To be competitive over the long term and use advantages of this process, companies must adjust to the changed business paradigm.

Digital economy in Serbia

ICT in the Serbian market was estimated at EUR 1.73 billion in 2016 and has been the fastest growing sector in the last decade, accounting for 6% of the country's GDP. The Serbian ICT sector is strongly export-oriented with exports hitting a record EUR 900 million in 2017, and approximately 25% year-over-year growth rate, putting the industry in the highest ranking [14, p. 7]. ICT service export encompasses more than 40% of all service exports, which puts Serbia among the top European countries with only five EU countries ahead – Ireland (67%), Belgium (48%), Finland (46%), Sweden (45%) and Germany (41%). Additionally, Serbia's relative growth of the ICT service exports in relation to all service exports in the last ten years (26.7%) was only the second highest to Belgium (33.29%).

According to the World Economic Forum's 2017 Global Information Technology Report, Serbia reached a Networked Readiness Index value of 4.0 out of 7, the index measuring how well an economy is using information and communications technologies to boost competitiveness and well-being [14, p. 7]. Serbian index value is equal to the Western Balkans average and similar to that of Albania, Bulgaria, Greece, Romania, and Turkey. The biggest Serbian strengths identified in this report are available ICT skills and affordability. The most notable weakness is seen in the segment of business usage of ICT, which is essential for the digital economy.

While some authors claim that the development of ICT sector has created a push for the growth of other sectors as well [6, pp. 17-18], [11, p. 298], available data show that Serbian companies are not investing enough in ICT. Namely, Serbian companies invest only 0.7% of their profits in ICT, which is five times less than the global average (3.5%) [34, p. 41].

These low values are consistent with the conclusion from the most recent study analyzing the potentials of ICT in Serbia that the degree of collaboration among the growing ICT sector and other industries in the country is low [14, p. 9].

Based on the patent analysis [14, p. 13], ICT-related patent applications make approximately 15% of all domestic patent applications, which is a higher share than in Croatia (12%), but lower than in Hungary (21%), Bulgaria (32%)

and Romania (33%). By the count of ICT PCT patent applications per million population, Serbia performs far better than other Western Balkan countries. With Serbia having this indicator at 1.94 in 2016, the closest performance in the Western Balkan region came from Montenegro with 0.80 patent applications per million inhabitants [World Bank data 14, p. 13]. Serbia went up by 52 in rank regarding the ICT PCT patent applications per million inhabitants from 2012 to 2016. Its latest rank is 44 out of 103 countries for 2016.

Innovation potential, ICT capacities and collaboration between ICT and other business sectors are important elements in digital economies. In this paper, special focus is placed on digital transformation of companies, which should provide us with more details behind these macroeconomic numbers.

Description of the questionnaire

The questionnaire contains 26 questions, which are mostly closed-ended with predefined answers or rating scales by which respondents rated the challenges and needs of their companies. The questions were designed according to the relevant surveys conducted in the world. The questionnaire was distributed via the Typeform online platform to 218 respondents, namely, employees in companies of varying size and operating in different sectors, which remained anonymous for this survey.

The survey covered companies of varying size. Considered by the number of employees, survey participants consisted of about 2% of micro and 18% of small enterprises, about 24% of medium-sized enterprises and about 56% of large firms. The dominance of large companies in the sample is intentional, and the reason lies in the very topic of this survey – digital transformation is the process referring mostly to mature companies which need to transform and adapt to the digital economy. The majority of the surveyed firms operate in the IT sector (25%), production (13%), banking (12%) and professional consulting services (11%). The highest share of the IT sector is also intentional to potentially observe any differences between companies that already operate in the field of new technologies and companies operating in other sectors.

Respondents were individuals holding managerial positions in their companies. The majority of respondents, as much as 30%, held managerial positions, while the positions of the chief executive officer (CEO) and department manager were represented with the share of 14% each.

The companies that participated in the survey differ regarding the dominant market, their form of ownership and level of representative office in Serbia. The companies have mostly been observed, and the relevant conclusions have been derived, according to these criteria. In fact, the majority of these companies include representative offices in Serbia of the companies operating on more than 30 different markets (24%), while domestic companies operating on the regional and world markets account for 33% of the total number of companies, that is, 18% and 15% of surveyed companies respectively. The lowest percentage of respondents accounts for the employed in domestic companies operating on the domestic market (about 8%) and regional representative offices of the companies doing business on less than 30 markets (4%).

In the following sections, we will focus on the most important conclusions reached in the process of digital transformation in the companies doing business in Serbia.

The importance of digital transformation

Digital transformation is the process which is viewed as an opportunity by most companies in Serbia and which most of them have consciously already started to implement. However, preparation for the process of digital transformation, which offers a wide spectrum of potentials, is not a simple task for a company and implies the need to incorporate digital transformation goals into its development strategy.

Companies have recognized the importance of digital transformation, regardless of their form of ownership or size. Also, in almost all of them digital technologies change the industry in which they operate very intensively. Nevertheless, even though digital transformation is a very important business segment, which significantly changes the industry in which companies operate, they have mostly associated the responsibility for digital transformation to an already existing team. Only 5% of all companies have

formed teams dealing exclusively with digital transformation and bearing responsibility for this process.

The results show that companies in Serbia participate in digital transformation and that this is not an isolated case or characteristic of only some of them. Digital transformation is the process that involves both companies operating predominantly in the IT sector and those operating in more traditional economic sectors. Almost 50% of all surveyed companies hold that they are innovative in comparison with their competitors. At the same time, 70% of them implement one or more digital transformation projects. A significant number of respondents hold that their companies are successful relative to the ideally transformed organization, bearing in mind that one-third of them have assigned a rating of 7/10 to their organization against the ideal one (Figure 1).

Despite considering digital transformation important, only 20% of all companies have a clearly defined vision of digital transformation, which is below the global trends according to which 50% of companies have created a digital vision of their future [8, p. 4]. The situation is similar when it comes to the defined business decision strategy. Namely, about 20% of surveyed companies have defined their digital transformation strategy; this percentage is lower than the global indicator (37%). Respondents consider adjustments to the company rules to be a major challenge in the process of digital transformation of their companies, which can be attributed to the company's lack

of vision and strategy. Also, the management's lack of understanding for the process of digital transformation, entrepreneurial spirit and financial resources are also considered as major challenges.

Digital transformation is the process that is viewed as the opportunity that should not be missed by more than a half of companies, while again over a half of them are satisfied with the way in which the digital transformation process is internally managed. Over 50% of surveyed companies seek to successfully use digital transformation as an opportunity, which is why invest in the education and training of their employees and management and work on the creation of new digital services and the development of their innovative products. Efficient management of the process of digital transformation in a company is just the result of investing in the competencies of employees at all hierarchical levels, which enables 50% of companies to integrate digital products into their business processes and products.

Differences in approaches to digital transformation in relation to the form of ownership

Considering the form of ownership, domestic companies and representative offices of companies are equally satisfied with the way in which their companies manage the process of digital transformation. Those companies predominantly implement one or more digital transformation projects, while a considerably lower percentage of them have not

Figure 1: Rates are given to the company compared to an organization that has been ideally transformed (1-10)

DT Early stage (10.6%)   DT Medium stage (31.7%)   DT Mature stage (57.8%)
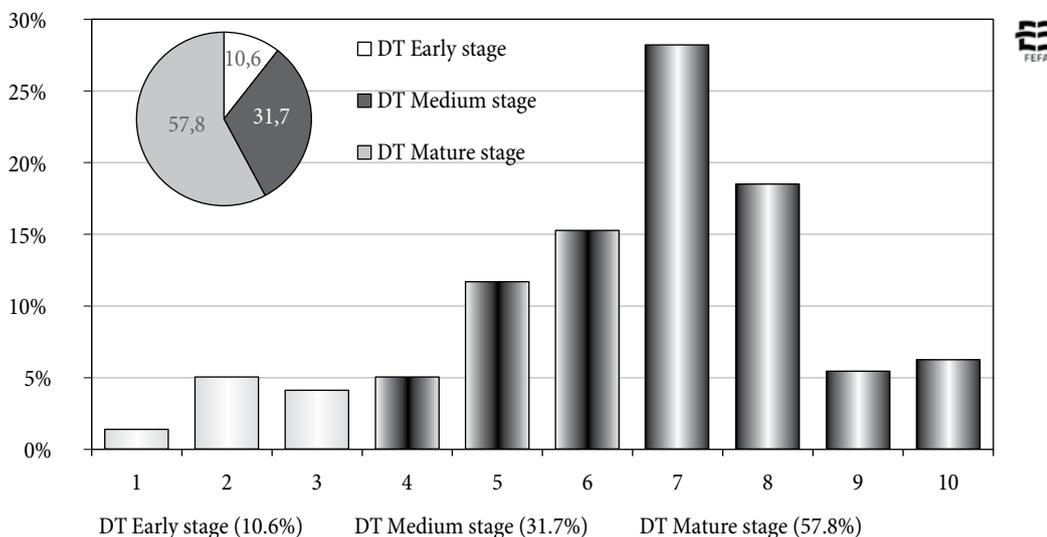
Source: Survey results.

yet implemented any digital transformation project (8% of companies in each surveyed group).

Regardless of the form of ownership, the surveyed companies hold that digital transformation changes their industry very intensively. At the same time, they mostly believe that they are more innovative than their competitors on the market.

As regards the views on intensity with which digital transformation changes the industries in which companies operate, it is important to note that companies efficiently manage the process of digital transformation and implement digital technologies in all parts of the value chain (Figure 2).

Although both groups of companies develop their innovative products and create digital services, there are differences between the two surveyed groups concerning the dominant way in which companies create digital aspects of their products. In other words, domestic companies doing business on the domestic market and those operating on the international market create about 85% of digital aspects of their products in the company, while domestic companies working on the regional market create nearly 70%. On the other hand, only regional representative offices of the companies operating on less than 30 markets mostly create their digital products internally, while in other representative offices this activity is predominantly performed by the head office or representative offices in other countries.

The creation of digital aspects of products in companies in Serbia is important because it creates a

knowledge base that will contribute to the productive use of resources, that is, to competitiveness over the long term. Product development in the company and the inclusion of a broader spectrum of organizational units and people in this process enhance the development of innovations to a greater extent than in an isolated business unit or entity [5, p. 4].

The creation of higher value-added products in the company provides the basis for its competitiveness because its employees and management face challenges which, after being successfully surpassed, turn into the creation of innovative products and services.

As previously determined, company's strategy and development trends must be clearly defined, so that it can retain a competitive position on the market after catching up with digital transformation. Although only 19% of all domestic companies and 22% of all representative offices have defined their digital transformation strategies, a large part of this process is still the segment of the company's existing strategy.

The significance of strategy and related activities

The 2015 Digital Business Global Executive Study identifies strategy as the key driver in the digital arena. In other words, the possibility of digital technologies to transform business depends in large measure upon the clearly defined strategy which is implemented by the leaders capable of

Figure 2: The extent to which digital technologies are changing the industry of the company
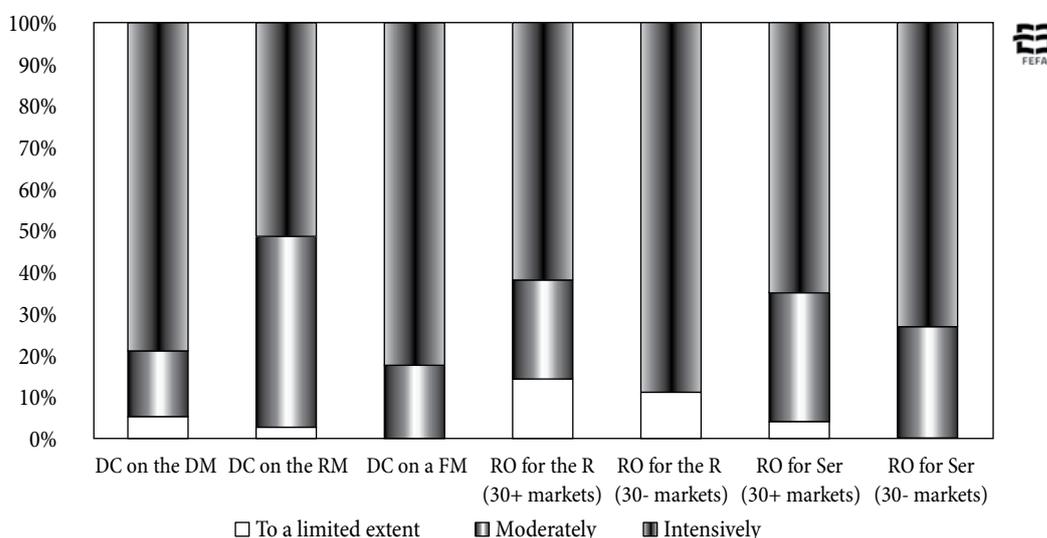
changing the existing organizational culture and creating a new one [13, p. 1].

According to the new Global Competitiveness Report 2018 [33], Serbia ranks 87th regarding the strategy and operational efficiency of its companies. According to this ranking, Serbia is not competitive or, in other words, it does not use its available resources in a sufficiently productive way.

However, low percentage of clearly defined strategies does not a priori rule out the fact that companies can be successful in catching up with the digital era. Although the percentage of companies having a defined digital transformation strategy is low, there is a high percentage of companies in which digital transformation is an important segment of their current strategies. Such a synergy can enable a productive use of the potentials and opportunities offered by digital transformation, needed to attract, develop and retain talent in the company.

In its study, Deloitte defines organizations with digital culture as organizations which are not risk-averse and which experiment, invest in talent and develop managerial skills. The results of the survey show that companies in Serbia do precisely that and that such companies represent the environment in which highly qualified individuals wish to develop their career [12, p. 5].

Regardless of their age, the majority of employees wish to work in organizations catching up with digital technologies [13, p. 1]. A similar result has also been confirmed on the Serbian market. Around 70% of respondents who consider digital transformation to be an opportunity are of the opinion that it has a positive impact on employer branding of the company.

Digital transformation has become an imperative process in which companies use new technologies for their products and processes. In a dynamically changing environment in which companies operating in different economic sectors are trying to catch up with this process, a sustainable competitive advantage depends on the ability of a company to innovate. Only 6% of all companies view digital transformation as a risk. Risk appetite unlocks the possibility of companies to innovate – a half of them create digital products, while over 57% of them create new digital company services.

The significance of a leader

Survey results show that in the past years digital technologies were mostly used to make some business segments more efficient, including the use of technologies for monitoring operational efficiency, sales trends, etc. Today, digital technologies penetrate all business aspects and form an integral part of company products and services.

Considering high intensity with which digital technologies transform the surveyed companies, it is important to have leaders with a vision for digital transformation. The results of our survey show that it is not necessary for leaders to have a technical background.

In nearly 40% of companies, the responsibility for digital transformation rests with the chief executive officer (CEO); on the other hand, the CTO is responsible for this process only in 9% of surveyed companies. In the companies where the CEO is responsible for digital transformation, respondents mostly view this process as an opportunity and these organizations also have a defined digital transformation vision and strategy. Respondents also believe that digital transformation changes their organizations very intensively. However, a large number of them hold that one of the major weaknesses of companies is lack of agility, that is, slow decision-making processes. The correlation between the CEO running the process of digital transformation and higher perceived significance of the process does not answer the question about cause and effect. Namely, if the highest-ranking individual in a company is also responsible for the process, this signals its significance to all company levels. On the other hand, the reason for the CEO taking direct control of the process can be the fact that this process is perceived as important for a given company, industry, market and business environment (Figure 3).

Skills and competencies

As we have previously stated, based on the Networked Readiness Index, Serbia has the highest rating for available skills [14, p. 7], which is why they take up a significant part of the conducted survey. As regards the leaders responsible for the process of digital transformation, the majority of

respondents gave their companies a rating of 3-5 in the context of skills necessary for digital transformation. Although there is evident need for additional skills in companies, only one-fourth of them organize training programs for employee skills improvement, while about 15% of all surveyed companies have embarked on the process of recruiting individuals with the skills required in this field.

Digital transformation is often wrongly perceived as the challenge which refers only to technological development and requires new people who possess knowledge in the field of information technologies and data analysis to overcome it [20, p. 31]. It requires not only the implementation of the latest business-related technological achievements, but also digital thinking and a completely new approach to problem-solving, business decision-making and risk management.

Digital transformation is a complex and demanding process in which the digital component must exist in all spheres of business that include, among other things, one very important segment – employee development.

As for the skills and competencies of companies vis-à-vis the ideal organization that underwent digital transformation, this research analyzes how respondents view their organizations in terms of knowledge, skills and competencies which are linked to artificial intelligence, blockchain technologies, cloud computing, big data analytics, integration of digital products and services, business process management skills, competencies of the top management

for the process of digital transformation, including the related competencies of employees at the company level.

When we analyze respondents' views on their competencies in the fields of blockchain technologies and artificial intelligence vis-à-vis the ideal organization that successfully implemented the process of digital transformation, we can state that all respondents, regardless of the form of ownership of the company or the sector to which it belongs, think that their skills are not at the satisfactory level; they gave blockchain technologies and artificial intelligence a rating of 2.2 on a 5-point scale, although they assigned different weight to these technologies for the process of digital transformation – 3.2/5 and 3.7/5 respectively.

On the other hand, business process management skills have been highly rated by all respondents. This leads us to a conclusion that all companies consider their management efficient, which is certainly due to investments in training and education of the management. As for the possession of skills for the integration of digital products and services, the situation is identical, which is in a positive correlation with the abovementioned successful integration of digital technologies into business processes and products.

Respondents also believe that the top management in their companies possesses the knowledge required for a successful process of digital transformation. It is interesting to note that over 80% of the total number of companies do not hire consultants in the process of

Figure 3: The extent to which digital technologies are transforming the company of the respondent based on the person responsible for digital transformation in the company
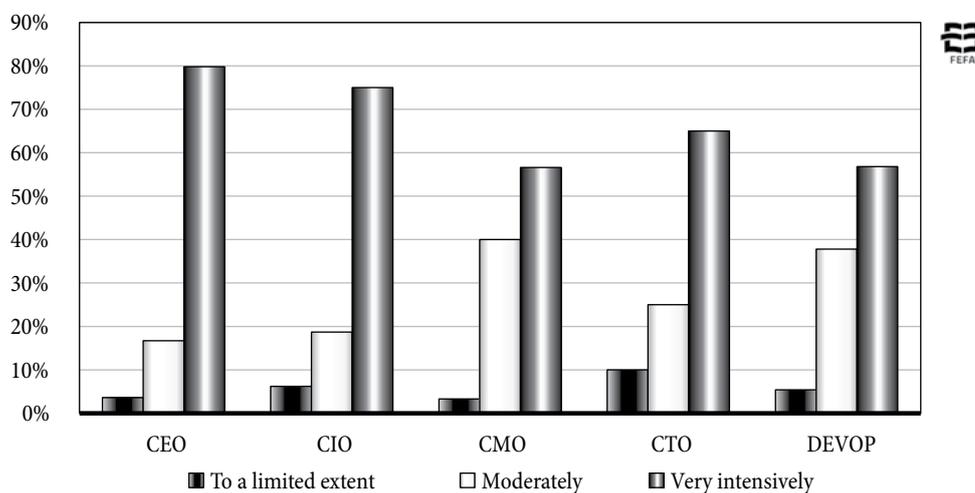
Source: Survey results.

digital transformation, which is especially true of domestic companies. This is in a positive correlation with the view that the existing management possesses the skills needed for the transformation of their organization.

All of this also leads to the conclusion that the process of digital transformation in companies relies on internal sources. This is especially evident in the case of domestic companies, which is also confirmed by the fact that about 20% of domestic companies have set up digital transformation teams. Also, domestic companies do not lag behind foreign ones concerning their training programs for employee skills improvement in the field of digital transformation (25%). As for the satisfaction of domestic companies with the number of employees who possess the skills needed for digital transformation, 30% of all companies gave it a rating of 3 on a 5-point scale. In this connection, it is evident that there is enough room for improvement and that domestic companies, being aware of the challenges and opportunities offered by digital transformation, hold that they have not yet sufficiently developed internal skills for these processes.

Foreign companies gave a similar average rating, but in the context of domestic companies this is more important because we have already seen that they rely much more on their capabilities in the process of digital transformation, while foreign-owned companies mostly rely on outsourcing, their head office or company or some other representative offices of these companies outside Serbia. The survey data clearly show that in the process of digital transformation domestic companies rely mostly on their employees, implement projects within this process by themselves and directly face all risks associated with these projects.

On the other hand, foreign companies have a more pronounced view on the fact that they possess the skills needed for the process of digital transformation as opposed to domestic companies. The reason must not necessarily lie in the fact that they have higher-quality personnel; rather, it lies in the fact that, in most cases, digital transformation projects are not elaborated in companies in Serbia which is why the skill levels are lower. Therefore, skills development in the context of digital transformation on the domestic market is not so important for foreign companies, which is also confirmed by the fact that they more often hire external consultants having expertise in this field (Figure 4).

A different approach to skills development in the company is also observed in the way in which companies having a different form of ownership work on skills improvement. In percentage terms, a large number of foreign companies do not perform any of the mentioned activities to improve employee skills. The jobs of the future will require people to think, communicate, organize and perform non-routine tasks. Employees will have to adjust to new ideas, methods, and techniques, and be open to continuous learning and adoption of new knowledge. Employers will request these skills at all levels and for all types of tasks, but to a varying degree. For this reason, the existence of activities influencing employee skills improvement is of crucial importance [31, pp. 28-32] (Figure 5).

Figure 4: Ratings of companies concerning the possession of sufficient number of employees with the skills needed for the process of digital transformation according to ownership
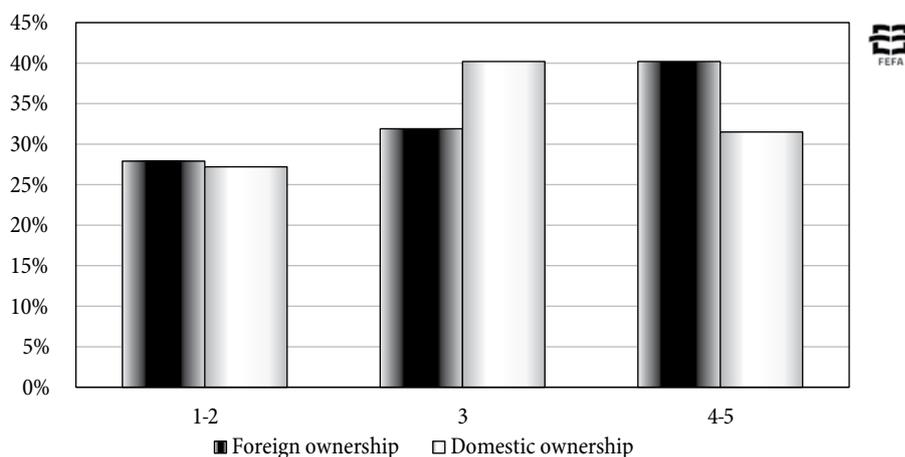

Source: Survey data.

In comparison with foreign ones, a larger number of domestic companies face skills shortages in the field of big data analytics in percentage terms. Intelligent and efficient analysis of these data is of crucial significance for managing the process of digital transformation in the situation when managers and leaders in a company cannot rely on their intuition and experience anymore [17, p. 63]. Therefore, the development of skills in this field is especially important for domestic companies. The situation concerning the development of cloud computing skills is the same. It is necessary to work on the development of these skills because they are considered to be the basic competencies needed for a successful implementation of the process of digital transformation. In the survey conducted by Deloitte, it has been emphasized that over 30% of respondents think that the technology in the field of big data analytics is the most important resource in their companies and that over the next five years an increasing focus will be placed on the development of the technology and skills linked to the Internet of things [12].

As for the companies covered by this survey, almost all of them face shortages of skills and competencies in this field. This especially refers to domestically-owned companies operating in foreign markets – 46% of them have pointed out that they face significant skills shortages in this field. This can also be explained by the fact that these skills are simply more necessary because they operate on

a much larger market. About 20% of domestic companies operating on the domestic market, 25% of companies operating on the regional market and 32% of companies having regional representative offices and operating on more than 30 markets face shortages of skills and competencies related to computer programming processes. As for foreign companies, the shortages of these skills are not significant in percentage terms, which can partly be explained by the fact that they develop few projects internally. However, a shortage of programmers is felt not only in Serbia. For example, the European Commission forecasts that until 2020 Europe will have a shortage of 500,000 individuals having this expertise [15, p. 4]. The problem with the shortages of skills and competencies in the field of artificial intelligence is very pronounced and exists in companies regardless of their size or form of ownership. This problem will also be pronounced in the times to come since artificial intelligence will increasingly gain importance. It is also interesting to note that all surveyed companies hold that they have enough skills and competencies in the fields of digital marketing and digital security for the process of digital transformation.

Although this survey has primarily dealt with the significance of different technological skills and knowledge needed for the process of digital transformation, parallel development of the so-called soft skills is equally important. From a global perspective, 18% of managers

Figure 5: The way in which companies with different ownership patterns work on skills improvement
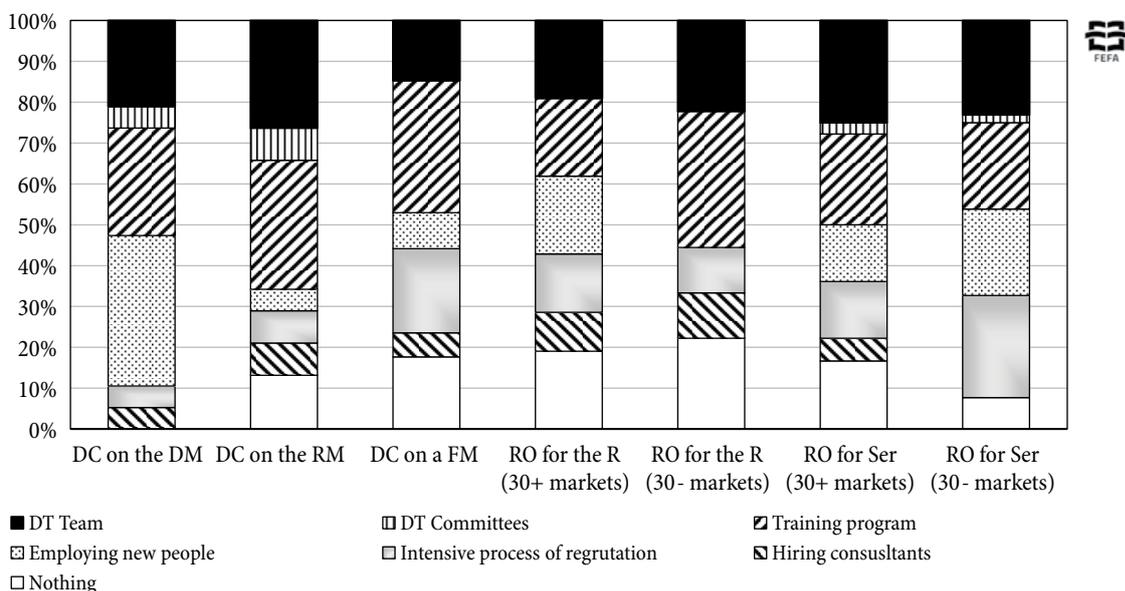
Source: Survey results.

think that technological skills are crucial for overcoming digital disruption and that forward thinking, creative thinking, the vision of transformation and change-oriented digital attitude, coupled with the standard possession of leadership and organizational skills, are equally important for achieving success in the digital age [12, p. 7]. Also, in their paper on the employee skills needed for the process of digital disruption, Jose Sousa and Rocha [10, p. 258] have also concluded that in order to overcome this process successfully, it is very important to possess three categories of skills: innovation skills, leadership skills, and management skills. In Serbia, respondents' answers comply with those abovementioned, given the fact that they gave business change management skills the rating of 4.5, while the significance of entrepreneurial skills in the company has been rated 3.9. At the same time, we can see that companies also need to improve these skills: respondents gave the business change management skills in their companies a rating of 3.75, while their entrepreneurial skills have been rated even lower – 3.4.

Conclusion

The conclusions of this paper are mostly based on the results of the survey conducted among 218 respondents from companies operating in various economic sectors in Serbia, with a third of them being C-level managers. Even though Serbian companies are investing in ICT far below the global average, the survey shows that the significance of digital transformation is recognized across all industries and employee levels.

Above all else, it is important to note that digital transformation is an ongoing process in which companies operating in different economic sectors participate. For this process to be successful over the long term it is necessary to have a clearly defined strategy implemented by visionary leaders who are ready to have a corresponding organizational culture.

On the Serbian market, digital transformation is mostly viewed as an opportunity that transforms companies to a large extent and is implemented by leaders who do not necessarily have a technical background and who have a vision of how the organization should look like. Most

of the companies do not have a digital strategy, but have incorporated the element of digital transformation in their main strategy. In most cases, the process of digital transformation is the responsibility of the company CEO, but still, most companies do not have a designated team responsible only for this process. Nevertheless, half of the companies are creating their digital products and/or services.

The survey also shows that domestically-owned companies develop digital aspects of their products in the company in Serbia, in contrast to foreign-owned ones which usually do that outside, in the headquarters, other offices of the company abroad or through subcontracting. This internal product development is important for achieving long-term productivity, that is, competitiveness. This way the company can develop the skills and knowledge needed for this process and build the knowledge-based part of the economy. This is further visible in the perception of skills needed for the company to further advance in the process of digital transformation, with domestically-owned companies requiring higher skill sets in various segments.

Having this in mind, we can confirm that the skills available among the working population are crucial not only for further development of the ICT sector, but also for building a strong digital economy. Based on this research, we see that non-tech companies require skilled employees to continue to develop in-house digital projects, which will help them in building and keeping a competitive position. This is an additional argument for the state to support the development of digital and entrepreneurial skills in the country at various levels, because it will help strengthen domestic companies across various sectors.

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USING BIG DATA ANALYTICS TO IMPROVE EFFICIENCY OF TAX COLLECTION IN THE TAX ADMINISTRATION OF THE REPUBLIC OF SERBIA**

Upotreba analize masovnih podataka za unapređenje efikasnosti naplate poreza u Poreskoj upravi Republike Srbije***

Abstract

Tax evasion poses a major problem for the overall business environment in every economy - it endangers competition, reduces resources for budget-funded public goods and services, and public policies enforcement as well. Moreover, fundamental human rights are denied in an informal labour market. The reform of the Tax Administration of the Republic of Serbia, which has been implemented since 2015, has already contributed to the increase in efficiency of tax collection over the past years; however, there is still significant room for improvement of tax collection, especially individual income taxes, social security contributions, and value added tax. One of the pillars of the Tax Administration Reform refers to the improvement of the analytic function regarding risk management aiming to make the tax control function more efficient, and raise the awareness of voluntary tax declaration. The paper presents the first results of a joint scientific-research project between the Tax Administration and the Faculty of Sciences of the University of Novi Sad, aiming to develop the algorithms for detecting the risk of tax evasion by using advanced methods in big data analytics and the development of artificial intelligence with the help of machine learning. The presented indicator is based on the weighted norm distance between income distribution in a legal entity and the average income distribution in the business sector which it operates in. The results show the sound performance of the developed indicator. In addition to improving the efficiency of field control, the approach is also going to enable an affirmative approach to those taxpayers who are classified in a low-risk category in terms of tax evasion. Furthermore, additional positive effects are expected based on higher self-reporting of risky categories due to higher probability of being a subject of a field control and detecting tax evasion.

