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REQUIRED LEVEL OF INVESTMENT FOR FAST ECONOMIC GROWTH: STYLIZED FACTS AND POLICIES

Neophodan nivo investicija za ubrzani privredni rast –
stilizovane činjenice i politike

Abstract

To close the gap in economic development relative to the EU average, Serbian economy has to achieve significantly higher growth rates in comparison to other European countries over the longer period. Theoretical and empirical literature indicates that the level of investment in physical capital is one of the key determinants of the dynamics of economic growth. In this paper, based on data on investments and savings in Serbia and in 37 countries that in the previous three decades achieved an average GDP growth rate of over 5% per year (so-called fast-growing economies – FGE), we present and analyze relevant stylized facts. In the observed period, FGE had average total investments of 25.6% of GDP, of which 69% was private and 31% public investments, whereby private investments were predominantly domestic, which is associated with a high rate of gross domestic savings (of 27.4% of GDP). On the other hand, total investments in Serbia were 9.7% of GDP lower than the FGE average, which was a consequence of significantly lower public and domestic private investments, which was, among other things, a consequence of significantly lower domestic savings (by over 20% of GDP). As in the recent period there has been a noticeable increase in public investments in Serbia, in order to accelerate economic growth, it is necessary, in addition to maintaining them at a high level, to encourage a considerable increase in domestic private investments through economic measures policy and wider reforms of the general institutional environment, with the aim of having the total level of investments of over 25% of GDP over the next few decades.

Keywords: *investments, savings, economic growth, economic policy*

Sažetak

Da bi se smanjio jaz u ekonomskom razvoju u odnosu na prosek EU, neophodno je da privreda Srbije ostvaruje znatno veće stope rasta u odnosu na druge evropske zemlje u dužem periodu. Teorijska i empirijska literatura ukazuje da je nivo ulaganja u fizički kapital jedna od ključnih determinanti dinamike privrednog rasta. U ovom radu, na osnovu podataka o investicijama i štednji u Srbiji i u 37 zemalja koje su u prethodne tri decenije ostvarile prosečnu stopu rasta BDP-a od preko 5% godišnje (tzv. brzorastuće ekonomije), predstavljene su i analizirane relevantne stilizovane činjenice. U posmatranom periodu brzorastuće ekonomije su u proseku imale ukupne investicije od 25,6% BDP-a, od čega su 69% bile privatne, a 31% javne investicije, pri čemu su privatne investicije bile pretežno domaće, što je povezano sa visokom stopom bruto domaće štednje (od 27,4% BDP). S druge strane, ukupne investicije u Srbiji bile su za 9,7% BDP niže od proseka ovih zemalja, što je posledica znatno nižih javnih i domaćih privatnih investicija, usled, između ostalog, znatno manje domaće štednje (za preko 20% BDP-a). Kako je u poslednjem periodu primetan porast javnih investicija u Srbiji, u cilju ubrzanja privrednog rasta potrebno je, pored njihovog održavanja na visokom nivou, podsticati znatno povećanje domaćih privatnih investicija, kroz mere ekonomske politike i šire reforme opšteg institucionalnog ambijenta, sa ciljem da u periodu od narednih nekoliko decenija ukupan nivo investicija bude preko 25% BDP-a.

Ključne reči: *investicije, štednja, privredni rast, ekonomska politika*

Introduction

Since the beginning of the 21st century, there have been noticeable advancements in Serbia’s economic performance. Based on the World Bank – World Development Indicators data [86] on GDP per capita (PPP adjusted), between 2001 and 2022 Serbia’s GDP per capita increased by 119.18%, rising from 9,529 to 20,886 international dollars (constant 2017), while the EU-27 average increased by 44.05% from 33,463 to 48,203 international dollars (constant 2017). Serbia’s average annual growth speed has exceeded those of the EU-27 by 1.8 percentage points for the period 2001-2022 (Figure 1), helping to bring Serbia’s GDP per capita level closer to those of the EU-27. Moreover, Serbia’s strong commitment to achieving higher rates of economic growth is also proven by its higher growth compared to the average of 95 emerging markets and developing economies (as per IMF definition), as well as compared to the average of the Western Balkan (WB) countries (Figure 1). From the time point of view, Serbia performed relatively well (in comparison to other countries in the Central and Eastern Europe) in two sub-periods: 2001-2008 and 2018-2021 [71].

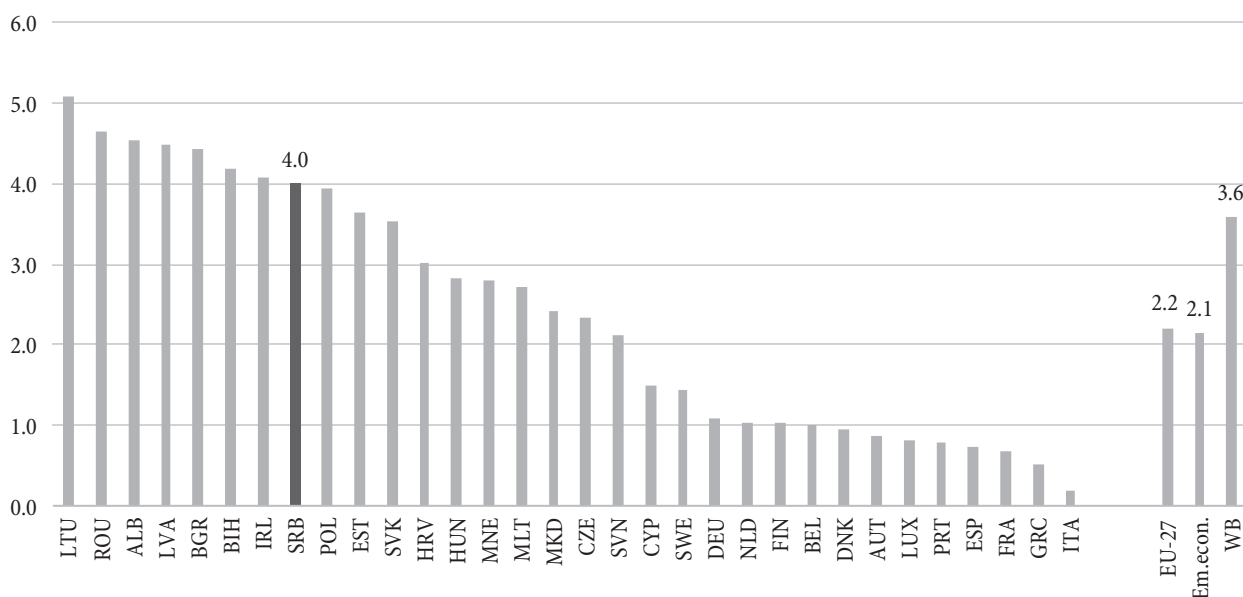
Despite a positive convergence trend, additional efforts are needed to narrow the gap between Serbia and the EU-27. Based on the Figure 2, Serbia’s GDP per capita

(PPP adjusted) was 43% of the EU-27 average in 2022. Although this represents a 15-percentage-point increase from 2001, when Serbia’s GDP per capita was a 28% of those of the EU-27 average, it indicates the substantial distance the country must cover to achieve full convergence.

