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RESPOND TO COVID-19 CHALLENGES: UNCONSTRAINED GROWTH AND POLICY OPTIONS

Odgovor na izazove kovid 19 krize – neograničeni rast i moguće ekonomske politike

Abstract

In the first, empirical part of the paper, we have dealt with the previous recession episodes in Serbia in the 15-year interval from 2006 to 2020 and the direct impact of the Covid-19 crisis. We have compared the long-term and short-term trends and one-off Covid-19 impacts on the real and monetary economy, financial sector, and the rest of the world. Key lessons drawn from the previous crises are highly relevant today. The second part of the paper is analytical. For that purpose, we have updated our DSGE model with the data until the last quarter of 2020 and simulated nine alternative scenarios of fiscal, monetary, and industrial policies over the next five years. They showed remarkable results in some sectors, but created imbalances in others. Focusing on GDP growth in the post-Covid-19 period is misleading since the economy will never be the same. There is a need to choose an optimal mix of conventional policy measures and an industrial policy based on digitalisation and IT. The current Government policy of a huge fiscal deficit and rising public debt exposes the country to unbearable risk in the future.

Keywords: *recession, Covid-19, DSGE model, monetary, fiscal, and industrial policies.*

Sažetak

Prvi deo rada je empirijski. U njemu smo analizirali prethodne recesije u Srbiji u periodu od 15 godina između 2006. i 2020. i direktne posledice kovid 19 krize. Uporedili smo dugoročne i kratkoročne trendove i jednokratni uticaj kovida 19 na realni i monetarni sektor, finansijski sektor i odnose sa inostranstvom. Zaključili smo da su danas izuzetno relevantne ključne lekcije iz prethodnih kriza. Drugi deo je analitički. Radi toga smo ažurirali naš DSGE model opšte ravnoteže u Srbiji sve do poslednjeg kvartala u 2020. godini. Na njemu smo simulirali devet alternativnih scenarija fiskalne, monetarne i industrijske politike tokom narednih pet godina. Njihovi rezultati su se izvanredno pokazali u pojedinim sektorima, ali su stvarali neravnoteže u drugim. Zato fokusiranje samo na rast BDP u post-kovid 19 periodu, bez otklanjanja neravnoteža, obmanjuje. Ekonomija više nikada neće biti ista kao ranije. Potrebno je odabrati optimalnu kombinaciju konvencionalnih mera ekonomske politike i povezati ih sa industrijalizacijom zasnovanom na digitalizaciji i IT tehnologiji. Aktuelna vladina politika visokog fiskalnog deficita i rastućeg javnog duga izlaže zemlju nepodnošljivom riziku u budućnosti.

Ključne reči: *recesija, kovid 19, DSGE model, monetarna, fiskalna i industrijska politika.*

Introduction

The Covid-19 pandemic took many lives, but it also imposed a severe shock to the economy, both in Serbia and worldwide. The governments and central banks of many countries reacted immediately and vigorously. Fiscal and monetary stimulus has been widely used everywhere, with tax holiday and delay of repayment of credit instalments. Many jobs have been lost, and remote working has become the rule, as has online shopping. Digitisation, the Internet, and IT have gained exceptional momentum, as some social restrictions that previously hindered their application have been forced out. After the shock caused by Covid-19, the economy will never be the same. That worries us. We are concerned about what will happen to the Serbian economy in the long run. Will the existing fiscal and monetary policy calm the crisis or will it create a prolonged depression similar to the Great Recession of 2008?

All optimistic estimates of GDP growth are de facto estimates of unconstrained growth because they do not incorporate the imbalances that such growth creates. These imbalances are binding, and GDP growth must adjust to them. Besides, certain state interventions might further complicate the post-crisis recovery. In this paper, we will show how GDP growth creates imbalances in Serbia and how the Government and the NBS could react to them.

A year has passed, the economic climate has changed and many positive expectations have been formed. It is believed that this crisis is temporary and has the character of the previous occasional recessions. That is not only the assessment of our Government, but also of the IMF. "Thanks to unprecedented policy response, the Covid-19 recession is likely to leave smaller scars than the 2008 global financial crisis." [3, p. xvi] We do not share that view. As we have already said, we believe that the economy will never be the same after this crisis. Moreover, Serbia is already on its way to repeat all the mistakes it made during the Great Recession and re-enter the public debt crisis. Behind it creeps the current account crisis followed by the possible renewal of inflation.

We will illustrate our scepticism using the example of the formation of GDP in Serbia and the Eurozone. For the sake of comparability of data, we took the IMF data on GDP in USD for the period from 2006 to 2026, which includes the corresponding IMF forecast for the next six years. That covers two decades, which is a long enough time to notice certain regularities. In Figure 1, we shall show the growth rates and GDP levels with the shaded area covering the forecast period.

GDP growth rates in Serbia and the Eurozone are highly integrated. We notice that both economies periodically entered a recession – particularly in 2009, 2012 and 2015. The Eurozone was again in recession in 2019-20, while Serbia was not. More precisely, Serbia was in recession for at least four quarters (three quarters in 2020 and one quarter in 2021), but this cannot be recognised from the dollar data on GDP. The reason is that the dinar has appreciated in real terms, and Serbia had a positive dollar GDP growth in 2020. After that, in the next six years, both economies will achieve the growth rates forecasted by the IMF.

The GDP growth rates are math growth rates that hide misconceptions. Technically speaking, a country's economy enters a recession if it has two related quarters

Figure 1: GDP in Serbia and the Eurozone, USD billions
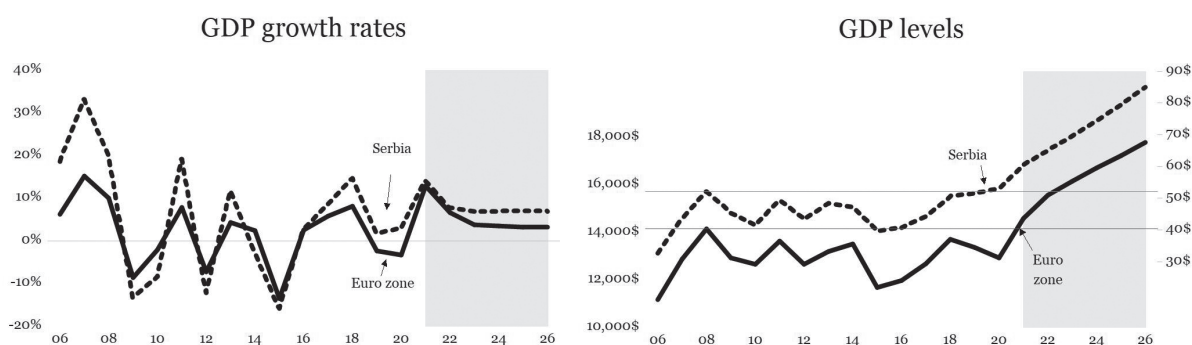
with a negative GDP growth rate. However, that says nothing about the depression of economic activity, which is measured by the level of GDP. The point of overcoming the depression occurs when the level of GDP is sustainably higher than in the year before the outbreak of the crisis. The right side of Figure 1 shows that after the Great Recession of 2008 the Serbian economy did not emerge from depression until 2020 (despite the recession).

On the other hand, the Eurozone economy does not emerge from depression until 2021. Furthermore, the recovery period after the Covid-19 crisis has two unusual features. GDP is propelled like a rubber bullet, while growth rates show no more cyclical oscillations. Hence, IMF's optimism is not well grounded.

This crisis is such that it mimics a shock similar to the one in the Great Recession due to the disruption of international capital flows. However, on this occasion, not only the flows of international trade, but also the supply chains within the countries were broken. On the other hand, policy measures taken to stimulate aggregate demand have been similar to those implemented after 2009. Therefore, similar adverse effects can be expected this time. In other words, expansive fiscal policy had brought many countries into a public debt crisis, after which forced rebalancing had to be implemented at a lower level of economic activity. It seems that Serbia will rejoin that group of countries, although the data on GDP currently cover it up.