Keywords: *big data, tax evasion, risk management in tax collection, machine learning.*

Sažetak

Poreska evazija predstavlja krupan problem za sveukupno poslovno okruženje u svakoj privredi – ugrožava konkurenciju, smanjuje izvore za budžetski finansirana javna dobra i usluge i za sprovođenje javnih politika, a na neformlanom tržištu rada uskraćuje ljudima elementarna prava. Reforma Poreske uprave Republike Srbije koja se sprovodi od 2015. godine već je doprinela povećanju efikasnosti i naplati poreza u prethodnim godinama, ali i dalje postoji značajan prostor za unapređenje naplate, naročito poreza i doprinosa koji se plaćaju na dohodak fizičkih lica i poreza na dodatu vrednost. Jedan od stubova reforme Poreske uprave odnosi se na unapređenje analitičke funkcije za potrebe upravljanja rizicima kako bi se efikasnije koristili kapaciteti kontrole, ali i jačala svest o dobrovoljnom prijavljivanju poreza. U ovom radu predstavljeni su prvi rezultati zajedničkog naučno-istraživačkog projekta Poreske uprave i Prirodno-matematičkog fakulteta Univerziteta u Novom Sadu čiji je

cilj razvoj algoritama za detekciju rizika od poreske evazije upotrebom naprednih metoda analize masovnih podataka (big data) i razvoj veštačke inteligencije uz pomoć mašinskog učenja. Predstavljeni pokazatelj zasniva se na merenju ponderisane distance raspodele zarada u pojedinačnom privrednom subjektu od prosečne raspodele zarada u oblasti delatnosti u kojoj posluje. Rezultati ukazuju na dobre performanse razvijenog indikatora. Pored efekta na unapređenje efikasnosti terenske kontrole, ovaj pristup omogućiće i afirmativni pristup prema onim poreskim obveznicima koji spadaju u ocenjenu niskorizičnu kategoriju po pitanju poreske evazije. Takođe, očekuju se i dodatni pozitivni efekti po osnovu samoprijavljivanja rizičnih kategorija zbog veće verovatnoće da će biti predmet terenske kontrole i otkrivanja poreskog prekršaja.

Ključne reči: *masovni podaci, poreska evazija, upravljanje rizicima u naplati poreza, mašinsko učenje.*

Introduction

Tax evasion is one of the major obstacles to increasing the competitiveness of an economy. It directly and negatively affects the conditions for business activities in the market for the companies that legally declare and pay taxes, making their production costs, and, consequently, the price of their products and services higher compared to the prices of competitors who do not pay taxes and contributions. Moreover, tax evasion, due to relatively low budget revenues, directly erodes the space for improving the level and quality of public goods and services and citizens' satisfaction. From the perspective of individuals working in the informal sector, it generates the conditions of insecurity and denial of fundamental human rights, that is, the features of a modern society (health, retirement, disability insurance, etc.).

Tax evasion is directly related to the level of grey economy in a country. Empirically proved, grey economy is higher in the countries with a lower level of income per capita [1]. Additionally, the level of tax evasion is higher in the tax systems where the structure of taxation implies more the taxation of production factors than the taxation of consumption. The reason for this is that tax evasion regarding production factors, especially income, is much simpler.

Although grey economy has been significantly reduced in the period between two consecutive assessments, its level in Serbia remains relatively high causing very high losses in terms of unpaid budget revenues. Namely, according to the empirical assessment of grey economy in Serbia, especially product turnover and salary payments of registered legal entities, there was a decrease in its level from 21.2% in 2012 to 15.4% of GDP in 2017 when two consecutive assessments were conducted [2]. The same study estimated, based on a survey on the perception of registered legal entities, that there was still a high share of unregistered legal entities that only operate in the black market (17.2%).

According to the standard model of tax evasion Allingham-Sandmo [3], [4] and empirical researches [4], [5], the degree of tax collection depends on the level of tax rates, the level of penalties and most of all, on the probability of detecting tax evasion.

Within the framework of the Tax Administration Reform which is being implemented in the period 2015-2020 based on the Programme for Transformation of Tax Administration, adopted in 2015, the main objectives are to increase the efficiency of tax collection, improve the service quality, reduce the costs of fulfilling tax obligations and improve institutional capacities through a better organization, information system and adequate human resources [6].

Over the past three years, the performance of the Tax Administration has been significantly improved through a number of measures, and the most important among them are: the introduction of electronic reporting of all tax obligations, strengthening the advisory role of employees, raising the awareness of voluntary compliance with the regulations and reporting taxes, identifying secondary activities and then focusing on the core business, reducing the number of branches which deal with the core activities (from 78 to 37), strengthening the advisory role of inspectors, and improving data quality through the development of registers and data exchange with other institutions.

One of the most important ways of improving Tax Administration efficiency is based on strengthening the analytical function through the work of the Strategic Risk Department in order to improve risk detection and optimize the performance of tax control tasks by concentrating on the riskiest categories of taxpayers.

Big data are considered to be a new type of resource, i.e., assets in business operation and the largest source for

productivity growth in the upcoming period, as stated in a reference report by the McKinsey Global Institute in 2011 [7]. Theoretical and empirical papers on income distribution are available in the literature. Since then big data has been used to improve business processes and increase efficiency and productivity, mostly in the private sector, primarily telecommunication data and the data from the Internet and social networks. The aforementioned McKinsey Institute report estimates that along with the financial sector, the largest area for increasing productivity by using big data – is in the public sector, that is, state administration.

Since 2018, the most advanced big data analytics has being introduced and used in the risk management system in the Tax Administration, which includes the development of algorithms based on the so-called machine learning, enabling the introduction of artificial intelligence as well. The advanced stage of the research will include deep learning methods according to which an analysis of the behaviour of legal entities by using big data is going to be conducted. In order to provide sustainable work on the introduction of these methods in the activities of the Tax Administration as well as reliance on appropriate expertise, in 2018 the Tax Administration signed a Business Cooperation Agreement on Scientific Research with the Faculty of Sciences – University of Novi Sad (Department of Mathematics and Informatics) under the project "Detecting the risk of evasion of paying individual income taxes based on the appropriate methods by using artificial intelligence". The aim of the project is to develop a series of risk indicators for tax evasion by using the methods for analysing big data on depersonalized data and applying them to the data in the Tax Administration for better direction of the activities and more efficient tax collection.

The aim of the paper is to present the results of the half-year research, conducted in cooperation between the researchers from the Department of Mathematics and Informatics at the Faculty of Sciences in Novi Sad and the Tax Administration of the Republic of Serbia. The research aims to improve the methodology of risk management, which will be used for the assessment and support to risk management of tax evasion in the Tax Administration, continuing to be developed in the following period.

In the second part, the database is presented based on which risk indicators are developed by using mathematical models. It is a tax return base for all types of income earned by citizens. The third part presents a methodological approach to developing risk indicators and an example of risk indicators for tax evasion based on an appropriate metrics that compares the characteristics of distribution of the amount of net income within a single legal entity with the income distribution for all employees in the line of business which the legal entity operates in. Finally, the results are discussed and, in the concluding remarks, there is a brief description of a future research based on the methods of machine learning that will be applied to big data aiming to improve the methods for detection and assessment of the risk levels of tax evasion among single legal entities.

Description of the database

The development of the algorithms for risk indicators and their testing is conducted by using depersonalized individual data (excluding personal data of income recipients and income payers) based on the tax returns from the unified tax collection database. To develop and test these risk indicators, the data from the tax returns for the period from April 2014 to May 2018 were previously prepared in an appropriate way in accordance with the regulations and principles on personal data protection. The so-called data anonymization was performed. Personal identification numbers of individuals and tax identification numbers of legal entities, after having added basic data to each legal entity from the register of tax identification numbers (business activity code, municipality, year of establishment and a form of organization), were encrypted by the authorized persons in the Tax Administration. Personal data from different sources were not combined by using these personal identifiers. All researchers who participated in the research were employed at the University and signed appropriate data confidentiality agreements with the Tax Administration and committed to the exclusive use of the data for scientific purposes in accordance with the agreed project goals.

In the entire database used for the research, there were 6,141,812 income recipients, 234,310 income payers

(unique tax identification numbers, hereinafter: TINs) and 201,635,126 different combinations of income recipients, income payers, tax returns and types of income.

During the whole analysed period, for 36,011 income payers there was a submitted at least one tax return by tax control based on field control findings of tax breach. It refers to approximately 15% of all income payers (unique TINs) that reported their tax obligations in the analysed four-year period.

Only in one whole year, for example in 2017, tax control submitted tax returns for 16,440 employers based on the field control reports out of 157,163 different TINs that reported their income tax obligations.

Table 1 represents the breakdown of income payers (TINs) by type, on the example of March 2017: about 50% are legal entities not financed from the budget, similar to the number of entrepreneurs; 5,174 are legal entities financed from the budget, and only 427 are foreign representatives. In the total number of tax returns the prevailing ones are those related to salary, followed by other incomes (performance based contract and temporary jobs), then sick leaves compensation and capital income (interests and dividends).

When we look at the structure of the total reported net income for which tax obligations were paid in one month (March 2017) according to the type of income, the size of a legal entity measured by the number of employees (Figure 1), the largest volume of income was realized based on salaries and mainly from large legal entities with over 250 employees. There is also a disproportionately higher ratio of capital income (interests and dividends) in relation to salary payments in small legal entities compared to larger ones (this is probably a tax arbitrage because of a lower burden of profit due to

salary income). A lot of legal entities with few employees (0 or 1-10) can be noted as well.

Figure 1: The total net personal income after tax, by income categories and the size of the income payer measured by the number of employees, in March 2017, in dinars
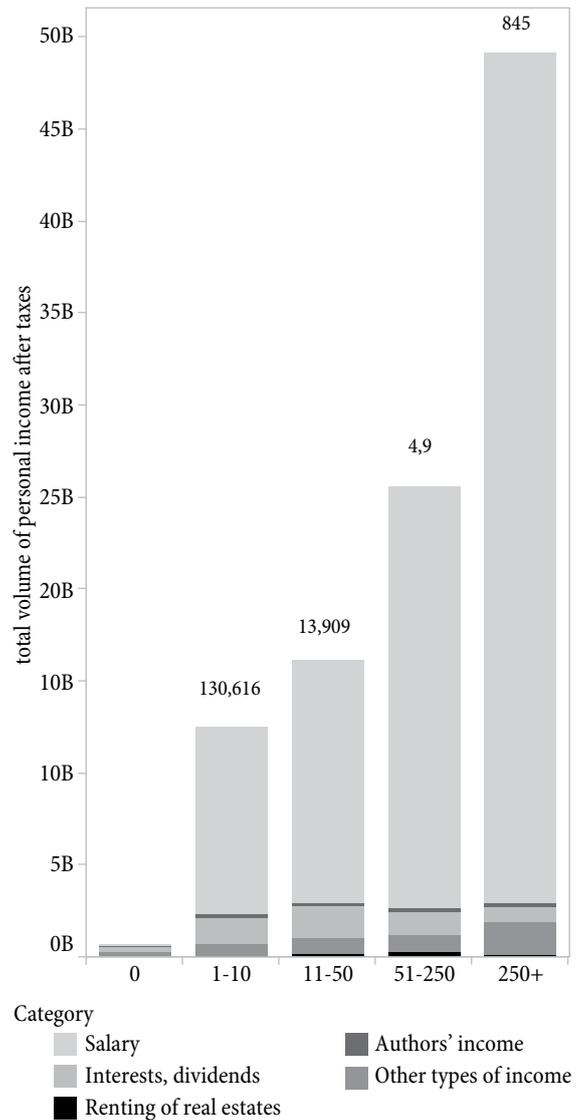
Source: Authors` calculation; Tax administration
Note: above each bar there is a number of TINs of a matching size category measured by the number of employees.

Table 1: Structure of tax returns according to the type of income and the type of income payer in March 2017

Type of income payers	Number of income payers (TINs)	Number of tax declarations by type of personal income						
		Salary	Sick leaves compensa-tions	Authors' income	Interests and dividends	Renting of real estate	Other types of income	In total
Legal entities not financed from the budget	76,625	1,608,166	67,492	13,488	75,532	11,989	125,946	1,902,613
Legal entities financed from the budget	5,174	959,926	28,688	12,972	614	1,791	119,334	1,123,325
Foreign representation offices	427	3,829	133	419	262	29	371	5,043
Entrepreneurs	74,933	200,504	17,211	329	14,304	1,875	7,817	242,040
Other	4	58,062	1,251	84	3	0	363	59,763
In total	157,163	2,830,487	114,775	27,292	90,715	15,684	253,831	3,332,784

Methodological approach

The aim of the research on improving the efficiency of tax collection is the development of a number of risk indicators that can be applied to each income payer or income recipient or a particular group of income payers or income recipients. Each risk indicator is based on a specific algorithm that is developed and tested on the data described in section 2. Once developed and tested, the indicators are applied in the Tax Administration on personalized data and used in the business activities of the relevant Tax Administration services. Tax compliance risk includes the risk of non-declaration of income, the risk of not reporting the full amount of income and the risk of error in reporting tax obligations.

Generally speaking, risk detection algorithms are based on establishing a significant deviation of the "behaviour" of a taxpayer from the expected/average behaviour based on theoretical and/or empirically determined patterns. Therefore, the algorithms applied on depersonalized big data owned by the Tax Administration identify the "risk" deviations of the features of a taxpayer from the expected values. During the analytical procedure of identifying the risk indicators, time and longitudinal components are taken into account, i.e., the expected values of certain features of taxpayers over certain period of time are analysed, as well as the distribution of the value of the corresponding features related to taxpayers (income recipients or payers) at a specific time.

Once established, the algorithms for measuring the risk indicators on the personalized data owned by the Tax Administration from the unified tax database, the values of one or a combination of several risk indicators, are used to prepare the plan for control activity – both for deep analysis of the behaviour of specific "risky" taxpayers and field control. This contributes to the efficiency of tax inspectors' performance that regrettably have limited capacity.

The first type of indicators developed and presented in the paper uses the data on monthly net individual income and is based on the assumption that they follow certain patterns and therefore, that the deviations from the patterns can indicate the risks of tax evasion.

Theoretical and empirical papers on income distribution are available in the literature. An overview of the prevailing theories can be found in Bjerke [8], and other various models have also been analysed in Neal and Rosen [9]. On of the theories of wealth and income distribution among individuals is given in Stiglitz [10]. This theory is based on the idea of identifying the economic factors that lead to income and wealth equalization and the economic factors that lead to the dispersion of income and wealth. Alternative distribution factors are considered, such as consumption function, heterogeneity of working skills, inheritance policy and differences in natural growth depending on income category.

Statistically, income distribution is characterized by skewness and a long right tail, the arithmetic mean of income is higher than median income, and salaries in several right percentiles take a disproportionately large part of total income. Different theories explain these empirical facts. It is clear that income dispersion is the main motivation for investing in personal education and training. A generally accepted theoretical stochastic model involving empirically observed characteristics is that it is a stochastic process of Brown type, that is, the income distribution has the prevailing features of a lognormal distribution.

The distribution of the total monthly net income during one month for the entire Serbian economy indicates some anomalies, as depicted in Figure 2. Regarding the amount of net income ranging from the minimum income up to approximately 25,000 dinars, there is large "density" of employees (i.e., a large share of this category of employees in the total number), whereas in the range of 35-90,000 dinars there is a plunge in the distribution, i.e., rather low frequency of this income category compared to the expected frequency that we would have had if the income had been distributed according to the theoretical (lognormal) distribution that is empirically noticed and frequently seen in literature (more details in section 3). This observation indicates a large number of employees who "receive a minimum salary" or a little higher amount, while their actual salary should have been in this second income category with insufficiently recorded frequency (the difference is probably paid in cash, not into a bank account). This deviation, obtained as the difference between the empirical distribution of total net income

Figure 2: Individual net income (from all income payers) below 175,000 dinars, in March 2017
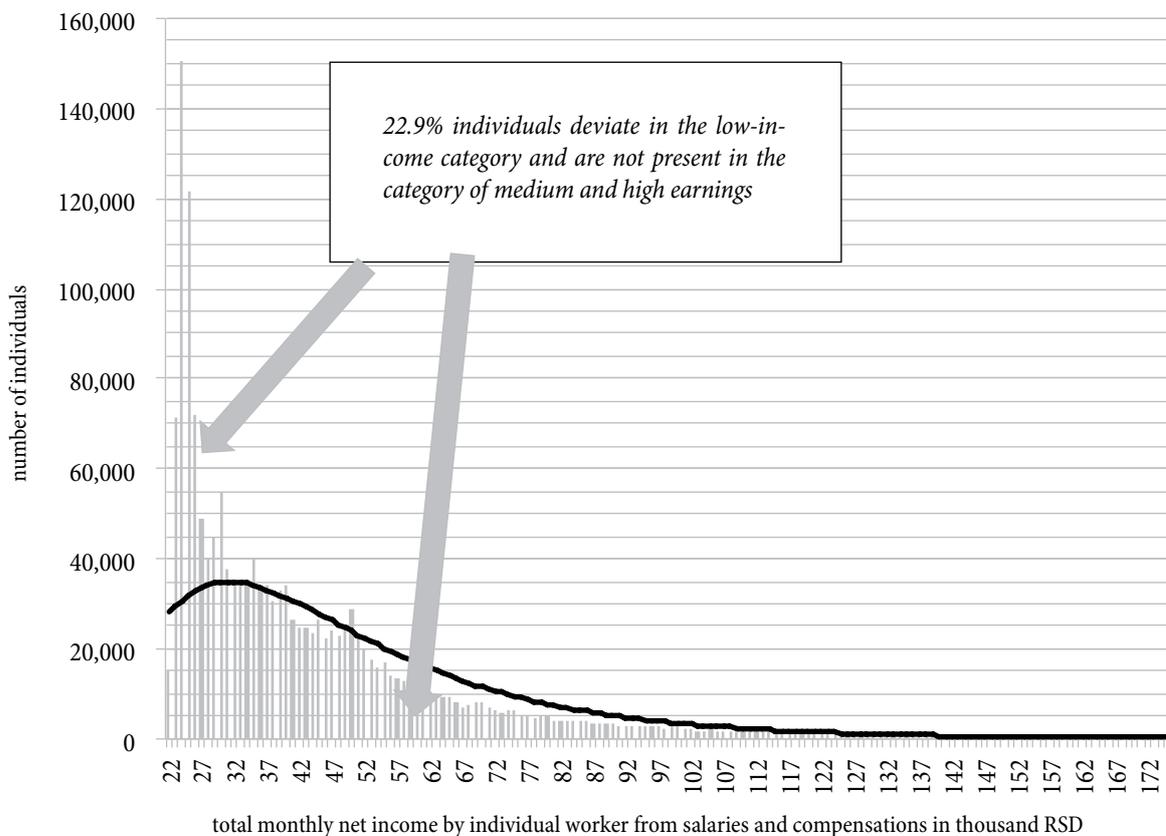
per employee and the lognormal distribution based on the parameters calculated on the basis of empirical data for the entire population, formally registered as being employed in that month, amounts to 22.9% of the total number of registered employees, that is, approximately 390 thousand employees (income recipients) in March 2017.

Results: development of risk indicators based on the deviation of the distribution in the reported income from the average income distribution in a relevant business sector

The risk indicator presented here is based on the typical income distribution in economy in the specific area of business activity where the legal entity belongs to, and in the legal entity itself.

If we look at the income distribution (as in Figure 2) for individual legal entities, whose size measured by a number of employees exceeds a certain critical size (e.g. 10 employees), certain "diversity" of individual income should also be expected. This "diversity", that is, a fact that

there is a certain range of salaries and the structure of all employees neatly divided into different sub-categories within this range, is largely based on the corporate compensation policy and the type of a business activity, i.e., the need to employ certain categories of workers according to the type of work and qualification, which, in turn, reflects on the amount of an individual income and on the appropriate distribution of all salaries in a legal entity. On the other hand, the impact of market forces i.e., the competition in the labour market, leads to a relative equilibrium of wages for specific types of jobs within legal entities operating in a similar line of business.

The differences in the distribution of net income per employee in different sectors of economy and in a few areas of business activities are presented in Table 2, as well as in Figures 3 to 7. The value from p10 column (10th percentile) indicates that 10% of employees in this area of business activity belong to the category of income lower than the values shown in the column. The column with the value of p50 implies that a half of the employees in this area of business activity are employed

Table 2: Overview of the statistics for the net income per employee based on salaries and compensations by sector, for March 2017, in dinars

Sector	Number of employers	Average salary	p10	p50	p90	Standard deviation
Agriculture, Forestry and Fishing	2,658	39,704	23,975	34,294	59,662	55,170
Mining	256	158,195	36,434	70,099	191,999	833,054
Manufacturing Industry	24,844	44,324	23,920	32,447	70,162	92,401
Electricity, Gas, Steam and Air Conditioning Supply	328	125,485	47,327	136,267	181,261	59,693
Water Supply; Wastewater Management, Control of Waste Removal Processes	785	41,052	26,820	36,944	58,655	26,718
Construction	8,833	42,225	19,000	30,175	64,307	225,799
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	49,807	39,588	22,293	26,849	58,196	116,794
Traffic and Storage	8,020	43,182	23,962	35,000	60,659	50,780
Accommodation and Food Services	11,803	28,172	17,342	25,019	39,725	36,177
Information and Communication	4,196	90,524	25,019	53,071	169,124	247,343
Financial and Insurance Activities	1,772	94,029	24,683	63,982	164,130	202,697
Real Estate	1,046	52,951	22,000	31,752	83,222	331,602
Professional, Scientific, Innovation and Technical Activities	16,465	57,729	22,209	33,145	100,383	154,696
Administrative and Support Service	4,458	39,414	13,304	28,645	58,974	91,994
State Administration and Defence; Compulsory	1,243	54,440	30,568	50,905	85,709	25,487
Social Security Education	3,732	43,755	20,883	45,580	63,407	25,393
Health and Social Care	3,941	44,405	25,264	39,157	72,992	34,409
Art; Entertainment and Recreation	2,885	38,623	24,081	31,424	60,000	31,524
Other services	10,007	37,098	18,003	26,121	65,354	36,148

Source: Authors` calculation; Tax Administration.

**Figure 3: Net income distribution in the Construction Sector, March 2017, in dinars**
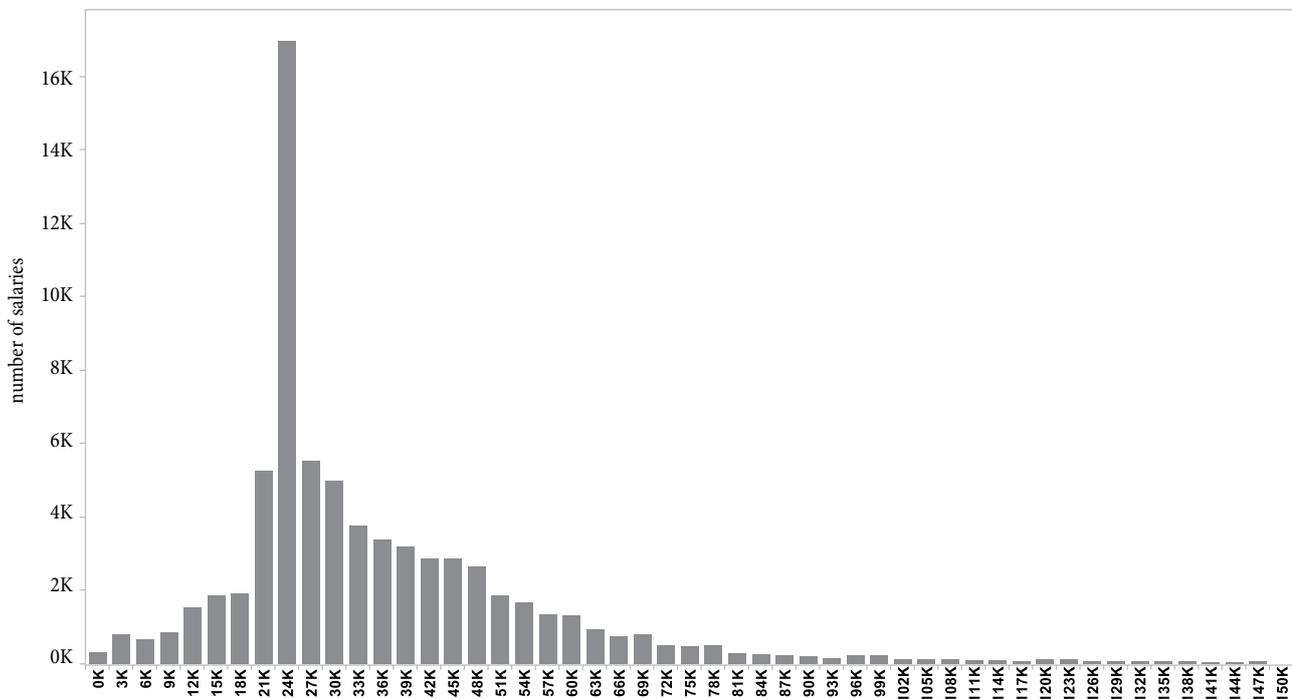
Source: Authors` calculation; Tax Administration.
Note: Only net income from salaries and compensations of salaries below 150,000 dinars are presented on the histogram.

according to the reported net income of lower or equal value related to the corresponding column. The last column – a standard deviation is the way to measure the "dispersion" of distribution. It is calculated as the square root of the sum of the squares of deviations of individual net income from the average net income in the corresponding business activity. Cross-sectoral differences can be clearly noticed.

Figure 4: Net income distribution in the Accommodation and Food Services Sector, March 2017, in dinars
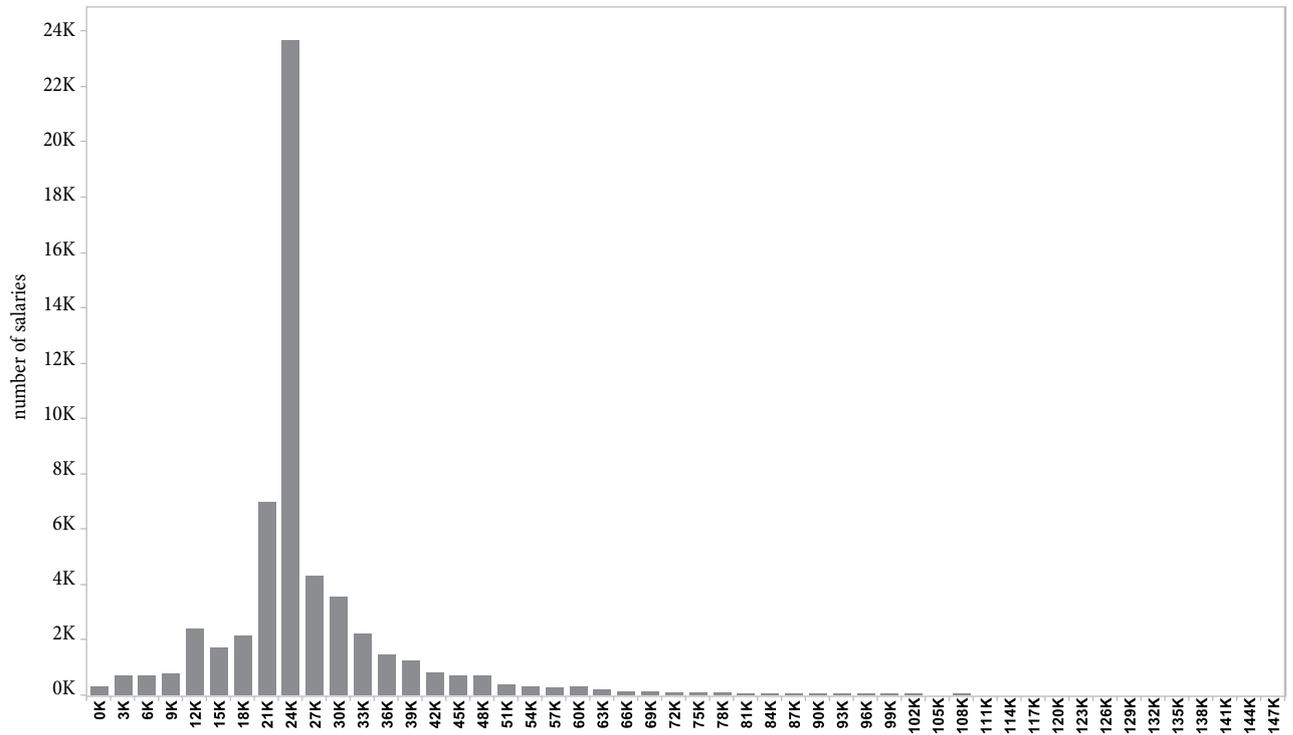
Source: Authors` calculation; Tax Administration.
Note: Only net income from salaries and compensations of salaries below 150,000 dinars are presented on the histogram.

Figure 5: Net income distribution in the Financial and Insurance Sector, March 2017, in dinars
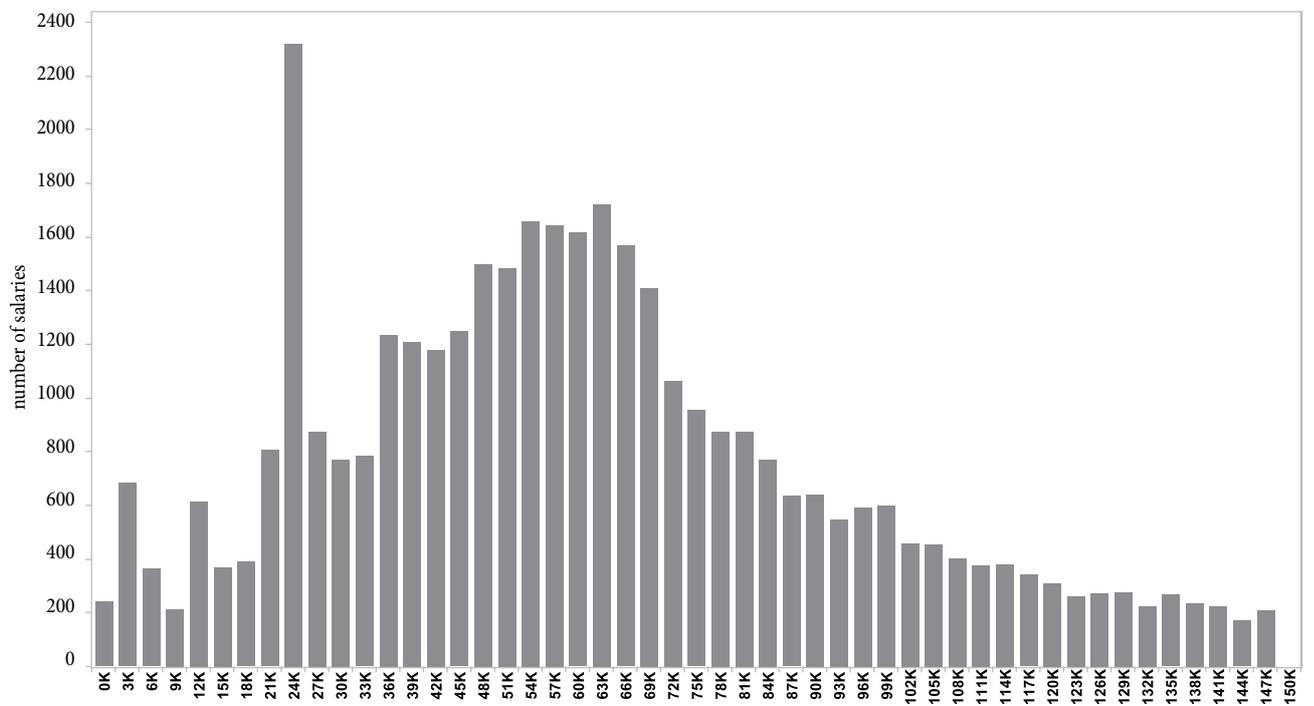
Source: Authors` calculation; Tax Administration.
Note: Only net income from salaries and compensations of salaries below 150,000 dinars are presented on the histogram.