To attain faster convergence, Serbia would need to significantly accelerate its growth rate to more than 5% per year over a longer period of time. If EU countries were to continue their economic growth at the same rate as in the past, with a GDP per capita (PPP adjusted) growth rate of 4% per year Serbia would need almost half a century to reach the EU-average level of economic development, while with the growth rate of 5% per year, the full convergence period would be reduced to 31 years. If Serbia is to post strong economic growth of 6% per year, it would take 23 years to achieve full convergence with the EU-average in terms of GDP per capita (PPP adjusted).

Economic growth is one of the most complex topics in economics, as theoretical and empirical literature suggests that more than 60 factors directly or indirectly affect the speed of economic growth. Although both theoretical and empirical models differ in their paradigmatic approach and practical specification of growth drivers, there is a broad consensus in economic literature that investments in physical capital stand for one of the most significant

Figure 1: Average GDP per capita growth rates for selected economies, 2001-2022 (%)



Notes: GDP per capita growth rates are calculated based on GDP per capita PPP adjusted, in constant 2017 international dollars. Em.econ. refers to Emerging markets and developing economies (as per IMF definition).
Source: Authors’ calculation based on the WB – WDI database [86]

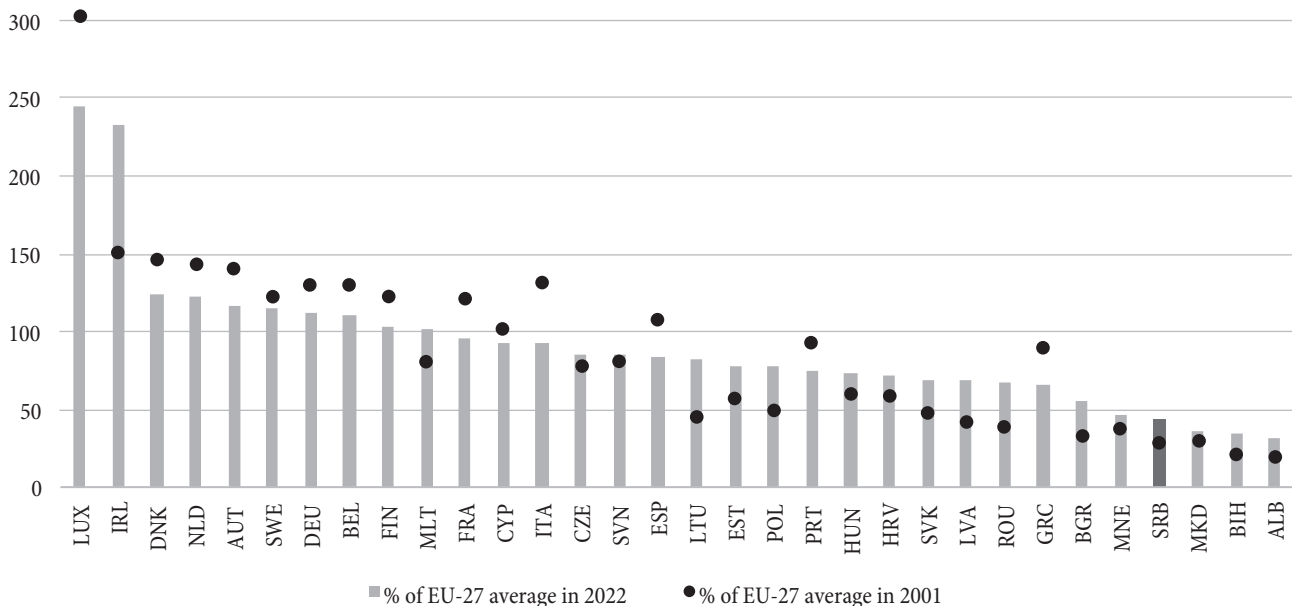
direct determinants of economic growth. To achieve fast economic growth, many conditions have to be met, some of which are under direct or indirect government control, while others, such as global economic trends, are beyond the government’s control. The level of investments in fixed capital, as one of the most important drivers, is to a large extent shaped by the characteristics of government policies. However, as economic growth is influenced by many factors, the question is: What level of investments in fixed capital is required to achieve GDP growth of more than 5% per year? To provide a robust and precise answer to this question, sophisticated econometric analysis would be required. However, a broader insight into this issue can also be provided by taking into account the experience and stylized facts of the economies that posted such growth in the past.

In that respect, this paper uses the annual data from 1990 to 2019 to identify a set of countries which have posted GDP growth of more than 5% per year (FGE) in that period and to evaluate the level and structure of investments in fixed capital that have been associated with such economic performances. The results show that FGE on average had total investment in fixed capital of 25.6% of GDP, of which 69% was private and 31% public investment, whereby private investment was predominantly domestic, which was associated with a high rate of gross domestic

savings (of 27.4% of GDP). The results of statistical tests (one-side Wilcoxon rank test) show that the median total investments (as a % GDP) in FGE were significantly higher than in Serbia, with both public investments and median private investments in FGE being higher than the respective median volumes in Serbia. The results also show that the median gross domestic savings in FGE were significantly higher than the respective median values in Serbia. These findings suggest that the policy strategy aimed at accelerating economic growth in Serbia in the long run should focus on increasing the overall level of investments, by keeping public investments at a high level and fostering the rise in domestic private investments. To achieve that, government policies oriented towards ensuring macroeconomic stability and strengthening the quality of formal and informal institutions are of crucial importance.

The remainder of the paper is structured as follows. Section 2 outlines the theoretical frameworks and the review of empirical literature on the domestic savings-investment-growth nexus. Stylized facts on savings and investments in FGE are presented and analyzed in Section 3, while the Section 4 is dealing with the identification of the gap between Serbia and FGE in terms of the size and structure of investments and domestic savings. Section 5 provides a conclusion with the discussion of policy aspects and implications of this topic.

Figure 2: GDP per capita, PPP (constant 2017 international dollars) as a % of EU-27 average



Source: Authors’ calculation based on the WB – WDI database [86]

Theoretical framework and literature review

Identifying the key drivers of economic growth and understanding the mechanisms through which these factors exert their influence are one of the crucial topics in economics. Consequently, various theoretical models were developed which were later tested in many empirical studies.