At the end of 2020, Serbia's public debt was below 60% (with a decline in the last two quarters), while the envisaged fiscal deficit for 2021 was 3% (which is a reduction of over 5% compared to the previous year). However, such fiscal position of the country was not sustainable. According to the adopted budget revision for 2021 [9], [2], the fiscal deficit will increase to 7%, with an additional increase in public debt of at least 4% of GDP. Thus, Serbia is entering a growing spiral of public debt, which can be dramatic when the interest rate returns to a normal level.

The IMF recommends "… prioritising health care spending, providing well-targeted fiscal support, and maintaining accommodative monetary policy while monitoring financial stability risks. Then, as the recovery progresses, policymakers will need to… boosting productive

capacity (public investment) and increasing incentives for an efficient allocation of productive resources… Effort should also be directed at creating space [for debt managing] through increased revenue collection (fewer breaks, better coverage of registries, and switching to well-designed value-added taxes), greater tax progressivity, and by reducing wasteful subsidies" [3, p. xvii].

In this paper, we will model fiscal support and accommodative monetary policy, as well as boosting productive capacity and efficient allocation of productive resources. We will use our DSGE model for that purpose [4], [5]. In our view, the necessary increase in health care expenditures must be accommodated within the existing fiscal expenditures. It should not be an excuse for a dramatic increase in the fiscal deficit. Additional health expenditures, as proposed by the Government, account for only 0.4% of GDP, which is negligible compared to the -7% of general government deficit. We do not think that the IMF recommendations for increased VAT proceeds and greater tax progressivity are acceptable for Serbia, which already has a high tax burden. We do not consider that the fiscal policy of keeping the fiscal deficit at -7% is a reasonable policy for the current economic crisis.

In this paper, we will analyse the fiscal, foreign exchange, monetary, foreign trade and industrial policies and their impact on other macroeconomic variables. In the first part, we will show how Covid-19 affected the Serbian economy. After that, we will briefly summarise the lessons from the two previous crises: the Great Depression and Fiscal Consolidation. These two parts of the paper are empirical. The following three parts are analytical and based on our DSGE model, which was calibrated on the data until the fourth quarter of 2020. In the third part of the paper, we will show our unconditional forecast for key macroeconomic variables for the next five years. It was assumed that the Government would refrain from any active policy to address macroeconomic disbalances. In the following two sections, we will show the possible effects of an active fiscal policy and the effects active monetary and industrial policies could have. Finally, in conclusion, we summarise a menu of policy options. It is up to the Government to make an optimal policy mix. The present one is neither optimal nor sustainable.

Covid-19 impact

To identify the impact of the Covid-19 crisis on the Serbian economy, we will do two things. First, we will not only look at GDP and its components, but give a much bigger picture of the economy. It is based on four interrelated areas of activity: the fiscal sector, the real economy, the monetary bloc and the rest of the world. In this sense, four blocks of macroeconomics explain how one of the key macroeconomic deficits is formed and financed – the savings-investments deficit. Sustainable economic growth depends on it. That has been the case for the past two decades. However, the Covid-19 crisis introduced many novelties. Supply chains have been broken. People are forced to work remotely, many professions have suddenly become redundant, the Internet has never been more used in production, and online sales of goods is switched on. That seems to be an irreversible change. New technology and new ways of communication will determine future economic growth.

Second, we will observe the long-term and short-term trends of each of the selected variables and compare them with the effects of the Covid-19 crisis in 2020. That way we will know precisely whether this crisis has contributed to some bad results or whether they would have occurred regardless. We determined the long-term trend based on the compound annual growth rate in the

2006-19 period. Analogous growth rates were compiled to determine the short-run trend in 2015-19. The last year of 2020 is exceptional as the product of the Covid-19 crisis. That is why we treated it differently. We have shown the changes in the trend as the difference between long-term and medium-term growth rates. Positive changes are marked with upward green arrows ▲ and changes with the opposite effect with downward red arrows ▼.

The first block of variables is the fiscal block. We monitored fiscal revenues and expenditures, fiscal deficit, public debt and the activity of the Development Fund (which is mainly financed from the budget). The fiscal block has all the green arrows until 2019, which means that the trend was generally improving. Fiscal revenue grew, while actual fiscal expenditures decreased, which narrowed the fiscal deficit. Also, the share of public debt in GDP declined. However, in the last year, all these indicators changed the sign and turned red. The fiscal revenue was declining, as opposed to the fiscal expenditures. That increased the fiscal deficit and public debt. Its growth is not as high as expected because certain foreign loans have not been activated yet. Only the Development Fund improved its activity because the state used it to provide companies with additional liquidity.

The second block refers to the GDP generated in the real economy. The data refer to GDP as an aggregate

Table 1: Four-sector trends in 2006-19 and Covid-19 impact in 2020

Related to GDP	Long-run	Short-run	Trend		Covid-19		Related to GDP	Long-run	Short-run	Trend		Covid-19	
	(1)	(2)	(3)		(4)			(1)	(2)	(3)		(4)	
Fiscal block							The rest of the world						
Fiscal revenue	0.1%	1.7%	1.6%	▲	-1.8%	▼	Foreign debt	1.3%	-4.6%	-5.9%	▼	6.7%	▲
Fiscal expenditure	-0.1%	-0.3%	-0.1%	▼	16.9%	▲	Capital inflow	-5.9%	25.2%	31.2%	▲	-25.7%	▼
Development Fund		55.2%		▲	56.8%	▲	International investment position	0.4%	-2.1%	-2.5%	▼	2.5%	▲
Public debt share	3.3%	-7.2%	-10.5%	▼	9.3%	▲	Foreign direct investment	7.5%	6.8%	-0.8%	▼	-54.2%	▼
Fiscal deficit	-13.8%	-50.6%	-36.8%	▼	353.0%	▲	Official reserve	-0.9%	-0.2%	0.7%	▲	-1.1%	▼
							Credit rating EMBI	-22.8%	-30.4%	-7.6%	▼	53.1%	▲
Real economy							Monetary economy						
GDP*	2.1%	3.3%	1.2%	▲	-1.0%	▼	Monetary Survey NFA	2.0%	-0.9%	-2.9%	▼	3.8%	▲
GDP goods*	1.0%	1.9%	1.0%	▲	1.3%	▲	Monetary Survey NDA	5.8%	2.7%	-3.1%	▼	15.5%	▲
GDP services*	2.5%	3.8%	1.3%	▲	-1.8%	▼	Commercial banks assets	3.0%	2.6%	-0.3%	▼	11.8%	▲
Investment*	3.6%	10.7%	7.0%	▲	-2.8%	▼	Loans to companies	2.3%	0.8%	-1.5%	▼	7.3%	▲
Export*	6.7%	7.2%	0.5%	▲	-5.9%	▼	Loans to households	6.6%	5.3%	-1.3%	▼	11.0%	▲
Import*	4.7%	8.9%	4.2%	▲	-3.5%	▼	Stock exchange turnover	-11.1%	-2.4%	8.7%	▲	-47.4%	▼
Remittances	-3.4%	-1.4%	2.0%	▲	-17.9%	▼	Money aggregate M3	6.2%	5.7%	-0.5%	▼	14.6%	▲
Current account	-5.2%	8.5%	13.7%	▲	-17.9%	▼	T-bills	-6.1%	-11.2%	-5.1%	▼	0.8%	▲
* In real absolute terms							Investment funds	32.6%	19.4%	-13.2%	▼	15.6%	▲
Source: Author.							Saving-investment Gap	-8.2%	-4.7%	3.6%	▲	-4.9%	▲

and to the production of commodities and provision of services within it. From the elements of final demand, we single out investments, export and import. Here we add the current account deficit and remittances from abroad which significantly reduce the current account deficit.

The real economy has similar results to the fiscal sector. All indicators show a positive trend with green arrows up to 2019. In 2020, however, they all turned red. The only exception took place in the production of goods, which in these difficult circumstances recorded a minimal growth of 1.3% due to a good harvest in agriculture. Investments record a strong positive trend in the short run, followed by import. Remittances are an essential source of financing of the current account deficit, but the pace of their growth is slowing down, particularly in 2020. The current account is also deteriorating.

