

Miroљjub Labus
University of Belgrade
Faculty of Law
Department of Economics and Law

Milica Labus
Belox Advisory Services
Belgrade

POLICY MIX FOR FISCAL CONSOLIDATION IN SERBIA: CONDITIONAL FORECAST APPROACH*

Povezivanje ekonomskih politika radi fiskalne konsolidacije u Srbiji – ocena mera na osnovu uslovnih prognoza

Abstract

The Serbian Parliament has adopted the fiscal consolidation program recognizing an exponentially rising public debt as a real threat to the economy that must be contained in order to avoid sovereign default. Despite the legacy of unfavorable macroeconomic development due to last-year's flood, a challenging expenditure cuts approach was adopted. It will keep domestic demand at depressed levels for some time even if austerity measures are not front-loaded but phased-out over three years. The reverse of the debt trend is projected for 2017, when the debt-to-GDP ratio will reach 80 percent.

We use in this paper QUEST_SERBIA DSGE model to assess what would happen to the Serbian economy if the policy maker consistently implemented the policy package. Results are compared with model-based estimates of what would happen if the policy maker did nothing at all. The differences between these experiments are considered as net effects of the fiscal consolidation package. Assessment of the spontaneous development is based on an unconditional forecast from the model, while controlled development is based on a conditional forecast.

The social costs of fiscal consolidation will be significant if the fiscal policy is not supported by an adequate mix of monetary and foreign exchange policies. Among alternative scenarios we had designed, a delay in monetary easing was the worst case. A timely easing of the monetary policy followed by a relatively stable real exchange rate shows the best simulation results.

* We have benefited from helpful comments by Pavle Petrović and Miloјko Arsić, and Nikola Altiparmakov, Branko Hinić, Mirko Djukić, Jasna Atanasjević, Marko Paunović and other participants at the Fiscal Council working meeting with the QUEST_SERBIA team in January 2015. The authors also thank the USAID Business Enabling Project for financial support. Any opinions expressed in this paper are those of the authors and not those of the cited institutions.

Fiscal consolidation as proposed is a workable policy, which will keep the rising debt-to-GDP ratio at sustainable level, but it is still not sufficient to reverse debt trend in 2017. Perhaps the other structural measures will do this job, but they are beyond the scope of this paper.

Key words: *fiscal consolidation, monetary policy, exchange rate policy, DSGE model, conditional and unconditional forecast, Serbian economy*

Sažetak

Parlament Srbije usvojio je program fiskalne konsolidacije i ocenio da je rastući javni dug realni izazov za srpsku ekonomiju, koja bi u budućnosti mogla da doživi slom ako se odmah ne preduzmu odgovarajuće mere. Iako okolnosti u privredi nisu povoljne nakon prošlogodišnje poplave, usvojen program mera zasniva se na zahtevnom principu smanjenja javnih izdataka. To će značajno smanjiti domaću tražnju iako su efekti mera ravnomerno raspoređeni na tri godine. Zaokret u trendu rastućeg duga predviđen je tek za kraj 2017. godine kada će dug dostići 80 odsto BDP.

U ovom radu mi smo koristili QUEST_SERBIA DSGE model da bi ocenili efekte primene mera fiskalne politike pod pretpostavkom da će se one dosledno sprovoditi tokom celog perioda konsolidacije. Te efekte smo uporedili sa spontanom razvojem ekonomije bez navedenih mera. Razliku u efektima tumačimo kao neto rezultat primene paketa fiskalne konsolidacije. Ocena spontanog razvoja je zasnovana na bezuslovnim prognozama u okviru našeg modela, dok je kontrolisani razvoj ocenjen postupkom modeliranja uslovnih prognoza.

Društveni troškovi fiskalne konsolidacije ne bi morali da budu preterano visoki ako bi fiskalna politika bila podržana sa odgovarajućom

monetarnom politikom i politikom kursa. U okviru razmatranih scenarija takve koordinacije, odugovlačenje sa monetarnim popuštanjem daje najslabije rezultate. Rezultati su mnogo bolji ako se blagovremeno popuštanje monetarne politike poveže sa politikom održavanja relativno stabilnog realnog kursa dinara.