Among the various economic growth theories, those emphasizing the significance of investments in driving economic growth stand out. According to the classical growth theory, originated from the seminal research of Adam Smith and David Ricardo, the key factors affecting economic growth are capital accumulation and productive investments, which were predominantly achieved through the reinvestments of profits resulting from specialization, division of labor, and comparative advantages [25, pp. 1-2]. Improvements to the classical theory of growth led to the development of other theories, such as the Harrod-Domar economic growth model, grounded in the Keynesian perspective [19], [26]. The model highlights the significance of investments in influencing economic growth through two channels. Firstly, investments generate income, referred to as the “demand effect”. Secondly, investments contribute to gross domestic capital formation, influencing the economy’s production capacity and output growth, known as the “supply effect” of investments. The impact of investments on economic growth through these channels is influenced by national savings and investments productivity, with domestic savings and the capital-output ratio emerging as crucial determinants in the Harrod-Domar model. Expanding upon the unrealistic assumptions of the Harrod-Domar model that only capital contributes to growth (given sufficient labor to utilize all available capital) and that capital-output ratios are fixed, Solow [78] and Swan [79] introduced the neoclassical theory of economic growth. The Solow-Swan model of long-run economic growth acknowledges three driving forces of economic growth. These are the accumulation of capital, labor or population growth, and technological progress. Under this framework, economic growth relies not just on the amount of accumulated capital but also on how that capital is utilized, with technological progress

playing a central role in enhancing the productivity of labor. The model highlights the crucial role of savings in determining capital intensity, positing that a higher savings rate results in a greater capital stock (i.e., rise in investments) and, consequently, higher production levels. The aforementioned theories belong to the group of exogenous growth theories, where external factors determine economic growth. Over time, it was established that economic growth can be driven by endogenous factors, giving rise to the endogenous growth theory. This theory, developed by Romer [73] and Lucas [50], posits that investments in human capital, innovation, and knowledge significantly influence economic growth. The positive externalities and spillover effects generated by a knowledge-based economy are important for fostering economic development, supporting the role of physical capital in the growth process.

Investment-led growth theories have stimulated empirical research trying to examine the link between investments and economic growth. A considerable body of empirical studies supports the positive relationship between investments and economic growth, as suggested by theoretical models. In their empirical study, [62] proved the positive impact of investments in fixed assets, i.e., in gross fixed capital formation (GFCF), on economic growth of Bangladesh, India, Nepal, Pakistan and Sri Lanka in the period 1971-2006. The results showed that a 1% increase in capital raises GDP per capita by 0.61%. Similar results were obtained by [70] who conducted research on the same sample of countries but for the period from 1990 to 2014. According to their results, a 1% increase in GFCF leads to an increase in economic growth by 0.58%. Exploiting the data for India from 1970 to 2012, [9] showed that capital formation has a positive effect on economic growth in the long run, with an elasticity coefficient of 0.38. The long-run relationship between GFCF and GDP was also confirmed by [57], who examined the data for Uruguay from 1988 to 2011 and showed that the increase of one percentage point in GFCF leads to an increase in GDP by 0.128%. The positive impact of GFCF on economic growth has also been proven by numerous other authors in recent literature [37], [45], [65], [68], [82], [87], confirming that investments activities are an important tool to boost the economy.

Theoretical and empirical literature dealing with investment-led growth often emphasizes the importance of investments in physical capital. According to [72, p. 481], “physical investment is generally the most robust correlate of long-run growth”, while the positive impact of physical capital on economic growth has been proven in many empirical studies [18], [47], [55], [69]. This approach to core determinants of economic growth is based on the Solow [78] growth model where growth is driven by physical capital accumulation since it leads to an increase in national production capacity. In the same line, capital accumulation is considered a proximate source of economic growth [72, p. 481]. According to the proximate approach to economic growth, variations in growth rates among countries are attributed to differences in the accumulation of resources (physical capital, human capital, and labor) and differences in the growth of productivity. These factors are commonly referred to as proximate drivers of growth [27], [28]. Empirical research has found mixed results about their impact on economic growth. Some studies suggest that economic growth is driven by increases in total factor productivity [21], [29], [41], while others showed that accumulation of physical capital serves as the principal driver of growth [23], [66], [83]. A significant contribution to this line of research was made by [42, p. 4], who examined the proximate factors driving growth accelerations and determined which factors sustain these accelerations. Their analysis, covering 156 growth accelerations identified in 158 countries between 1950 and 2019, gave special importance to the significance of physical capital. The results indicated that although improvements in total factor productivity are the primary drivers of growth accelerations, the accumulation of physical capital plays a crucial role in sustaining these accelerations.

Building upon the previous review of both theoretical and empirical literature, it is undeniable that there is a crucial link between investments and economic growth. However, the influence of capital accumulation on economic growth depends on the factors determining the accumulation of capital and their intensity [82, p. 2]. Although the literature dealing with the identification of factors that shape the overall level of investments in a country is very

scarce (e.g., [74]), combining research that explores the determinants of various types of investments (public and private, domestic, and foreign) leads to a large number of factors that affect the overall level of investments in the country. Some of the most frequently identified factors in the theoretical and empirical literature belong to the group of macroeconomic drivers. Thus, lower interest rates generally encourage investments by reducing the cost of borrowing [38], [51], [59]. In the same line, a stable or low inflation rate creates a favorable environment for long-term investments [2], [17], [30], [54], [60]. Economic growth also belongs to the group of macroeconomic factors that influence investments, given the two-sided causality between investments and economic growth. A considerable body of literature deals with examining the causality of this relationship, showing that investments not only affect economic growth but also that economic growth stimulates further investments [10], [53], [67], [82].

In addition to macroeconomic, investments are influenced by political and institutional factors, such as political stability, government policies and legal framework, among others. Stable political environment and prominent development of political institutions have a stimulating effect on investments by providing lower risks for investors [40], [76], [85]. Investors are sensitive to government policies related to taxation, trade, and business regulations. So, a transparent and predictable policy environment is likely to attract more investments [44]. A robust legal system that protects property rights and enforces contracts enhances investor confidence, fostering higher levels of investments [11]. These political and institutional factors are particularly important for foreign direct investments, but they are also very important when it comes to domestic private investments. In the same line, political as well as economic instability can significantly impact investments decisions by creating considerable uncertainty regarding the determinants that are key in the investment decisions [74, p. 22]. Related to that, exchange rate stability is considered an important determinant of investments, bearing in mind that a stable exchange rate reduces uncertainty for international investors [15].

Financial variables are also regarded as important drivers of investments. A well-developed and well-performing

financial market indicates economic health and attracts both domestic and foreign investors. Within this group of factors, in addition to the already highlighted role of the price of capital (interest rate), availability of capital has a very important impact on investments levels [74, p. 23].

Besides the previous determinants that are commonly emphasized in the literature, investments are also influenced by infrastructure and technological development [14], [48], social factors like labor force, its education and skills, as well as demographic trends [63], international trade determinants like trade openness [35], [74], etc.