The third block refers to the rest of the world and encompasses external debt, the international investment position of the country, inflow of capital from abroad and FDI. We also added the EMBI credit rating and the country's foreign exchange reserves. In this block, positive and negative trends match each other. Official reserves are declining, but at a slower pace, while FDI is reducing its share of GDP. On the other hand, capital inflows are rising, foreign debt is declining, and credit ratings are improving. Serbia is a debtor country in international investor relations, but its exposure is declining slightly. Furthermore, while the number of red and green arrows was almost equal up to 2019, they all turned red in 2020. The Covid-19 crisis aggravated all indicators of the global financial market's impact on Serbia.

The last block refers to the monetary economy. Here we analysed the following variables: NDA and NFA, financial depth, loans to the economy and households, T-bills, monetary aggregate M3, turnover on the Belgrade Stock Exchange, investment funds and the aggregate gap between savings and investments. The monetary and banking sectors have a completely different position. In terms of trends, red arrows predominate significantly. That means that the monetary situation had been deteriorating even before the outbreak of the Covid-19 crisis. The NFA and NDA were reducing their growth rates, just like the share of money in GDP, bank assets

and loans to households and businesses. All investment funds showed poor performance. That also refers to the turnover on the Belgrade Stock Exchange. The savings-investments gap was also increasing. On the other hand, the value of almost all these indicators improved in 2020. That means that the injection of liquidity into the banking system by the NBS and the postponement of repayment of credit obligations yielded positive short-term results.

To conclude: the Covid-19 crisis has halted or reversed positive trends in three of the four macroeconomic blocks: the fiscal sector, the real economy, and the ROW. However, fiscal incentives in the fourth block were not sufficient to wipe out these impacts. On the other hand, monetary incentives were much more effective. The question is, however, how long will this monetary support be sustainable.

Lessons from the previous crises

In the simulations of possible economic policies after the Covid-19 crisis, we will use nine variables. The first group of three variables relates to macroeconomic imbalances: fiscal deficit, public debt, and trade (and current account) deficits. The second group of indicators shows economic growth: GDP growth rate, employment and real wage rate growth. The third group of variables refers to the economic policy instruments: real exchange rate, repo interest rate and inflation. All these data are presented in Figure 2. The entire period of 15 years was divided into three parts. The first part refers to the period after the outbreak of the Great Recession, from Q1 2009 to Q4 2014 (the shaded area is yellow). The effects of this crisis extended beyond the stated limit, but the 2015 Fiscal Consolidation suppressed them. We marked that second period stretching two years from Q1 2015 to Q4 2016. Of course, some effects continued beyond this period, but we ignored them since the primary goal of fiscal consolidation was achieved. The last period is the Covid-19 period marked between Q1 2020 and Q4 2020 (and shaded with ochre). To understand how it is possible to maintain macroeconomic imbalances, we have prepared data on financing thereof and presented them in annex in Figure A.1.

The first period after the Great Recession can be called the crisis of industrial production and current account. It

is evident that GDP growth declined in 2009, but not to the extent that would indicate a major recession. However, the recession was huge in industrial production. The share of industry in the formation of GDP fell from 24 to 21 percent. For five years, this share remained at a similar level with significant cyclical changes and another deep recession in 2014. After that period, the industry share in GDP continued to fall and stopped at the level of 20% at the end of 2020. Although deindustrialisation in Serbia was present even before this period, now it is becoming a permanent feature of the Serbian economy. Fiscal support for foreign investment has not reversed this trend at all. Also, fiscal support from the anti-crisis Covid-19 policy in 2020 did not change the trend of deindustrialisation. It only made it possible to keep GDP growth in the industry at a "positive zero", which is not a bad result given what happened to the industry in other countries.

Lack of domestic investment is one of the causes of the relative decline in industrial production [see 6]. It is also the consequence of banks' commercial policies. As shown in Figure A.1, the corporate sector has received a decreasing number of loans from banks since 2012.

When the Great Recession spread to Serbia, the banks reacted proactively. Since foreign companies owned most domestic banks, they recapitalised their Serbian subsidiaries. Although the depth of the financial sector did not increase significantly, the corporate sector received additional bank funds. That lasted until 2012. After that, deleveraging of domestic banks occurred. They repaid foreign loans to their parent banks and reduced domestic funds available for lending. They also changed their favourable clients – banks preferred to finance households and the state instead of the corporate sector. The crowding-out effect was becoming visible. As long as the share of loans to the public sector was below 8% of GDP, there was also a crowding-in effect: both the government and the corporate sector tend to increase their credit shares. After this point, the apparent increase in banks' lending activity to the government sector begins, at the cost of reducing the corporate sector share. That is one of the outcomes of the public debt rise, which fits into the banks' impression that the state is less risky than the corporate sector. At least the government never had any NPLs, which was not the case in the corporate sector.

Figure 2: Three recent development stages
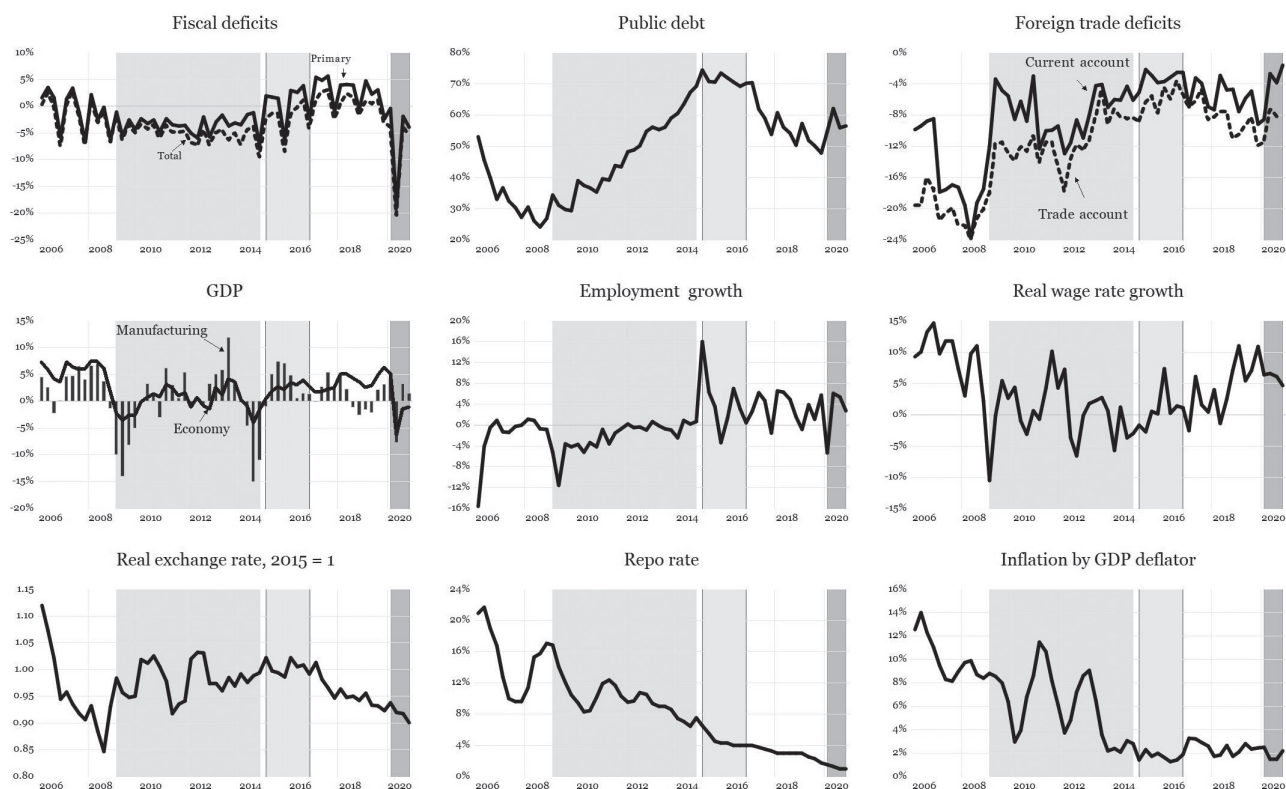
During this period employment declined, while real wage growth rates fluctuated significantly, yet around zero. That implies that there was no sustainable growth of real wages in this period. Real wages grew significantly only after the completion of the Fiscal Consolidation programme.