Figure 6: Net income distribution in Beverage and Food Production, March 2017, in dinars
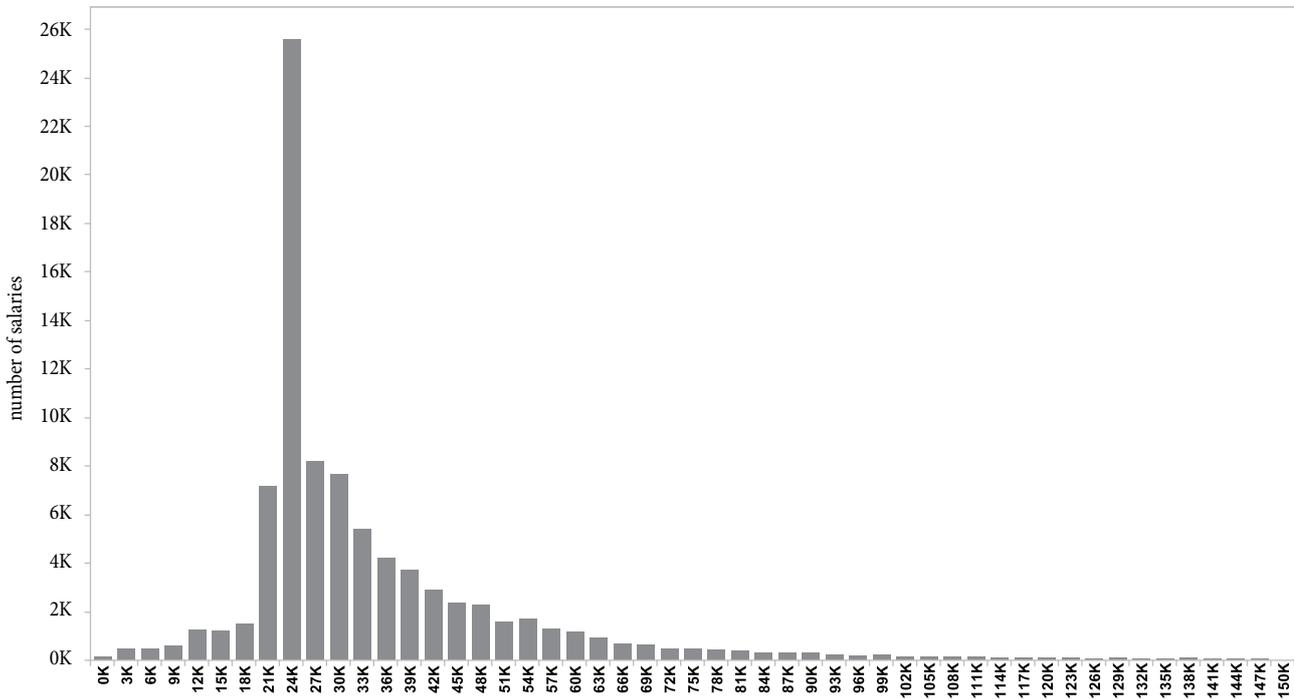
Source: Authors` calculation; Tax Administration.
Note: Only net income from salaries and compensations of salaries below 150,000 dinars are presented on the histogram.

Figure 7: Net income distribution in Computer Programming, March 2017
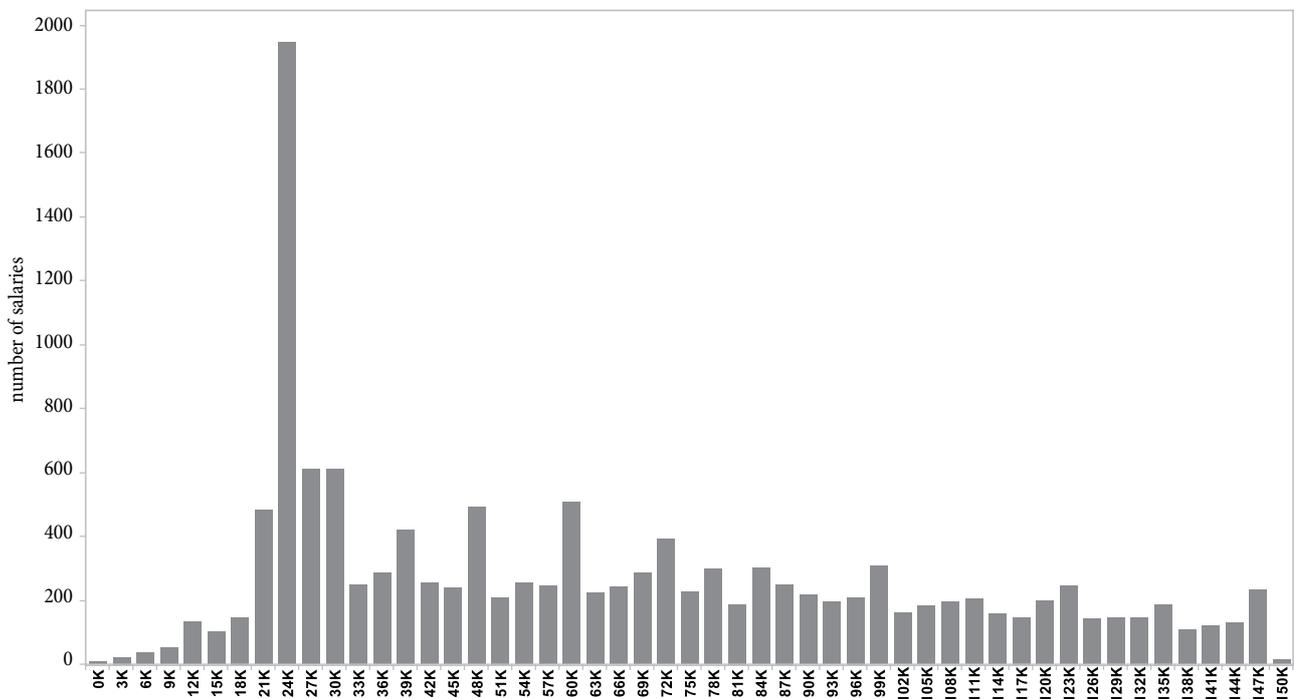
Source: Authors` calculation; Tax Administration.
Note: Only net income from salaries and compensations of salaries below 150,000 dinars are presented on the histogram.

The initial assumption in the presented analysis is that the income distribution in legal entities corresponds, to a lesser or greater extent, to the income distribution in the relevant economic sector and in the specific area of business activity. The assumption is based on the aforementioned facts – most importantly, the overall

economic environment, the seasonality typical of the sector and the operating of the labour market that leads to approximately equal salaries in the sector.

In accordance with these statements, two risk indicators for tax evasion have been developed, ρ_1 and ρ_2. The indicator ρ1 shows the deviation of a company's income distribution from the distribution of the whole business industry for a month, whereas the indicator ρ_2 has a time dimension and monitors the deviation of the income distribution for the analysed legal entity from the income distribution in its business industry over a certain period of time.

The indicator ρ1 is calculated in the following way. The net income range, with a minimum salary of net amount amounting 15,000 dinars, is divided into intervals (bins) with an increase of 10% so that the first interval includes the net income of 15,000 to 16,500 dinars, the next bin includes salaries from 16,500 to 18,150 dinars etc. The last of 27 bins includes net income exceeding 196,650 dinars. We are going to mark these intervals as (E_i, E_{i+1}). For any chosen month, a vector with 27 components is calculated (corresponding to a histogram) for the entire business activity in the following way. All companies with 10 or more employees were selected. The number of the elements for every bin was calculated by simple counting, D_1, ..., D_{27}. Then the vector $d = (d_1,...,d_{27})$ was formed with the components

$$d_i = \frac{D_i}{\sum_{i=1}^{27} D_i}$$

The defined components of the vector d have the value in the interval [0,1]. Their sum is 1 and they represent the approximation of the corresponding probabilities (the probability of income being in the i-th bin).

Then, for a company with 10 or more employees, a vector corresponding to the net income distribution in that company is formed in the same way. If we mark the number of salaries (or compensations) in i-th bin with P_i and define

$$p_i = \frac{P_i}{\sum_{i=1}^{27} P_i}$$

we get a vector p = (p_1,..., p_{27}). The risk measure ρ1 for the selected legal entity is defined as the weighted norm distance between vectors d and p in the following way.

Starting from the assumption that the risk of tax evasion is higher if there is a significantly higher mass in bins with low salary in the income distribution within the selected legal entity, we defined the weight coefficient $\frac{1}{E_i^2}$ which penalizes a large portion of salaries in low earning intervals, the most in the first bin, and the least in the last bin. Therefore, the risk indicator is calculated as

$$\rho_1 = \sum_{i=1}^{27} \frac{|p_i - d_i|}{E_i^2}$$

The risk indicator ρ_1 obtained in this way shows the deviation of the income distribution in the selected legal entity in relation to the whole line of business. The high value of the indicator ρ_1 indicates a high risk of the existence of tax evasion, as it shows that, compared to the whole line of business, the disproportionate part of low salaries is paid out. On the other hand, the existence of the weight coefficient $\frac{1}{E_i^2}$ for $i = 27, 26,...$ – for sufficiently high salaries, reduces the impact of the difference that is caused if we have an excess of higher salaries in the analysed legal entity.

By monitoring the behaviour of ρ_1 over certain period, we can also define the risk indicator ρ_2 that has a time dimension. By assuming that seasonality is a feature of the whole industry, the change of indicator ρ_1 over certain period of time indicates that the change in the income distribution does not result from the oscillations due to natural seasonality or general market trends, but comes as a consequence of the changes in the policy of paying salaries of the analysed legal entity. We mark with $\rho_1(j)$ the risk indicator ρ1 for the selected legal entity in a certain month. Then, we suppose that we have available data for j = 1, ..., m months. Then we can form the coefficients $\rho_1(1),...,\rho_1(m)$ for the legal entity and define

$$\rho_2 = \frac{1}{m} \sum_{j=1}^{m} \rho_1(j)$$

as an average deviation from the expected distribution depending on the line of business. Analogously, we can also consider the variation of the sequence $\rho_1(j)$, as well as the variation coefficient. The high values of these indicators also indicate an increased risk of tax evasion in the payment of salaries.

Descriptive statistics of the risk indicator ρ_1

By using the presented methodology for the calculation of the risk indicator ρ_1 on the specific data for the selected accounting period (March 2017), the obtained values are normalized by converting them into a corresponding percentile of distribution so that they are in the range 1-100. Figures 8-10 show individual net income (for net incomes above 15,000 dinars) distribution within legal entities (TINs) that are classified as low, medium and high risk entities regarding the risk of tax evasion. It can be clearly seen that the share of earnings around the official minimal wage is higher with the increase in the value of the risk indicator ρ_1, and that in less "risky" entities the income distribution is much corresponding to the log normal distribution, which is most often cited in theoretical and empirical literature as a referent one.

Figure 8: Individual net income distribution in March 2017 for the income payers with the risk indicator ranging from 0 to 33 (33% of the "low-risk" ones)
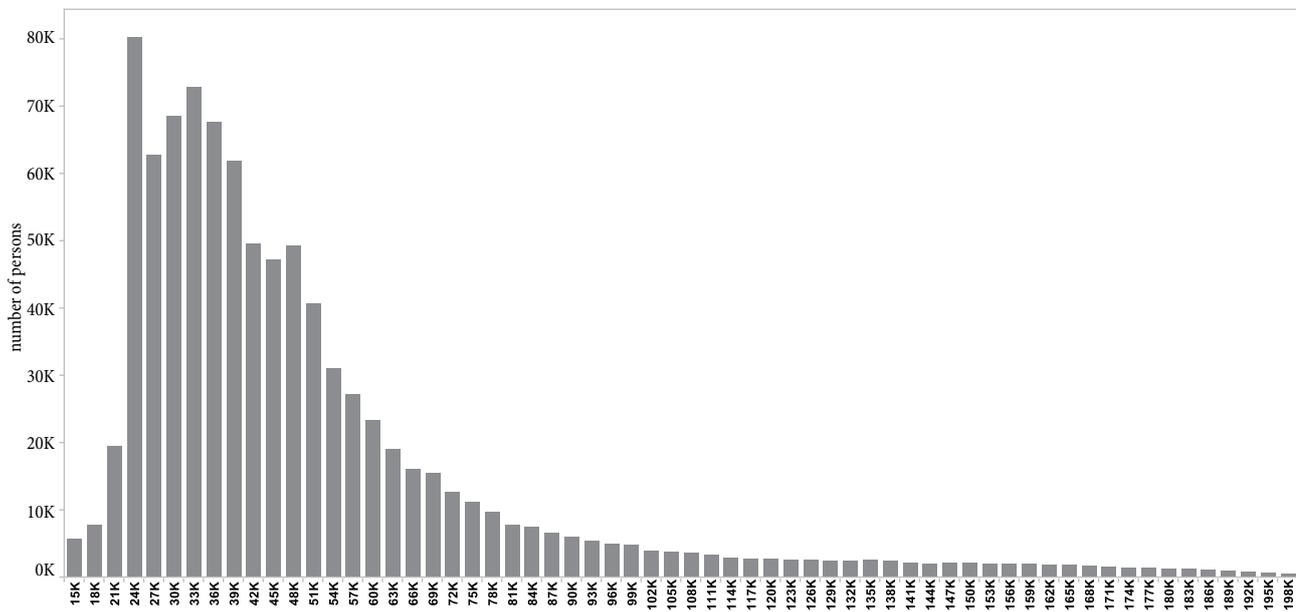

Source: The author.

Figure 9: Net income distribution in March 2017 for the income payers with the risk indicator ranging from 33 to 90 ("medium risk")
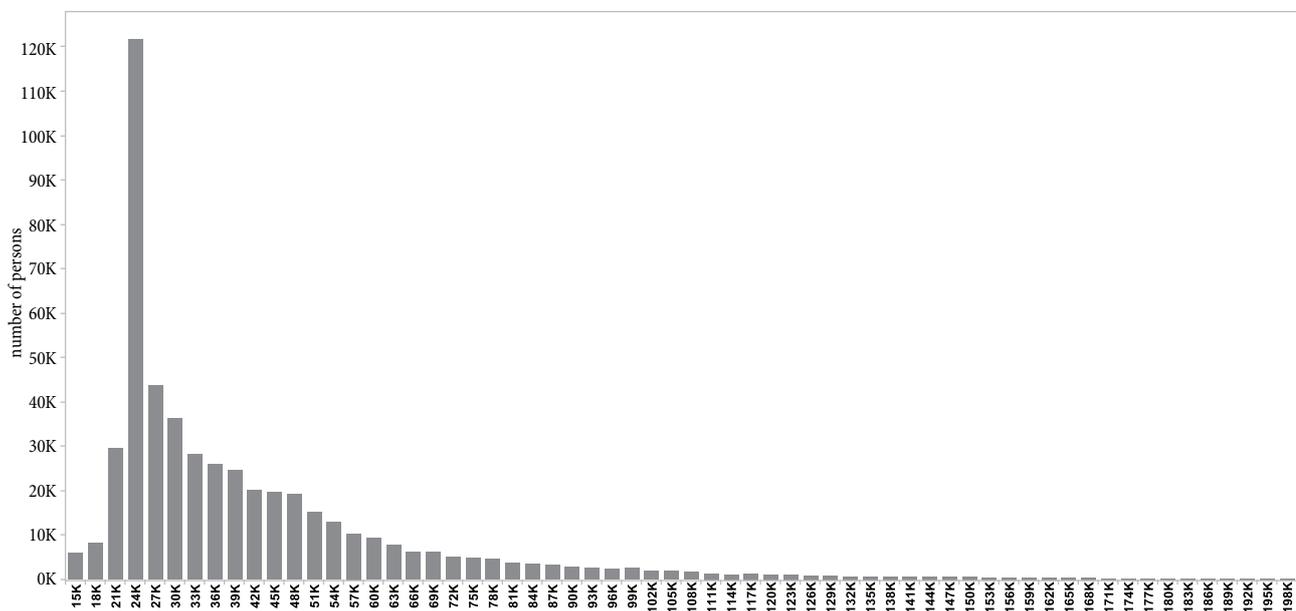

Source: Authors´ calculation

Figure 10: Net income distribution in March 2017 for income payers with the risk indicator higher than 90 (10% of the "high-risk" ones)
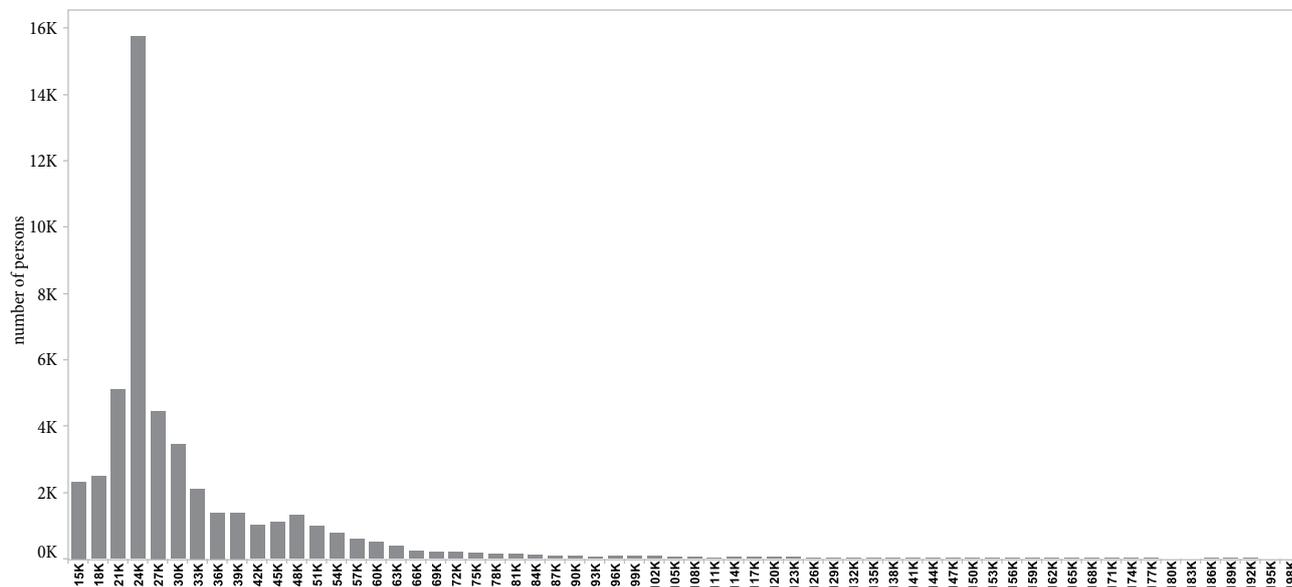
Source: Authors´ calculation.

Figure 11: Net income distribution in March 2017 for the area of business activity "Security protection and investigation activities" and the income payer (TIN) with the value indicator ρ1 =99.83
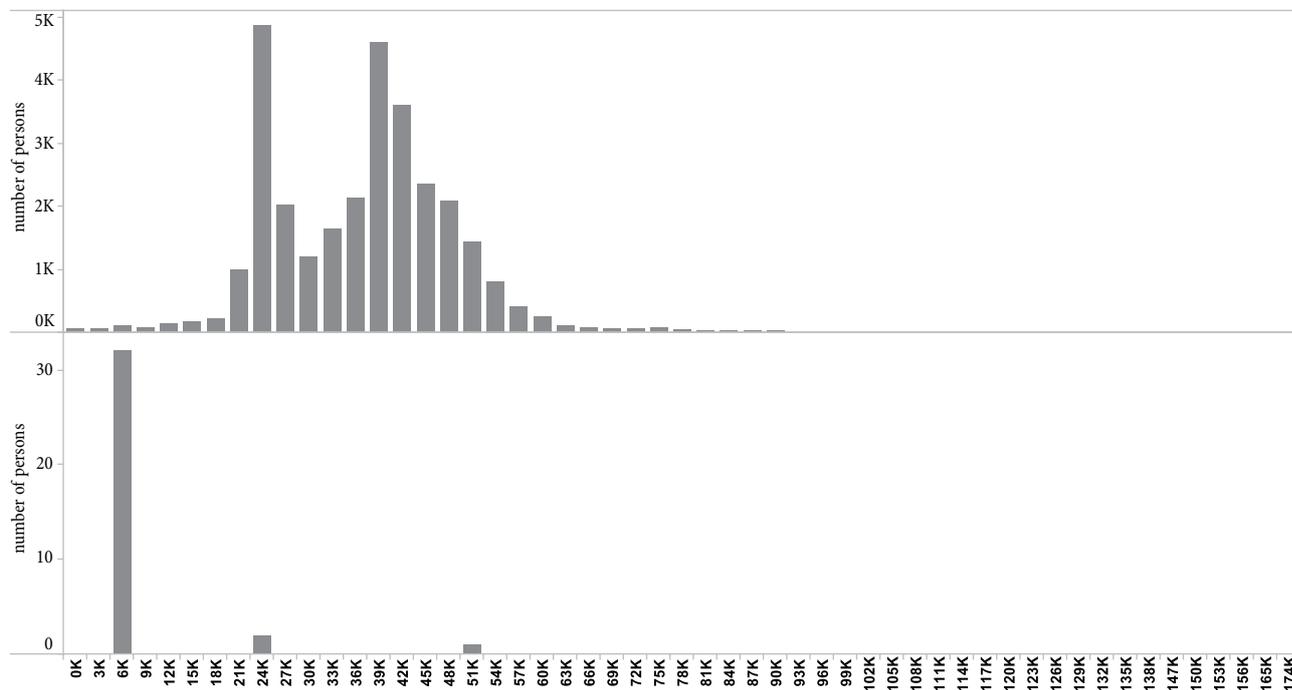

Source: Authors´ calculation.

On the example of legal entities with very high values of risk indicator ρ1 and the line of business they operate in, the risk detection method can be even better illustrated, as shown in Figures 11-14. For example, in a company whose net income distribution is shown in the lower part of Figure 11, out of 35 employees, 32 received net income ranging from 6,000 to 9,000 dinars (probably part-time jobs), while two employees were registred to a minimum salary and one employee to a salary within a range from 51,000 to 54,000 dinars. Judging by all this, due to the lack of disparity in salaries and a wide range of different categories of employees with different levels of earnings

Figure 12: Net income distribution in March 2017 for the area of business activity "Management Activities; Management Consultancy" (totalling 251 different TINs) and the income payer (TIN) with the value of indicator ρ1 =99.88
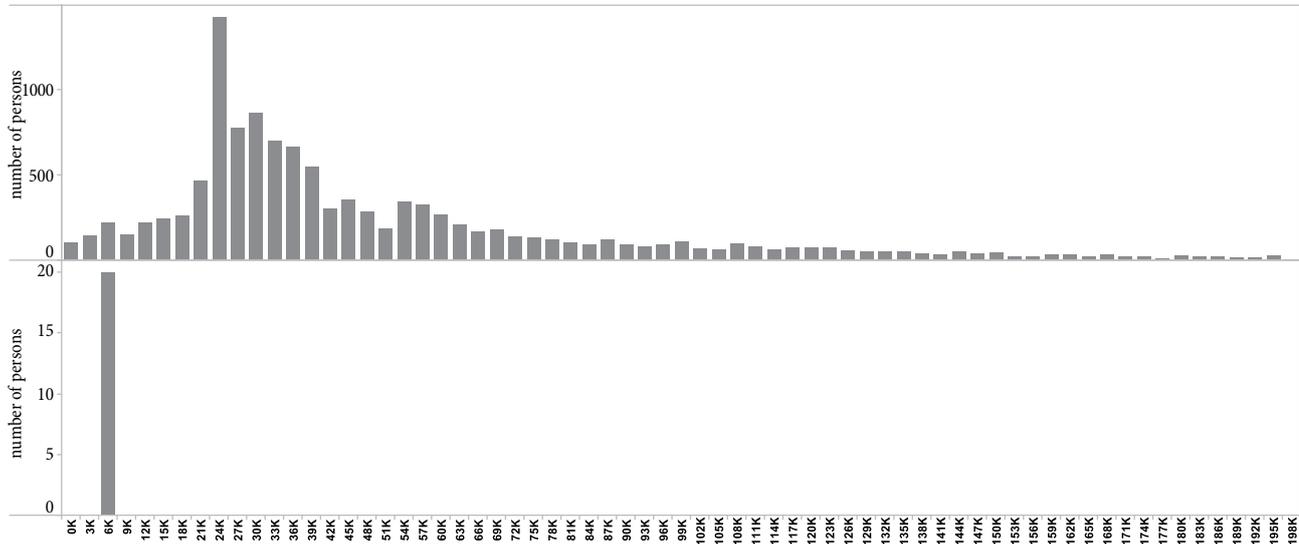
Source: Authors´ calculation.

Figure 13: Net income distribution in March 2017 for the area of business activity "Retail Trade, except for motor vehicles and motorcycles" (totalling 1,720 different TINs) and the income payer (TIN) with the value of indicator ρ1 =99.86
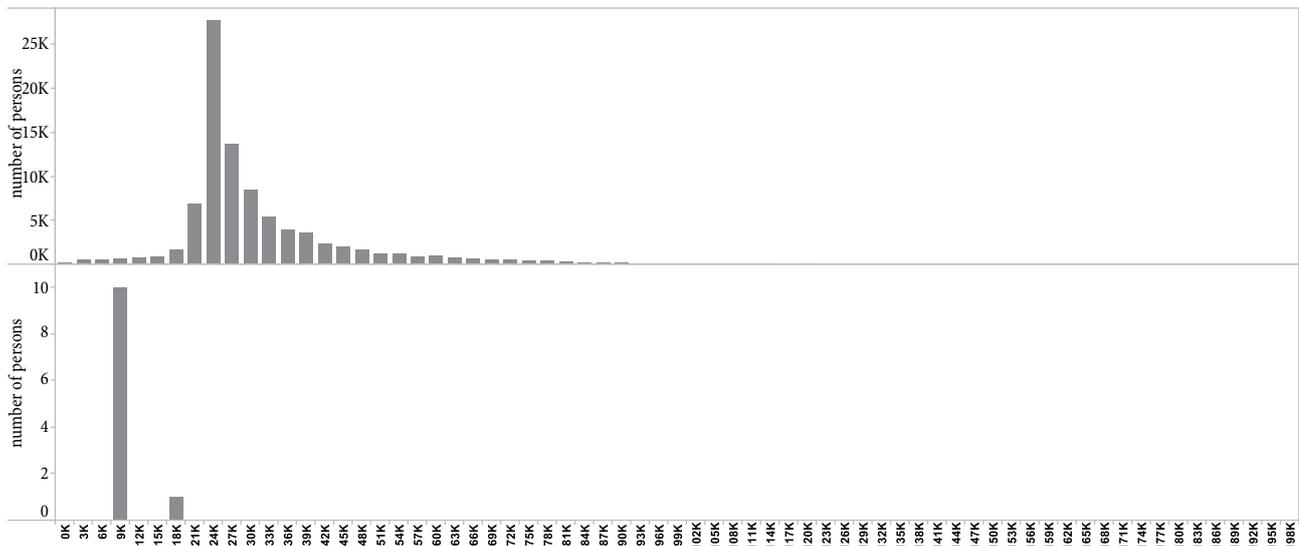

Source: Authors´ calculation.

(as illustrated in the upper part of the Figure referring to the whole line of business), there is a high possibility that some part of the employees' income is paid in cash and not into a bank account. Similarly, within a legal entity in Management activities; Management Consultancy, depicted in Figure 12, with a very high net income dispersion at higher intervals as well, a very high value of risk indicator ρ1 is connected to the fact that all 20 employees in this company were registered on the amount of net earnings ranging from 6,000 to 9,000 dinars

Concluding remarks

Like the presented risk indicator, other risk indicators are going to be developed and used in future. The new ones will be developed according to a similar methodology relying on some other or additional information as risk factors. For example, a deviation in terms of the expected ratio of hiring employees according to different types of contracts (employment contracts, service contracts, author contracts, temporary contracts), a deviation from the

Figure 14: Net income distribution in March 2017 for the area of business activity "Wholesale Trade, except for motor vehicles and motorcycles" (totalling 2,096 different TINs) and the income payer (TIN) with the value of indicator ρ1 =98.79
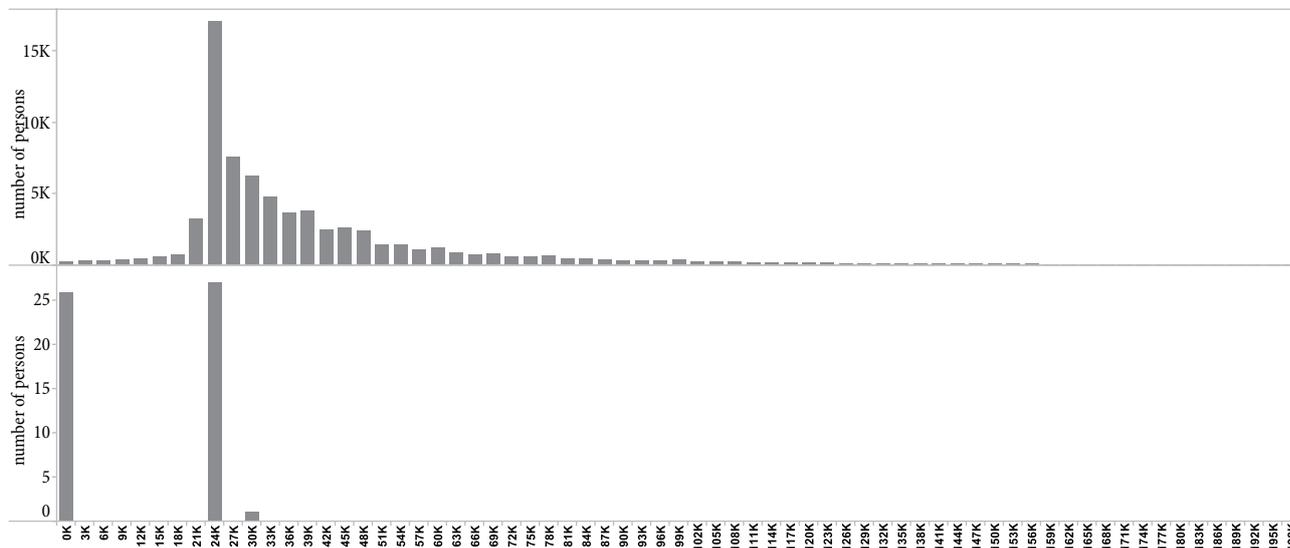
Source: Authors´ calculation.

expected ratio of received income from interest and from salary by individual person, a deviation from the expected seasonality in earnings and the number of employees in a business entity, a deviation from the expected ratio of paid income to different production factors by business entity - labour and capital share in paid income. Different risk indicators may be combined in some cases.

Further development of risk indicators presented in this paper relies on the development of artificial intelligence methods based on the methods of machine learning. The machine learning will be employed to find good predictors for the delays in the payment of obligations, the probability of irregularities based on historical tax control findings, as well as predictors for the amount of individual net income based on certain attributes (age, gender, line of business, headquarters, tenunre, previous salaries and other sources of income) while relying on some of the models in literature (e.g. Mincer equation [11]). The development of these predictors, in particular the one for probabilities of irregularities, is a very difficult challenge due to incomplete information, i.e., tax evasion may have occurred in companies in which there was no field control. In the case of individual income predictor, it might be possible to use the model on the income payers which are, according to the indicator presented in this paper, considered to be less risky, and "test" it

on the rest of taxpayers in order to predict salaries and other income.

Unknown features, as well as that the fact that the data changes over time pose a great problem, as well as the fact that it is necessary to define a model that minimizes the objective function that changes to a certain extent over time, i.e. the objective function is not fixed in time. The first two problems can be considered as the problems of binary classification – with a zero-one result (no delays/there are delays and no violations/there are some violations). Such classification cannot be quite precise, so k-classification will be considered, which can provide better estimates regarding tax evasion. Considering the size of the database, unknown features and incomplete information, this is a very challenging task – both mathematically and economically, and it is necessary to apply customized methods of numerical optimization.

The use of the indicators developed this way will lead to more efficient detection of tax evasion, intended or as a result of reporting mistakes, by better management of tax control activities whose capacities by nature are limited to the control of only certain, small part of taxpayers in a specific period of time.

Apart from direct effects on more effective detection of tax evasion, it is possible that this approach will also produce additional – indirect effects on the increase in tax

collection due to greater self-reporting of tax obligations by taxpayers, aware that "deviations" in their behaviour will be taken into account when prioritizing control activities by the Tax administration.

The paper presents the application of big data analytics on a single database relating to individual income tax returns. An additional space for identifying the risk of tax evasion by using big data analytics is cross-referring to the data in different tax registers. For example, very good risk indicators can be obtained by cross-referring data on value added tax returns with the data on income tax returns of the same legal entity.

Another benefit of the development of risk indicators for individual taxpayers is the possibility to use these indicators to rank all taxpayers according to the level of risk, i.e., the degree of compliance with the regulations and the fulfilment of tax obligations. This ranking enables a positive approach by implicitly "privileging" regular tax payers. The last is not possible if tax administration relying exclusively on the factual verification of the tax compliance by tax control.

Finally, applying big data methods in the analysis in tax administration also provides valuable insights that could be translated into recommendations for tax policy improvements. For example, the evidence can serve to support reducing the space for tax arbitration or improving the regulated procedures related to tax declaration in order to eliminate some frequently perceived risks.