Although all the aforementioned factors determine investments to a greater or lesser extent, the variable that stands out in both theoretical and empirical literature as particularly important is savings. As previously stated, both Harrod-Domar and Solow-Swan model point to the key role of savings in investments activity. According to [52, pp. 200-201], a high savings rate leads to a substantial capital stock and elevates output in the steady state of the economy, while a low savings rate results in a diminished capital stock and reduced output. In the same line, [72 p. 481] states that “investments have to be financed by saving” emphasizing “the critical importance of domestic saving in economic growth”, while according to [81, p. 140] accumulation of capital, as one of the three components of economic growth (along with growth in population and technological progress), arises when the current income is not entirely spent, but rather a portion of it is saved and invested to augment future output and income. The positive relationship between savings and investments has been confirmed in a considerable body of empirical research [33], [61], [77], [80].

Bearing in mind the evident importance of savings for investments and economic growth, it becomes crucial to explore the determinants of savings within a country. Both theoretical and empirical literature has identified numerous factors that can influence savings. Some of the most important are interest and inflation rate, dependency ratio, income, and government saving. The theory suggests that determining the impact of a change in the real interest rate on savings is not straightforward, due to the interplay of two opposing effects – the income effect and the substitution effect. An increase in the interest

rate tends to boost future income and household wealth, encouraging higher current consumption and, hence, a reduction in savings. Conversely, a higher interest rate implies that postponing current consumption will yield greater future consumption, thereby leading to an increase in savings. Therefore, the overall effect of an increase in the interest rate on the savings rate is uncertain [8]. Given this complexity, it is not surprising that empirical research yields mixed results. While some studies demonstrate a positive correlation between interest rates and savings [1], [3], [6], [12], others indicate a negative impact [75].

Savings rates may also be influenced by inflation rate changes, but the impact remains unclear. On the one hand, a rise in the inflation rate diminishes the real value of the wealth of households, leading to uncertainty regarding the future values of assets and real incomes, resulting in increased savings. Conversely, a higher inflation rate is linked to greater uncertainty about the rate of return, potentially exerting a negative impact on savings. Empirical studies confirm the unpredictability of the inflation effect. For example, [16] and [75] found a negative effect of inflation on savings, while [6] and [12] reported a positive impact, supporting the notion that increased economic uncertainty stimulates individuals to increase savings.

One of the crucial factors influencing savings, particularly in countries that are less developed, is the dependency ratio reflecting the structure of the population. The higher dependency ratio results in lower disposable income as a result of high expenditure level, leading to reduced savings, and conversely. The negative effect of an increase in the dependency ratio on the savings rate has been proven in empirical research [24], [39], [46].

In the theoretical model of consumption, one of the primary factors influencing savings is the value of wealth or budget constraint. Under this framework, consumption in a specific period relies on anticipated future income. Thus, income as well as its growth plays a crucial role in shaping consumption patterns and, consequently, savings. Empirical research has confirmed a positive correlation between income and the magnitude of savings [6], [20], [24].

Public saving is another determinant that can significantly influence national savings. The neoclassical

interpretation of the life-cycle model suggests that reducing government savings is likely to boost consumption while discouraging overall savings. This occurs by shifting the tax burden to future generations, resulting in a decline in national savings. In contrast, the Ricardian theory argues that an increase in government savings would not affect national savings. This is because any such increase would be offset by a proportional reduction in private savings [4]. Empirical results are also ambiguous [6], [13], [24], [49].

In addition to the mentioned factors, the level of savings in the country can also be influenced by other factors such as the development of the financial market, terms of trade, political (in)stability, productivity growth, etc. [3], [4], [7], [16], [24], [36], [43].

Considering the previously discussed importance of investments for economic growth, analysis of the level of investments and their structure is crucial for giving policy recommendations related to achieving higher rates of economic growth.

Investments and growth nexus: Stylized facts from fast-growing economies and Serbia

Investments and economic growth

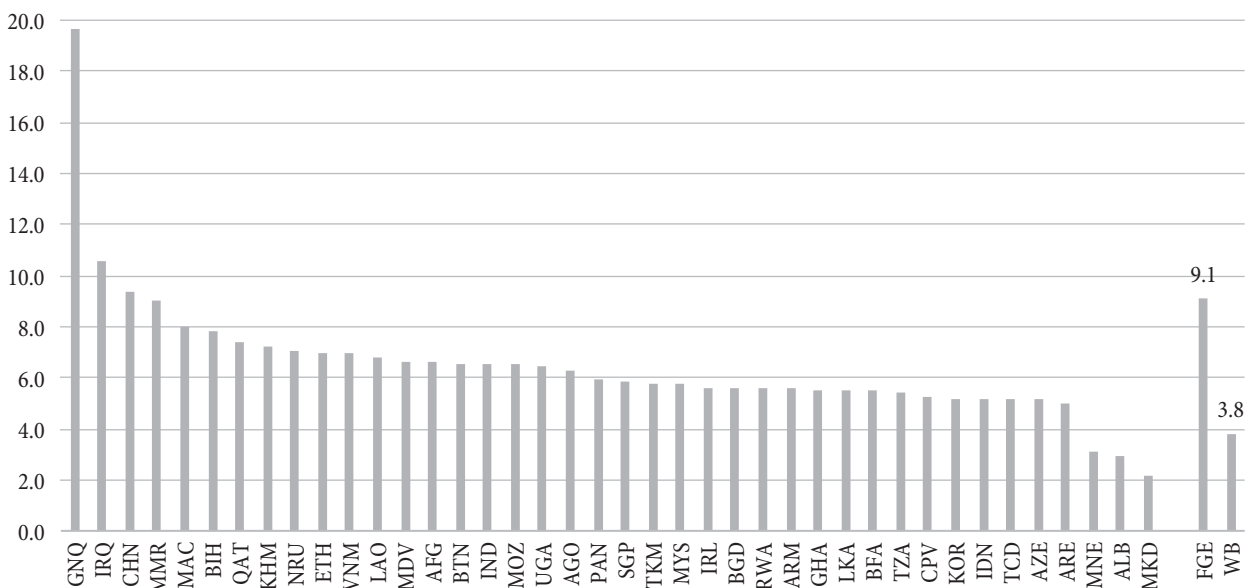
Analyzing the level and structure of investments for countries that have achieved high rates of economic

growth in the previous period yields valuable insights for formulating policy recommendations aimed at fostering economic growth in Serbia and expediting the convergence process with the EU-27.