Public debt increased from 30% to over 70% in this period. That led to a public debt crisis which posed a threat that the country would declare a default. That is why the Financial Consolidation programme was enforced. However, before we proceed to its analysis, we will show the costs of financing the public debt. As shown in Figure A.1, these costs exceeded 12% of GDP in 2014, only to be higher than 14% of GDP the following year. Those were mainly the costs of domestic debt service, i.e., the service of debt to domestic banks. Later, the costs of servicing foreign government loans rose.

Today there is a debate about the level of sustainability of public debt. According to our legislation, that is 45% of GDP, but in practice 60% is taken as standard under current circumstances. However, the amount of public debt is not a problem by itself, but the cost of servicing it is. Of course, the servicing costs depend on the amount of public debt and the level of interest rates. Interest rates are currently low, and the cost of interest is around 2% of GDP. Do notice that in 2014 it was 3% of GDP.

Public debt can be approximated as an accumulated fiscal deficit. The financing of the fiscal deficit is also visible in Figure A.1. When financing the fiscal deficit, the state must borrow not only for these purposes, but also for the repayment of the previously taken loans. In fiscal terminology, this is called treasury receipts and outlays. Receipts represent all domestic and foreign loans and payments from privatisation. Outlays are all repayments of domestic and foreign loans plus loan processing costs. The existence of a high public debt includes a permanent need for extensive government borrowing. As future borrowing conditions are uncertain, public debt is a source of permanent risk to Serbia's fiscal stability.

The current account deficit is equal to the savings-investments deficit. Financing the current account deficit shows how one country gets funds to finance the investments it cannot finance from its own savings and accumulation of profits. Figure A.1 shows the financing of the current account deficit in Serbia. In Q2 2008, the current account deficit and the trade balance equalled at 24% of GDP (usually, the trade deficit is higher by a few percent). It was a completely unsustainable situation. For the most part, this deficit was financed by the inflow of capital from abroad, but the Great Recession interrupted this tendency. Reduced capital inflows from abroad forcibly cut down the current account deficit. However, remittances from abroad did not decrease as much. They provided critical support for financing the domestic imbalance in this period and later on.

High current account deficit and the interruption of capital inflows from abroad in 2009 caused a forced adjustment in the economy. Due to a falling demand, the industry was plunged into recession, and the persistent fiscal deficit exploded on the public debt side. This debt soon proved unsustainable, which is why in 2015 the Fiscal Consolidation programme was adopted. The burden of adjustment mostly fell on pensions. In the 2015-16 period, real wage growth barely exceeded the zero limit (0.7%), while pensions dropped significantly. At the end of 2008, they amounted to 13.5% of GDP. At the beginning of the Fiscal Consolidation they fell to 12.3%, only to further decrease to 10% up to now.

The industry slowly started to switch to the production of goods for export, so that in the period of Fiscal Consolidation it achieved growth, if not the entire GDP. Employment also showed positive growth rates. The trade and wage deficits narrowed, although the cost of financing public debt remained high. The trend of public debt growth was stopped and brought down, declining until the Covid-19 crisis.

In the era of Fiscal Consolidation, the real exchange rate was on the verge of its equilibrium determined by the PPP standards. At the same time, the repo interest rate dropped significantly, pulling down all other interest rates. The cost of financing domestic public debt was starting to decline significantly. Inflation calmed down between 2% and 4%.

Even after the Fiscal Consolidation, the NBS continued to ease its monetary policy and reduce its repo rate. At the same time, by intervening in the foreign exchange market, the NBS was pushing the real exchange rate towards more

significant appreciation. Serbia faced Covid-19 with a repo rate of 2.25% in February 2020, which, through a series of reductions, fell to 1% in December 2020. The real exchange rate of the dinar appreciated at least 10%.

Is this situation sustainable? The situation at the end of 2008 was like the one we have today. Will Serbia enter the crisis again with a delay of one year or will it, perhaps, get out of the crisis this year? The answers to these questions depend on the general economic climate in the world and the renewal of economic activity in the EU, as well as on the macroeconomic policy in the country. Currently, the forecasts for the EU are pretty optimistic. After a decline of -6.6% in 2020, the IMF forecasts growth of 4.4% in 2021, 3.8% in 2022 and 1.9% in 2023. For Serbia, the IMF forecasts growth of 4.9%, 4.5% and 4.0% in 2021, 2022 and 2023, respectively. We have already expressed our doubts about these forecasts. In the next section, we will present our forecasts for the growth of key macroeconomic variables over the next five years based on our DSGE model [4], [8].

Forecast

We already used the GDSE model to assess what would happen to the Serbian economy if the policymaker consistently implemented the policy package of 2015 Fiscal Consolidation [7]. These results were compared with the model-based estimates of what would happen if the policymaker did nothing at all. The differences between these experiments were considered net effects of the Fiscal Consolidation package. Assessment of spontaneous development was based on an unconditional forecast from the model, while controlled development was built on a conditional forecast.

After that, we further modified the model in order to endogenise fiscal variables and include banks' commercial policies [5]. As for the fiscal part, the main idea was to link fiscal revenue to business cycle conditions. The expenditure side indeed responded to an output gap, while the revenue side was primarily modelled in a way to reflect government fiscal policy stances. We endogenised the revenue side as well and made it correspond to the business cycle path. The influence of banks' commercial

policies on private investment was handled beyond the households' optimisation problem since it depends on bankers' decisions and is highly uncertain. It is assumed that there is some inertia in the investment expenditure while the remaining dynamics depends on the growth rate of loans extended by banks to the private sector.

The data for the model was updated from Q1 2003 to Q4 2020, while the model was calibrated and solved for a somewhat shorter period from Q1 2006 to Q4 2020. Generally, the DSGE model of rational expectations can be represented in general form by a set of first-order and equilibrium conditions [1]:

$$
\begin{aligned}
E_t\{f(y_{t+1}, y_t, y_{t-1}, u_t)\} &= 0 \\
E(u_t) &= 0 \\
E(u_t \cdot u_t{}') &= \Sigma_u
\end{aligned}
$$

(1)

where E_t is an expectation operator, f are structural equations, y is a vector of endogenous variables, and u is a vector of stochastic shocks. The system of equations (1) comprises linear and non-linear first-order difference equations, with leads and lags, which have no explicit algebraic solution. The solution has to be numerically computed in the form of policy functions, which relate all endogenous variables in the current period to the endogenous variables of the previous period and current shocks. To be more precise, endogenous variables in the current period are to be expressed as a function of only state variables in the previous period and current shocks:

(2) $$y_t = g(y_{t-1}, u_t)$$

The policy function g is computed by linearising the system (1) around the steady state (y_{ss}) using the first-order Taylor expansion and the certainty equivalence principle:

$$y_t = y_{ss} + g_y \cdot (y_{t-1} - y_{ss}) + g_u \cdot u_t$$

or

(3) $$\tilde{y}_t = g_y \cdot \tilde{y}_{t-1} + g_u \cdot u_t$$

where $\tilde{y}_t = \tilde{y}_t - \tilde{y}_{ss}$. Impulse response functions (IRFs) are directly calculated from the policy function (3). One must start from the initial value of variables given by the steady

state and the initial shock to one variable of interest and iterate on as many times as the number of future periods has been chosen. The results are IRFs. Running a forecast is remarkably similar to making an IRF after a Bayesian estimation, except that the forecast does not begin at a steady state but at the point corresponding to the last set of (historical and model-updated) observations.

Figure 3 shows the DSGE model forecasts for all three blocks of our key variables (imbalances, growth, and economic policy instruments). The model, in principle, supports the IMF forecasts for the growth of the Serbian economy in 2021-22 with lower growth expectations for 2023-25. It also identifies the associated macroeconomic imbalances. Although a negative growth rate is forecasted for the first quarter of 2021, the following quarters compensate for that fall and the average annual growth rate surges to 5.9%. Next year it is 4.4%, followed by 2.8% in 2023. Then zero growth is projected in 2024 and 2.9% in 2025. Thus, according to our DSGE model, the Covid-19 crisis might be temporary and last only one year. The GDP estimates form a right-leaning inverted letter U with a slight increase in the first part, a maximum in 2021 and an accelerated decline towards 2025.