Fiskalna konsolidacija je izvodljiva i može da kontroliše rast duga u odnosu na GDP, ali je malo verovatno da će okrenuti njegov rastući trend u 2017. godini. Za to su potrebne druge strukturne mere, čije razmatranje izlazi izvan okvira ovog rada.

Ključne reči: *fiskalna konsolidacija, monetarna politika, politika deviznog kursa, DSGE model, uslovne i безусловne prognoze, srpska ekonomija*

JEL CLASSIFICATION: E17, F47

Introduction

The design of a fiscal consolidation programme was a subject for discussion at last year's Kopaonik Business Forum, see *Labus* [8], *Petrović* and *Brčerević* [11]. This year, it is actually at hand, since the Serbian parliament has adopted such a programme within the fiscal framework for the budget for 2015 year. There are no more uncertainties with respect to the Serbian government's policy stance. An exponentially rising debt-to-GDP ratio is recognized as a real threat to the Serbian economy, which must be contained in order to avoid sovereign default in the near future. For that reason an expenditure cuts approach was adopted that would keep domestic demand at depressed levels for some time. Austerity measures are not front-loaded but are phased-out over the mid-term period of three years. The reverse of the debt trend is projected for the end of 2017, when the debt-to-GDP ratio will reach 80 percent.

Serbia is about to complete a precautionary stand-by arrangement with the IMF (SBA), which will be anchored by the fiscal consolidation programme. Monetary and exchange rate policies will continue to rely on the inflation targeting framework, but fiscal adjustment is expected to create room for a gradual rebalancing of the policy mix towards monetary easing, *IMF* [5]. The intended switch of fiscal and monetary policies is unprecedented in recent history and draws therefore a considerable public and professional attention. We address in this paper two key issues: whether the fiscal consolidation programme

can stabilize the public debt, and how monetary and exchange rate policies can mitigate social costs of the fiscal consolidation.

It is always a serious professional challenge to assess the potential impacts of any economic policy measures. We live in a changing and uncertain world, which also might be responsible for missing targets. However, some risks can be modelled and predicted. DSGE models serve this purpose. We use in this paper the QUEST_SERBIA model – a DSGE model of the Serbian economy – in order to assess the impacts of the fiscal consolidation package. Our main goal is to perform a model-based counterfactual experiment of what would happen to the Serbian economy if the policy maker consistently implements the policy package. Results will be compared with our estimates of what would happen to the same economy if the policy maker did nothing at all. We consider the differences between these two experiments as the net effect of the fiscal consolidation package. Technically speaking, assessment of the spontaneous development is based on an unconditional forecast from our DSGE model, while controlled development is based on a conditional forecast.

The paper is structured in the following way. We demonstrated the model's accuracy of doing one-step-ahead forecast in the first part of the paper, since we already described the model elsewhere. Our (unconditional) forecast of main macro variables for the next three years is presented in the second part. Technical details how a conditional forecast is done in a DSGE framework are elaborated in the third part. We present and discuss the counterfactual experiment, which embodies key measures of the fiscal consolidation package, in the fourth part. This is the central part of the paper. The fifth part addresses monetary easing and its potential contribution to moderate social costs of the adjustment. Finally, we briefly conclude in the last part, and indicate what the principal risks and challenges are associated with the fiscal consolidation package.

In-sample forecast

We have developed a DSGE model of the Serbian Economy that is called QUEST_SERBIA. It is based on the European Commission's QUEST III model that has been used for