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DIGITALIZATION OF THE TAX ADMINISTRATION IN SERBIA

Digitalizacija poreske administracije u Srbiji

Abstract

Tax administrations (TAs) in the developed countries are entering the final phase of digitalization, where the complete change of tax paradigm is the final goal. That is a level in which a TA uses data submitted by individuals and legal entities to assess taxes, without the need for any further collection of the same. As a response to technological changes in society and business, digitalization permitted TAs to use technologies such as advanced analytics, pre-population, big data analytics, and blockchain. As a result, the TAs significantly increased efficiency, improved the level of services offered to taxpayers, and introduced new services. The tax administration in Serbia has taken the first step in the digitalization process. It concerns the transition from paper to digital data formats, database creation and investment in human capital and IT, which is a prerequisite for converging with the developed countries and a response to the needs of the digital society. Despite the progress made, the Serbian TA is still at the beginning of the process of transformation into a modern, digitally oriented system. Some recommendations for the next steps in Serbia and the security aspect of the TA digitalization process are also considered.

Keywords: *tax administration, digitalization, new technologies.*

Sažetak

Poreske administracije (PA) razvijenih zemalja sveta ulaze u završnu fazu digitalizacije čiji je krajnji cilj potpuna promena poreske paradigme. To je nivo na kome PA već poseduje sve raspoložive podatke o fizičkim i pravnim licima neophodne za obračun poreza, bez potrebe za bilo kakvim dodatnim prikupljanjem istih. Kao odgovor na tehnološke promene u društvu i načinu poslovanja, digitalizacija je ovim PA omogućila korišćenje savremenih tehnologija poput napredne analitike i naprednog popunjavanja poreskih dokumenata, analitike velikih podataka i blockchain-a. Kao rezultat, PA su značajno povećale efikasnost, unapredile nivo usluga koje nude poreskim obveznicima i ponudile nove usluge. Poreska administracija u Srbiji napravila je prve korake u procesu digitalizacije. Oni se tiču prelaska sa papirne na digitalnu formu podataka, kreiranja baza podataka i investicije u ljudski i tehnički kapital što je preduslov za hvatanje koraka sa razvijenim zemljama sveta i reakcija na potrebe digitalnog društva. Uprkos progresu koji je učinjen, PA Srbije se još uvek nalazi na početku procesa transformacije u moderan, digitalno orijentisan sistem. Neke preporuke za dalji tok digitalizacije PA Srbije, kao i bezbednosni aspekt čitavog procesa su takođe predmet ovog rada.

Ključne reči: *poreska administracija, digitalizacija, nove tehnologije.*

Introduction

Digitalization has the potential to transform the world economy much more than we see today, because it changes not only how we produce and consume, but the type of goods and services that are required. It has contributed to the development of new products and services and new forms of business. A significant amount of global business moves to online platforms. Estonia, for example, now offers digital identity (e-Residency) to the individuals who want to start a business in the country. The company can be started online without the need to appoint a local director or open a local bank account (they can use PayPal or other online payment services). Consumers also adopt new technology very fast. Under the influence of the Internet, social networks and mobile platforms, they also change needs and behaviour. The modern consumer expects new and different relationship with the producers and especially with the state administration. The question arises as to what extent is the state administration ready to respond to the challenges that digitalization sets in the 21st century?

In this paper, we will focus on one of the largest and most important sectors of the state, tax administration. For tax administration, digitalization represents both challenge and opportunity. Digitalization challenges go beyond the simple changing of communication channel with tax administration or the transformation of existing services from paper to digital forms. Using modern technology, operations that are now time-consuming can be instant. With people becoming digital and connected, they are now expecting that payment of taxes become a part of their natural environment. Taxpayers will expect that paying taxes should be no more complicated than booking a hotel online [25, pp. 23-45]. Also, they will expect more transparency and trust in order to allow TAs, at some moment, the automatic deduction of tax amounts out of their account like they are doing today with iTunes or Apple Store services, or with Netflix or Uber.

In order to satisfy modern taxpayers, TAs need to understand them better. TAs are already receiving the bulk of data by taxpayers, but most of those data are not used due to the lack of tools. Big data technology now offers TAs the possibility not only to better use existing data but also to create new services and values for taxpayers [25, pp. 47-72]. Some of the estimations show that by 2020 around 200 billion of different devices will be connected online. Besides our personal phones, most of the connected devices will be in factories, businesses, healthcare, public institutions, and so forth. Smart devices can give TAs all necessary data they need to track business processes, manage taxpayers, increase efficiency and save costs. Collecting and using dig data from third parties and combining it with tax data will help TAs to develop new e-services that target the specific needs of taxpayers. That will also help TAs to understand better and predict taxpayer's behaviour.

Serbian Tax Administration started digitalization process in 2005 by introducing online reading of cash registers. A few years later, first tax forms were digitalized (VAT, payroll taxes, personal income tax). A significant progress was made in 2017 by forming the Office for IT and e-Government. Important projects which are a prerequisite for the TA digitalization, such as State Data Centre, e-Payment, e-Paper or e-Inspector, were started. Today, it is possible to submit all tax forms online through the TA's specialized web portal "ePorezi" (*e-Taxes*). Although the possibility exists, most taxpayers still use the paper form for tax applications. Therefore, there is still a lot to be done in the process of digitalization of the TA in Serbia. As the Serbian TA efficiency is still on a low level compared with EU countries, digitalization can accelerate conversion to the EU standards.

In this article, we will analyze different experiences in the TAs digitalization process, with a significant focus on European practice. Serbian Tax Administration digitalization will also be analyzed in detail. Using world best practices, we will give some proposals for the next possible steps in the TA digitalization process in Serbia both in the short and medium terms.

Digitalization of TAs: the best practices

In the process of digitalization, some countries are leading, some are following, and others are still at the beginning. However, some steps in digitalization of the TAs are similar

in all countries. In the next paragraph, we will give a short review of the main tools and levels of digitalization with focus on best practices from different countries.

Automation and pre-population

Automation and process standardization are the first level of the TA digitalization. If taxpayers are submitting data in a standardized format, that can help tax authorities to use those data more efficiently. The use of third-party data is essential for supporting the tax administration in processing tax returns. Collecting more information and more data sources is important to extend the tax coverage, but also to provide existing taxpayers with better services.

At the beginning of the digitalization process, data used by tax authorities are mainly internal, with limited use of data from other governmental agencies. Most administrations in the world are still at this level, filing tax returns based on data obtained from taxpayers and mostly in paper form. With the automation of the process, TAs become able to use the full range of data sources, such as internal, other governmental sources and external sources. In this step, TAs need support from the other governmental organizations, and it is useful if that process is a part of the overall process of government digitalization. In Russia, for example, the assessment of property taxes is done based on inputs from the cadastre office and local government. Taxpayers can see all information online [6, p. 43]. In this step, investment in digital services and changes in the legal framework are required.

The next step is the simplification of tax return and all other tax procedures. Electronic filing of tax applications needs to be available in this step. Tax administration also needs to improve internal capacity and skills by developing both software solutions and human capacity. New jobs, such as data analyst, social network analyst, cyber security officer, and so on need to be developed for tax administration purposes. That is one more reason why political support is essential. Changes in education programmes and legislation will not be possible without that support. Also, gaining taxpayers' trust will be impossible, especially in developing countries, without government support.

When these phases are finished, the tax administration is ready for pre-filing of tax returns and advanced analytics. Some developed countries are already in this phase. In Australia, the tax office (ATO) gives the opportunity to taxpayers to pre-fill information directly into individual income tax returns [1]. Information provided by that system help the ATO to improve tax service, to offer faster and easier service for a taxpayer who files his returns online, but is more laborious and time-consuming for others. In this way, the ATO is stimulating taxpayers to use new technologies. In Denmark, the tax administration conducted an experiment on 40,000 taxpayers separated into two groups. Half of them self-reported their income, while the income tax of the second group was calculated based on third-party data. Using audit data, they concluded that the tax evasion rate was close to zero for income obtained from the third-party reporting. However, the tax evasion rate was considerable for self-reported income [19].

The final step is the so-called "no-return" approach where all taxpayers are connected in the system, and all tax data are available in real time (or near real time), with the possibility for clients to pay all taxes online [26, p. 190]. This step is yet to be reached for most of the countries. However, some predictions, for example in the UK, suggest that by 2020 there will be no need to file a tax return. The TAs will provide tax return based on data collected over the reporting period, and taxpayers will have the choice to accept or challenge it. That is the process of full automation of tax administration.

The use of pre-populated returns provides many benefits to taxpayers and TAs. The OECD report 'Survey of Trends in Taxpayer Service Delivery Using New Technologies' reported several major benefits [23, p. 13], such as reduced compliance problem for taxpayers, better confidence, improved image of the revenue body, faster processing of taxpayers' tax return information, quicker refunds and elimination of many errors.

On the other side, there are potentially two significant problems. First, if tax rates are different (i.e., in different geographic areas, business sectors, etc.), the tax administration needs to inform taxpayers about them every year. This problem is based on legislation and can be solved by unifying tax rates. The second potential problem is linked

with the adjustment of the pre-populated returns received by taxpayers. OECD reported that adjustment rate varied from 25 to 50% [23, p. 14]. Those costs can be lowered by automating adjustment process.

Finally, automation of TAs will lead to the potential use of other technological tools, such as advanced analytics and big data.

Advanced analytics

Advanced analytics is the process of "using statistical techniques to make predictions about causes and effects" [24, p. 14]. Establishing an effective advanced analytics function requires a wide range of organizational and technical challenges. Regarding organization, the analysis suggests that, in the early phase of development, centralization may be more appropriate [24, p. 14]. Once the organizational structure is established, the next step is to learn how to manage complexity and uncertainty. Although different types of software are available, the best results will occur through learning-by-doing process. The next step is to decide about analytics software, especially choosing between open sources and commercial analytics software. Finally, TAs need to manage data to ensure they are suitable for analytic purposes. In this process, IT division of the TA is essential.

Most of the advanced analytics projects fall into one of two categories [24, p. 18]:
- Predictive analytics – recognizing and understanding relationships in the data, and
- Prescriptive analytics – helping TAs to understand the impact of different actions on taxpayers.

Those two categories can also be combined in order to anticipate how individual taxpayer will respond to a specific TA action.

One of the main applications of advanced analytics is audit case selection. Faced with limited resources and relatively large numbers of taxpayers, TAs require a systematic risk-based approach for identifying which taxpayers to audit [22, p. 5]. Almost all countries in Europe with advanced digital TAs implemented automatic audit case selection in their work (Finland, France, Ireland, the Netherlands, Norway, Sweden, and the UK). Out of

the 16 tax administrations surveyed by OECD in 2015, 15 indicated that they had deployed analytics to prioritize cases for audit [24, p. 20]. Some important lessons are learned from this survey:
- Most of the surveyed countries (i.e., France, Ireland, Mexico, the Netherlands, Norway, Sweden, Switzerland, and the UK) in choosing audit cases start from VAT non-compliance;
- Key part of the decision to build a model is an assessment of the next best alternative;
- Social network analysis (SNA) is vital in situations where individual-level assessment may fail to detect anything of concern. Countries like Ireland, Malaysia, the Netherlands, New Zealand, and Singapore use SNA to connect individuals with different risk groups;
- If resources permit, a multiple-model approach can offer advantages over the single-model. This is due the different nature of tax forms and different relationships in data;
- TAs need to develop so-called unsupervised models – models that search to identify unusual patterns in data. A good example is the Australian model, designed to identify incorrect income tax deductions. A database of tax returns is used to identify the atypical ones — a corporation with a significantly higher type or rate of deduction than competitors, for example [1].

The second important use of advanced analytics is for filing and payment compliance. The main objective is to secure an outstanding payment or return or to prevent the problems. In the UK, for example, the TA has a model that predicts which taxpayers are most likely to miss filing deadlines, and intervenes in advance to overcome a possible situation. They create a team of behavioural economists and social psychologists to try to improve government policy and services [20]. The similar predictive model has been developed in Canada. In its first year of implementation, non-filer model resulted in around 130 million CAD additional revenue. Today, several other models are used to improve the TAs effectiveness and enhance taxpayer services [2]. A few other countries in Europe, like Ireland, Finland, and Norway are also using these types of models. However, this way of using advanced analytics is more appropriate for countries with

dominant direct tax forms (CIT, PIT, property tax) and self-reporting tax application model.

On the other side, similar models are used to predict possible tax debt and to model the risk that some individual or company will fail to pay tax on time. Finland, Singapore, Ireland, and Sweden created models that attempt to assess the likelihood of insolvency or other potential payment problems. Australia and Norway use predictive analytics to send an SMS message to taxpayers found to be a payment risk [25, p. 26]. Models also help to identify which types of taxpayers show the greatest response and based on that, they are planning future interventions.

Some tax administrations started using advanced analytics, not only for control but also in support of taxpayer service. Ireland and Norway use different analytical techniques to predict which channels taxpayers use for communication. Then, they are using specific methods to encourage taxpayers to use digital communication channels or to prepare software user-friendly with a specific type of communication channel (i.e., for a smartphone). On the other side, Singapore tax authority uses some techniques to analyze the content of taxpayers' emails. They use knowledge from that source to deliver better service to taxpayers (i.e., to start some campaign in advance, or provide more guidance on the web site) and reduce the need for taxpayers to contact the TA.

Advanced analytics can also be used for deciding about tax strategy and policy. Countries like USA, UK, Finland, and China use this technique for tax gap analysis. Singapore is using advanced analytics to explore and predict the impact and reaction on the proposed policy changes. Of course, these types of models are different from previous (predictive) models because they use simulations and therefore, they are more linked with economic and mathematic theory. Finally, advanced analytics can be used for segmentation of taxpayers. Using cluster analysis, we can identify the groups of similar taxpayers and then create different services for them.

Applying big data to tax processes

Big data refers to datasets that are both big and high in variety and velocity, which makes them difficult to handle using traditional tools and techniques [8]. As far as TAs are concerned, they have always had access to large amounts of data. However, only recently technological progress has made it possible to create true value by way of combining these large datasets originating from different and heterogeneous data sources [16]. Creating value from big data is closely connected to the ability to take better decisions [7]. Big data is usually collected from a variety of sources – different organizations, internet of things (IoT) devices, social media accounts – which often requires collaboration between these organizations. In the case of TAs, there are some exceptions. Cooperation could be taken as granted since all these organizations are different public agencies, all working under the same mandate. Organizations feeding the data are usually required by law to do so – such as employers, businesses, even individual taxpayers. Electronic cash registers could be considered as IoT devices feeding information to the TAs, but other devices might do so in the future, as payment systems advance in their application in Serbia – such as smartphones (through contactless transactions and e-Payment systems). Finally, using data from sources such as social media accounts is somewhat anecdotal, but not without precedent.

Collection of big data takes place in many forms, including monitoring electronic communication, internet tracking (usually by way of "cookies," small packets of data left by websites on users' PCs), RFID, location information, video surveillance, financial information, and electronic record keeping. Whilst mere collection of this information can be intrusive, the privacy risks are multiplied when multiple pools of data are combined [4]. This has prompted a regulatory response from many jurisdictions, with the most prominent being the recent European Union General Data Protection Regulation (GDPR).[1] Such regulations include certain restrictions on further use of data – i.e., rules that personal information processed for one purpose cannot generally be used for other incompatible purposes[2] – making it more difficult

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1 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.

2 Article 5(1)(b) of the General Data Protection Regulation.

for TAs to access all free personal data available on a citizen or business in order to implement big data analytics and assess tax evasion scores. It is possible that future regulation (in democratic societies) will follow the same logic and place further restrictions on state actors in the indiscriminate use of large amounts of personal data in order to detect tax fraud.

Many governments from all over the world started adopting their big data strategies, which usually begin by their application in tax administrations, as these organizations gather and process millions of persons and companies who pay taxes. Their approach to implementing big data and big data analytics strategies are usually two-pronged: the first goal is to improve efficiency of a public agency, in this case the TA, in the delivery of its mandate, i.e., collection of taxes; the second one is to make it cheaper, or to require fewer employees to achieve better results.

The TA of the Netherlands, for example, has initiated various big data-driven programmes that have resulted in additional income between 750 million and 2 billion euros, making 5,000 staff obsolete, while employing 1,500 new staff, knowledgeable in big data analytics. The entire TA is shifting the focus of its employees towards big data analytics to detect tax evasion and fraud [17]. This is also the case with American Internal Revenue Service (IRS), which is one of the most advanced TAs when it comes to audit and detection of tax evasion. IRS also allows researchers to use long panels of tax returns to observe individuals over time [18], as such research is considered to greatly benefit policy analysis and making of informed decisions in the public sector. However, IRS's big data-driven software has been such a success that 65 new employees working on it have collected an additional 8.4 million USD of revenue per employee [12]. Significance on detecting tax evasion is quite clear having in mind that estimated lost revenue of HMRC (UK tax administration) is 20.6 billion GBP per year, that of IRS 115 billion USD, while as much as 50% of India's economy is in the grey sector [21]. Many other TAs have implemented big data collection and some form of big data analytics, advanced and otherwise – such as the Australian TA, that has allowed access to some of its services by way of SMS, and then online as of 2013, or the Brazilian state of Parana,

that has implemented electronic VAT invoicing in order to detect tax fraud [25].

We can conclude that taking into consideration all examples mentioned above, and looking from a data point of view, the real challenge for TAs in the future is not anymore data collection, but big data analytics. Developing algorithms (software) that allow the efficient use of a vast amount of data available, in order to make better (and more efficient) decisions in the public interest, and using minimum resources, are some of the challenges digitalization puts in front of a tax administration in the 21st century.

Using blockchain technology in taxation

Blockchain is a technology that could potentially revolutionize the way we conduct payments, store data and perform transactions, and has the power to disrupt and strongly reorganize accounting and the way tax payments are processed. As the demand for data increases from tax authorities around the world, a key focus of the discussion was how to establish trust between taxpayers and tax authorities. Prerequisite for a high level of trust is transparency. Also, fewer intermediaries in the communication chain mean the higher level of security and lower transactional costs. Blockchain could help TAs solve all identified problems. Blockchain can remove a need for an intermediary by providing a secure, distributed record of online transactions. Technology can trace transactions, verify information, but can also insert business logic into a transaction using smart contracts (computer code which automates the 'if this happens, then do that' element of written contracts) [28]. Main benefits of using blockchain technology in tax administration are transparency, better control (restricted access to network and data), upgraded security, and efficiency (when information is updated, it is updated for everyone in the network at the same time).

Blockchain could be used for transactional taxes, such as VAT, withholding tax, stamp duties, and insurance premium taxes. Blockchain technology could also help with transfer pricing, payroll tax and much more [28]. For example, in most of the developed countries, digitalization process covered payroll taxes. However, there is a number

of government institutions involved in the process. Each institution holds their own register, often duplicating data held by other institutions. Implementing a blockchain can solve that situation. Intermediaries, responsible for calculating and transferring tax and social security payments from employee salaries to relevant institutions, will not be necessary anymore. Technology based on the blockchain could replace some intermediaries [5].

Another example is how blockchain can change the transfer pricing regime. First, blockchain can facilitate the tracking of the transaction and the identity of all involved parties. Documents can be written into a self-executing smart software, eliminating the possibility to be fake. Information stored on the blockchain is visible only to parties that have access to the system. The payments are automatically executed by software if they meet specific conditions [5].

Next example is linked with the possibility to use blockchain technology to upgrade VAT transactions. In most of the countries, VAT is the most significant revenue of the national budgets. For these reasons, tax authorities search for ways to raise efficiency in VAT collection. One of the solutions is implemented in Brazil, where electronic invoices are mandatory and are received by tax authorities in real time. European countries such as Hungary and Poland also implemented real-time VAT reporting solutions. However, the existing system is fraught with a variety of problems. It is highly reliant on businesses themselves to correctly calculate the amount of VAT due and submit it to the tax authorities. Also, the system makes it difficult for governments (if not impossible) to track VAT payments, resulting in fraud.

In the traditional VAT transaction, the VAT invoice is issued by the company, and the client pays the bill including VAT. Information about that transaction is recorded in the company's system. On the other side, the company pays its bills to the suppliers and calculates VAT to pay it to the tax authority. At the end of the process, the company can ask tax refund if they had paid more to the suppliers than their clients paid to the company over the defined period (monthly, quarterly, etc.).

Using blockchain, the process can be shorter and faster. The client pays the invoice to the company. At the same time, blockchain calculates invoiced VAT and divides it into the non-VAT and VAT part. The VAT is paid directly to the tax authority. The company pays the supplier's invoice. Blockchain calculates VAT residual (differences between input VAT and output VAT) and sends it to the tax authority [5, p. 13].

We are still in the very early stages of understanding what blockchain can do for the tax authorities. Using blockchain in full capacity in taxation will call for the important changes in national databases and network systems, but also in the legal system, reforming laws on databases and intellectual property [5, p. 11]. Although the benefits of blockchain technology on a governmental level are hard to overlook, in the long run blockchain can be a driving factor in implementing real-time, automated tax processes for both legal entities and individuals.

Security and tax digitalization

Tax administration digitalization might simultaneously lead to new risks related to data security. As one of the goals of tax administration is taxpayer protection, new mechanisms within the digital paradigm need to be enforced. The recent data breach, such as Marriott (data of about 327 million guests have been accessed by an unauthorized party), Facebook (about 90 million user accounts have been compromised by hackers), Sacramento Bee (personal data of 19.4 million California voters exposed) and other, show the high importance of cybersecurity. Taxpayers' trust in tax authorities is crucial for successful digitalization, and if the population lacks trust, it will be harder to maintain the process.

There are three levels of tax data protection: taxpayers, tax preparers (intermediaries), and tax administration. Most of the attacks on taxpayers are in the form of "phishing" – the use of fake emails and websites to trick individuals into supplying confidential information. For example, emails claiming to be from tax authority which promises a tax refund, but they are actually an attempt to get people to hand over confidential information. Cyber-attacks on tax preparers or tax administration enable gathering data on numerous taxpayers and are consequently more interesting for cybercriminals than attacks on the individual taxpayers.

In the USA, for example, tax preparers have a crucial role and are obliged to create and implement security plans [15]. The IRS has developed a comprehensive checklist on the operation, physical environment, computer systems, and employees in order to assist tax preparers in the development of a security plan [14]. Tax data security challenges have to be assessed at the tax administration level as well. In Norway, for example, the IT security testing of tax administration is often performed by the external independent third parties [29, p. 9].

Besides described cyber-attacks, additional concern on tax data protection relies upon adequate protocols and procedures regarding data access. Namely, tax administration employees might disclose and/or copy individual tax data or aggregate data for the indefinite number of taxpayers if security mechanisms and proper control (actions of all individuals in information system have to be stored; potential to copy and/or send data have to be restricted) is not a part of the tax administration IT system. Also, some protocols for international information exchanges are created such as the Foreign Account Tax Compliance Act (FATCA) in the USA, and the Common Reporting Standard (CRS) in the OECD countries. The most important part of those protocols is cybersecurity.

Norwegian Tax Administration (NTA), based on its experience with international data exchanges and security, is giving to other tax administrations the following advice:

- "Build the necessary foundation for trust by implementing layer upon layer of both technological and organizational security concerning the protection of the integrity, confidentiality, and availability of the information received;

- Use the planned exchange of international tax information strategically in your communication with the population. Target specific segments of the population with well-chosen appeals to nudge their behaviour towards compliance and pursue other segments vigorously with adequate measures.

- Do not underestimate the time and effort necessary to test both your own IT solutions and the information you will receive from other jurisdictions..." [29, p. 9].

Of course, it is not possible to be 100% protected, but the security risks must be analyzed and managed. For example, the Spanish Tax Agency (AEAT) has accepted the Corporate Risk Map for the analysis and management of different kind of risks, based on Enterprise Risk Management methodology[3] [27, p. 11]. They also created an internal security unit, in addition to external security consultants, which analyzes the impact of data security on tax administration digitalization projects.

Digitalization of the TA in Serbia

Serbia is still at the beginning of the TA digitalization process. According to the World Bank Doing Business Report, Serbia is ranked 79th according to the "paying taxes" indicator, although in the total "doing business" score it is ranked 48th out of 190 countries. At the same time, paying taxes is one of the three worst indicators for doing business in Serbia, out of ten measured by the World Bank [32]. Digitalization, as a part of the tax reform in Serbia, is essential for reducing the cost of doing business, and productivity increases of both private and public sector.

State of play

Some first steps in the TA digitalization in Serbia were done by introducing mandatory online communication between the TA and cash registers (June 2005) for all legal entities.[4] In mid-2011, the TA started a portal ePorezi (*e-Taxes*). Through that portal, taxpayers can submit various tax reports. The first three tax forms for which it was possible to file a tax application through this service were VAT for legal entities, property tax, and payroll taxes. In the beginning, taxpayers were obliged to fill out the form, in order to register for ePorezi, and submit it personally to the Tax Administration in paper form. Later on, the TA reviewed this procedure, and taxpayers are now able to register for online tax applications electronically.

The new service ePorezi has revealed some main drawbacks of e-tax services in Serbia in general – an

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3 See more about ERM on https://www.theirm.org/media/886062/ISO3100_doc.pdf.

4 Exceptions for very small enterprises and for some specific sectors (lawyers, taxi drivers, etc.) are defined by the Law.

obsolete system architecture. For example, authentication requires the use of an electronic signature, stored on a national ID card's contact chip, which is a standard practice. Still, anyone trying to access these services requires an additional piece of hardware, a smart card reader, which is not a part of any standard home/office configuration. While reasonably cheap and easily accessible, the smart card reader is something only more tech-savvy users will purchase and install at home or work. This effectively reduces the number of potential (individual) users. Furthermore, obtaining this electronic signature on the national ID card is free of charge, but (another) visit to a local police station is a must, as e-signature is not installed by default when an ID card is issued. This is also why many taxpayers who would be willing to test drive the system and perhaps use it in the future, opt out. The system architecture and security features are designed in such a way that these electronic signatures can only be used from a Microsoft Windows-based computer. This excludes from using these services ever-growing population of those who use their smartphones and tablets as their primary (or only) computer, or those who opt to use a different operating system, such as Linux or iOS. This can be changed by introducing cloud-based services.

The portal ePorezi also has a peculiar weakness, quite unusual for a digital online tool – it has working hours. The ePorezi portal is unavailable during the night, when it goes down for around six hours due to "regular maintenance", making it effectively accessible 75% of the time. Also, its capacity seems to be inadequate, as it sometimes crashes during peak days;[5] still, the Tax Administration does not extend reporting deadlines by default due to unavailability of its online portal, as reporting can be done in paper form or via post as well. This introduces uncertainty in the exclusive use of online tools and requires having alternative ready, placing an unnecessary burden on businesses and citizens.

As of January 2019, taxpayers can submit most of the taxes online. They can also see the current status of tax debt by tax forms. This is a good step forward. However,

individuals have not seen much of an improvement with digitalization, except in terms that they are now able to use the digital form for submitting a tax application (vs. visiting the local tax office or sending an application by post). In fact, the Serbian TA needs to incentivize users to switch to digital by providing new services and improved functionality and for example, delivering tax returns, a detailed list of payments by taxpayer and tax form, tax history, etc.

However, we need to have in our mind that the best results regarding user penetration were achieved when people or businesses had been legally compelled to change over how they communicate with the TA [7]. In fact, most countries have not resorted to making an e-application mandatory until the percentage of electronic submissions has not reached a very high level – 97.4% in Portugal [3, p. 33] and 74.4% in Slovakia [10, p. 30], to name a few. Some European countries still do not mandate exclusive use of digital tax reporting.

To help in that process, it is important that TAs set a clear objective and follow it. Changes in objectives can result in a lack of trust. For example, digital reporting of the annual personal income tax in Serbia became mandatory five years ago. However, since 2016, the process has been reversed, and the self-reporting of annual PIT has also become possible in person or by post. This has led to a significant, steady and ongoing decrease in the number of electronic submissions. Lesson learned from 2015 when the TA introduced mandatory electronic submission of annual PIT shows that it is possible for taxpayers to submit an online application. However, when the possibility to choose between electronic and paper form were introduced again, most of the taxpayers used the second one.

Another example – VAT application – shows the opposite. Taxpayers were able to communicate electronically with the Tax Administration and submit VAT application starting from June 2011. The process was slow in the beginning. In November 2012, the Tax Administration received electronically only 0.36% of the total VAT applications submitted. One year later, the TA received 12% of VAT application electronically. Finally, in July 2014 all VAT applications were filed electronically.

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5   It is usually not the portal itself that crashes, but its web interface, reporting errors 500 (internal server error) and 504 (gateway timeout error).

Reporting the payroll taxes is another example of successful digitalization process.[6] Starting from 1 March 2014, a system of centralized collection of the payroll tax implies that a tax application for payment of taxes and contributions to salaries and other remuneration of employees can be submitted exclusively in electronic form. The effects of this reform were numerous. First, the possibility of paying payroll tax on one payment account, instead of 20 different accounts in the previous period, was introduced. This has led to significant savings both for the state and for taxpayers and commercial banks. The World Bank estimated that, on this basis, the annual costs of the business of all legal entities were reduced by about 13 million euros. On the other hand, given that the TA processes about 300,000 payroll tax applications per month, the need for a significant number of employees in the TA (estimated around 400) has been dropped. Those employees were allocated to other duties (tax control, monitoring, evaluation, analysis, etc.). After this reform, it is no longer possible to pay off earnings before taxes and contributions are paid. About 200,000 employees became more secure. The errors that were large in the case of paper reports in the previous period were reduced, which led to an increase in the efficiency of the TA.

Most of the observed problems can be solved with legal changes (i.e., system working hours) or with infrastructure investments. Lack of available data can be solved by creating a single database that would connect databases of tax administration, pension insurance fund, health insurance fund, unemployment fund, customs, police and cadastre. This step has already been started by creating the State Data Centre and the information system eZUP. Most of the state institutions are storing or sharing their data through this system. This is an underlying assumption for the big data and advanced analytics, and the first step of the so-called "on-line" control and tax collection. The new system, eInspektor is one of the examples of automation of the work of state services. Primary goals are the coordination of the work of state inspections, raising the efficiency of supervision, standardization of the work of inspections and access

to data by all inspections. The project is still in the pilot phase, but when it finishes, 41 inspections, including tax inspection will be involved.

Important steps are done in the area of security by creating the National Centre for the Prevention of Security Risks in the ICT Systems of the Republic of Serbia (CERT). The main task of the CERT is to provide data security of Serbian national ICT infrastructure. This includes "effective response and resolution of incidents when they occur, preventive activities in order to minimize the number of possible incidents and raising of awareness of state authorities on ICT security" [31].

Next steps

What are the possible next steps in the TA digitalization, based on previous analysis? First, the TA needs to clearly define digitalization objectives (both in the short and medium term). In Serbia, the objective can be to reach the level of digitalization of Hungary, Poland or the Czech Republic (full process automation, e-accounting, pre-population of as much as possible tax forms, advanced analytics, etc.). Second, as digitalization has an impact on different sectors, it is necessary to cooperate with other government stakeholders. Services like eInspektor or eZup are good starting points. Third, the TA needs to be fully transparent to the taxpayers in this process, to try to consult them and to put the effort in order to implement their suggestions as much as possible. Finally, a partnership with the private sector solution providers from an early stage can also be helpful for reducing costs for both the TA and taxpayers. However, above all of that, successful digitalization demands investment in new competences and skills (i.e., more technical and IT skills), changing employment structure (more people capable of working with new technologies), and major organizational changes in the TA (centralization of some functions, new sectors, etc.).

Starting from possible objectives, in the short term, the full process automation of data collecting and sharing needs to be finished. Services such as the State Data Centre and eZUP need to be fully implemented and used by the TA. Also, the TA needs to create all the

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6   Payroll tax in Serbia is composed of the national tax on personal income, and pension and health insurance contribution.

necessary conditions to use services like e-Payment or e-Inspector which are not in use now. Technical and legal preconditions for that step exist. Law on tax procedure and tax administration needs to be amended in order to support digital tax receipts, online payments, etc.[7]

The portal ePorezi needs to be upgraded to be able to work on different platforms and operating systems. Online applications need to be mandatory for some tax forms. In the beginning, online application and online tax report for annual PIT for individual taxpayers is possible after minor legal adjustments. Also, in the period between 6 months and one year, all online communications with the TA need to be mandatory for legal entities. That would require some changes in the TA, especially on the organizational level. That will enable accurate and precise tax accounting, so that the TA, but also every taxpayer, has a daily electronic insight into the state of their tax account (in all tax liabilities). The uncontrolled accumulation of the debt of certain taxpayers will be avoided, and the costs of administration both for the TA and for taxpayers will be reduced.