This trend was formed based on the current behaviour of the Serbian economy. Even in such conditions, the DSGE model predicts that macroeconomic imbalances will be maintained. As the primary deficit is expressed relative to GDP, GDP growth reduces its actual size. According to the forecast of the DSGE model, the primary deficit will be at the level of -1% this year, but in the following years, from 2022 to 2025, it will grow: -3.8%, -5.4%, -6.4% and -5.8%, each year respectively. The fiscal deficit will be higher by additional 2% to 3%.

The growth of the fiscal deficit is driving the growth of the public debt. It will still be below 60% of GDP this and the following year in order to reach the said level in the second part of 2023. After that, it will increase up to 70% at the end of our forecast period. If long-term relations are observed, the public debt grows almost in a straight line from 2006 to 2014. In the second period, from 2015 to 2025, it has the shape of the letter U. Such forecast gives a clear warning. Public debt in Serbia is the most significant long-term problem with which the country cannot deal if it does not change its economic policy.

Another long-term problem is the trade and current account deficit. The current account deficit is always lower

Figure 3: Hands-off policy forecast

than the trade deficit due to the significant inflow of income from abroad based on remittances. In our model, there are no variables to capture remittances, but the export and import of goods and services. Therefore, our forecast refers only to the trade deficit. From Figure 3, we see that its movement has the shape of an inverted letter U. It first decreases in 2021 and 2022 to -6% and -4.5% of GDP, respectively. In 2023 it falls to only -1% of GDP, but later returns to -8% in 2025. Therefore, the industrial policy must change in this area as well. The production of goods for export would have to increase in order to maintain a long-term sustainable trade deficit at, say, -4% per year.

In terms of employment and real wage rate forecasts, the DSGE model envisages a slow decline in employment growth rates and, on the other hand, a somewhat cyclical growth in real wages. In 2021, the decline in real wages will continue, but they will recover after that.

The three economic policy instruments are the real exchange rate, repo interest rate and inflation (relating to controlled prices). It is, of course, difficult to predict what kind of economic policy the Government and the NBS will pursue, which is why the forecasts for these variables are very uncertain. However, if the existing economic policy does not change, further real appreciation of the exchange rate should be expected, as well as inflation in the inflation target corridor + 3% +/- 1.5%. Interest rates will likely remain at the current low level. However, the DSGE model predicts pressure on interest rate growth over the next two years, followed by a decline, but still above the current levels. That is a warning that the relationship between macroeconomic disbalances and their structural linkages is such that low-interest rates are unsustainable in the long run. Due to the existence of high public debt, rising interest rates would significantly increase the cost of servicing it. The repo interest rate is used to manage inflation expectations. The repo rate growth forecast in Figure 3 indicates that there is a possibility of rising inflation and that a low repo rate cannot be guaranteed indefinitely.

Thus, if the economic policy does not change, the prospects for future growth show that Covid-19 will be a temporary crisis under the condition that macroeconomic imbalances are somehow under control. In that respect,

the ongoing crisis depends on the country's public debt and its ability to borrow additional funds. However, that is not enough. The inflow of foreign capital and remittances from abroad should be sufficient to cover the excessive trade deficit.

Policy options

Forecasts of GDP growth rates are updated quarterly. Thus, for instance, in October 2020 the IMF forecasted a decline to -7.2% in the Eurozone that year, and in April 2021 it revised the projected decline to -6.6%. Therefore, it raised estimates for the Eurozone's growth in the coming period by 0.2% per year based on the final data for Q4 2020.

Our DSGE model has been calibrated to data up to Q4 2020, so that the forecasts for future developments start from Q1 2021. As we have already stated, these forecasts are shown in Figure 3 under the assumption that the Government's economic policy and the monetary policy of the NBS do not change and ignore macroeconomic imbalances. In this section, we will show how forecasts change if any of the time series are directly influenced by the economic or monetary policy change. In technical terms, the obtained forecasts represent conditional forecasts of the analysed variables.

The conditional forecast implies that variables are split into two subsets: predetermined (controlled) variables and non-predetermined (uncontrolled) ones. For predetermined variables, the future paths are given by the policymaker in accordance with the policy scenario which the policymaker aims to implement. The controlled variables are entirely under the control of the policymaker for all forecast periods and have the status of exogenous variables in the DSGE model. Uncontrolled variables are endogenous variables whose equilibrium values are the solution of the underlying non-linear DSGE model.

Not all endogenous variables have corresponding stochastic shocks. However, an empirical or measurement variable must have associated stochastic shocks in order to facilitate the Bayesian estimation of parameters. Each controlled variable must have an associated stochastic shock in order for the conditional forecast to be obtained. In a DSGE framework, shocks are stochastic variables with

a known probability density distribution, variance and stochastic path modelled by a first-order autoregressive equation. Solutions of the conditional forecast suppress these autoregressive equations and compute the corresponding shocks needed to match the restricted paths from the reduced form first-order state-space representation of the DSGE model (3). However, the state-space representation (3) should be augmented with both predetermined and non-predetermined variables. Vectors of variables and shocks $(\tilde{y}_t, u_t)$ are split into controlled $(\bar{y}_t, \bar{u}_t)$ and uncontrolled ones $(\hat{y}_t, \hat{u}_t)$ to get:

$$(4) \qquad \bar{y}_t = g_y \cdot \bar{y}_{t-1} + g_u^{y,\hat{u}} \cdot \hat{u}_t + g_u^{y,\bar{u}} \cdot \bar{u}_t$$

If the vector of the last model's observations y_0 is created and if $y_{ss} = y_0$, the system of equations (4) can be solved algebraically for controlled shocks $(\bar{u}_t)$. Then, using the system (3), all uncontrolled variables can easily be obtained. Of course, this should be done recursively.

Figures 4 and 5 show what changes may occur in the areas of imbalance (first row), growth (second row) and policy instruments (third row) in nine different economic and monetary policy scenarios:

1. The first scenario directly affects the fiscal imbalance. We posed the question what would happen if the Government decided to change fiscal expenditures and revenues in such a way as to cancel the primary fiscal deficit. We called this scenario "Zero primary deficit".

2. The second scenario provides opportunities for the Government to influence growth through public investment. We fixed the share of public investment in GDP at 4%. In this case, of course, the primary fiscal deficit becomes a variable that adjusts to other variables in the DSGE model. That scenario is marked "Government investment".

3. The third scenario changes the monetary policy of the NBS. In this scenario, we assumed further reduction in the repo interest rate of 0.5% per annum. We called this scenario "Easing monetary policy".

4. In the fourth scenario, we modelled the changes in the exchange rate policy. The real exchange rate has appreciated, so we explored what would happen if the exchange rate policy was pursued without appreciation or depreciation. In that case, the exchange rate would correspond to the PPP (Purchasing Power Parity) standard. For such a policy, the NBS has at its disposal interventions in the foreign exchange market. We called this scenario "Exchange rate adjustment".

5. The following two scenarios do not depend directly on monetary or economic policy, but represent desirable changes in technology and efficiency in the use of factors of production. The fifth scenario models the introduction of new technology. The consequence of the Covid-19 crisis is that the economy and all communications are turning to the Internet and IT technologies. We named this scenario "New technology".

6. The sixth scenario models the increase in total factor productivity (TFP). We called it "TFP improvement".

7. The seventh scenario tests the IMF's proposal that it is necessary to increase VAT collection to cover the fiscal deficit. We called this scenario "VAT increase".

8. The eighth scenario tests the reduction of the fiscal burden. We assumed that it was possible to temporarily stimulate the corporate sector by abolishing the corporate income tax, which is not a significant source of fiscal revenue anyway, but is essential for companies. We call it the "No profit tax" scenario.

9. The last, ninth scenario refers to the expansionary fiscal policy of the Government. It proposed a rebalance of the budget for 2021 by raising the fiscal deficit from 3% to 6.9%. Such a rise includes additional funds for health care, salaries in the defence system and anti-crisis measures. This scenario is called the "Expansive fiscal policy".