In order to identify fast-growing economies, we looked at the average GDP growth rate achieved in the period from 1990 to 2019 (the period 2020-2022 was excluded due to the global pandemic's impact). Subsequently, we selected countries exhibiting an average GDP growth rate exceeding 5% during this period. Thirty-seven countries met this criterion¹, constituting the sample of fast-growing economies (FGE) for this research. In the observed period, FGEs posted average GDP growth rate of 9.1%, while without the data on Equatorial Guinea, which can be seen as an outlier, the average GDP growth rate in FGEs was 6%. Figure 3 delineates their average GDP growth rates, including the data for the Western Balkans (WB) countries, both at the individual country level and the average for the WB region – except for Serbia, for which comparable data on 1990-1995 are not available. However, even if the period for Serbia is shortened to 2000-2019, which does not include a deep economic downturn in the 1990s, the

1 These countries are: Afghanistan, Angola, Armenia, Azerbaijan, Bangladesh, Bhutan, Bosnia and Herzegovina, Burkina Faso, Cabo Verde, Cambodia, Chad, China People's Republic of, Equatorial Guinea, Ethiopia, Ghana, India, Indonesia, Iraq, Ireland, Korea Republic of, Lao P.D.R., Macao SAR, Malaysia, Maldives, Mozambique, Myanmar, Nauru, Panama, Qatar, Rwanda, Singapore, Sri Lanka, Tanzania, Turkmenistan, Uganda, United Arab Emirates, Vietnam.

Figure 3: Average GDP growth rates for selected countries, 1990-2019 (%)



Source: Authors' calculation based on the IMF – WEO database [31]

average GDP growth rate was close to 3.6% per year, which is close to the WB average, but still substantially below the FGE average. It should be noted that even if the time span is reduced to 1995-2019 or 2000-2019, no country from Central and Eastern Europe or WB passes the sample threshold of GDP growth rate of more than 5%.

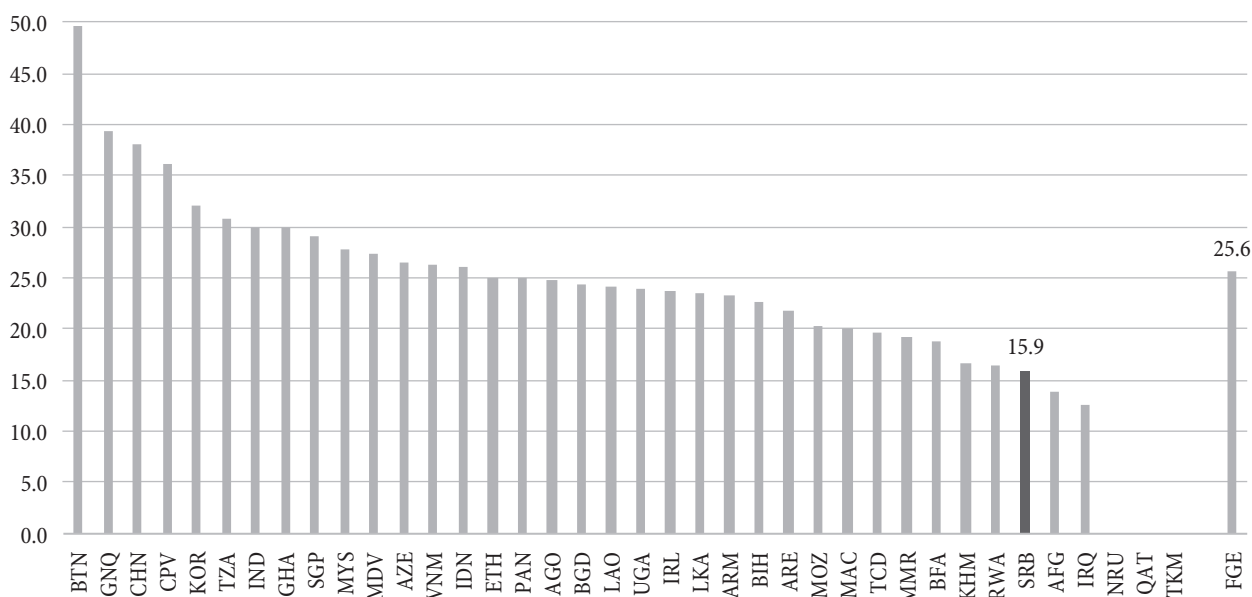
According to the data (Figure 3 and Figure 4), the speed of economic growth in FGE is positively correlated with the total investments. Data on the average level of investments in FGE in the period 1990-2019 (Figure 4)

indicate that FGE had total investments of around 25.6% of GDP. Six FGE countries (including China) had total investments of more than 30% of GDP over the observed period. The average rate of total investments remains pretty stable even if the time span is shortened to 1995-2019 or 2000-2019.

Public *versus* private investments

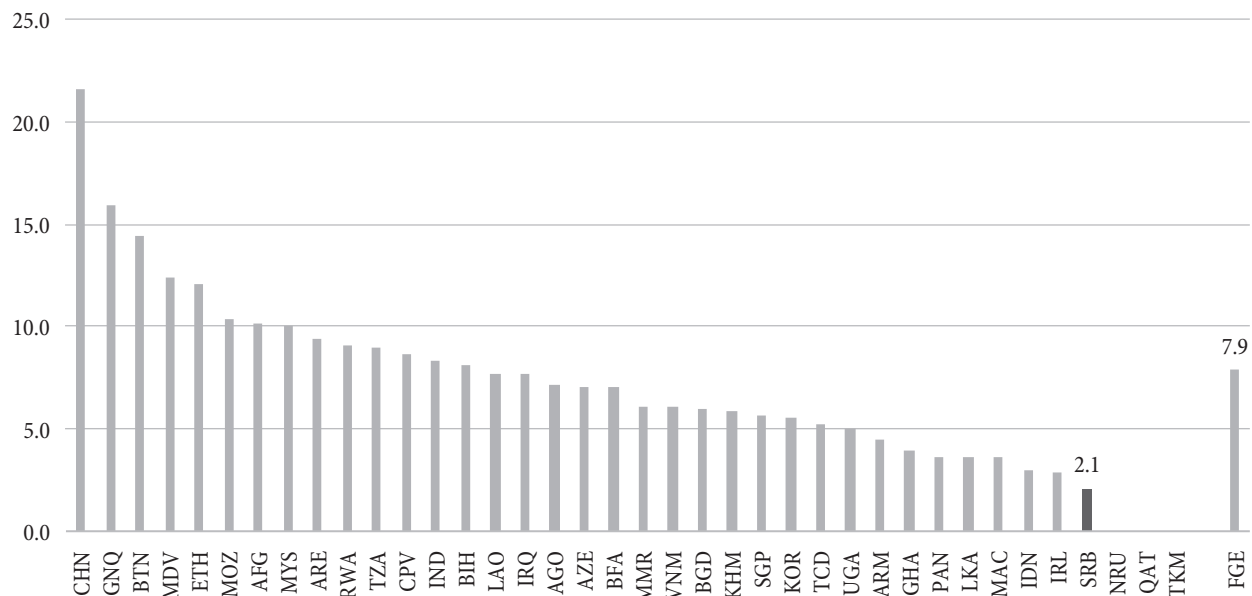
Having in mind that both public and private sectors undertake investments activities, an analysis of the average level of