The next possible step is pre-population of some tax forms, and that can be done with just a few legal adjustments. At this moment, it is partially doable because of intersystem connectivity through the State Data Centre and the access which the TA has to both financial and personal data of its users. The TA has been already receiving most of the information needed directly from third parties such as employers and banks. Thus, the TA has all the data necessary to pre-populate the form and leave it to the user only to double-check it, or to add a missing income, which is the subject of self-reporting. In Estonia, for example, about 95% of tax returns are done through e-filing. The country offers one-click tax return, where the taxpayer just needs to verify and submit, and receives a refund in 5 days [13, p. 9]. Serbian TA has all technical prerequisites to do the same. Based on experience from Finland, the information received from third parties has such a wide coverage that the pre-filled tax return is, in fact, the final tax decision for 80% of the individual taxpayers [11, p. 9]. It is also necessary

to leave the possibility of reviewing tax application, but this could also be done online.

The process can be started immediately with a pilot test of a very limited form of a pre-populated return involving one segment of taxpayers. Property tax application can be a good example. Notaries (and courts) are required to notify the TA on any changes of ownership of a real estate in the country, and they forward all the data needed to fill out the tax application with this notice. However, the TA only sends out a warning to a taxpayer notifying them they need to apply to pay the property tax (and eventually file charges if warnings are ignored). The TA is unable to assess the tax without this application, even though no new data will be available in the application.

Another good example for pre-population in Serbia is annual PIT. At this moment, all data required for annual PIT evaluation are received by the TA from third parties (employers must send all payroll tax information to both taxpayers and the TA). Taking that into consideration, we think that this tax form can also be easily pre-populated. By starting a small pilot project covering these tax forms, and on the basis of the data received from third parties, the TA can send the pre-filled return to the taxpayers. Based on this pilot test results, the TA can do the same for other self-reported tax forms.

One of the next possible steps in the TA digitalization process, discussed for many years in Serbia, concerns online cash registers which send data about transactions to the TA in real time. Although controversial in Serbia, comparative data suggest that introducing online cash registers opens many possibilities in the areas of fighting the grey economy, tax audit and data mining. For example, as Hungary introduced relevant legislation, upwards of 200,000 online cash registers have been installed, and they transmitted over 10 million pieces of data daily to the Hungarian TA [30, p. 36]. In this way, the Hungarian TA avoided cases when there was only one cash register at a store which was "under repair" for extended periods, where the cash register was seldom used, or when receipts were issued, but under a false or obsolete VAT number. Apart from such obvious improvements, advanced data mining is also available, and TAs can make the use of big data available to them – such as targeting specific

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7   Detailed analysis of necessary changes should be undertaken.

establishments that do not show increased activity when their next-door neighbours do, particular businesses in particular weather and the time of day, and at a certain location (i.e., ice cream vendor at a river bank during a hot summer day), etc. This data can even be cross-referenced with the number of employees for whom business is paying contributions – if there are three cash registers operating and sending data, but only two reported employees, then such vendor would be a potential candidate for an audit. Hungarian TA recorded a surplus of around 630 million euros in one year after the introduction of online cash registers.

Similar examples can be found in some other countries in the region. Croatia, for example, introduced online cash registers in 2013 using some form of an online digital certificate and specialized software solution. The certificate is used for digital signing (registration) of receipts and subject identification during online data exchange with the TA. The receipt needs to be certified before it is printed and delivered to the customer. After issuing a receipt, the software automatically sends all data in real time to the TA. The lack of Internet can cause problems, as during this offline period receipts are signed with a certificate but not sent to the TA. To prevent possible frauds, strong enforcement methods and trained personnel are in place. Using this model, the Croatian TA achieved excellent results in the field of tax collection and fight against the grey economy. Similar models are used in Slovenia and the Czech Republic.

In the medium term, and after online fiscalization, organizational changes and infrastructure investments mentioned in the previous part, and advanced analytics is something TAs can start to use. That can lead to the improvement of tax accounting and creation of the e-accounting system. Changes include a broad range of accounting and financial information, i.e., general ledgers, trial balances, and journal entries, etc., submitted in electronic form monthly or quarterly. Such actions can help TAs to be more strategic, to predict possible tax debt, and prevent other problematic situations (i.e., tax fraud). This should be the first phase of future e-audit. In order to reach an e-accounting level, TAs need to invest more in digital capacity and expertise.

Next step is to understand better taxpayers' needs and specificities and to classify them in different groups (not only by size) in order to offer them better and more adequate services. The TA can start using social network analysis on the basis of EU and UK experience. Advanced analytics can also be used for different types of models which can simulate potential reactions of taxpayers on policy changes. That is one of the crucial steps for the success of the digitalization process.

Finally, since our digitalization process is at the beginning, we can use experience from other countries and other sectors and try to jump a few steps forward – for example, possibilities for using blockchain technology. Creating a national data centre based on the existing technology can be, on a certain level, the limitation for further development. In that sense, it would be helpful to launch a pilot project on using blockchain in VAT transactions. This pilot project is important to resolve questions as to how blockchain changes tax administration, what legal changes are necessary to support blockchain, how tax data can be made fit for blockchain, which accountant and auditor standards we need to change, and many other questions. One of the possible gains from using blockchain in VAT transactions is the elimination of tax returns, which is an important step toward digitalization of the TA.

Concluding remarks

Serbia is still at the beginning of digitalization of the tax administration. Starting from Ernst & Young analysis of levels of digitalization, the TA in Serbia is somewhere between level 1 called "e-file" and level 2 called "e-accounting" [9, p. 2]. That is the level in which legal entities or individuals are required or have the option to use a standardized electronic form for filing tax returns. Also, income data (i.e., payroll, financial) are also filed electronically and matched annually. In the e-accounting level, corporate entities are required to submit accounting or other source data to support filings (invoices, trial balances, etc.) in a defined electronic format at a defined frequency. This is not done yet for all tax forms, and Serbia is lagging behind compared with other CEE countries. For example, Hungary or Poland

have already reached the e-accounting level of the TA digitalization.

Still, from the existing digitalization process, we need to shift to a level in which the paradigm of the process is completely changed. That is the level in which legal entities and individuals are required to submit additional data, and the TA also starts to assess external sources data (i.e., bank statements). The TA begins to match data across tax types, potentially across taxpayers and jurisdictions in real time or near real time. On the next step, all data are analyzed by the TA and cross-checked to filings in real time or near real time to prevent fraud, unintended errors, and to map the geographic economic ecosystem. The TA sends taxpayers electronic audit assessments with a limited window to respond. The final phase of digitalization, called "e-assess," is the level in which TAs use submitted data from individuals and legal entities to assess tax without the need for tax forms. Taxpayers have a limited window of time to audit government-calculated tax [9].

We concluded that digitalization could help the Serbian TA, in the medium term, to close the efficiency gap and converge faster to the highest EU standards, but also to make doing business in Serbia more competitive. Some countries (emerging markets especially) may jump from zero to advanced in a very short period using new technologies in tax administration (good examples are Ireland or Estonia). Others may be struggling with legacy systems, and the progress may be slower. Serbia is now at the point where the TA needs to choose which way of digitalization it will take.

In the end, there are some open questions regarding the digitalization process. Although most of the individuals and businesses in the future will be digitalized, there will always be some groups that may never use modern technology: elderly, those living in the locations with limited access to the Internet, industries that have less access to technology, people with less confidence in technological changes, etc. They will still require support, and the TA needs to service them as well. That leads to a different segmentation of taxpayers by identifying similar behaviour patterns. That will help the TA to predict which taxpayers will use certain types of services, how to address them, and what additional support they need. This is especially important for the younger population (future taxpayers) and intermediaries (accountants, tax advisors).

How digitalization will influence "taxpayer morale" is the next open question. One of the key considerations for tax administrators is that if taxpayers are operating in a user-friendly environment where they know that all tax activities are transparent and safe, will that significantly reduce tax evasion? If yes, digitalization may also be branded as a part of government's efforts to fight against illegal economy and corruption as well.

Last question, but not less important, is security. It is true that new technologies can raise efficiency and transparency, but are all taxpayers (especially corporations) ready to go public with the level of taxes they pay? Also, having all data online makes businesses more exposed to possible frauds. Recent examples have shown that more data leaks than ever before. The question is, do the digitalization and new technology also bring a new level of security? Answer to that question is still not clear.

Acknowledgments

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ENTREPRENEURSHIP EDUCATION AIMED AT DEVELOPING THE SKILLS FOR THE FOURTH INDUSTRIAL REVOLUTION

Preduzetničko obrazovanje u funkciji razvoja veština za četvrtu industrijsku revoluciju

Abstract

New technologies are leading to changes in business models. Skills needed to perform most jobs are changing profoundly. Their acquisition and development are becoming crucial for the success and modernization of the labour market offering new forms of flexibility and security for job seekers, employees and employers. The era of automation necessitates the development of not only digital, but also social and emotional skills. Development of creativity, innovation, analytical and critical thinking, communication, negotiation and decision-making skills are gaining in importance.

These skills, an integral part of entrepreneurship competence, are developed through entrepreneurship education. In today's world, this form of education is approached not only in the narrow sense, as a process of preparing for business creation, but also in a wider context, as a process of developing entrepreneurial mindset and skills and personal qualities that have universal application. There are several approaches, methods and models of entrepreneurship education. Serbia does not yet have a clearly defined strategy for developing this type of education. Aimed at providing recommendations for the selection of optimal solutions, an assessment study of the effects of the "Student Company" method of entrepreneurship education, recognized globally as a model of good practice, was carried out within our education system. The research has shown that, according to the assessment of 175 teachers involved in the programme, the "Student Company" method also gives excellent results in our country. This speaks in favour of its inclusion in all secondary schools in Serbia as an informal type of education.

Keywords: *entrepreneurship education, skills, labour market, Student Company, mini-company, education, Serbia.*

Sažetak

Nove tehnologije dovode do promena modela poslovanja. Veštine potrebne za obavljanje većine poslova se značajno menjaju. Sticanje i razvoj veština postaju ključni za uspešnost i modernizaciju tržišta rada kako bi ono moglo pružiti nove oblike fleksibilnosti i sigurnosti za one koji traže posao, zaposlene i poslodavce. U eri automatizacije pored neophodnosti razvoja bazičnih digitalnih veština kod svih, i naprednih digitalnih veština za određenu grupu radnika, rastu potrebe za razvojem socijalnih i emocionalnih veština. Razvoj kreativnosti, inovativnosti, analitičkog i kritičkog mišljenja, komunikativnosti, veštine pregovaranja, odlučivanja, emocionalne inteligencije dobijaju na značaju.

Navedene veštine predstavljaju sastavni deo preduzetničke kompetencije i razvijaju se kroz preduzetničko obrazovanje. U svetu se danas tom obrazovanju ne pristupa samo u užem smislu, kao procesu pripremanja za kreiranje biznisa, već u jednom širem kontekstu, kao procesu razvoja preduzetničkog načina razmišljanja, preduzetničkih veština i ličnih kvaliteta koji imaju univerzalnu upotrebu. Postoji više pristupa, metoda i modela preduzetničkog obrazovanja. Srbija još uvek nema jasno definisanu strategiju razvoja ove vrste obrazovanja. Sa željom davanja preporuka za izbor optimalnih rešenja, sprovedeno je istraživanje procene efekata jednog od metoda preduzetničkog obrazovanja, „Učeničke kompanije", u okviru našeg obrazovnog sistema. Ovaj metod, koji se bazira na iskustvenom učenju i realizuje se u srednjim školama, na globalnom nivou je prepoznat kao model dobre prakse. Istraživanje je pokazalo, prema oceni 175 nastavnika koji više godina učestvuju u realizaciji programa, da metod „Učenička kompanija" i kod nas daje odlične rezultate. To govori u prilog uključivanja ovog modela, kao neformalnog oblika obrazovanja, u sve srednje škole u Srbiji.

Ključne reči: *preduzetničko obrazovanje, veštine, tržište rada, Učenička kompanija, mini kompanija, obrazovanje, Srbija.*

Introduction

We are living in the times of the Fourth Industrial Revolution. Set in motion by the synergetic effect of the advance of new technologies, the ways of production, consumption, service provision, and communication are undergoing transformation. Overall mobility is on the rise, from the movement of capital to knowledge to people.

As all revolutions do, this too brings about disruptions of the existing systems that need adaptation. One of the first fields to take the blow is the labour market.

The surge of new technologies and trends is leading to a conversion of business models, as well as a change in the division of labour between workers and machines, bringing about the transformation of the present job profiles. As a direct result of these changes, the kinds of skills required to perform most jobs will profoundly shift.

New technologies are opening up new opportunities, raising productivity, and stimulating growth. However, not everyone will be the winners in this process, as adaptation is called for, and how long it will take and what the "price" to be paid economically and socially is going to be will primarily depend on the buildout of the knowledge and skills of the population [32]. Positive effects will not come about on their own; it is imperative to mobilise governments, the business community, the education system and all the structures of the society in the right direction [40]. In the short run, imbalances will emerge; on the one hand, armies of the unemployed will arise, especially among the youth who are particularly at risk, whereas, on the other hand, companies will not be able to cover their needs for people with specific knowledge and skills.

The existing models of education that offer profiled "skill sets" for specific occupations will not be able to respond to demands of time. Having in mind that, according to estimates, current students will have to switch several occupations by the end of their career in order to adapt to the labour market demands [33], that there are no longer clear boundaries among professions and the dynamics of technological development is progressively creating new occupational categories, it is obvious that changes in the concept of education will be unavoidable. "Skill acquisition and development are essential for the

performance and modernisation of labour markets in order to provide new forms of flexibility and security for job seekers, employees, and employers alike" [14, p. 2]. In the light of the aforementioned, entrepreneurship education assumes a particularly significant role.

Skill shift – Automation and future of the workforce

According to the forecasts, by the year 2020 there will be a shortage of 85 million people with high and medium-level qualifications worldwide [39]. In a survey conducted by Mourshed and associates [39], 57% of the employers interviewed stated that they could not find suitable entry-level hires, 27% reported that they were not able to fill vacancies because they could not find applicants with the right skills, one third said that the employees' lack of skills was causing major problems, through creating additional costs, reducing the quality of work or increasing working time spent.

When asked if the graduates were adequately prepared for the labour market in Europe, only 35% of employers and 38% of students agreed, while 74% of education providers were confident that they were. These answers point to an evident gap in the labour market supply and demand, which education providers have not yet fully perceived [39].

This assessment is confirmed by the findings of the research carried out by the European Commission in Serbia and the countries of Southeast Europe in 2016 [3]. The research studied the position of higher education graduates in the labour market. The surveyed employers in Serbia rated their satisfaction with the skills of their new graduate employees 5.9 on a scale of 1 to 10 (with foreign employers rating them 7.0, and domestic employers 5.5). Only 55% of employers are of the opinion that graduate recruits bring "some" added value compared to their non-graduate employees. It is noticeable that employers in the high technology sector are less satisfied with the skills of their new graduate recruits in comparison to other employers. It was noted that 82% of employers provide supplementary training for their new graduate recruits, with as many as 92%

of employers in high technology areas conducting it through formal training.

These are just the imbalances the presence of which is already felt; however, the question arises as to the degree the future impact of the implementation of new technologies will have on the requirements of the labour market for certain skills and knowledge.

The expected "gap" between the existing skills and the skills required of the future workforce was the subject of a survey carried out by Lund and associates [32] and launched at the end of 2017, polling more than 1,500 respondents from different sectors of the economy and society. At the beginning of 2018, the findings of a survey involving about 300 executives at companies with more than $100 million in annual revenues were published. When asked about how important "addressing potential skills gaps related to automation/digitization within their workforces" was, 62% of executives said they believed they would have "to retrain or replace more than a quarter of their workforce between now and 2023". Over 70% of executives in Europe and 64% in the United States of America see addressing this problem as a top ten priority [32, p. 3].

Given the wave of new technologies and trends disrupting business models and the changing division of labour between workers and machines transforming current job profiles, the vast majority of employers surveyed for this report expect that, by 2022, the skills required to perform most jobs will have significantly changed. According to the World Economic Forum's estimates, the global average skills stability—the proportion of core skills required to perform a job that will remain the same—is expected to be about 58%, meaning an average shift of 42% in required workforce skills over the 2018–2022 period [51, p. 11].

What are the forecasts and the types of knowledge and skills that will be required to do business in the future?

It is anticipated that a significant part of human activities will be automated in the near future [25], [33], [13]. The scope and dynamics of automation will vary across countries depending on the level of their technical and economic development, the education level of the workforce and the ability to manage the social effects that these changes will bring about. It is estimated that at the global level 15% of human activities will be automated by 2030 [33]. In Europe, this percentage is supposed to range from 25 to 45% by 2025 [13].

Workers of the future will be spending more time on activities that machines are less capable of, such as managing people, applying expertise and communicating with others. They will be spending less time on predictable physical activities, collecting and processing data, in which machines already exceed human performance. The required skills and abilities will also shift towards more social and emotional skills and more advanced cognitive abilities, such as logical thinking and creativity [33], [31].

It is estimated that 8 to 9% of the workforce, or 2.66 billion people globally, will be in new occupations yet unknown to us today, and that as many as 75 to 375 million people will likely need to transition to new occupational categories and upgrade their skills [33].

The question of what the skills needed for the future are has become a subject of intensive research with the aim of timely preparing the workforce for the jobs of the future.

According to The Future of Jobs Report 2018 [50], "skills continuing to grow in prominence by 2022 include analytical thinking and innovation as well as active learning and learning strategies. Sharply increasing importance of skills such as technology design and programming highlights the growing demand for various forms of technology competency identified by employers surveyed for this report. Proficiency in new technologies is only one part of the 2022 skills equation, however, as 'human' skills such as creativity, originality and initiative, critical thinking, persuasion and negotiation will likewise retain or increase their value, as will attention to detail, resilience, flexibility and complex problem-solving. Emotional intelligence, leadership and social influence as well as service orientation also see an outsized increase in demand relative to their current prominence" [50, p. ix].

The networking site LinkedIn conducted a survey in 2018 with the aim of determining the 10 skills that will be most in demand as of 2019. They have divided the skills into soft and hard, and according to that research, the top 5 soft skills that will be required by companies are creativity, persuasion, collaboration, adaptability and time management. On the hard-skill side, cloud computing was

top, with engineers in demand as more and more services and data migrate to the cloud. Artificial intelligence came next, followed by analytical reasoning, since companies need to make decisions based on the myriad of data that's now accessible to them. People management came fourth, followed by user experience design – the process of making all these new technologies accessible and easy for humans to interact with. According to the analysis, 2019's employers are looking for a combination of both hard and soft skills, with creativity topping the list of desired attributes.

In their Skill shift: Automation and the future of the workforce report [4], researchers at the McKinsey Global Institute have provided particularly analytical and workable answers to the questions as to what will be the coming shifts in the demand for workforce skills and how work will be organized within companies, as people increasingly interact with machines at the workplace.

They have devised a new taxonomy of 25 workforce skills, grouping them into five categories: physical and manual, basic cognitive, higher cognitive, social and emotional, and technological. Based on the quantification of time spent on 25 core workplace skills today and in the future for the United States and five European countries, with a particular focus on five sectors: banking and insurance, energy and mining, healthcare, manufacturing and retail, they have made an assessment of the evolution of the demands for certain skills by 2030 (Figure 1).

To understand the nature and magnitude of the coming skill shift, they have taken, as they say, "a business-oriented approach" to defining skills. They have included both intrinsic abilities (for example, gross motor skills and strength, creativity, and empathy) and specific learned skills, such as those in advanced IT and programming, advanced data analysis, and technology design. This allowed them to build a comprehensive view of the changing nature of workforce skills and provide a sufficient level of detail to motivate concrete actions and interventions.

In the findings of the survey they state the following: While advanced technological skills are essential for running a highly automated and digitized economy, people with these skills will inevitably be a minority. However, there is also a significant need for everyone to develop basic digital skills for the new age of automation. We find that basic digital skills are the second fastest-growing category among our 25 skills—after advanced IT and programming skills. They increase by 69 percent in the United States and by 65 percent in Europe. Our executive survey indicates that workers in all corporate functions are expected to improve their digital literacy over the next three years, and especially employees in functions including sourcing, procurement, and supply-chain-management. Accompanying the adoption of advanced technologies into the workplace will be an increase in the need for workers with finely tuned social and emotional skills—skills that machines are a long way from mastering [4, p. 11].

The research also shows that workers of the future will spend significantly more time deploying social and emotional skills than they do today. In aggregate, between 2016 and 2030, demand for these social and emotional skills will grow across all industries by 26 percent in the United States and by 22 percent in Europe. Among all the skill shifts in the analysis, the rise in demand for entrepreneurship and initiative taking will be the fastest growing, with a 33 percent increase in the United States and a 32 percent rise in Europe. Other social and emotional skills, such as leadership and managing others, also showed strong increases [4, p. 11].

It is obvious that economists, other researchers, and organizational practice experts use different definitions when discussing workforce "skills"; however, based on the aforementioned research, there are certain unambiguous conclusions that might be drawn. Automation and new technologies lead to growing skills instability, and adapting to changes calls for substantial endeavours aimed at the development of knowledge and skills of the population. All research studies emphasize the importance of soft skills or social and emotional skills as they are referred to in some of them. The LinkedIn Learning Editor, Paul Petrone, wrote in a blog that "the rise of AI is only making soft skills increasingly important, as they are precisely the type of skills robots can't automate". Creativity, innovation, analytical thinking, critical thinking and decision-making, adaptability, emotional intelligence, leadership, collaboration, persuasion and negotiation, time management, all play a particularly significant role.

The question that may be raised is how to develop these skills.

Not going into deeper analysis on different types of classification, nor into further discussion about which of the listed skills are skills and which ones are abilities, we may unequivocally assert that all of them are important components of entrepreneurship competence and are developed through entrepreneurship education. Therefore, today entrepreneurship education needs to be approached and viewed in a wider context, as education essential for personal development and self-realization, education that will enable the individual to adapt to dynamic changes in the labour market and be an active member of society.

The European Union's approach to entrepreneurship education

The development of entrepreneurial potential of citizens and organizations has been one of the key

Figure 1: The assessment of the evolution of the demands for certain skills by 2030

Category	Skill	United States, all sectors — Hours worked in 2016, billion	Change in hours worked by 2030, %	Western Europe, all sectors — Hours worked in 2016 billion	Change in hours worked by 2030, %
Physical and manual skills	General equipment operation and navigation		-24		-27
	General equipment repair and mechanical skills		-9		-11
	Craft and technician skills		-2		-21
	Fine motor skills		-8		-15
	Gross motor skills and strength		-9		-10
	Inspecting and monitoring skills		-20		-25
Basic cognitive skills	Basic literacy, numeracy, and communication		-6		-8
	Basic data input and processing		-19		-23
Higher cognitive skills	Advanced literacy and writing		-10		-8
	Quantitive and statical skills		-2		2
	Critical thinking and decision making		17		8
	Project management		2		3
	Complex information pro- cessing and interpretation		18		18
	Creativity		40		30
Social and emotional skills	Advanced communication and negotation skills		27		26
	Interpersonal skills and empathy		30		21
	Leadership and managing others		33		27
	Entrepreneurship and initiative-taking		33		32
	Adaptability and continuous learning		24		24
	Teaching and training		14		8
Technological skills	Basic digital skills		69		65
	Advanced IT skills and programming		91		92
	Advanced data analysis and mathematical skills		25		22
	Technology design, engin- eering, and maintenance		31		20
	Scientific research and development		28		25

Source: [4, p. 9].

objectives for the European Union and its members for many years, and entrepreneurship education has been recognized as the most effective method for achieving that objective. The view that "investing in entrepreneurship education is one of the highest return investments Europe can make" has been expressed in the Entrepreneurship 2020 Action Plan [18, p. 5].

One of the problems that has been identified within the European Union is an overall lower enthusiasm of the population towards entrepreneurship, compared to the competitive economies of the developed countries of the West and East. According to the research, only 37% of Europeans state that they would like to be "self-employed", whereas the percentages for the United States and China are 51% and 56% respectively [18, p. 7].

The Entrepreneurship Competence Framework states that "there is a growing awareness that entrepreneurial skills, knowledge and attitudes can be learned and in turn lead to the widespread development of entrepreneurial mind-sets and culture, which benefit individuals and society as a whole" [2, p. 5].

This view is based on the results of numerous research studies aimed at measuring the effects of applying specific entrepreneurship education models.

Summing up the results of 91 studies from 23 countries which dealt with various impacts of entrepreneurship education (84 national research studies and seven transnational projects involving several countries), the Entrepreneurship Education: A road to success study states that "the prevailing impression that emerged from the evidence collected is that entrepreneurship education works. Students participating in entrepreneurship education are more likely to start their own business and their companies tend to be more innovative and more successful than those led by persons without entrepreneurship education backgrounds. Entrepreneurship education alumni are at lower risk of being unemployed, and are more often in steady employment. Compared to their peers, they have better jobs and make more money."

Furthermore, entrepreneurship education effects "tend to cumulate and lead to acceleration: those who participated in a higher number of entrepreneurship education measures benefited more over time. The positive impact is not restricted to students and alumni. Besides impact on the individual, evidence from the examples reviewed for this study also shows impact on educational institutions, the economy and society" [7, p. 7].

The importance attached to entrepreneurship education and the scope of efforts directed at its development in the European Union can be traced through documents developed by the European Parliament, the Council and the European Commission.

The European Commission first pointed out the importance of entrepreneurship education in 2003 in its Green Paper – Entrepreneurship in Europe [23]. The basis for the development of entrepreneurship learning in the EU and pre-accession countries was set out in 2006 through the Recommendation of the European Parliament and of the Council on Key Competences for Lifelong Learning [22] (European Parliament and Council, 2006), where one of the eight key competences necessary for all members of a knowledge-based society is defined as the "sense of initiative and entrepreneurship". Today, in practice, this competence is simply referred to as "entrepreneurship competence", but in the work on its development, a broader approach that includes the "sense of initiative" is also taken into account. Further on, in 2008, the European Commission adopted the Small Business Act for Europe as a new strategic document in the field of small and medium-sized enterprises which focuses on the development of lifelong entrepreneurial learning with entrepreneurship as a key competence [21].

Entrepreneurship education has been given a significant role in the process of achieving the main objectives of strategic development, "smart growth" and "employment" defined in the Europe 2020: A strategy for smart, sustainable and inclusive growth document, adopted in 2010 [20]. The Strategy emphasizes the need for entrepreneurship education to be embedded in the education system. As a result of this decision, a number of documents have been issued. First, the Rethinking education: investing in skills for better socio-economic outcomes report was adopted in 2012, urging all EU Member States to provide young people with at least one practical entrepreneurial experience during their compulsory education [17].

Later on, in 2013, the Entrepreneurship 2020 Action Plan was defined. It expected all EU Member States to ensure that the entrepreneurship competence was embedded into curricula across all levels of education – primary, secondary, higher and adult education – by the end of 2015. This document also underscores the need for experiential learning, stating that before leaving compulsory education each student should be offered an opportunity to have at least one practical entrepreneurial experience, which may be accomplished in various ways: through participation in running a mini-company or by enabling students to manage a specific project [18].

Endeavours aimed at establishing the development of entrepreneurial spirit and culture in the EU countries were reaffirmed in 2016, when A new skills agenda for Europe was adopted [14].

A new skills agenda for Europe: Working together to strengthen human capital, employability and competitiveness was created in response to the problems that Europe faces (youth unemployment, problems with the inclusion of immigrants, raising the competitiveness of national economies). The Programme states that:

> formal education and training should equip everyone with a broad range of skills which opens doors to personal fulfilment and development, social inclusion, active citizenship and employment. These include literacy, numeracy, science and foreign languages, as well as transversal skills and key competences such as digital competences, entrepreneurship, critical thinking, problem solving or learning to learn, and financial literacy [14, p. 5].

It is obvious that both entrepreneurship as a competence and entrepreneurship education hold a prominent role in the EU strategic documents, and member states have been actively working on the implementation of these strategies. However, it has been observed that there are different approaches at the national level within the EU, both to the development of entrepreneurship education and the interpretation of entrepreneurship as a competence.

In an effort to reach a unified conceptual approach that would incentivize the development of the entrepreneurship competence at the European level, and create a link between the educational and the business sector, the European Commission's Joint Research Centre started work on the Entrepreneurship Competence Study in January 2015. As a result of this work, the Entrepreneurship Competence Framework (EntreComp) was defined in 2016. This document defines and describes entrepreneurship as a competence, specifies a reference framework that delineates the components of entrepreneurship in terms of knowledge, skills, and attitudes, and provides appropriate tools for the assessment and effective development of this, in their own words, key competence. In the context of the EntreComp study, "entrepreneurship is understood as a transversal key competence applicable by individuals and groups, including existing organisations, across all spheres of life. It is defined as follows: Entrepreneurship is when you act upon opportunities and ideas and transform them into value for others. The value that is created can be financial, cultural, or social (FFE-YE, 2012)" [2, p. 9].

This definition focuses on the creation of value, regardless of the type of value or context, and covers all domains in the value creation chain. It also refers to creating value in the private, public, non-governmental sector or any other hybrid combination. Thereby, it covers all types of entrepreneurship.

"Entrepreneurship as a competence applies to all spheres of life. It enables citizens to nurture their personal development, to actively contribute to social development, to enter the job market as employee or as self-employed, and to start-up or scale-up ventures which may have a cultural, social or commercial motive" [2, p. 10].

This approach clearly demonstrates that the EU expert group defines education for entrepreneurship not only in the narrow sense as a process of preparation, education and training for creating a business, but also in a wider context, giving it a prominent role of a key competence1 and seeing it as a process of developing an entrepreneurial mindset, entrepreneurial skills and personal qualities that have universal application.

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1   "Key competences are often also called generic – because they are of a developmental character, general – because they are widely applicable, transversal – because they represent abilities that can be transferred to new situations, and, in the school context, interdisciplinary – because they are developed within a framework involving an integration of all subjects during schooling, making them a common denominator across all the curricula and syllabi" [6, p. 6].

Goals, principles and methods of entrepreneurship education

Entrepreneurship education encompasses "all educational activities that seek to prepare people to be responsible, enterprising individuals who have the attitudes, skills and knowledge necessary to achieve the goals they set for themselves to live a fulfilled life" [16, p. 3]. The aim of entrepreneurship education is to develop entrepreneurial competences. They are defined as a combination of knowledge, skills and attitudes related to entrepreneurship. Within entrepreneurial competences, we may distinguish skills such as analytical thinking, goal setting, teamwork, negotiation, presentation, leadership skills, motivation, decision-making, time management, etc. [27], [14]. [9]. In terms of attitudes, we speak of creativity, sense of initiative, need for achievement, risk-taking tendency, self-efficacy, locus of control [37], [38], [1], [27]. As far as knowledge is concerned, it pertains to the understanding of the role of entrepreneurs, as well as to the knowledge of relevance for carrying out entrepreneurial activities (planning, budgeting, making calculations, and a number of other areas of knowledge important for successful running of company functions). The basic and at the same time indispensable level of knowledge to be acquired should ensure the "financial literacy" of participants [27], [9].

The past few decades have seen an increase in activities aimed at development and implementation of entrepreneurship education across all educational levels in Europe. In a multitude of existing programs, three approaches to this type of education can be clearly distinguished [27]. The first approach may be termed "education about entrepreneurship". In this type of programmes, entrepreneurship is studied as a societal phenomenon. Set against the background of economy and innovation, this theoretical approach explores who becomes an entrepreneur and what motivates entrepreneurs and analyzes the factors influencing entrepreneurial processes. The second approach, which may be called "education for entrepreneurship", focuses on acquisition of skills and knowledge relevant to starting a new company. The central elements in such teaching include acquiring knowledge and training in setting up a budget, developing a business plan, marketing strategy, and a plan for organizing business operations, and reflecting on the motives for setting up a business. The third approach, "education through entrepreneurship", uses the entrepreneurial process as a method or tool for achieving a specific set of learning objectives. These processes vary from specific entrepreneurial activities aimed at developing a company or working on case studies, or participating in activities that combine practical and theoretical learning and/or collaboration between schools and the business community. This approach is based on experiential learning.