The Government can use any combination of these scenarios. We avoided that because we wanted to identify individual effects of each of them. At the same time, we did not experiment with different durations. It is assumed that each of these policies should, for the medium term, cover the first 12 quarters. After that, the DSGE model was allowed to adjust spontaneously in the next eight quarters. The policies can also be one-off in the sense that some variables change at the beginning of the

period, over one to four quarters, while all other variables adjust spontaneously. The other extreme is that a policy is consistently pursued in the long run throughout all twenty quarters. Of course, all other combinations are possible, provided that economic policymakers have a clear idea of what they will do and when.

Active fiscal policy

Figure 4 shows simulations for five possible fiscal policies. The most intriguing policy is the current policy of maintaining a high fiscal deficit pursued by the Government. The results of such a policy are presented with ochre bars. Its effects are immediately noticeable: it makes dramatic differences in terms of fiscal deficit and public debt, while for other variables the differences exist at the level of fine-tuning.

The short-term trends influence the simulation results because quarterly data reveal the cyclical and short-term pattern of change. In the third and fourth quarters of the last year, public debt was relatively reduced. After that, it immediately grows, but it is not before the first quarter of 2022 that it reaches the limit of 60%. After that, it grows almost in a straight line and reaches 80% at the end of 2025.

Of course, no government, including our own, will persistently maintain a high fiscal deficit in the real economy at the cost of exploding the public debt. We have assumed that the Government has been doing that for three years, after which it has left the fiscal deficit and public debt to be freely formed based on market conditions. That, however, cannot stop the growth of public debt and fiscal policy would certainly have to change in the meantime. Our simulation is helpful because it shows that public debt continues to grow even after reducing the fiscal deficit. Note that our simulation considers the fiscal deficit, interest rates and GDP growth rates, and not foreign investment loans for infrastructure that additionally boost the public debt.

The first panel in Figure 4 further shows that the fiscal deficit can be formed based on an aggressive investment policy of the state. Moreover, an increase in public investment expenditures may create a larger fiscal deficit than the Government anticipated ex ante. The ochre line demonstrates that in Figure 4.

High fiscal deficit is not the only aggressive policy. The opposite aggressive policy is the scenario which includes forced reduction of the fiscal deficit to zero and holding it at that level for some time. That is shown by the blue line in Figure 4. After abandoning this policy, things would return to the beginning, and the fiscal deficit would be re-established at the initial level. On the other hand, the public debt would have the shape of the letter U, with its right tail ending at 55% of GDP. This policy sends an important message. The policy of suppressed fiscal deficit should be persistent, not temporary, in order to successfully manage the public debt. The cost of that policy is not in losing growth opportunity, but in getting public support.

The IMF envisions higher VAT collection to keep the fiscal deficit within the desired limits. That is simulated by the dotted green line. After the initial adjustment, which would take about a year, such a policy would begin to yield visible results. Not only would the fiscal deficit be reduced, but it would also turn into a fiscal surplus. That would have a favourable effect on public debt, which would fall below the 50% threshold at the end of the observed period.

The price of such an accommodating public debt is an increase in the tax burden. However, that is not the only price. With the increased tax burden, GDP falls, followed by the fall in employment growth rates and real wages. On the other hand, the process of appreciation of the exchange rate would continue, which would have a favourable effect on reducing the trade deficit. Inflation would initially rise to 5%, but would then return to the inflation target.

In another fiscal scenario, the aim of reducing the profit tax is to temporarily introduce more accumulation into the corporate sector. However, that does not necessarily mean higher investments because foreign companies can take increased profits out of the country (repatriate) and not reinvest them. Nevertheless, this would create a fiscal deficit during the implementation of this measure and after its abolition and lead to a return to the previous tax rates on profit. Such a measure would not solve the public debt problem, although it would help to somewhat reduce it. The appreciation of the real exchange rate would continue, but with a milder growth, which would partially improve the trade balance. Real wage growth would stabilise at a flat

rate of 2% per year. Inflation would temporarily explode in 2022, but calm down afterwards.

Maintaining macroeconomic stability implies not only a sustainable fiscal deficit and public debt, but also low and stable inflation. The repo interest rate is used to manage inflation expectations. We saw in Figure 2 that the NBS kept the repo rate at a reasonably high level after the Great Depression, because inflation expectations were also high. After that, inflation calmed down; thus, monetary policy was eased. At the time of Covid-19, the NBS reduced the repo rate to support the economy and households to reduce the cost of high interest rates. The question is how long the repo rate can be maintained at 1% per year. Figure 4 shows that the application of various fiscal measures causes an increase in inflation. Therefore, the solution to the general equilibrium model automatically reacts and estimates what the repo rate should be in order to calm the inflation. The repo interest rate simulations in Figure 4 warn that there is a possibility of rising inflation and that a low repo rate cannot be guaranteed indefinitely. Thus,

other methods of monetary support for overcoming the Covid-19 crisis might be temporary as well.

No fiscal measure prevents further appreciation of the real exchange rate. It would appreciate the most with the scenario based on the VAT increase. It is true that, after the intervention period, the real exchange rate would be partially depressed, but it would still be significantly below its equilibrium level.

To conclude: the Government's policy of maintaining a high fiscal deficit creates a risk of pushing the public debt out of control. On the other hand, the IMF's proposal to increase revenues by boosting VAT solves both those problems, but creates other risks – falling GDP and real wages, along with rising unemployment. No such side risks exist with suppressing the fiscal deficit, yet this policy should be persistent and supported by the public. Other fiscal policies provide intermediate solutions. The effects of different fiscal measures change over time, which calls for a policy mix that would be optimal over the mid-term cycle.

Figure 4: Active fiscal policy
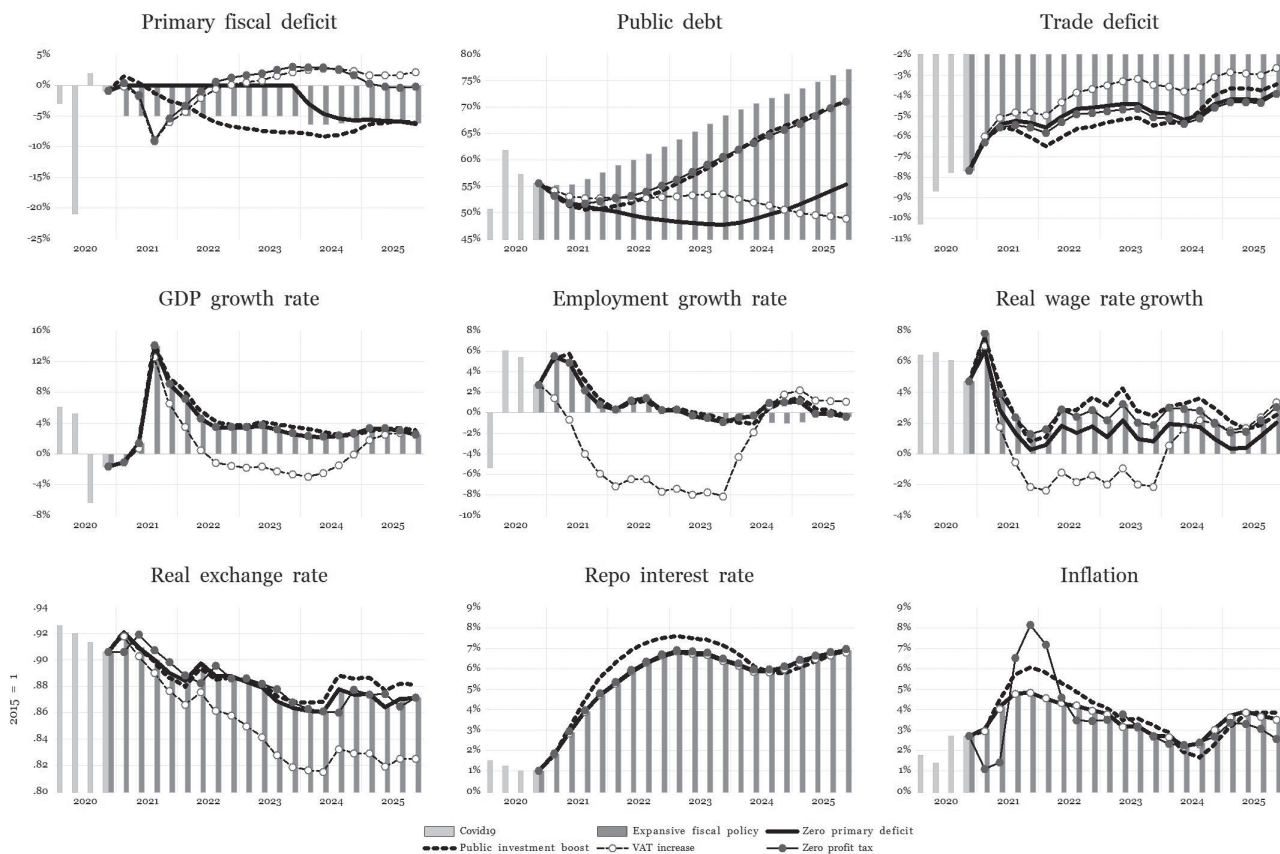
Active monetary and industrial policy