Figure 4: Average level of investments (% GDP) for selected countries, 1990-2019



Note: Data for NRU, QAT and TKM are not available.
Source: Authors' calculation based on the IMF Investments and Capital Stock Dataset [32]

Figure 5: Average level of public investments (% GDP) for selected countries, 1990-2019



Note: Data for NRU, QAT and TKM are not available.
Source: Authors' calculation based on the IMF Investments and Capital Stock Dataset [32]

public and private investments (as a % of GDP) provides additional valuable insights. These data are presented in Figure 5 and Figure 6 and indicate that in FGE most of the investments in physical capital come from the private sector (around 70% of the total investments, i.e. on average close to 8% of GDP), while the contribution of public investments to overall fixed capital formation is smaller (30% of total investments, i.e. 17.7% of GDP), albeit still considerable. This finding is consistent with the research of [64]. These authors proposed a new interpretation of the term ‘investment’ [64, p. 1332] and developed a new methodology that they applied to the data on public and private investments in 28 EU countries. Their results suggested that “the private sector mostly invests in fixed capital, whereas the public sector mostly invests in human capital” [64, p. 1330].

Structure of private investments: Domestic *versus* foreign capital formation

Additional valuable conclusions can be reached by analyzing the role of domestic and foreign investments in posting high total investment. However, it is challenging to separate foreign capital formation from domestic capital formation. The option of subtracting foreign direct investments (FDI) and public investments from gross fixed capital formation (GFCF) and considering the residual as an approximation

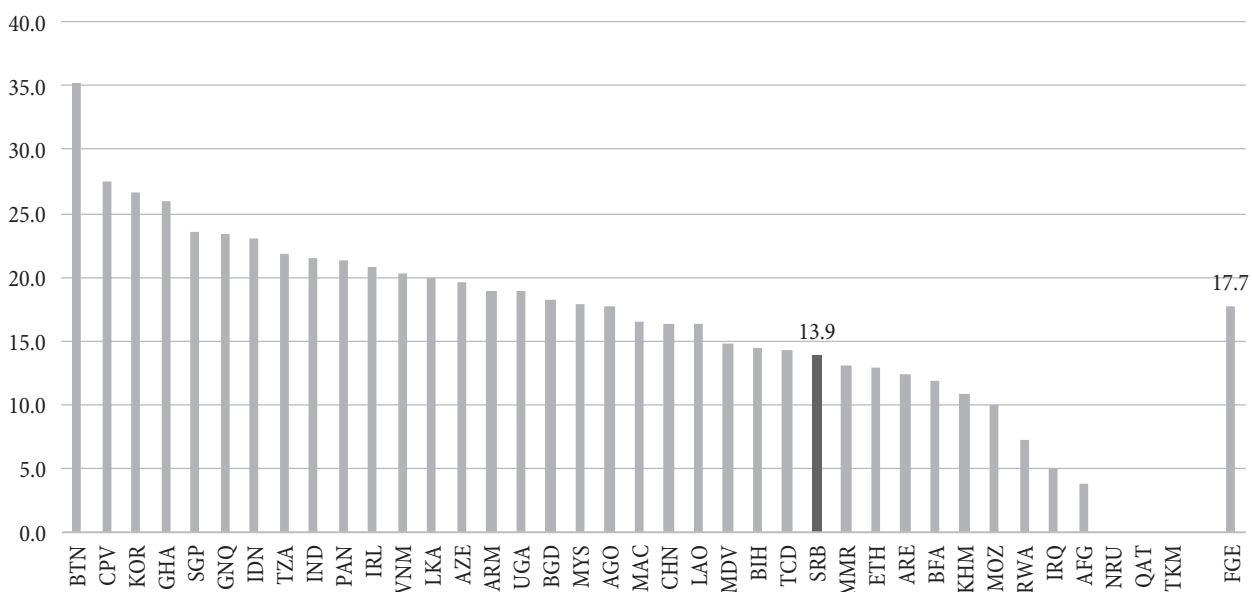
for domestic private investments has several drawbacks. First, FDI data does not precisely reflect the foreign component of GFCF, since mergers and acquisitions are not part of GFCG, while they can represent a large share of FDI. The problem can also occur in the case of joint ventures [22], [34], [58]. Second, GFCF and FDI are hardly comparable since they are measured according to the different accounting rules. Third, FDI flows registered in the balance of payment do not directly match to any measure of real investments [5].

To assess the role of foreign capital in financing investments and stimulating economic growth, one can examine the data on the proportion of FDI in relation to GFCF, as reported by UNCTAD (Figure 7). The data presented in Figure 7 show that FGE have been relying more heavily on domestic investments in financing their growth. In the sample period in FGE, FDI accounted for 16.6% of the overall investments, which means that the major share of investments in those countries (83.4%) has been funded by means of domestic investments. Three quarters of FGEs had an FDI-to-GFCG ratio of less than 20% during the period of strong economic growth.

Domestic savings and investments

Having in mind that domestic savings constitute a significant source of financing domestic investments, as

Figure 6: Average level of private investments (% GDP) for selected countries, 1990-2019



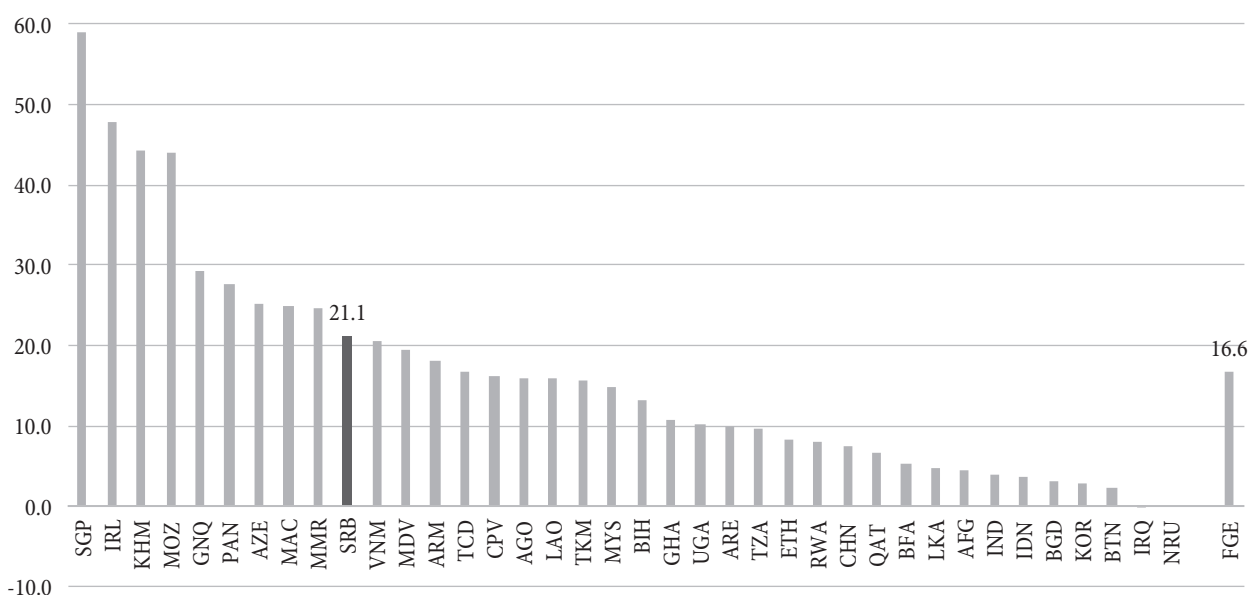
Note: Data for NRU, QAT and TKM are not available.
Source: Authors' calculation based on the IMF Investments and Capital Stock Dataset [32]