The first two approaches ("about" and "for") recognize a close connection between entrepreneurship and the economic development theory. The third approach ("through") is broader and encompasses the competence to "perceive new opportunities" and put them to work in different social areas.

Apart from the differences in content, as far as entrepreneurship education is concerned there are also differences in the methods used: formal, non-formal and informal.

Within the educational system (the formal method), entrepreneurship can be implemented as a separate course in the curriculum, as a part of or a topic within other courses (the integrated approach), or in a problem-oriented way as part of the syllabi of several related courses (cross-curricular approach).

Two thirds of European countries have embedded entrepreneurial learning at the level of primary education. The most dominant are the transversal, horizontal and cross-curricular approaches based on learning outcomes. In primary education, half of the countries have had learning outcomes defined, and they are mainly related to attitudes towards entrepreneurship, as well as transversal entrepreneurial attitudes. There are no countries working on practical entrepreneurial skills at the primary school level [16], [6].

At the secondary school level, entrepreneurship education has, in one form or another, been introduced in all countries. Approximately two thirds of countries have opted for the integrated and cross-curricular approaches, with somewhat greater representation of the former. In some countries, entrepreneurship is taught as a separate course; in these cases, entrepreneurial learning is encompassed

in a variety of ways: as a separate compulsory course, as one of the elective courses or as part of an economic group of courses.

When it comes to entrepreneurship education, universities have now taken on a special position. In addition to their standard role in the development of science and education, their importance in the development of innovativeness, and indirectly the competitiveness of the economy and economic development, is now being emphasized. In this respect, we may now come across ideas about the development of the "entrepreneurial university", "entrepreneurial ecosystem at faculties", etc. [42], [45], [41]. Universities can no longer be isolated bastions devoted to theoretical research, as their linking to and collaboration with the economy become imperative for their sustainability, on the one hand, and for successful economic development of the country, on the other.

Studies of the impact of entrepreneurship education across methods and educational levels have shown that the greatest effects of entrepreneurship education are achieved by means of experiential learning and its implementation at lower educational levels [48], [49]. A particularly important period seems to be the secondary school. Bearing in mind the scarcity of time and money as resources and the difference in the effects of specific programmes, it is essential to choose the most efficient method and programme. Research studies worldwide have shown that informal types of education lead to particularly good effects in the field of entrepreneurship education and the best model of good practice is the "mini-company" or the "Student Company" model [12], [17], [16].

The Directorate-General for Enterprise and Industry of the European Commission has recognized this programme as the best method of entrepreneurship education for students.

The "mini-company" method encompasses all three approaches to entrepreneurship education ("about", "for" and "through"), i.e., it brings together the theoretical and practical approach and is realized in collaboration between the educational and business sector.

The "mini-company" is the most widespread method used in the majority of European countries. Approximately 350,000 students participate in this programme in Europe on a yearly basis (JA Europe 2017). Some European countries have embedded the "Student Company" programme2 as an option in their curricula, whereas in other countries, the programme is offered through extracurricular activities or national programmes.

Research conducted in several countries has shown that this programme leads to successful achievement of short-term outcomes in forming positive attitudes towards entrepreneurship and developing entrepreneurial skills [26], [27], whereas the long-term effects may be observed in higher start-up rates, higher employability, better career development [11], [10], [1], [48].

The goal that the EU aims to achieve is to provide all young people with at least one practical entrepreneurial experience before leaving compulsory education, and the establishment of a mini-company is considered one of the most effective practical entrepreneurial experiences available for schools [17], [15].

The United Kingdom is one of the European countries with the longest history of implementing the "Student Company" programme (the Young Enterprise programme). Upon 50 years of running this programme, a survey was conducted on a sample of 371 Alumni showing that the participants of this programme are 26% more likely to run their own business than their peers, that their companies have a higher turnover (with 12% of the enterprises earning more than 500,000 pounds, compared with 3% of businesses in the control group), employ more people than other comparable companies (11% employing 51 to 100 people, versus 9% in the control group), were more resilient in surviving the recession crisis period (49.6% increased sales during the crisis, and 30% developed new products), are highly diversified, innovative, etc. [1].

Following 10 years of the implementation of the "Student Company" programme in Sweden, a research was carried out with the aim of assessing the impact of the programme and the cost-effectiveness of this type of education. The study was conducted in the period from 1990 to 2007 on a sample of 166,603 participants

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2 The "Student Company" programme is encountered under different names in different countries. Although several terms are widely used, such as mini-company, student company, young enterprise, they all refer to the same programme (author's remark.)

of the programme from 1980 to 2007 and a control group of 221,530 respondents who were not involved in the programme. The findings showed that programme participants launched their own business at the beginning of their career in 20% more cases compared to the control group and did it a year earlier on average. The companies started by programme participants created 130,000 jobs annually over the 20-year period. Furthermore, those companies had on average a 20% higher income compared to the control group companies, their "survival span" being longer and contributing more to the budget revenues. When employed in other companies, they advanced faster and the companies employing them also grew faster [48].

Numerous studies that have observed its short-term effects have confirmed the significance of the impact the "mini-company" method has on the development of entrepreneurial competences of its participants [27].

These results provide strong enough arguments for serious consideration of the prospects for a wider implementation of the "Student Company" programme in the educational system in Serbia.

Entrepreneurship education in Serbia

When it comes to the analysis of the state of entrepreneurship education in Serbia, what may be asserted is that, although there is growing awareness of the need for the development of entrepreneurship education in Serbia, the actual work on its development has not gone far yet.

The need for developing enterprising disposition, skills and knowledge has been expressed in a number of laws and strategic documents (Law on the Education System Foundations, 2009; Law on Primary Education, 2013; Law on Secondary Education, 2013; Law on Adult Education, 2013; National Youth Strategy, 2005; Strategy for Development of Education in Serbia 2020, 2012; Strategy for the support to development of small and medium-sized enterprises, entrepreneurship and competitiveness for the period from 2015 to 2020, 2015, etc.). However, a comprehensive framework for the implementation of entrepreneurship education across educational levels and profiles has not been defined yet.

Entrepreneurship education has so far been implemented as a separate course only in secondary vocational schools since 2004/2005. It is on the list of compulsory vocational courses with an annual course load of 62 to 64 hours and is taught in the final year. The main objectives of entrepreneurship education are to enable students to acquire basic entrepreneurial skills and knowledge, to develop positive attitudes towards entrepreneurship, as well as to prepare them to actively seek employment or self-employment. The subject is predominantly taught by teachers of general, general vocational and vocational courses who attended a two-day training programme with an emphasis on active teaching methods [44].

Furthermore, the Ministry of Education, Science and Technological Development runs various programmes and projects related to entrepreneurship which are being or have been carried out with the support of different development partners (such as the German and Norwegian governments, USAID, corporations, NGOs) [6]. However, these are mainly pilot projects limited in scope and duration (including only a certain number of schools, defined by type of school or territorially). Systematic attempts to incorporate entrepreneurship into curricula for primary schools, grammar schools, secondary arts schools are still underway.

As far as entrepreneurship education in Serbia is concerned, it may be noted that continuous development and a clearly defined concept have so far been provided only through informal programmes implemented by the Junior Achievement organization in Serbia.

The Junior Achievement Serbia organization is part of the global Junior Achievement Worldwide (JAW) network, founded in 1919, which encompasses 121 countries across all continents and represents the world's largest entrepreneurship education programme attended by more than 10 million students annually.

The implementation of this programme in Serbia started in 2005 with the establishment of the Junior Achievement organization. Since then, more than 60,000 students from 286 primary and secondary schools from all over Serbia have been enrolled in its education programmes in the field of entrepreneurship and financial literacy. Through a combination of theoretical and practical,

hands-on teaching, mentoring programme, organization of competitions and fairs, these students are offered an opportunity to learn the principles of business operations and are at the same time encouraged to develop their entrepreneurial competencies.

The programme is carried out in schools with the assistance of mentor teachers who have previously undergone training, developed and licensed by Junior Achievement Worldwide and certified by the Ministry of Education, Science and Technological Development of the Republic of Serbia. At the same ime, volunteers from the business community are also involved in the work with students and actively contribute to this youth education venture through mentorship, lectures and participation in juries at competitions. It is important to emphasize that the implementation of this programme, both worldwide and in Serbia, is financially supported by the business sector.

In 2013 and 2014, the European Commission declared the Junior Achievement organization in Serbia national winner in the field of entrepreneurship promotion, as well as runner-up at the European level. Long-standing active advocacy of the importance of entrepreneurship education in Serbia has resulted in the introduction of Junior Achievement activities into current strategies and action plans of the Ministry of Economy, Ministry of Education, Science and Technological Development and Ministry of Youth and Sports. The programmes have been accredited by the Ministry of Education of the Republic of Serbia and are listed in the catalogue of programmes approved by the Institute for the Improvement of Education.

Through a variety of practical activities, the Junior Achievement Serbia educational programme provides students with the opportunity to gain managerial and organizational skills, teamwork and cooperation abilities, as well as the opportunity to boost their career ambitions.

The programme focuses on encouraging students' innovation and creativity, entrepreneurship, experiential learning, along with developing skills that contribute to employability and economic and financial literacy.

In order to improve the quality of the programme, Junior Achievement is continuously working on the expansion of the network of teachers and further development of the competencies of the teachers already involved.

Programmes aimed at secondary schools can be implemented as a part of the curriculum in all schools that have entrepreneurship as a course or as an extracurricular activity in all other schools of any educational profile, within the framework of extended school activities defined by law.

Unquestionably, the flagship, the most recognizable and most important programme implemented within Junior Achievement is the "Student Company" programme.

This programme is based on the learning by doing principle. Following a standardized curriculum, under the supervision of trained mentors, students create a company, develop it and close it in one school year. Students are given the opportunity to run their own companies, with real products and services, as well as to manage the money earned during the whole period of their high school education.

Student companies are formed at the beginning of the school year and, throughout the duration of the programme, students go through all the stages of an actual company's business operations: raising finance for starting up a company, defining the organizational structure of the company; allocating roles/positions among team members; choosing the product or service that the company will provide based on their own ideas; market research; business plan preparation; product/service creation; marketing strategy; product design and business promotion; communication with business associates and consumers; exhibiting and selling at school competitions and local events; closing the company and settling its finances.

In order to ensure successful business operations of their companies, students are encouraged to interact with the business sector, potential buyers, institutions and the civil sector, thus promoting both their work and the community in a context wider than the school. In addition to acquiring first-hand knowledge on how business processes operate, the "Student Company" programme also enables students to familiarize themselves with the principles of market economy. Participation in competitions comprises an integral part of the programme concept. Junior Achievement Serbia organizes four regional competitions for student companies across the country, in which they compete for the national finals, where they

eventually vie for the best student company in Serbia. Every year, the best Serbian student company attends the European competition where it measures its strength with other peers - the best student companies from 35 European countries. Student companies from Serbia also have the opportunity to take part in international fairs organized by Junior Achievement Europe, held in various European cities.

Although the guiding idea behind this programme is to foster entrepreneurial spirit and financial literacy, and the most important outcome sought after in the programme is to open opportunities for self-employment and youth employment, this programme, in addition, contributes significantly to students' personal growth [27], [29].

Having in mind that students work according to a standardized methodology and receive guidelines and procedures for different stages in the development of a student company, research has shown that there are no significant variations in the organization, length and quality of student companies in different schools and countries [27, p. 12]. Based on these facts, it may be assumed that the programme should result in the same or similar effects in different countries. However, "numerous studies in the world show that factors that shape the entrepreneurial intentions of young people are significantly conditioned by the cultural and socio-economic context, which means that we cannot rely solely on experiences from other countries in the design of entrepreneurship education programmes" [44, p. 160].

So far, there has been no extensive research into the effects of applying this method of entrepreneurship education in Serbia; therefore, it might be interesting to explore the effects of application of this programme in our educational system. To that end, a research project has been launched involving mentor teachers participating in the realization of the programme.

Assessment of effects of the "Student Company" method in Serbia based on empirical research

In order to assess the effects of the application of the "mini-company" method on the development of entrepreneurial competences of students in the secondary school system

in Serbia, a survey was conducted polling the teachers involved in the implementation of the programme.

Having in mind that, within the scope of entrepreneurship education, a distinction may be made between the "narrower" and "broader" approach, with the former encompassing "education and training for running entrepreneurial business" and the latter dealing with "training for entrepreneurial behaviour, thinking, and performance" [6, p. 6], for the purpose of our research we have focused on the assessment of effects in terms of the broader approach.

Our initial standpoint was that no matter "whether or not they go on to found businesses or social enterprises, young people who benefit from entrepreneurial learning, develop business knowledge and essential skills and attitudes, including creativity, initiative, tenacity, teamwork, understanding of risk and a sense of responsibility" [18, p. 6].

Our aim was to find out how teachers who work or have worked with students in the implementation of the "Student Company" programme evaluate the usefulness of the programme in terms of the development of attitudes, skills, business knowledge.

Since there is a multitude of existing programmes and methods of entrepreneurship education that may be encountered in the European and global practices, we believe that research studies of this type are essential if we are to come up with scientifically-based recommendations for a wider application of this educational method in our environment. So far, there have been no comprehensive studies of the application of the "Student Company" programme in Serbia. Attention of the scientific audience, both in this country and in the region, has been more directed at examining entrepreneurial intentions and attitudes towards entrepreneurship among students, and in this sense, we have only very limited insights into the effects of entrepreneurship programmes offered to high school students.

Strong inspiration to launch this research came from the findings of the Innovation Cluster for Entrepreneurship Education, a large multinational research project. The Innovation Cluster for Entrepreneurship Education (ICEE) started in January 2015 and ran until January 2018. The project was co-funded by the European Commission

through the Erasmus+ programme. The leading partner in the consortium, with responsibility for its implementation, was Junior Achievement Europe (JA Europe).

The ICEE project was a policy experiment. To move towards the European goal that every young person should have a practical entrepreneurial experience before they leave school, the consortium tested what the scenario would look like if 50% of students between 15 and 20 years of age had such an experience. At the centre of the study was a mini-company scheme called the JA Company Programme (CP).

In this project, twenty upper secondary schools from Belgium, Estonia, Finland, Italy and Latvia participated in a 27-month field trial using mini-companies for the practical entrepreneurial experience. These schools were compared with the situation at five control schools. The research in ICEE was based on a combination of qualitative and quantitative methods. The quantitative study included surveys to students, teachers, parents and business people. The net samples were 7,000 students, 3,500 parents, 1,000 teachers and 400 business people. The data were collected over the period of two school years. In the qualitative study, 150 people from ten of the participating schools were interviewed in addition to head teachers and representatives from JA and the ministries. In addition to the research, all the ICEE partners worked together in four "cluster areas" to identify good practices on: national strategies, content and tools, teacher training, and assessment [27].

The research in Serbia was primarily initiated with the idea of exploring some of the issues that were the subject of the ICEE analysis – first of all, the evaluation of the effects of the programme on students in the sphere of developing entrepreneurial competences, as well as obtaining information on how entrepreneurship educators themselves were prepared for it. The research was based on responses expressing personal opinions and teacher assessments. Some of the questions were designed in the form of statements (e.g. Our education system pays enough attention to entrepreneurship education). A 5-point Likert scale was used for responses (1 – I strongly disagree, 2 – I generally disagree, 3 – I neither agree nor disagree, 4 – I generally agree, 5 – I strongly agree). Certain questions

required teachers to rate the effects of the programme in certain areas, on a scale from 1 to 5 (e.g. Assess the usefulness of the "Student Company" programme in developing students' entrepreneurship skills (1 – not useful, 5 – very useful). In designing the questions, so as to be able to compare the results, we were guided by the questions that had already been tested and used in research undertaken with the same or similar objectives [27].

The research was conducted from mid-September to late November 2018. During this period, a questionnaire was defined and tested, an online teacher survey was carried out, and interviews with 25 teachers were held.

The questionnaire was sent to all active teachers collaborating with JA Serbia. According to the organization's data, as of 2008 until now, 963 teachers have received training for working with students in the "Student Company" programme. In the meantime, there have been natural fluctuations, and a certain number of teachers have retired, some have changed their jobs, and a number of them have never in effect been active. There are currently 461 teachers in the JA Serbia teacher base. Some teachers mentor student teams each year, whereas others do it periodically. It is also important to keep in mind that teachers' work is voluntary. In the past several years, the average number of active teachers in a school year has ranged from 100 to 120 teachers. In the survey sent, we received a response from 175 teachers from 118 schools. Bearing in mind that the "Student Company" programme is being run in 120 schools, this may be considered a very high response rate. This response rate may also be regarded as an indicator of their evaluation of the programme.

As we were interested in how teachers assess the extent to which entrepreneurship education is being implemented in our secondary schools, whether they need additional training in order to engage in entrepreneurship education and how they evaluate the effects achieved by using the "mini-company" method with their students, it was important for us to determine whether there are differences in attitudes about these issues that are dependant on the type of secondary school in which they work, their vocation (prior education) and the length of work experience in running the "Student Company" programme with students.

Among surveyed teachers, most of them (84%) work in secondary vocational schools, 11% in grammar schools, 4% in mixed schools and 1% in art schools. The structure of respondents closely follows the structure of our secondary schools. In the school year 2017/2018, there were 510 secondary schools in Serbia, of which 310 were vocational (60.8%), 111 grammar schools (21.8%), 49 mixed (9.6%) and 40 art schools (7.8%). A somewhat higher representation of JA teachers in secondary vocational schools may be interpreted as a result of the introduction of entrepreneurship course into the curricula of these schools, thus igniting a greater interest of teachers to master a specific model of entrepreneurship education.

Out of all the surveyed teachers, 50% of them have been participating in the implementation of the programme for more than 5 years, 21% from 3 to 5 years and 29% for less than 3 years. Out of the total number of respondents, 75% are women, and 25% are men. In secondary schools in Serbia women comprise 66% of employees.

According to the educational structure, the teachers who graduated from faculties in the field of social sciences and humanities comprise the majority (47%), with the faculty of economics being most represented, 31% received education in the field of technical and technological sciences, 15% studied natural and mathematical sciences and 7% medical sciences.

When asked whether they had the opportunity to acquire knowledge in the field of entrepreneurship during their formal education, 65% stated they did not.

As their main motivation for signing up for the training aimed at preparing them for the implementation of the "Student Company" programme, out of several answers offered, two of which were to be selected, 75% of teachers reported "the usefulness of the programme for students' development and personal growth". It was followed by the answer "for professional development" chosen by 46% of respondents, whereas 20% reported curiosity as the reason. Interestingly enough, only 5% stated it was "for credit points", although earning points through different types of continuous professional training is a requirement. These data point to a high level of personal motivation of teachers for being involved in the programme. This is also shown in answers to the question "Why are you running

the 'Student Company' programme at your school?" Out of the answers offered, three of which could be selected, the answer "I believed that it would be useful for the students I teach" was given by 80% of respondents, the response "because of the opportunity for acquiring new knowledge" was submitted by 53%, whereas the statements "I believe in learning by doing" and "I am attracted to informal forms of teaching" were chosen by 41% and 28% of respondents respectively. The answers "for socializing and getting to know new people" and "for the sake of expressing my creativity and innovation" were found at the bottom of the list, receiving 25% and 22% respectively.

The responses point to high levels of intrinsic teacher motivation, which is a significant factor for the success of the programme implementation. Notwithstanding how much a programme may be standardized, the role of the teachers is still of the utmost importance in the educational process.

The ICEE study states that "enthusiastic and competent teachers play a crucial role in the implementation and upscaling of EE3" [27, p. 8].

The survey item aimed at assessing the competence of teachers for the implementation of the programme was the following: "I have the necessary knowledge and skills for mentoring in the 'Student Company' programme and I do not need additional training and improvement", where respondents were supposed to indicate the extent to which they agreed with the statement on a scale of 1 to 5 (1 expressing "I strongly disagree", and 5 "I strongly agree"). Out of the total number of teachers, only 9.7% believe that further training is not necessary, and these are the teachers who have been involved in the programme for more than 3 years (21.6% of respondents with 3 to 5 years of experience and 10% of respondents with experience of over 5 years) (Figure 2). Obviously, teachers with 3 to 5 years of experience in the programme are more confident. In this group the mean score was 3.48, for teachers with over 5 years of experience it was 3.24, whereas the mean score for the whole group was 3.21. As expected, teachers with less than 3 years of experience were the ones who believed that they needed further training the most (mean score

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3   Entrepreneurship education.

of 2.98). That additional training is needed was explicitly stated by 24.5% of teachers. This is not surprising, as 65% of teachers have not encountered entrepreneurship education during their previous schooling.

When observing the variations in responses in relation to the type of teachers' primary education field, the mean score ranges from 3, in the group of teachers coming from the background of natural and mathematical, as well as technical and technological sciences, up to 3.4 for teachers graduating from social sciences and humanities. On the basis of the interviews conducted with teachers, it may be concluded that this difference in favour of the teachers who received education in social sciences and humanities is attributable to the teachers who studied faculties with an economic group of courses (Faculty of Economics, Faculty of Management, Faculty of Organizational Sciences).

The item "Our education system pays enough attention to entrepreneurship education" received a mean score of 2.3. Out of the total number of respondents, 63% said that entrepreneurship education was not being given sufficient attention (Figure 3). Out of the 175 surveyed teachers, only two opted for the statement "I strongly agree" and they come from the group of teachers with the shortest experience in the programme. There were no significant differences in teachers' answers dependant on their education or seniority in the programme.

The statement used to assess whether there are differences in the attainability of the ultimate goal of entrepreneurship education – the development of students' entrepreneurial competencies, which may be attributable to the types of secondary schools, was the following: "The courses in the curriculum offer students the opportunity to develop entrepreneurial competencies". Responses in all subgroups (divided by the type of school, length of teachers' programme participation) were very similar. When all schools are observed collectively, the mean score is 2.72, with secondary vocational school teachers' responses receiving a mean of 2.73, and grammar school teachers 2.63. Teachers in art schools gave the lowest rating (the average being 1.5), but due to their low participation in the total set, they did not significantly affect the overall mean results. Such an inconsiderable difference in the assessment of the curricula between secondary vocational schools, in which entrepreneurship is a curriculum course, in contrast to grammar schools which do not include it, suggests that there is probably a problem in how the curriculum is defined and how the entrepreneurship course is being taught in terms of learning outcomes.

As the main objective of the survey was to assess the effects of applying the "Student Company" method to the development of students' entrepreneurial competencies, the questionnaire required teachers to evaluate the usefulness of the programme for the development of entrepreneurial skills (Figure 4) and the development of entrepreneurial attitudes (Figure 5) on a 5-point scale. The statements were related to specific types of skills and attitudes, 1 meaning that the programme had no effect, and 5 indicating that the programme was very useful. The responses have demonstrated that teachers believe the "Student Company" programme to be very effective in both areas.

Figure 2: Teacher's attitudes on "I have the necessary knowledge and skills for mentoring in the 'Student Company' programme and I do not need additional training and improvement"
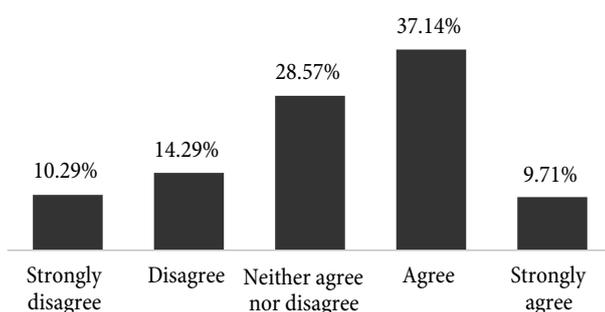

Figure 3: Teacher's attitudes on "Our education system pays enough attention to entrepreneurship"
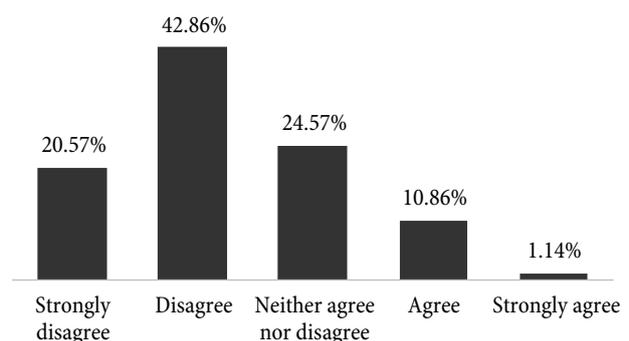
Skillswise, what can be inferred from the means cores is that the programme provides excellent results in developing teamwork skills (4.62), presentation skills (4.58), communication (4.58), decision-making (4.48). Slightly weaker effects, but still above 4, are achieved in goal setting skills (4.39), managing timelines (4.33), leadership skills (4.30), negotiation skills (4.21) and conflict solving (4.14).

Excellent results are also attained in developing attitudes. Teachers have evaluated that the programme most significantly affects the development of creativity in students (4.71), then self-confidence (4.65), proactivity and taking initiative (4.53), need for achievement (4.47), perseverance (4.42) and risk management (4.21).

The teachers were asked to specify the areas in which they believed the "Student Company" programme gave the best results (Figure 6) and the development of students' overall potential ranked first. It is worth noting that for each of the offered areas the mean score was above 4.2.

Based on the findings of the research, it may be ascertained that the "Student Company" programme accomplishes excellent results in the development of entrepreneurial skills, entrepreneurial attitudes, and financial literacy. All these lead to the growth of the students' overall potential, and this is exactly what is important in the era of the Fourth Industrial Revolution, when the most valued individual traits are creativity, proactivity, adaptability, need for achievement, risk-taking and a sense of initiative.

These results are fully consistent with the results obtained through ICEE research. In their words, "teachers, students and parents in all the countries mentioned a wide range of learning outcomes, such as knowledge (how to start and run a company); generic skills (creativity, conflict solving and presentations), and attitudes (school motivation, responsibility, self-efficacy and self-confidence). Both students and teachers mentioned that a by-product

Figure 4: Assessment of the effects of the "Student Company" programme on developing entrepreneurial skills
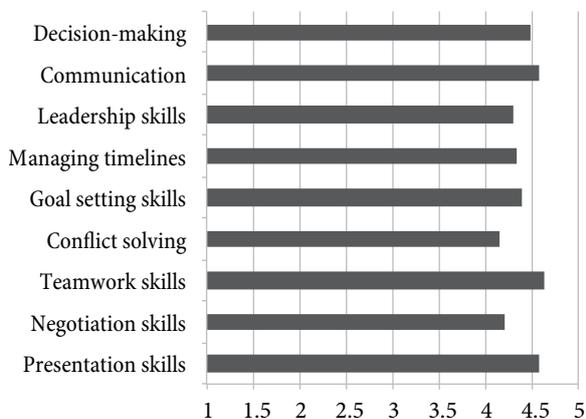
Figure 5: Assessment of the effects of the "Student Company" programme on the development of entrepreneurial attitudes
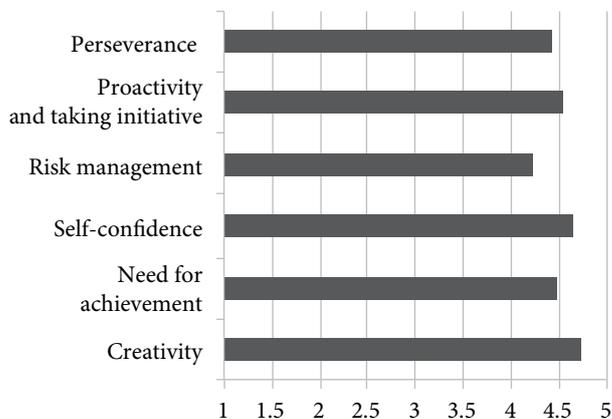

Figure 6: Assessment of the effects of the "Student Company" programme on student development in different areas
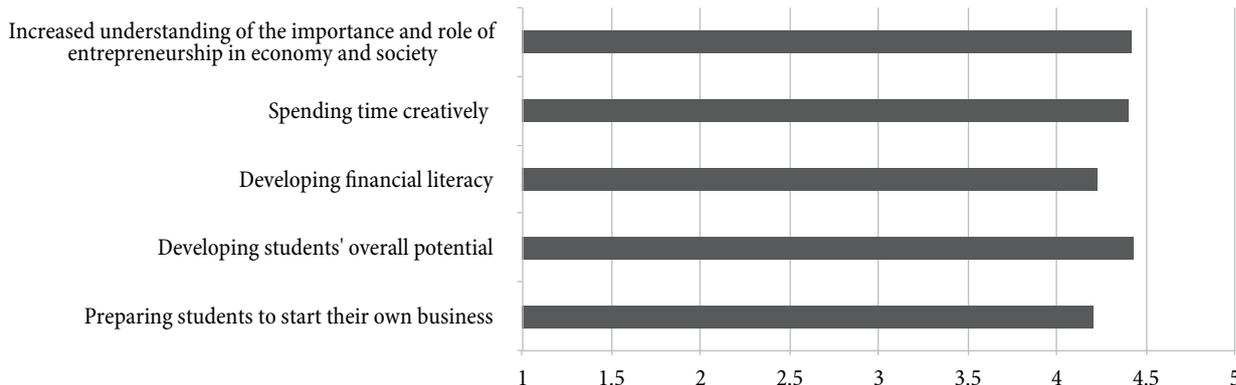
of this process, was more students coming to understand the usefulness of the other subjects that they were being taught" [27, p. 7]. Furthermore, "they pointed out that the most important success factor for CP is the opportunity it provides for the individual student. Teachers (and students) describe how mini-companies provide opportunities for personal growth through practical knowledge; opportunities that the school otherwise does not provide" [27, p. 47].

We obtained very strong evidence of these attitudes through interviews with teachers. They found that, when involved in the programme, students developed a competitive spirit and self-confidence. They heard students say that they had not experienced anything better in their lives. They said that students improved their school performance and they could see great progress in students participating in the programme over the period of two school years. Probably the most vivid assessment of the effects of the programme was given by a teacher who said "these kids are starting to differ from other children in the classroom".

Conclusion

The Fourth Industrial Revolution is leading to accelerated transformations of economies and societies globally. Labour market demands are changing dramatically. New occupations are emerging and the existing ones disappearing. Given the dynamics of the change, there is a high degree of uncertainty about the types of knowledge and skills that will be needed in the future. Numerous studies suggest that an increase in the need for workers with finely tuned social and emotional skills – skills that machines are a long way from mastering, will be accompanying the adoption of advanced technologies in the workplace. The development of creativity, innovation, entrepreneurship and sense of initiative, analytical and critical thinking, communication and negotiation skills, decision-making, leadership, and empathy is gaining in importance.

These skills are an integral part of the entrepreneurship competence and are successfully developed through entrepreneurship education. In today's world, this form of education is approached not only in its narrow sense, as

a process of preparing for business creation, but also in a wider context, as a process of developing entrepreneurial mindsets and skills, as well as personal qualities that have universal application. There are several approaches, methods and models of entrepreneurship education. Serbia has started implementing entrepreneurship education within its education system, but does not yet have a clearly defined strategy for the development of this type of education across different levels and educational profiles. Currently, entrepreneurship has been introduced as a course in the final year of secondary vocational schools, while in other schools and at lower educational levels it is envisaged that this competence will be developed through cross-curricular collaboration. The research we have conducted shows that the existing curricula do not allow for the efficient development of entrepreneurship competence among students and is not given enough attention. Insufficient teacher training for this type of education appears as an additional problem.

Worldwide experience shows that the best effects in the development of entrepreneurial competences are achieved through informal types of education, and the "Student Company" method has been recognized as an example of good practice. This method is based on experiential learning and is implemented in secondary schools. In order to provide recommendations aimed at selecting optimal solutions for the design of entrepreneurship education in Serbia, a study has been carried out to evaluate the effects of the implementation of the "Student Company" programme within our educational system. The survey has shown that, according to the assessments provided by 175 teachers from 118 secondary schools participating in the programme, the "Student Company" method also gives excellent results in the development of entrepreneurship skills and attitudes among our students. A standardized training method combining practical and theoretical instructions alleviates the problem of insufficiently or inadequately trained entrepreneurship teachers. In addition, the "Student Company" method is implemented in cooperation between the business and education sectors, spontaneously connecting them, which can further contribute to reducing the "delay" of the educational system in terms of the needs of the economy.

All these arguments speak in favour of the inclusion of this model in all secondary schools in Serbia as an informal type of education.