We will assess the impact of monetary policy using two variables: the real exchange rate and the repo interest rate, which are its basic instruments. Let us start with the exchange rate. All simulations in the DSGE model appreciate the real exchange rate. Lowering the repo interest rate at one point brings the exchange rate closer to its equilibrium level. That is the period when the low interest rate prevailed. When we afterwards released the interest rate, it soared because inflation rose in the meantime. With a higher interest rate, the real exchange rate started to appreciate again.

The real exchange rate shows that some imbalances in the Serbian economy are related and that correcting one of them can aggravate others, emphasising the structural weaknesses In Figure 5, the path of the real exchange rate is presented with a blue line. One of the analysed scenarios is the forced correction of disparities in the real exchange rate. That would significantly improve the trade balance. However, at the same time, it would raise inflation and increase the pressure to raise the repo interest rate.

On the other hand, such a foreign exchange policy is very unfavourable for the public debt due to the significant component of foreign loans. Such negative effect on debt growth can be compared to the negative effect of Government policy of maintaining a high fiscal deficit (as shown in Figure 4). Even if the exchange rate was released to the level of its market appreciation after the 12th quarter, in the remaining 8-quarter period the public debt would continue to grow at a constant pace. The whole period would end with an 85% share of the public debt in GDP. At the same time, GDP growth rates would fall sharply and fluctuate around zero levels. That is why employment would fall and the rates of change in real wages would have a cyclical trajectory with a zero mean value. Thus, correcting the real exchange rate parity by itself seems like a bad economic policy scenario. The trouble is that maintaining such a course depends on the inflow of capital from abroad (including FDI) and the remittances of our citizens working abroad. In other words, an appreciated real exchange rate is a systemic characteristic of the Serbian economy that incorporates a permanent risk related to the inflow of capital from abroad.

The second scenario includes monetary policy based on the manipulation of the repo interest rate in order to enhance anti-crisis measures. We wondered what would happen if the NBS decided to further reduce the repo interest rate (for instance, by half). The dashed ochre line shows the simulated outcomes in Figure 5. Inflation would, of course, rise until the end of the controlled period, after which the repo rate would be adjusted upward and inflation would drop. In 2024, by definition, the easing of monetary policy will cease, which will cause its sudden adjustment. The temporary growth of repo interest will also cause a temporary decline in GDP and employment and real wages. Things will be returning to normal the next year: GDP will return to its long-term growth, as well as employment and real wages. Thus, the manipulation with further lowering of the repo interest did not yield many positive outcomes, but caused a rather dramatic adjustment after being abandoned.

To sum it up: monetary policy simulations show that it cannot help much in eliminating the fundamental risks of the economy, which are high public debt and long-term appreciation of the real exchange rate.

Let us now turn to the economic policy measures related to industrial policy. We simulated these measures according to two scenarios: introducing the new technology by modelling its risk on investment, on the one hand, and raising the overall productivity of factors of production, on the other hand, i.e. technology changes and efficiency of combining inputs in the production process.

From the point of view of economic growth, sustainability of the public debt, price stability and containing appreciation of the real exchange rate, both instruments of industrial policy offer much better prospects than fiscal and monetary policy measures. They may seem like a deus ex machina because their stochastic shocks have no counterparts in statistics and cannot be empirically verified. However, they are a part of the DSGE model and, as such, shape solutions of the general equilibrium model. As might be expected, new technologies and rising TFPs do not support significant employment growth, but raise real wages. In that sense, creating a practical industrial

policy becomes an incredibly challenging task due to potential public resistance.

Practically speaking, the introduction of new technology can be realised only through new investments. So far, the Government has only aided foreign investment through a policy of subsidies. It is a notorious fact that these investments brought mostly dirty and outdated technology to the country. Their attraction lied in the creation of new jobs. These jobs are unsustainable in market competition with other economies, especially when they introduce new technology. It would be more than useful for the Government to change the criteria for promoting investments. Subsidies, if any, should equally apply both to domestic and foreign investments. At the same time, the key criterion would have to be the state of the technology being introduced. The second criterion should be overall economic productivity, measured by appropriate input-output multipliers in corresponding sectors [6]. All these must be viewed in the context of general digitalisation of business: remote work, online connection of producers and customers, expansion of

online offers, cloud storage of information, investment in the security of Internet communications, the Internet of Things, significant changes in healthcare and pharma, financial services, professional services and so on.

Conclusion

In this text, we have empirically dealt with the previous recessions in Serbia in the interval of 15 years, from 2006 to 2020, and the direct impact of the Covid-19 crisis. We have compared the long-term and short-term trends and one-off Covid-19 impacts on the real and monetary economy, financial sector, and the rest of the world. Some lessons drawn from the previous crisis should not be ignored today. We simulated nine potential scenarios for fiscal, monetary, and industrial policies over the next five years. Current Government policy based on a huge fiscal deficit and rising public debt is unsustainable. Herein, we have given a menu of possible policy options. Each option in itself achieves some good results, but creates imbalances in other aspects. Therefore, there is a need to choose a mix

Figure 5: Active monetary and industrial policy
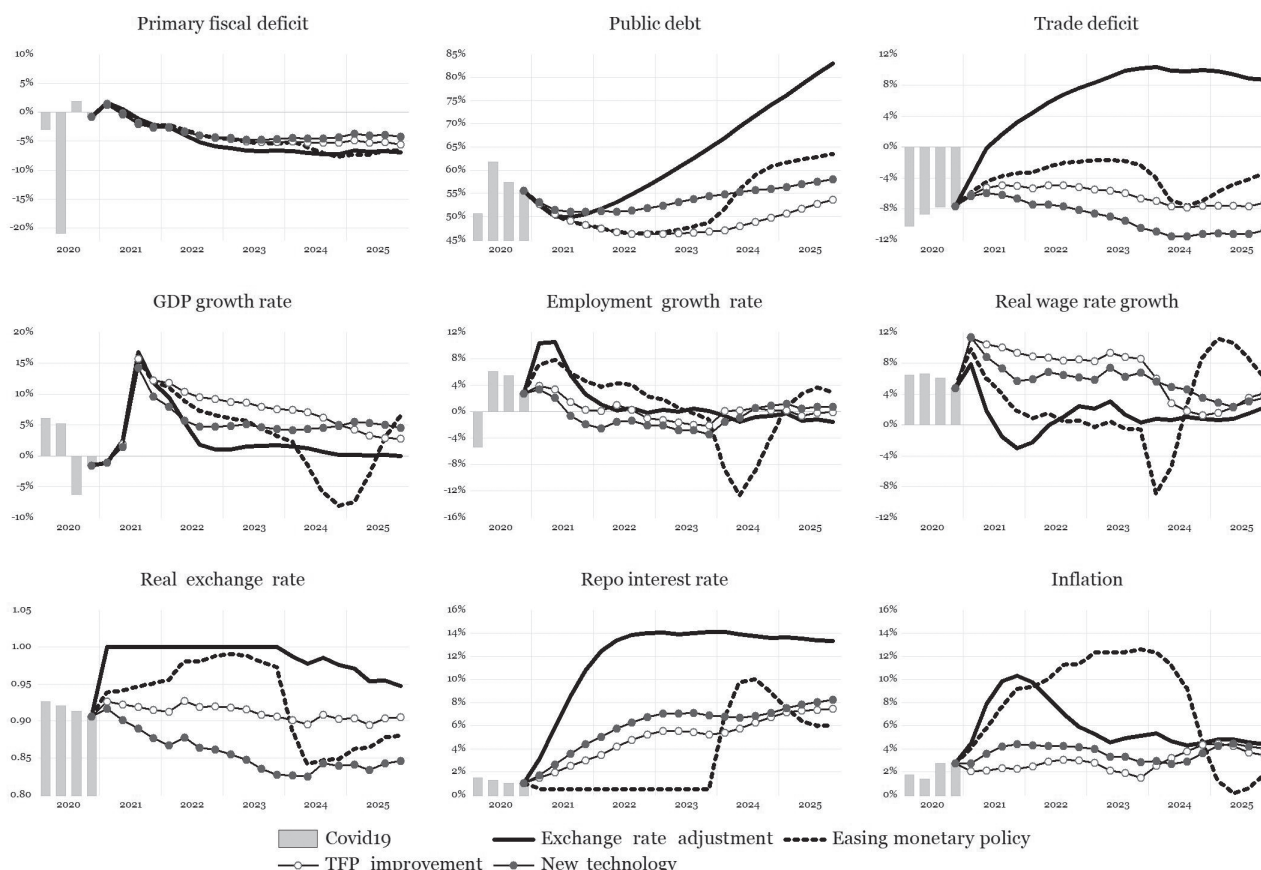
of economic policies that will not expose the country to immeasurable risk in the future.