discussed in Section 2 of this paper, it is useful to analyze the average level of gross domestic savings (expressed as a % of GDP). The data presented in Figure 8 show that FGE countries had high gross domestic savings, with the average of 27.4% of GDP over the observed period, while close to 40% of FGE countries had domestic savings of more than 30% of GDP. The data (Figure 9) also indicate a solid positive correlation (0.31) between gross domestic savings and total investments.

Investments and savings in Serbia versus fast-growing economies: Gap analysis

The total investments in Serbia over the sample period amounted to 15.9% of GDP on average, which was substantially (by 9.7% of GDP) below the FGE average. The overall investment gap was pronounced due to lower levels of both private investments (by 3.8% of GDP) and public investments (by 5.8% of GDP). In addition to the

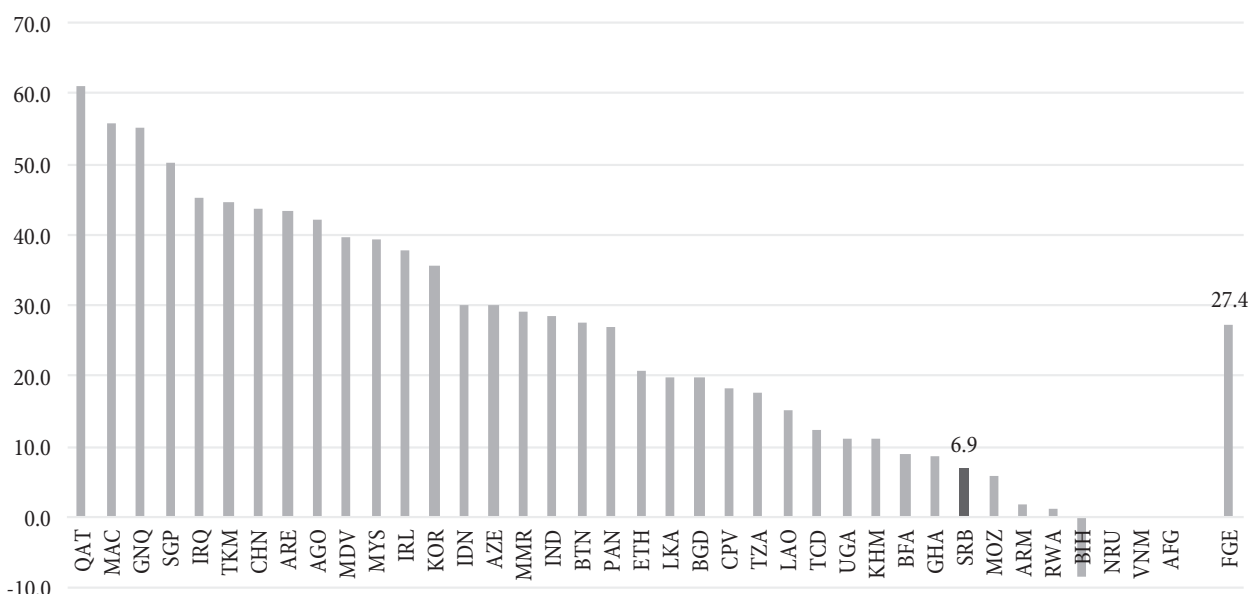
Figure 7: FDI inflows as a ratio to GFCF, average for the period 1990-2019 (%)



Note: Data for NRU are not available.

Source: Authors' calculation based on the UNCTAD Stat database [84]

Figure 8: Average gross domestic savings (% GDP) for selected countries, 1990-2019



Note: Data for NRU, VNM and AFG are not available.

Source: Authors' calculation based on the WB - WDI database [86]

difference in volume, the structure of investments in Serbia differed from the structure in FGE. While in FGE public investments accounted for 31% of total investment, in Serbia they accounted for less than 14% of total investment. In addition to that, the structure of private investment in Serbia was different from the respective structure in FGE. The data indicate that in the observed period, FDI-to-GFCF ratio in Serbia stood on average at 21.1%, while in FGE the respective share was 16.6%, which means that Serbia was more prone to rely on FDI in financing investments than it was the case with FGE. Since domestic investments are to a large extent conditional on domestic savings [33], [61], [77], [80], relatively lower share of investments financed from domestic sources in Serbia can be explained by its relatively low savings rate. With the overall gross savings rate of 6.9% of GDP, Serbia underperformed substantially (by 20.5% of GDP) in comparison to FGE, with respect to gross domestic savings.

In order to examine whether the differences in relevant investments and savings variables in Serbia compared to FGE are statistically significant, we conducted an additional statistical analysis. For these purposes, the one-sample Wilcoxon signed rank test was implemented, which represents a non-parametric alternative to a one-sample

t-test in situations where the data cannot be assumed to follow a normal distribution. The results of the Shapiro-Wilk test of normality, presented in Table 1, justify the application of the one-sample Wilcoxon signed rank test.