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PUBLIC INTEREST CONSIDERATION IN COMPETITION POLICY

Razmatranje javnog interesa u politici zaštite konkurencije

Abstract

Welfare and protection of consumers, i.e., benefits for consumers based on a high level of competition between market participants operating on the same relevant market, are the main objectives of competition policies. In other words, this means that, as one of the goals of the competition policy, one should certainly bear in mind public interest, which is also the subject matter of this study. Efficient competition plays a major role in creating an encouraging and developing environment for all market participants; hence, it is very important that the restriction of competition be minimized. In this context, the study deals with the objectives of protection of competition, having in mind the protection of public interest. Also, the study defines the concept of public interest itself, explaining the role of protecting public interest from the perspective of protection of competition. Examples from practice are therefore used to further illustrate the mentioned concepts. The link between protection of public interest and protection of competition has not been analysed in detail in literature, although there is an increasing number of cases before commissions around the world where a national security test or a public interest test is taken into account when deciding not only in concentration cases, but also in antitrust cases.

Keywords: *protection of competition, competition policy, public interest.*

Sažetak

Blagostanje i zaštita potrošača, odnosno ostvarivanje koristi za potrošače na osnovu visokog nivoa konkurencije između tržišnih učesnika koji posluju na istom relevantnom tržištu osnovni je cilj politike zaštite konkurencije. Drugim rečima, kao jedan od ciljeva politike zaštite konkurencije svakako treba imati u vidu i javni interes, što je ujedno osnovni predmet ovog rada. Efikasna konkurencija ima pretežnu ulogu u kreiranju podsticajnog i razvojnog okruženja za sve tržišne učesnike, te je vrlo važno da ograničavanje konkurencije bude svedeno na minimum. U tom kontekstu, u radu su sagledani ciljevi zaštite konkurencije, imajući u vidu očuvanje javnog interesa, objašnjen je koncept javnog interesa, obrazložena uloga očuvanja javnog interesa iz ugla zaštite konkurencije i predstavljeni su uporedni primeri iz prakse. Veza između zaštite javnog interesa i zaštite konkurencije do sada nije detaljno analizirana u literaturi, iako postoji sve veći broj slučajeva pred komisijama širom sveta gde se test nacionalne bezbednosti ili test javnog interesa uzima u obzir prilikom odlučivanja komisija, ne samo u slučajevima prijave koncentracija, već i u slučajevima povrede konkurencije.

Ključne reči: *zaštita konkurencije, politika zaštite konkurencije, javni interes.*

Introduction

Many countries around the world either adopted or are in the process of adoption of legislation regarding protection of competition. People are becoming increasingly aware of the negative effects of anti-competitive practices. Such practices have adverse effects on purchasing power, companies' performances, economic growth and social development. Also, anti-competitive practices restrict competition and deteriorate customers' welfare by creating barriers to entry and leading to price increases. Altogether, these effects reduce efficiency and inhibit innovation, also affecting a country's public interests. In order to identify and sanction the effects of anti-competitive practices, it is necessary to establish adequate legal and institutional framework in the field of competition protection.

Application of the competition protection policy is important for efficient functioning of market economy, which is a basic precondition for both economic and political stability of a country. For these reasons, it is important that any restriction of country's market competition be minimized. Restriction of competition can be manifested in the form of agreements and concentrations that significantly prevent, limit and distort competition, as well as in the form of abuse of a dominant position. All forms of restriction of competition can be very dangerous for every single market in which they occur, both in the short and in the long term, and especially in the latter. Restriction of competition can lead to serious consequences for both market participants and consumers.

When public interest is discussed in terms of being a constituent part of the competition protection policy, the first thing that comes to mind is that, in every procedure conducted by the bodies responsible for protection of competition, the effects of the decisions on economic progress and welfare of the society, especially consumers' benefits, must be considered. This means that, in addition to assessing the impact of market participants' activities on fair competition indicators, potential effects on the improvement of production and trade in goods and services must also be evaluated. In other words, it is necessary to encourage technical or economic progress, while providing consumers with a fair share of benefits, provided that market participants are not unnecessarily constrained. In this respect, any decision of the competent authority for the protection of competition should anticipatively consider the question whether public benefits arising from certain activities of market participants exceed public damage caused by the reduction of competition. On the other hand, it is necessary to consider the activities of market participants that can create benefits from the aspect of competition and, at the same time, be detrimental to the society as a whole.

The subject matter of this paper is research on the interdependence of public interest and competition policy. The aim of the paper is to point out the necessity of considering public interest in the conduct of the competition protection policy. In addition to introduction and conclusion, the work consists of three parts. The first part describes the objectives of the competition protection policy. The second part explains the concept of public interest, while the third is dedicated to a unified consideration of public interest and competition policy.

Objectives of the competition protection policy

Defining the competition policy, as a very young institution in Serbia, is not an easy task. If we tried to define it, we would probably include the following: "set of legal regulations and rules that enable improvement of competition, but also its regulation or protection, in such a way that its effects are not harmful to the whole society". This definition indicates that the regulation of competition, in any way, can lead to harmful consequences for society and vice versa, that some cases of regulation can improve the general well-being of society. Competition regulation, such as the prohibition of predatory prices, ensures the operation of a large number of companies on the market, and consequently a greater supply, quality and more favourable prices for consumers.

Professor Motta [22] defines competition policy through the following goals:
- Improving well-being (total surplus);
- Improving consumer welfare (consumer surplus);
- Protection of small enterprises;
- Promotion of market integration;

- Greater economic freedom;
- Fight against inflation;
- Equity and equality.

To these goals, Motta also adds other public factors that affect competition, such as the following:

- Social factors;
- Political factors;
- Ecological factors;
- Strategic factors (primarily industrial and trade policies).

On the other hand, highly quoted Robert H. Bork [6] defined competition several decades ago using five definitions. In his opinion, competition is all of the following: the process of rivalry; absence of restriction of one company's economic activity by another company; a market situation where an individual buyer or seller does not affect the market price by buying or selling; the existence of fragmented industries and markets; a state in which consumer welfare cannot be increased by moving to an alternative state through a court order. The last definition, the most commonly used by Burke, points to the importance of consumer welfare as public interest in the competition policy.

One of the basic goals of the modern competition policy is to facilitate efficient resource allocation and economic growth, increasing the usefulness of all participants in the economic process. In a competitive market, resource allocation functions in a way that ensures the production of the goods and services that consumers need, at the lowest possible cost and at prices that consumers are willing to pay. Such market is considered an efficient one. Still, the basic goals of the competition policy should not be related only to efficiency. In this respect, competition should be seen as a dynamic process of race among different market participants. Consequently, the objectives of the competition policy include consumer welfare, equal distribution of income, encouragement of development of small and medium enterprises, and others [20]. The main economic goal of the competition policy is the preservation and promotion of competitive process and its task is to encourage effective competition. Therefore, it should not be understood as something that protects small enterprises from large and vice versa.

In a highly competitive market, individual participants have a small market share, and therefore cannot influence prices, regardless of increasing or decreasing the produced quantity. Therefore, the legal framework of the competition policy provides an open possibility to apply the *de minimis* rule. This means that even if they violate certain competition rules, small firms do not produce any economic effect, and therefore such offences are not subject to investigation by competition authorities. Since in such competitive conditions the price is given, in order to maximize profit all companies will produce the quantity of products that will provide them with the lowest average production costs. In this way, production efficiency is achieved [4]. Moreover, a perfectly competitive market is characterized by the absence of entry and exit barriers, which is why price changes lead to the entry of new players or the exit of the existing ones, thus achieving allocative efficiency. A high level of competition results in reduction of prices, greater supply of products and services, and a constant pressure to lower production costs. Consequently, effective implementation of the competition policy is expected to provide benefits for consumers.

On the one hand, proportionally to their size, large firms can effectively influence competition on the market. Companies that have market power can act independently of other market participants. Consequently, they can also increase the prices that consumers pay, thus securing higher profits. In a business environment, in general, a desire to maximize profits always exists. On the other hand, the competition policy sees enormously high profit as a potential abuse of a dominant position [15]. If there is only one market participant, it will limit the quantity produced below the competitive level in order to increase the price. This will result in higher average production costs, since only the competitive level of production volume provides minimum costs per unit. This creates production inefficiency. In order to avoid this, appropriately designed economic policy should include competition protection measures, with the main aim of achieving a greater level of competition in all markets. Therefore, the legal framework of the competition policy is very important for successful development of a market economy [15]. However, the implementation of such policy

does not mean that companies cannot communicate and merge or that the possession of a dominant position on the market is punishable by itself. For that reason, one of the key factors in the implementation of competition policy should be informing and training company's executives. Knowledge of competition rules can ensure effective protection against distortion of competition, instead of exposing them to financial troubles, due to competition protection measures – penalties, that can reach up to 10% of the total annual income.

From the standpoint of the competition policy and analysis of individual cases, it is necessary to distinguish between static and dynamic competition in the market [25]. Static competition implies that there are no significant changes in the market. The products are offered at fairly favourable prices, but there are no significant improvements to existing products, nor is there introduction of new ones. In such circumstances, there is no significant drop in prices driven by innovations. Without innovations, all companies on the market have the same technology and the same business model, they achieve equal and very small profits, and in the long run prices are equal to marginal costs. Dynamic competition is driven by innovations. A market with such competition is characterized by different activities of competitors, resulting in significant product differentiation and quick responses to newly emerging changes, either in terms of specific innovations or the appearance of new market opportunities.

Bearing in mind the above definitions, it could be said that most of today's markets, in the conditions of global competition, have a dynamic character. Traditional static analysis focuses on determining market power in the relevant product market. Dynamic analysis looks at competition from a wider angle and is less focused on the current state, and more on the processes taking place in a particular market.

Modern competition policy is based on the synthesis of competition law and economics. This is due to the fact that the problem of competition protection cannot be seriously considered without understanding the economics, more precisely the way in which the relevant market operates. Competition policy is based on the belief that the competitive market contributes to the increase of economic efficiency and social well-being. Therefore, it is not rarely seen that competition authorities intervene in certain markets in order to ensure competitiveness in them. Ideally, the market should function without intervention and regulation. However, this is not possible, primarily because not all of the markets are structured as highly competitive.

Based on all of the aforementioned, we can conclude that the basic goal of the competition policy is welfare and protection of consumers, i.e., providing benefits for consumers established on the high level of competition between business entities operating on the same relevant market. In other words, this means that one of the objectives of the competition policy must be to pay attention to public interest. In his speech in July 2001, European Commissioner for Competition Policy, Mario Monti, said that "the goal of competition policy, in all its aspects, is to protect consumer welfare" [21]. Strong competition brings lower prices and better quality of life to consumers, which is reflected in a greater supply of high-quality products and services.

Consumers always profit the most from the implementation of competition policy. Companies offering goods and services on the market should offer them the best value for their money. However, establishing a competition policy enforcement body requires a certain amount of costs. Logically, the question of cost-benefit analysis is raised, i.e., whether the benefits outweigh the costs. The key to success, which in this case means the justification of the existence and enforcement of a competition policy, in a particular country lies in the quality of its institutions, primarily the commission for protection of competition and the judicial system [28]. Due to great expansion of the competition policy in the world, the interest in more precise assessment of its effects is growing. Because of this, competition authorities in certain countries began assessing the positive impact of their activities, which is directly manifested through the increase in consumer welfare [17].

Competitive pressure constantly encourages companies to be more productive than others in order to offer their products at lower prices and achieve a higher market share, making them more competitive in comparison to other companies. Therefore, the goals of competition policy and

its basic role, which is increasing the level of competition, i.e., the creation and strengthening of competitive pressure, are evidently followed by the growth of productivity of individual enterprises, and therefore the entire economy, as well as the development of public interest, reflected in economic progress and consumer benefits.

The traditional competition policy is narrowly understood. Its goals are related to the prohibition of agreements that restrict competition, the prohibition of abuse of a dominant position, and the prohibition of non-competitive mergers. However, such perceptions have changed significantly over time and the protection of competition is now understood much more broadly and has a significant role in the conduct of business processes. Competition policy is nowadays understood as a conduct of business activities [19]. It implies enjoyment of equal rights, efficient economy, sound business logic and public interest.

What is public interest?

The law on protection of competition leads to the welfare of consumers and fosters fair competition among market participants. Essential characteristic of this area is a multidisciplinary approach, because the application of legal framework requires the perception of legal, economic, social and political dimensions. When the competition law is at the service of public interest, certain regulations of the law that define restrictive clauses may be suspended in favour of social and political objectives.

Numerous examples in countries around the world and in Europe, whose practice we mostly rely on, are based precisely on the consideration of the impact of a specific case on national security and public interest. Global practice already differentiates considerations related to economic issues from considerations concerning other objectives, such as social protection of employees, protection of public health and environmental protection. Areas of relevance to national security are rarely precisely defined in national legislation, but the competent body has always responded adequately when the threat to national security arose [24].

The concept of public interest, although widespread and often used in public appearances, primarily in political philosophy, is not fully and precisely defined. It is very difficult to give a definition of public interest, if not impossible, since the conceptualization of this term requires an individual to have broad knowledge. The concept of public interest continually evolves through the development of social community, which makes every attempt to define it harder.

Broadly speaking, common to all previous attempts to define public interest is the opinion that the elected government should serve the people, where the people are the main consumers of benefits provided by state governance. Any attempt to find a more precise definition than the previous one was not successful and has justified the question whether public interest should be defined at all.

The dominant problem in defining the concept of public interest is its variability, depending on current social circumstances and the accepted social norms. For this reason, the accepted concept of public interest today does not necessarily have to be a concept that will be accepted in the following period. In accordance with the previous explanation, during the 1950s coal was used as a primary source of energy for heating people's homes and that did not cause any controversy. Today, this is definitely not the case in most countries, due to the accepted social opinion about environmental protection, which makes the concept of public interest evolve towards sustainable and renewable energy sources. This example illustrates how difficult it can be to define public interest and make that definition universally applicable. Contrary to the previous one, in certain cases social consensus on issues of a wider social significance can be easily achieved. An example is the fact that in all modern societies grand larceny and murder are defined as criminal acts and are severely punished because of the public interest to preserve order and peace in a society.

Consequently, the closest definition of the concept of public interest can be formed using deduction as an accepted logical method of conclusion. Deduction as a method of logical conclusion starts from a general case and leads to the individual one. On the other hand, the reverse logical process – induction, starts from the individual case and leads to the general one. Induction specifies a certain starting premise, which can be correct,

and causally leads to the conclusion that the same thing can be applied to the whole society. Ineffectiveness of induction is reflected in a very familiar example of the black swan [27]. Namely, in the Old World, before the discovery of Australia, it was believed that all swans in the world were white. The scene of the first black swan on the newly discovered continent points to the fact that, based on induction, by concluding from the individual to the general case, even with the correct starting assumption one can reach a conclusion that may be wrong, although it is based on the exact foundation.

It can be concluded that the closest definition of public interest can be reached following the path from a general to the individual case. However, in spite of unambiguous determination of the logical method of conclusion, in case of public interest, it is extremely difficult to define the general concept, primarily because of the basic characteristic of public interest – the variability which is caused by the development of a certain social community and accepted social norms. This does not mean that participants in public debates should avoid defining public interest, but that they should be cautious when trying to do that. They should consider the limitations of the conclusion based on experience or unambiguous observation of a phenomenon.

Given the continuous development of the concept of public interest, there is a need for any legislation in developed society that uses this concept not to be rigid, but to constantly adjust to the nature of the concept. This is the reason why public interest has to be understood as a decision made with the idea of achieving common good for society as a whole, especially in the area of health care, environmental protection and national security.

In 1988, the United States introduced a provision known as "Exon-Florio" in its Antitrust Law. It gives the President of the United States the power to stop foreign investments in domestic enterprises in order to protect national security, regardless of whether other regulations of the Law have been met. The relevant Committee on Foreign Investment in the United States (CFIUS - the U.S. Committee on Foreign Investment) has recently referred to this regulation and made decisions that completely ignored the loss of potential economic benefits, justifying this act by the protection of national security.

Making decisions contrary to the regulations of certain laws in order to preserve public interest is not exclusively the practice of modern state governance. However, under the influence of the global crisis and the growing protectionism of national economies, public interest can increasingly be used as the basis for a protectionist economic policy, where the state has an increasing share in market regulation. For example, in 2015 German Federal Cartel Office banned the merger of two supermarket giants, EDEKA and Kaiser's Tengelmann, on the grounds that it could lead to the domination of regional markets [7]. However, the Minister of Economy subsequently overturned this decision due to concerns about employment, job security and workers' rights [8]. On the other hand, without any proof of competition concern, the United States Government blocked the planned merger between semiconductor companies, Singapore-based Broadcom Limited, California-based Broadcom Corporation and Broadcom Cayman L.P., which it claimed to be a threat to national security [29].

Although the previously mentioned examples are exemptions to the rule, this practice can become a legitimate justification for easing or circumventing competition rules when it comes to decisions made by state policymakers. In accordance with the preceding, there are several dilemmas: can the consequences of such decisions be observed, what are the direct economic consequences of putting public interest before fair competition rules and how much time is necessary for them to be manifested? Keeping in line with the economic logic, any distortion of fair competition and regulatory impact on the free market can, in anticipation, lead to significant negative repercussions that occur in the long run.

Public interest, especially in the segment of national security, public health, environmental protection or macroeconomic stability of the entire economic system, has a primary place on the list of goals of decision-makers. However, the question is what scope and level of intervention is needed to save public interest. Lack of precise criteria, standards and justified decisions can result in the competition rules being endangered and ignored. In the long term, the negative social effects resulting from neglect of competition rules may be greater than short-

term gains based on the preservation of public interest. The preceding conclusion is especially apparent when negative effects generated by the regulatory intervention of competent bodies cannot be minimized or completely neutralized, which is why they are cumulated in the future.

Public interest and competition policy

Protection of competition practice is based on logical economic principles that all market participants abide by, and those principles are connected through an integral legal framework. They are accepted by all countries with developed fair competition practice. However, although these principles are universal, fair competition rules vary from country to country. These differences are the result of differences in economic policies, economy, tradition of competition protection, as well as social and political factors.

Two extremes can be identified in formulating the rules of competition protection. According to the first, totally unregulated markets are vulnerable to the presence of dominant market players, and strong pressure of regulatory bodies is needed in order to achieve market balance and welfare. In the second extreme, markets are in balance and the presence of a regulatory body would lead to inhibiting competition and innovation, while application of any rules would be counterproductive. In practice, most countries provided legal protection for the competition system positioned somewhere between these two extremes, meaning that intervention aimed at protecting public interest is occasional.

Competition policy clearly favours consumers, which is evident from the goal of the law on protection of competition that points to public interest manifested in economic progress and social welfare, consumer welfare above all. Due to that, the public regulatory body for protection of competition is often perceived as an antibusiness body which confronts large companies because of their real or alleged illegal behaviour [11]. Although this body can be viewed as acting against companies, through its policies it actually works towards improvement of the whole business environment, for all of the participants, both positively and negatively affected.

The main premise in competition policy is that the improvement of competition leads to the situation in which competitive companies compete providing high quality products and services at reasonable prices. Competition based on fair market conditions very quickly eliminates inefficient enterprises that have unreasonable prices compared to those of other market participants, as well as those enterprises that do not satisfy the level of quality that consumers expect. Fair competition is in line with greater welfare, as it leads to greater national income by positively influencing the growth of general productivity.

The last-mentioned premise assumes that consumer preferences or public interest are known, i.e., defined. For certain products and services, public interest is clearly defined in advance, while for others it is problematic to conceptualize it, and in those cases all power is concentrated in the competition regulatory body. For example, in the Republic of Serbia certain products, such as basic types of bread, defined as products for vulnerable social categories, are protected as such in order for basic human needs to be satisfied. In other words, producers of basic types of bread are limited by maximum retail prices in order for public interest to be achieved. On the other side of the spectrum, smartphones and other smart devices do not fit this category and, therefore, their retail price is not limited. Due to that, competitors on the modern smartphone market compete in quality, design, brand, product characteristics and especially prices, without any regulatory limits.

Based on this example, it is not clear whether the existence of predefined public interest leads to restriction of competition and, if it does, to what extent. What is the extent of regulation that has to be imposed, does protection of certain industries/markets lead to restriction of competition, and what damage to competition a society can tolerate for public interest are questions to be asked.

Overview of different practices regarding the safeguard of public interest in competition protection regulation

Many practical examples can be identified in the USA. In case of national security, a good example of prioritization of

public interest over the rules of protection of competition is the one where many investments of Chinese telecommunication companies in the USA were suspended. This investment wave was followed by the reaction of NSA, which wrote a report called "The counterintelligence and security threat posed by Chinese telecommunications companies doing business in the United States" and demanded the reaction of CFIUS. In this report, it is recommended that CFIUS forbids M&A transactions in which Huawei and ZTE were involved.

Although the realization of such transactions would lead to potential benefits for final consumers, such as better service quality and lower prices due to more efficient business operations, the national regulatory body made the decision to suspend them.

There are also other reactions of CFIUS aimed at protecting the USA interest. For example, it is thought that allowing significant acquisitions in the energy sector would have a negative impact on protection of national security. The proposal of acquisition of the Union Oil Corporation of California was initiated by the China National Offshore Oil Corporation (CNOOC). However, due to political pressure, CNOOC decided to bypass the planned transaction, due to anticipation of negative opinion of CFIUS.

Another example from the USA is the protection of steel market. In 2006, ArcelorMittal attempted to acquire the Laiwu Iron and Steel Corporation. However, this acquisition was stopped after a year and a half due to a negative review of the National Development and Reform Commission, which advocated the protection of steel market and its development potential [16].

Such practice has often been applied in Europe as well. For example, Germany was in similar position as the USA when, after a series of significant investments by Chinese companies in the technology sector, it decided to strengthen its regulations in order to establish more effective control over such processes [10].

The Australian Competition and Consumer Commission presents its National Competition Policy as a tool, rather than focusing on its goal. The purpose of implementing protection of competition is to improve productivity and achieve lower prices and better service quality, as well as to improve welfare and employment opportunities.

Although the National Competition Policy in Australia is created to serve public interest, individual cases can be subject to additional cost-benefit analysis.

The basic principle of the National Competition Policy is that a government should approve or deny restriction of competition only in cases in which it can be proven that the potential benefit for society is greater/less than the costs resulting from such a measure. The benefits include non-economic, as well as economic factors of public interest. Therefore, the factors that the Australian Competition and Consumer Commission [12] considers are the following:

- state legislation and policies related to ecologically sustainable development;
- social welfare and equity, including community service obligations;
- state legislation and policies related to occupational health and safety matters, industrial relations and access and equity;
- economic and regional development, employment and growth of investments;
- interest of all or a group of consumers;
- competitiveness of Australian industries;
- efficient resource allocation.

In the practical usage of the public interest test, decision-makers most often calculated factors of competitiveness, economic growth and development and employment, whose criteria for calculation are relatively well-known and clearly defined. On the other hand, non-economic factors, such as degree of social well-being, equality, social inclusion and environmental sustainability, do not have clearly defined criteria of measurement, and therefore are set aside. Even though these non-economic factors are formally included in the public interest test, their assessment is rarely used in making the final decisions that can affect public interest [14].

Australian regulations clearly prohibit companies' anti-competitive behaviour, but, at the same time, allow the competition authority to approve such behaviour (even in case of mergers that significantly weaken competition), only in cases where it can be clearly argued that this measure provides greater public benefit than damage caused by reduction of competition.

In this country, several bans on transactions occurred under the influence of the Foreign Acquisitions and Takeovers Act 1975. An example is the proposed Chinese investment in stockbreeding and the company S. Kidman and Co. Limited.

Botswana, although a developing country, recognized the importance of public interest, and incorporated it into its Competition Act. This Act aims to achieve maximum efficiency in preserving competitive markets, in line with the public interest of a company [9]. Also, in this Act the concept of public interest implies general social well-being, in contrast to personal or group well-being. In this definition, public interest represents the interest of a "higher rank" than an individual's interest. Individual or group interest which could cause the reduction of well-being of other members of society cannot be in public interest, as it leads to the reduction of the well-being of the whole society. Only actions that promote the well-being of the entire society can be part of public interest, even when some individuals or groups in the society are exposed to damage.

The Botswana Competition Act turns to the Australian Competition Tribunal [1], which tests public interest, by asking the following question: "Is the proposed behaviour/measure likely to result in the improvement of public welfare that exceeds the likely public damage resulting from reduction in competition?". In order to answer this question, it is necessary to identify and measure whether the effect of protection of competition is negative or positive for any individual or group of individuals. After full identification of effects, it is possible to determine the net effect on social welfare, which the Australian Treasury defines as the net impact of the change [14].

Recent cases of mergers of pharmaceutical international market giants have launched a debate in the UK on whether it is necessary to include a public interest test in competition law, which would allow the body in charge of protecting competition to invoke other legitimate public interests (besides the factors of public interests defined by the EU), primarily in cases of merging companies. The current policy on mergers allows the government to intervene in public interest. Thus, the merger of two large banks in the UK – Lloyds TSB and Halifax Bank

of Scotland was granted approval after the government intervention. Government representatives used a public interest clause, thus "overturning" the decision of the competition authorities to ban the merger of these two market players.

Following the United Kingdom, South Africa also included a public interest test in its competition policy. This test primarily relates to the merger policy, where public interest factors can serve to "overrule" the already obtained merger approval, or to "overturn" the ban on mergers. The public interest test used in SAR includes the following factors [26]:

- assessment of impact of mergers in a particular industrial sector or geographic region;
- impact on employment;
- ability of small businesses controlled by historically vulnerable people to become more competitive;
- ability of national industries to compete internationally.

In Switzerland, one of the most developed countries in the world, public interest factors are components of analysis that precede merger decisions. These factors are related to international competitiveness, competitiveness of a sector or a region, and the ability of small businesses to be even more competitive.

In the European Union, more precisely in the EU regulation of mergers, EU member countries are allowed to take appropriate measures to protect their public interest, which may not be included in the mentioned EU regulation. The only condition is that these measures must be in line with the general principles of and other rights extended by the European Union [18]. In the aforementioned regulation, the following three factors of public interest have been identified: general public safety, media pluralism and prudential rules.

The fact that goes in favour of the general public safety factor is that in the UK a series of measures were introduced in order to protect the domestic pharmaceutical giant AstraZeneca, which was considered very significant for public health, from acquisition by the competitive U.S. company – Pfizer [3].

An interesting example is the attempt by Gardner Aerospace Holdings Limited (whose parent company is Shaanxi Ligeance Mineral Resources Co., Ltd.) to purchase

Northern Aerospace Limited in the United Kingdom. Following consultations with the UK Government's Department for Business, Energy and Industrial Strategy, on June 18th, 2018, the CMA (Competition and Markets Authority) exercised an enforcement order under the Enterprise Act 2002, with the aim of preventing any actions related to the aforementioned acquisition. The potential buyer was blocked in the final stages of acquisition [5].

The last example of amendment to competition protection legislation came from Hungary, where in October 2018 the Hungarian Parliament adopted a law which requires approval of the competent minister for foreign investments in specific sectors of industry [2].

The Republic of Serbia defined the National Security Strategy [23], which represents the basis for the development of strategic documents in all areas of social life, as well as for the functioning of public bodies and institutions, in order to preserve and protect the safety of its citizens, society and the state. It is clear from this paragraph that the Commission should, when making its decisions, consider the basis defined by this Strategy. The Strategy provides an overview of the internal security policy, which specifies the following: "Internal security policy provides protection of the democratic political system, human rights and freedoms, public order and peace and the citizens' property security and other social values. In achieving internal security policy, legislative, executive and judicial bodies work together, with effective policies in the economic, social and health care fields, as well as other areas that have an impact on internal security." Hence, the Strategy views the health sector as one of the primary areas that form a particular level of internal security, which shows that one of the priorities of the State is the health and quality of life of its inhabitants.

The general objective and purpose of the national security system is the protection of national interests, protection of life and property of citizens being one of the most important among them. The Strategy attaches great importance to the health of the population – "The Republic of Serbia pays special attention to the health care of its citizens." It also states the following: "The Republic of Serbia is committed to develop and promote all aspects of security, especially human, societal, energy, economic, environmental and other contents of integral security of the Republic of Serbia. Special importance is given to creating conditions for the development of human security, which emphasizes the protection of economic, environmental, health, political and any other security of the individual and the community."

Conclusion

Since economic or quantitative benefits of competition are widely known, they have become a primary and even the only element in the decision-making processes regarding competition policies. Nowadays, due to the constantly increasing importance of public interest, the mentioned quantitative factors need to be supplemented by qualitative ones. That way, it would be possible to fully understand costs and benefits of chosen competition policies. Taking into consideration the mentioned countries and their competition policies, qualitative factors should encompass the following elements:

- State legislation and policies concerning ecological and sustainable growth;
- Social welfare and social equality;
- State legislation and policies concerning public health and security, industrial relations and access to capital;
- Economic and regional development;
- Employment and growth of investments;
- Interest of consumers or group of consumers;
- Competitiveness of Serbian companies;
- Efficient resource allocation.

The presented examples clearly suggest that particular restrictions of competition may be justified on the grounds of public interest. In modern economy, there is no such thing as perfect or unrestricted competition. Hence, there are particular rules, obligations and rights that justify potential restrictions of different market behaviours that would lead to economic benefits for the whole society. Therefore, the question is not whether public interest should be taken into account when considering different competition policies, but rather the nature and level of any competition restriction, as well as its effect on the whole society.

The public body dealing with the protection of competition may, and sometimes even must, delicately restrict competition in cases when public benefits surpass the harm such actions may bring. Regardless of whether more significant burden is imposed on competition or public interest, final decisions regarding competition policies should take into consideration all costs and benefits of different options. The definition of competition policy could be used as a conclusion: it is a set of regulations and policies that allow competition to be regulated to the extent that does not lead to a general decline in social well-being.

The aforementioned suggests the necessity to clearly determine particular economic and social factors that should be considered when discussing each competition policy. It is also of great significance to insist on a transparent discussion of public interest in the domain of protection of competition, encompassing all parties involved. Transparent discussions should be complemented by serious responsibility of policy-makers and hence ensure timely and most appropriate competition policies, which would reflect the defined economic objectives of a society.

An additional question that goes beyond this study is whether public bodies for the protection of competition are in the position to precisely assess elements that surpass competition policies, such as public interest. Is there any other public body that is in a better position to make such assessments? This question is of great importance, especially having in mind that the assessment of public interest encompasses different political and qualitative factors that significantly affect the welfare of a society.

On the other hand, if one subject was to decide on competition policies, it would be possible to ensure consistency of those decisions, as well as expectedness of particular outcomes. The consideration of public interest would ensure balance between economic and general social benefits (ecological, health, security, etc.), which would then lead to a more detailed competition analysis encompassing other members of a society as well. Inclusion of other members of society would be an important step towards the revival of public politics in Serbia.

Different countries from different parts of the world, with different political and legislative systems and values, have been fighting for years for the protection of competition and stability of their economies. In order to achieve these objectives, they established special rules, sometimes even not adjusted to the existing regulations, with the aim of protecting national interest. In Serbia, economic interests are still ahead of national security questions. Therefore, the country should also value non-material/qualitative factors of the economy, such as public health, environmental protection, social equality, etc., in order to provide all individuals living and working in it with maximum benefits.

We are to suggest the best possible practices on how to encompass public interest in protection of competition, while policymakers (government representatives, judges, sociologists and other parties involved) are to focus attention on either economic or non-economic factors in cases of dispute that will probably arise.

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TRAVELING EXPERIENCE: ROMAN EMPERORS AND DANUBE WINE ROUTE

Iskustvo putovanja – Put rimskih imperatora i dunavski put vina

Abstract

Cultural tourism is a new, rising tourist product worldwide, particularly in Europe. A cultural route is one of the most complex cultural products, comprising material and nonmaterial heritage, combined with interpretation, gamification and other drivers of sophisticated experience that a modern tourist expects. The Roman Emperors and Danube Wine Route is one of the certified European Cultural Routes with specific content, but also a hub structure, a pattern of development and potential for extension. As such, it emerges as an important vehicle of regional tourism integration.