Covid-19 seems to be a temporary shock, but we are worried about what will happen to the Serbian economy in the long run. All optimistic estimates of GDP growth are de facto estimates for an unconstrained growth because they do not integrate the imbalances that such growth creates. These imbalances are binding and GDP growth must adjust to them.

After this crisis, the economy will never be the same. We fear that Serbia is already on its way to repeat all the mistakes it made during the Great Recession and re-enter the public debt crisis. Behind it creeps the current account crisis and, after that, the possible renewal of inflation.

The model, in principle, supports the IMF's forecasts for the growth of the Serbian economy in 2021-22 (which corresponds to the Government's expectations) with lower growth prospects for 2023-25. It also identifies the associated macroeconomic imbalances. The public debt in Serbia is the most significant long-term problem with which the country cannot deal if it does not change its economic policy. Another long-term problem is the trade and current account deficit. To correct them, the inflow of foreign capital and remittances from abroad should be sufficiently high and persistent, which is not a certain outcome.

The Government's policy of maintaining a high fiscal deficit creates a risk of public debt rising out of control. On the other hand, the IMF's proposal to increase revenues based on boosting VAT solves both those problems, but creates other risks – falling GDP and real wages, along with rising unemployment. No such side risks exist with suppressing the fiscal deficit, but this policy should be persistent and supported by the public. Other fiscal policies provide intermediate solutions.

All simulations within the DSGE model appreciate the real exchange rate. Exceptionally, a very low repo interest rate at one point brings the exchange rate closer to its equilibrium level. When the pressure on the interest rate was eased afterwards, it soared because inflation rose in the meantime. With a higher interest rate, the real exchange rate returned to appreciation again.

The real exchange rate shows that some imbalances in the Serbian economy are related, and correcting ones can aggravate the others. That is typical of structural problems. Forced correction of the real exchange rate disparities would significantly improve the trade balance. However, it would raise inflation and increase the pressure to raise the repo interest rate and the public debt, which contents a significant foreign loan component. This negative effect on debt growth can be compared to the negative effect of Government policy of maintaining a high fiscal deficit. Thus, adjusting the real exchange rate without correction measures seems like a bad economic policy scenario.

The NBS might decide to further reduce the repo interest rate in order to enhance anti-crisis measures. That would not give many positive outcomes, but would cause a rather dramatic adjustment after abandoning such a policy. It seems the repo rate is not instrumental for avoiding high public debt or long-term appreciation of the real exchange rate.

As for the industrial policy scenarios, we follow the introduction of new technology and the raising of the overall productivity of factors of production. Their impact on economic growth, sustainability of public debt, price stability and fixing disparities of the real exchange rate is more constructive than other fiscal and monetary policy measures. However, creating and implementing a practical industrial policy becomes a difficult task due to potential public resistance in responding to the challenging labour market adjustments.

The effects of different policy measures change over time, which calls for a policy mix that would be optimal over the mid-term cycle. We present in this paper a menu with promising economic policy options. It is up to the Government to make an optimal policy mix. The present one is neither optimal nor sustainable.

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ANNEX

Figure A.1: Financing macroeconomic deficits
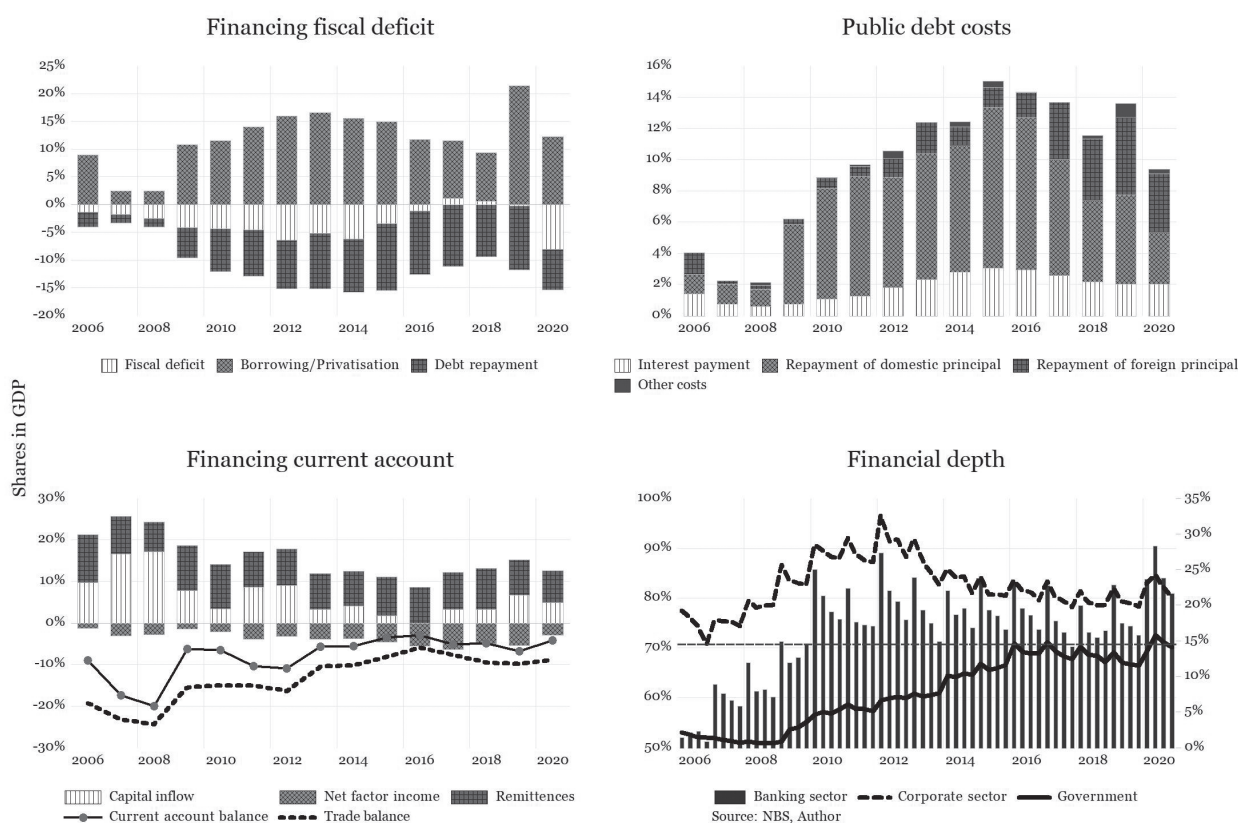
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