Table 1: Shapiro-Wilk test of normality

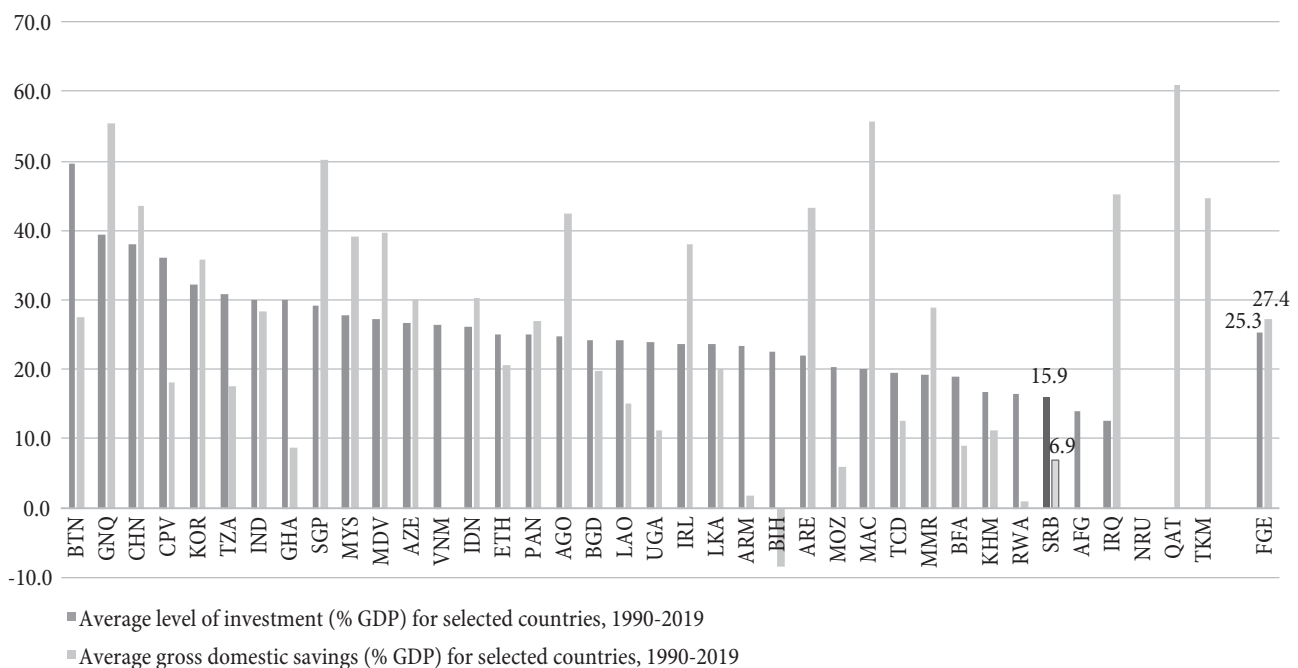
	Statistic	df	Sig.
Total investments (%GDP)	.968	821	<.001
Public investments (%GDP)	.861	821	<.001
Private investments (%GDP)	.978	821	<.001
FDI/GFCF	.726	821	<.001
Gross domestic savings (%GDP)	.997	821	.183

Source: Authors' calculation

One-sample Wilcoxon signed rank test enables to determine whether the median of the sample is equivalent to a specified standard value. In the context of our research, this test statistic enables us to determine whether the median of the sample of FGE and the median for Serbia are equal. The test results are presented in Table 2.

The results of the one-sample Wilcoxon signed rank test suggest that the median total investments (as a % GDP) in FGE was significantly higher than the median in Serbia, with both median public investments and median private investments in FGE being higher than the respective median volumes in Serbia. Consistently, the one-sample Wilcoxon signed rank test indicated that the median FDI/

Figure 9: Average level of investments and gross domestic savings (% GDP) for selected countries, 1990-2019



Note: Data for investments are not available for NRU, QAT and TKM, while data for savings are not available for NRU, VNM and AFG. Source: Authors' calculation based on the IMF Investments and Capital Stock Dataset [32] and WB - WDI database [86]

GFCF in FGE was significantly lower, while the median gross domestic savings was significantly higher than the respective median values in Serbia.

Concluding remarks and policy considerations

Investments in fixed capital stand for one of the critical determinants of economic growth dynamics. This paper has investigated the size and structure of investments and domestic savings in the set of 37 FGEs and estimated the respective gaps in comparison to Serbia. The 1990-2019 annual data show that FGE on average had overall investments in fixed capital formation of more than 25% GDP, with the pronounced share of both public investments (31% of total volume) and private investments (69% of total volume). Private investments in those economies were mostly financed from domestic sources, as the FDI-to-investments ratio was relatively low. In comparison to FGE, in the same period Serbia had substantially lower volume of investments, the gap being particularly pronounced in terms of public investment and domestic private investments, which was connected to much lower gross domestic savings.

Stylized facts and lessons from the set of FGE imply that to foster economic growth to higher growth rates (of more than 5% per year) in Serbia, a significant rise in the overall level of investments is required. In the last few years, public investments in Serbia increased substantially, from below 4% to more than 6% of GDP. A rise in public investments significantly contributes to an increase in the overall level of investments, both directly and indirectly, as empirical literature suggests that in emerging Europe, public investments tend to crowd-in private investments [56]. However, for public investments to generate their full potential, in terms of fostering private capital formation

and economic growth, a rigorous selection of investment projects based on objective economic criteria and their efficient implementation are needed. With respect to private investments, Serbia performed well in comparison to other emerging European countries, in the sense of inflow of FDI and financing of investments from foreign sources. However, with a global rise in interest rates and geopolitical tensions, the dynamics of investments from foreign sources in the future will be linked to considerable level of uncertainty. Taking into account these circumstances and the stylized facts on FGE, it is concluded that for a significant and sustained rise in private investments, a robust increase in domestic savings and domestic private investments is required. In that respect, the focus of the government should be on policies that would reduce economic and other risks associated with directing FDI in Serbia, as well as on policies that would promote domestic saving and investments. In that sense, in addition to ensuring macroeconomic stability, further improvement in the legal and institutional framework is necessary, with the focus on providing a level playing field (e.g., by tackling the shadow economy and corruption), ensuring the effective rule of law, enhancing the efficiency of public administration, and improving the quality of education. In addition to that, fiscal (tax and public expenditure) policy that would discourage consumption and promote savings can also provide a valuable contribution.

The results presented in this paper provide tentative indication of the savings-investment-growth nexus in the set of countries which have experienced solid economic growth over the past three decades. However, since economic growth is a multidimensional and complex issue, to provide more precise and robust results on the thresholds and structure of investments and savings that would lead to accelerated economic growth, it would be

Table 2: One-sample Wilcoxon signed rank test summary

	Total investments (%GDP)	Public investments (%GDP)	Private investments (%GDP)	FDI/GFCF	Gross domestic savings (%GDP)
Total N	1017	1017	1017	1055	879
Test Statistic	468686.000	510316.000	356882.000	126805.500	364704.000
Standard Error	9369.382	9369.382	9369.382	9899.120	7529.447
Standardized Test Statistic	22.398	26.842	10.466	-15.326	22.754
Asymptotic Sig. (2-sided test)	<.001	<.001	<.001	<.001	<.001

Source: Authors' calculation

necessary to control for the impact of many other factors on that nexus, by applying relevant econometric techniques, which opens the floor for further research on this topic.

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