Keywords: *cultural tourism, cultural routes, Roman heritage, thematic touring.*

Sažetak

Kulturni turizam je novi, u svetu i posebno u Evropi, rastući turistički proizvod. Kulturna ruta spada u najkompleksnije turističke proizvode, objedinjujući materijalnu i nematerijalnu baštinu, kombinovanu sa interpretacijom, generisanim igricama i drugim pokretačima sofisticiranog iskustva kakvo očekuje savremeni turista. Ruta rimskih imperatora i dunavski put vina je jedna od sertifikovanih evropskih kulturnih ruta sa svojim specifičnim sadržajem, ali sa specifičnom strukturom čvornih tačaka, obrascem razvoja i potencijalom za širenje. Kao takva, ova ruta postaje važno sredstvo integracije regionalnog turizma.

Ključne reči: *kulturni turizam, kulturne rute, rimski spomenici, tematske ture.*

Introduction

Since the beginning of the development of modern tourism, cultural contents successfully play the role of a magnet that attracts visitors and gives added meaning to travel. Today's tourist expects not only to see cultural contents, but also to be involved in them, to experience them and to share experiences with friends. That is why modern tourism products are becoming more complex. It is not enough just to have an attraction, but also full comfort when arriving and leaving, accommodation, food, as well as fun, connecting the basic content with all of the above elements. A modern traveler wants all the information to be brief, accurate, fun and humorous, but on his own rhythm, not by the ideas of a tourist guide. Sometimes he seeks company, and sometimes he needs no one to bother him. An ideal tourist product that offers all the above listed is touring, and cultural routes have a special potential in this regard. The Council of Europe recognized the value of this tourist product, as it was recognized by tourism authorities in the different parts of the world. This text is dedicated to one of the 33 accepted and certified Cultural Routes of the Council of Europe.

Characteristics of cultural tourism

The concept of cultural tourism has evolved and Richards [14, pp.12-21] explained this evolution of the "cultural tourism" definition. Early definitions were broad and connected with learning, assuming the desire of visitors to acquire knowledge. Later definitions were more precise, in order to measure the performance of different types of activities. The latest definition is again broad; as adopted by UNWTO [20], it refers to "learning, discovering and experiencing tangible and intangible cultural attractions/products…". This need to broaden the approach to this type of tourism shows its development, dynamic growth and the emergence of various new tourist offerings connected with it.

Many new niche concepts are derived from basic cultural tourism. Timothy [17] illustrates this by describing pilgrimage tourism (improving the spiritual side, seeking forgiveness, or something similar), dark tourism (visiting places of suffering) and sport tourism (with or without connection to some event). Also, festivals and other cultural events, sometimes connected with material monuments, and sometimes related to contemporary themes (games) are considered important cultural products with potential to integrate or promote the material heritage of the destination [5, pp. 162-173].

Dogan [1, p. 45] explains that historical layers of one destination, in this case Istanbul, could be narrated through myths, ideologies, power and politics. Clearly, myths connected with Istanbul are powerful: first the Greek colony in the 7th century BC Chalcedon; Byzantium upon the advice of Delphi oracle; umbelicus – spiritual center of the city calculated following Roman principles, projected in the crossing of the axes according to the movement of the Sun (Decumanus Maximus) and movement of the stars (Cardus Maximus); Constantinopolis named by its founder Emperor Constantine. Ideology and power are interlaced and could easily be found in the city architecture: Hagia Sophia as the symbol of new Christian capital (Deutera Rome – the second Rome) side by side with Süleymaniye Mosque. Politics became particularly important in the second half of the 20th century, with modernization that became a threat and skyscrapers and other "copy-paste" projects of "starchitects" supported by involved politicians. The final step in creation of the narrative is spectacularization of the destination. In Istanbul, it played a part in 2010 when it was transformed from a European City of Culture into a European Capital of Culture.

The discussion of events and cultural destinations confidently leads to certainly the most successful European cultural project, the European Capitals of Culture (ECOC), initiated in 1983 by Melina Mercouri. More than 40 cities, one or two annually, would take the role of the European Capital of Culture for one year, enabling much local cultural content to become accessible and, at the same time, spreading the idea of a united Europe. Many different positive effects were generated by such a project, which needed a complex instrument, like ACCESS, to measure it [6, pp. 498-514]. Although more sophisticated instruments for the measurement of cultural projects performance were developed later, ACCESS appears to be the most used, and it is based on the assessment of the event in several dimensions: arts, culture, community, economy, society and stakeholders. Although all dimensions are important, the first step should be to assess economic impact, which is not as easy for multidimensional projects as for like projects usually dedicated to cultural tourism.

With the development of the cultural tourism activity, its economic influence developed as well. In the paper on the evolution of cultural tourism already mentioned above, although questioning the methodology of some estimates, Richards [14, pp. 12-21] indicates a strong development of cultural tourism, from 37% of international tourism activities in 1990's to 40% of all tourists consuming at least some cultural tourism products. Cultural tourism brought progress to many local communities. On the other hand, there is the often-raised question of mass cultural tourism sustainability: are there enough local people to perform traditional roles and dances or prepare local food, and also are there enough trained people to guide, interpret and present heritage in a traditional way. Tourism is seen as the vehicle to support conservation and interpretation of the monuments, as well as to improve host communities [4].

Cultural routes belong to the most complex cultural products. Routes integrate tangible and intangible remains

indicating certain historic tracks, with the purpose and function, according to the interpretation of International Cultural Tourism Charter [15, pp. 246-254]. Sometimes they are called paths or itineraries, and they always incorporate activities of different stakeholders, forming a kind of a natural cluster. Since the contemporary visitor is not interested only in visiting and seeing monuments, for some time routes have been expected to provide a full experience. This experience can require visitors to involve themselves in different activities. Furthermore, a modern route is expected to expand this concept of experience into the concept of "sharing", i.e., involving other individuals in this experience and creating some new content (photo, text, drawing).

Cultural tourism, especially routes, cannot develop without public support. This is a special kind of public-private partnership. Basic research, conservation and preservation of cultural heritage need to be supported by a public initiative, because they are costly and with no clear return on investment criteria. Even investments in interpretation and marketing of such contents cannot guarantee payback in the early stages of cultural product development. That is why marketing, and very often advocacy of a new destination, also need public support. However, inclusion of a private initiative at the right moment in the activities of service (accommodation, catering, guiding) and commercialization can be of crucial importance for the destination with cultural content. Private stakeholders bring creative experiential elements in the tourist offering, enriching impressions on the site. As regards the RER&DWR, it could be said that this stage started with the EU certification of the Route. After the signing of a mutual memorandum of understanding among Serbia,

Bulgaria, Croatia and Romania, the act of certification was the last infrastructural act in the preparation of the Route, sending a clear message to private stakeholders to step in.

Overview of tourism in the SEE region

According to UNWTO data, tourism has recorded global growth for the 8th consecutive year with 1.403 billion of international arrivals in 2018, which represents a 6% increase in comparison to 2017 [22, p. 5]. This number of international arrivals was recorded two years earlier than envisioned by the UNWTO long-term forecast. Additionally, the numbers achieved represent further consolidation of the remarkable 2017 results, continuing to exceed the expected growth rate of 4-5% on the global level. Europe continued to be the leading tourist destination with about 700 million international tourist arrivals and 51% of the overall tourism receipts [22, p .5]. The regions of South and Mediterranean Europe (where, according to UNWTO, Serbia and the countries of the Western Balkans belong) have reported an increase of tourism receipts of 7% [22, p. 7], while all the countries of the Western Balkans have recorded a double-digit growth. The UNWTO forecasts envisage that by the year 2030 there will be around 1.8 billion tourists traveling around the world [18, pp. 17-34].

To accomplish these expectations, it is crucial for tourism to gain an important place in shaping national policies of economic development while nurturing competitive and responsible business models and practices, as well as improving cooperation between the public and private sectors.

Internationally, special emphasis is placed on regional cooperation and regional dialog in tourism that

Table 1: International tourist arrivals and overnights data in the selected SEE countries

	2015 (in 000)		2016 (in 000)		2017 (in 000)	
	Arrivals	Overnights	Arrivals	Overnights	Arrivals	Overnights
Croatia	12.683	65.863	13.809	72.099	15.593	80.222
Slovenia	2.707	6.614	3.032	7.342	3.586	8.572
Bosnia and Herzegovina	678	1.426	777	1.647	923	1.913
Serbia	1.132	2.410	1.281	2.739	1.497	3.175
Montenegro	1.560	10.651	1.662	10.528	1.877	11.470
Republic of North Macedonia	486	1.036	510	1.054	631	1.294
Albania	3.784	/	4.070	/	4.643	/

Source: UNWTO World Tourism Barometer, volume 17, issue 1, January 2019, official national statistics in selected countries.

Table 2: International tourism receipts data in the selected SEE countries in 000 USD

	2015	2016	2017
Croatia	8.834	9.634	10.924
Slovenia	2.328	2.424	2.750
Bosnia and Herzegovina	661	724	826
Serbia	1.048	1.151	1.346
Montenegro	902	925	1.041
Republic of North Macedonia	265	280	327
Albania	1.500	1.691	1.929

Source: UNWTO World Tourism Barometer, volume 17, issue 1, January 2019.

promotes deepening overall relations among the countries, continuation of the integration processes and the creation of conditions for economic growth and increasing the living standard of local populations.

Tourism in South and Southeast Europe, especially in the Western Balkan countries, has been recognized as an extremely important economic and social phenomenon that in the last several years has been gaining the attention it deserved for a long time: with 5.6% direct and 14.7% indirect share in GDP of the Western Balkan countries, a 24.1% share in their overall exports and 5.4%, and 14% direct and, respectively, indirect share in overall employment [11, p. 6]. The rationale behind this resides in the recognized economic gains (FX income, income for the local population, creating new jobs, influence on other industries, such as trade, agriculture, transportation, etc.) created by tourism. What is also recognized as equally important is political marketing on the national level and social influence that traveling and the feeling of new experiences, as defined by modern tourism, can have on the population in a region. This enlightening influence is important in a region that carries an inherited burden of a not-so-distant past. It should not be forgotten that a significant number of the population in the region born after 1991 practically does not have personal experience of traveling to other countries of the region. Their opinion on the countries and nations in the neighborhood is based solely on information obtained from media. This statement is supported with the empirical data that state that 72% of the population in the region sees regional cooperation as a strong factor of economic and political stability, while 56% of the participating companies in the survey consider

regional cooperation of tremendous importance for the development of their own businesses [11, p. 7].

The region of South and Southeast Europe/the Western Balkans is characterized by a diversified structure of tourist attractions, a rich cultural and historical legacy, preserved natural resources and considerable human potential. This region represents "old" Europe, "a richness of diversity", world with roots in history and, at the same time, a region that is not "overexploited", a kind of mystic and not fully explored setting. The region is interesting enough to become an indispensable destination for global tourists. However, the tourist offering of the region is extremely fragmented, and regional tourist products are not sufficiently developed. Administrative procedures are still strict (like the visa regime), limiting free inflow of tourists, which can be illustrated by the completely different regime of visas of different countries of the region toward tourists from a potentially very promising destination such as China [8]. Also, the business environment is inadequate and unequally developed, dominated by small and medium enterprises, family businesses that experience limited access to favorable financing, while current business practices are characterized by undeveloped managerial and other skills for conducting business. The Western Balkan countries are spending only 2% of their budget directly on tourism.

Analyses have shown that a rich culture heritage, remarkable natural beauty, but also hospitality and the warmth of the local population represent a common denominator for all the countries in the Western Balkan region. The latter often compensates for the imperfections and lack of the tourist offering, necessary infrastructure and other lack of facilities at tourist destinations. Given that 40% of world tourism [21, p. 23] is based on cultural heritage, while in Europe that share exceeds 50%, it can be concluded that culture is what brings European citizens, as well as citizens of the Western Balkan region, together. Therefore, the Council of Europe initiated the program of cultural routes in 1987, when the Santiago de Compostela Declaration was adopted, making Way of St. James (Camino de Santiago) the first Cultural Route of the Council of Europe. The idea was to show that the history and culture in Europe are based on traveling and cultural

exchange among people and to show the way in which rich and vibrant past helps to understand the modern period and discover European identity.

Currently there are 33 [3] certified routes that stretch all around Europe and thematically cover everything, from Mozart to Roman emperors, from olives to European ceramics, from towns with mineral springs to the Danube wine route. These routes combine material and nonmaterial heritage, points of interest interlinked through the network of the local communities, museums, universities, associations. The Cultural Routes of the Council of Europe promote transnational cultural cooperation and offer possibilities for sustainable socioeconomic cooperation. Partners on the Cultural Routes of the Council of Europe are working jointly on creating attractive programs for visitors at their destinations, offering a variety of activities and creative ways of traveling and exploring Europe.

The model promoted by the Council of Europe is the right model to be followed by the countries of the Western Balkan region: to connect and integrate in the already existing Cultural Routes of the Council of Europe, but also to create their own, authentic cultural routes and authentic tourism products. The exploration of this region is an endless adventure while cultural routes offer different ways in which this exploration can be realized through unique individual experiences in discovering the culture and history of towns and villages, people and their knowledge and experiences, gastronomy and handicrafts.

Cultural routes offer possibilities of connecting countries of the region, but, even more importantly, the possibility and a good opportunity for having their own citizens traveling throughout the region. This is especially important for younger generations, initiating considerable social impact on the overall events, but also for the economic development of the countries in the region.

Archaeological and historical foundation of the Roman Emperors Route

The Roman Emperors Route (RER), a cultural route combined with the Danube Wine Route (DWR), certified by the European Institute of Cultural Routes, is a linked group of archaeological sites which tell the story of the Roman Empire in the Danube region and the emperors who governed it. This part of the Empire, which the Romans originally called Illyricum, stretched from the Adriatic Sea to its northern border on the Danube. [Author's note: as a geographical term, Illyricum effectively includes the modern political units represented by Southeast Europe or the West Balkan countries.] Roman territory was extended even further when the Emperor Trajan completed the conquest of Dacia, modern Romania, north of the Danube in AD 107. The security of the Roman frontier and adjacent territories was maintained by the active presence of the Roman army which in turn required personal leadership of the Roman emperors in times of crisis. These

Table 3: Certified cultural routes that pass through the selected SEE Countries

	Routes
Croatia	The Saint Martin of Tours Route, Phoenicians' Route, The Routes of the Olive Tree, The Iter Vitis Route, The European Cemeteries Route, European Route of Historic Thermal Towns, ATRIUM – Architecture of Totalitarian Regimes of the 20th century In Europe's Urban Memory, The Roman Emperors and Danube Wine Route, Destination Napoleon
Slovenia	The European Route of Jewish Heritage, The Saint Martin of Tours Route, The Routes of the Olive Tree, The Iter Vitis Route, The European Cemeteries Route, Réseau Art Nouveau Network, The European Route of Impressionisms
Bosnia and Herzegovina	The European Route of Jewish Heritage, The European Cemeteries Route
Serbia	TRANSROMANICA – The Romanesque Routes of European Heritage, The Iter Vitis Route, The European Cemeteries Route, Réseau Art Nouveau Network, The Roman Emperors and Danube Wine Route
Montenegro	The Iter Vitis Route
Republic of North Macedonia	The Iter Vitis Route
Albania	Routes of the Olive Tree, ATRIUM – Architecture of Totalitarian Regimes of the 20th century In Europe's Urban Memory

Source: Cultural Route of the Council of Europe, www.coe.int/en/web/cultural-routes/by-country.

circumstances led to more frequent and longer visits of the emperors, as migrating barbarian groups created increasing pressures on the frontier defenses. Physical witnesses to the intervention of the Roman emperors in the Danube affairs are the archaeological sites which testify even today to the crucial significance of this region in the defense of the Empire.

Archaeology, as the study of the remains of past civilizations, has always attracted public interest, and the remains of Roman civilization are no exception. In general, "Romans" is a term familiar to the wider public, but Romans outside of Italy, the Roman Empire in the Danube region and the Roman emperors who lived and worked there present a novel experience to many. These are the concepts that drive the Roman Emperors Route, based on the premise that a thematically linked series of well-presented archaeological sites associated with the Roman emperors will constitute an effective tourist draw which will encourage serial visits. The success of the tourist attraction depends not only on the quality of archaeological remains (the extent of their preservation and conservation), but also on their presentation, the way each individual story is told to meaningfully bring the visitor back into the time when the emperors lived and ruled there.

Three case studies are presented here to illustrate the workings on the cultural route through the interpretation of its archaeological sites. The three sites chosen are directly associated with three native son emperors who were born and raised in Illyricum and who spent significant amounts of time there, time to be calculated in years of residency in the Danube region. The order is chronological in the late Empire, beginning with the emperor Diocletian in the late third and early fourth centuries AD.

In the 290's, Diocletian as emperor founded the Imperial Palace in Sirmium (Sremska Mitrovica, Serbia), an RER site which will be featured in the last case study. Diocletian was born on the Adriatic coast and rose through the army ranks to finally assume supreme command. When he decided to retire, following a normal human inclination, he chose his Dalmatian birthplace in AD 305; as a co-ruler of the Roman Empire, he created a retirement retreat on an imperial scale, so grand that today it is called a palace, Diocletian's Palace (RER) in Split, Croatia. Major elements of the palace are preserved as the historical core of the modern city of Split and form a priority tourist attraction on the Adriatic coast, especially in late August when the Roman palace comes to life during the celebration of the Days of Diocletian.

To ensure continuity in the management of the Empire, Diocletian appointed another Illyrian-born general Galerius as his successor and married him to his daughter Valeria to cement the bond. The Emperor Galerius' origins were close to the Danube, on the northern frontier of the Empire, and so, following the example of his father-in-law or perhaps in competition with him, in the early fourth century he prepared a monumental palatial complex (RER) near Zaječar in Eastern Serbia for his retirement. Like a faithful son, Galerius named the complex Romuliana after his mother and had his wish for his mother's good fortune inscribed over the entrance gate of Felix Romuliana: "blessed be my mother Romula". Galerius' palatial villa and temples were protected behind impenetrable defensive walls and massive towers.

Figure 1: Celebration of the Days of the Roman Emperor Diocletian in his palace, Split
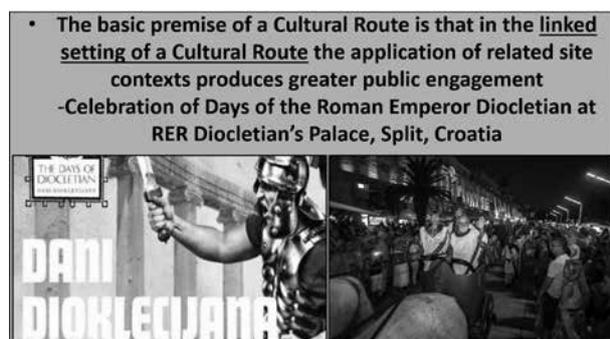

Figure 2: Felix Romuliana Palace near Zaječar
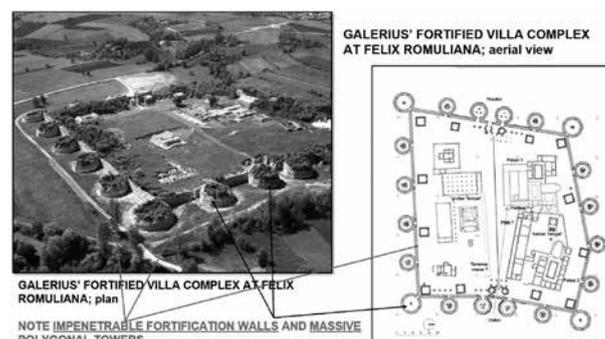
This is one of the best preserved Roman architectural complexes in the West Balkans, and it dramatically reflects the power concentrated in the hands of the Roman emperors, a true example of what Italian scholars have called "architettura di potenza", the architecture of power. Nothing was built on this site after the Romans abandoned it, and so Romuliana stands in splendid isolation amid the rolling hills of the Danube hinterland.

Constantine the Great deservedly must rank as one of the most distinguished Roman emperors. He consolidated once again the control of the Empire under the authority of a single ruler and is most well-known for establishing Christianity as the official religion of the Roman Empire. This was a major event in the history of the Western world. Constantine was another Illyrian general, born south of the Danube in Naissus (modern Niš, Serbia). Before he completed the construction of his "new Rome" in Constantinople (modern Istanbul, Turkey) in AD 330, Constantine used Sirmium (modern Sremska Mitrovica, Serbia) in the Middle Danube region as a strategic location to administer the Empire and manage the army on the troubled northern frontier. Historians can document the presence of Constantine in the RER Imperial Palace in Sirmium for over 500 days in the years between AD 317 and 324. His actual presence most probably extended for a much longer period. The excavated remains of the Imperial Palace are presented today in a modern preservation shelter to facilitate visitor access to the site.

Interpretation of the site is realized through a collage of different modes of presentation, ranging from restoration in place of the original mosaic pavements to three-dimensional reconstructions of the interior rooms

Figure 3: Roman Imperial Palace in Sremska Mitrovica
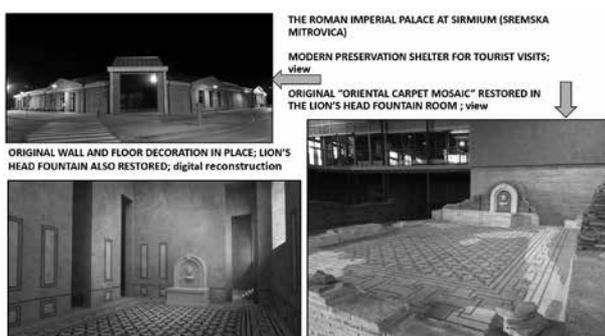
and graphic panels explaining important architectural features. The Imperial Palace in Sirmium is yet another historic monument and tourist product where we can observe the hand of an emperor in the design and use of an imperial administrative and residential center.

Traveling experience as the unique selling proposition of the Roman Emperors and Danube Wine Route

The Roman Emperors and Danube Wine Route was certified in 2015 by the European Institute of Cultural Routes (EICR), Luxembourg, under the auspices of the Council of Europe. Sometimes, the name of the route is abbreviated – RER&DWR. This Route has a Scientific Committee, as do all the other routes on the list, but it also has a specific managerial system that will be explained later, unique for this particular Route. Basic information about the Route can be found on the website of the European Institute of Cultural Routes [3].

The Route, certified by the Institute, connects five countries of the Middle and Lower Danube and partially follows, in the lower part, Roman Limes, the frontier of the Empire which in some parts geographically coincided with the Danube. However, this exciting trip, starting from the Istrian peninsula in Croatia, across Pannonia in Serbia and Hungary, then down the Danube in Bulgaria and Romania, allows viewing of archaeological remains on both sides of the Danube. The new idea is to connect this traveling experience with other, still unconnected and mainly unknown, but important archaeological sites in the region. It would imply extending the Route (its western branch), probably across Bosnia and Herzegovina, Montenegro and Albania and potentially some other areas. The existing Route is presented in a special publication [23] describing its content in a standard, but unique way, and also mapping the hubs as entry/exit points for visitors, which is also specific for the RER&DWR.

Hubs are the main characteristic of this Route, as a unique idea developed over several years. They can be identified on the map. Hubs are important for two reasons. From the perspective of visitors, they can expect to be able to access the Route at these spots, collecting some

Figure 4: Roman Emperors and Danube Wine Route map

The Principle itinerary of the Roman Emperors and Danube Wine Route						
① Colonia Pietas Iulia Pola Pollentia Herculanea Pula and Brijuni (27 – 68 AD)	② Andautonia Zagreb (100 – 400 AD)	③ Siscia Sisak (262 – 383 AD)	④ Roman Tomb Chapel (UNESCO) Pécs (390 AD)	⑤ Sirmium Sremska Mitrovica (10 BC – 582 AD)	⑥ Trajan's Table and Trajan's Bridge Kladovo and Drobeta Turnu Severin (103 – 105 AD)	⑦ Felix Romuliana (UNESCO) Zaječar (297 – 441 AD)
⑧ Timacum Minus Knjaževac (98 – 441 AD)	⑨ Kaleto Belogradchik (1st – 19th Century)	⑩ Colonia Ulpia Traiana Augusta Dacica Sarmizegetusa (160 – 270 AD)	⑪ Alba Iulia Alba Iulia (106 – 275 AD)	⑫ Roman Legio Camp Novae Svishtov (45 – 613 AD)	⑬ Sexaginta Prista Russe (70 – 600 AD)	⑭ Histria Constanta (657 BC – 600)

Wines from the Danube Region						
① Baranja Wine Region	② Ilok Wine Region	③ Fruška Gora Region	④ Morava Region	⑤ South Banat Region	⑥ Negotin Wine Region	⑦ Vidin Area / North-West
⑧ Muntenia and Oltenia Hills	⑨ Pleven, Veliko Tanovo / North-Central	⑩ Ruse / North-East and Black Sea	⑪ The Danube Terraces	⑫ Dobrogea Hills		

information about it and finding transport, guidance or other services there. On the other hand, hubs are the backbone of the managerial model of the Route, consisting of institutions and persons engaged in marketing and communication, and developing processes on the Route. The list of the hubs is dynamic: some new potential hubs must be developed on this itinerary and introduced in the existing Route, as well as in its extension. It is mainly expected that a hub will contribute to visitors' experience and add value to the Route.

The standard format of hub presentation was predefined during the process of Route development, although it is understandable that each hub is different and specific. However, some standard information can help travelers to manage and plan their route. The Route has two kinds of hubs, as can be seen from the name of the Route, and these are archaeological (Roman) and wine sites.

Archaeological sites communicate two kinds of contents to visitors. The first kind of content concerns archaeological remains and their interpretation with possible connection to the other sites on the RER&DWR. They offer information about: what was discovered and what is visible now; who did the excavations; discovered but still not revealed objects; the role of the site in Roman times – time period, capacity, purpose, size and type of terrain; who lived in the site; the myths and legends connected with it. This information should be supported with map(s), sketches, photos, etc. The second kind of content is related to tourist information on: transport access; travel time from surrounding cities; visiting conditions: tickets, working hours, availability of guides (in various languages); brochures, VR and other print and electronic presentations; estimate of time to be spent on site; what else to see: other attractions in the vicinity; possibilities

for room and board; closest city (population, number of tourist arrivals and overnights).

Wine sites have the same format consisting of two types of information. While the second one is the same as above, offering tourist information, the content of the first component is adapted to the wine destination. It contains data about: vineyards and grape varieties; history of that area and important families that lived there; wine cellars, castles and other important buildings; festivals and other events, particularly those connected with wine; other important information (monasteries, churches, music, etc.).

The development of the content on the Route is following three directions. First, the institutions responsible for the future development of the sites plan future activities which are listed in the abovementioned publication under the section: Recommendations for Improvement and Future Development. These recommendations can be either archaeological or tourist. Both are important for further progress of the sites around a particular hub. This internal development is happening in each hub separately. The second direction of the Route development concerns new hubs on the Route. The inclusion of Pécs, Hungary, in this first period of the Route's existence is a good example of "completing" the Route. Still, there are some extremely important sites that are not yet on the map for different reasons: some sites are not yet open for visitors, while some are not yet connected with the Route team. The third direction of the Route development was already mentioned and could be called "extension". The logical way to extend it is to examine the possibility of connecting it with some other regional sites between the Danube and the Mediterranean Sea; this process has started in early 2019.

The basic idea of this cultural route is to encourage travel from one destination to another and to provide a pleasant and comfortable experience for the traveler along the route. That is why the new website of the Route has been updated with useful information on how to travel, how to get from one hub to another, which means of transport to use, where to stay, how much time is needed from place to place, etc. Although it offers great experience to the visitors who visit individual sites on different occasions, the Route actually tries to motivate "explorers" to undertake longer trips involving several sites in order to achieve true excitement.

This kind of route is attractive to different types of visitors with their own specific expectations:

- Visitors who are specifically interested in visiting cultural attractions are probably most likely to follow the Route. According to the Atlas Project [13, p. 5], this was the second ranked motive to visit cultural sites, after opting for such an activity due to already being on holiday in that area. Since the Route invites people to "follow the story", it is not their first choice of a side activity on holiday. However, travelers who are particularly interested in culture are very interested in such content. According to the cited research, their primary goal is to visit specific cultural attractions (related to heritage, art, manifestations), which are available as archaeological sites and events (like gladiator spectacles) on this Route.

- Visitors on holidays interested in cultural attractions. According to the previous research, these could be visitors with higher education, occupying high positions. According to UNWTO, these visitors search for diversity, "…tending to raise the cultural level of the individual and giving rise to new knowledge…" [19, p. 121]. This Route, among other things, can provide an insight into the manner in which a large empire like the Roman could function as an efficient organization or how often the emperors changed their place of residence. Different levels of interest among members of this category led to an estimate that around 40% of all tourist trips are connected with culture [10, p. 21]. The RER&DWR relies on knowledge from general education, expanded by numerous contents of popular culture (films, comics, and games) offering a new experience of traveling through space and time.

- Young people travel for different reasons than their parents, basically encouraged by one of the following three reasons [12, p. 3]: to learn about new cultures (83%), to feel excitement (74%) and to increase their knowledge (69%). The RER&DWR offers insight into five new, partly undiscovered, but friendly and safe

countries along the Danube. In a relatively small region, young visitors can get familiar with different cultures, from Mediterranean, to Central European in the Pannonian plain, to different communities in the Balkans and Black Sea region. Excitement is guaranteed, either in urban environments (Pula, Pécs, Belgrade, Sofia, and Bucharest) or in nature: the Slavonian wetlands, the Đerdap Gorge or the Danube delta.

- Cruising passengers are traveling as an independent group, embarking on an adventure and visiting several destinations in a well-organized and elegant way [16, pp. 65-69]. Passengers from cruising ships can disembark in many places on the Danube, from Budapest to the Danube delta, and make a round trip to experience Roman heritage. It is even more exciting to be in a position to see a part of the Roman navy (port of sixty patrol ships – Sexaginta Prista) in Ruse. While cruising down the Danube, modern nomads, cyclers, can create their own "itinerarium Romanum".

- Business guests can be the most driving segment for RER&DWR, since the Route meets its two emerging demands: to decrease costs of events and to provide a new, unknown experience [9, pp. 703-712]. Floating conferences, conferences in new exciting destinations, like Pécs, Alba Iulia or Kladovo, offer access to unique ancient sites, within reach of major European transport hubs, at moderate prices and with specific local gastronomic and wine tasting experiences.

The Roman Emperors and Danube Wine Route is a travel to experience. It offers more than just a travel to a destination. It is a tour which enables visits to a series of destinations and gaining new experience [2]. Gastronomic and wine tasting experience along the Danube is supported by a diversity of specific wines, indigenous grape varieties and history of wine and civilization in this region. A rising number of travelers adopted orientation toward pleasures of food and wine as a lifestyle [7, p. 33]. In this journey down the Danube, they follow Roman, as well as wine trails, searching for a wine culture that was preserved to this day.

Conclusion

In the forthcoming period, the region needs to be prepared to put additional effort into achieving concrete cooperation in the most efficient manner, by linking public and private sectors in order to attain the best possible results, especially when it comes to overseas, long-haul outbound markets (China, Japan, India, South Korea and others). It is necessary to create and maintain the identity and image of the region, making it recognizable and interesting on the global level. The region should be prepared to use the opportunity to take over part of the tourists concentrated in certain European areas (which are overcrowded and interested to decrease their number of visitors) and redirect the tourist demand to itself.

It is necessary to define specific tourist products that will be the subject matter of joint and incorporated promotion, based on carefully studied habits and preferences of tourists from the target markets. Special attention should be focused on defining and establishing realistic goals, making projections of the anticipated number and structure of tourists that will visit the region in the forthcoming period, as well as the length of their stay. The new tourism platform should also attract and animate successful private companies, especially tour operators, to establish cooperation. This could be achieved through organizing direct business meetings to define and establish the framework and instruments for attaining realistically set goals. Regional cooperation should be deepened, because the countries of the region are not each other's competitors. On the contrary, most of them have complementary tourist offers. It is necessary to remove all the barriers from the region for it to acquire a visible spot on the international map of tourism.

One of the basic assumptions for obtaining good results in regional cooperation is certainly the facilitation of a simplified, easy journey, because modern tourists do not have time for complicated procedures and complex paperwork, but create their own itinerary on the internet. The most important element of that process is visa regime. It represents a barrier not only for travelers, but also for the increase of tourist receipts, creating new jobs, free trade. High prices, complicated administrative procedure and long entrance time to certain countries are discouraging

potential tourists that decide to go and spend their money in some other destinations. Facilitation of travel will not only open new employment opportunities that will encourage traveling, but will also represent an impetus for the overall economic development of the region.

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