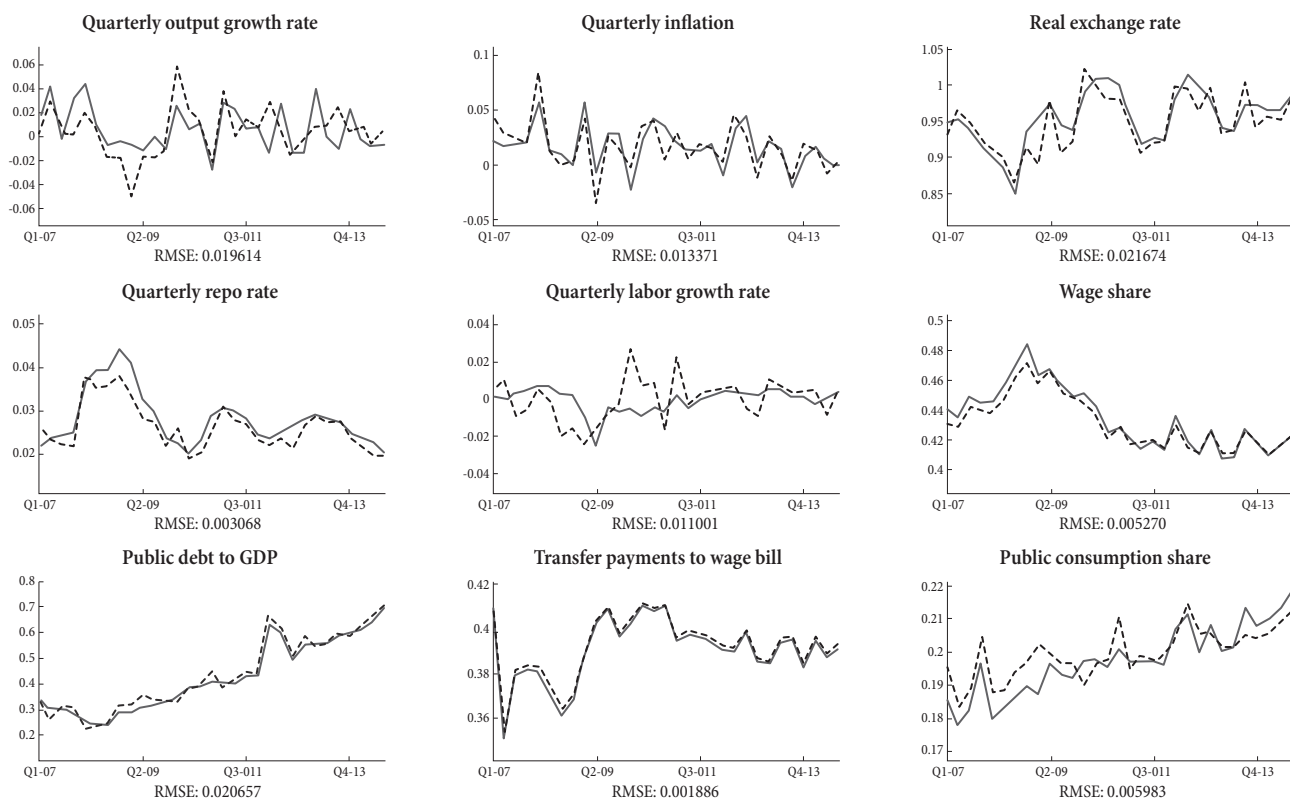
some time for macroeconomic policy analysis and research. As a member of the class of New-Keynesian Dynamic Stochastic General Equilibrium (DSGE) models, QUEST III has rigorous microeconomic foundations derived from utility and profit optimization and includes frictions in goods, labor and capital markets. *Ratto et al.* (2009) provide a detailed exposition of the core version of the QUEST III model applying it for the euro area data and using Bayesian techniques to estimate parameters. This model encompasses three regions: a small open economy in the European Monetary Union (EMU), the other euro area, and the rest of the world. The main property of such a DSGE model is that households, firms and governments make rational decisions based on first-order conditions, derived from their behavioral equations, subject to intertemporal budget constraints.

QUEST_SERBIA follows this line of modelling with some substantial differences. In our model there are two regions: the domestic economy and the foreign economy where the euro zone is treated as the rest of the world. The differences are due to the distinct properties of the Serbian economy compared to the EU area. The Serbian economy

is a small open market economy, which is imperfectly integrated into the wider international market. Contrary to this, the EU economy is a large open economy with full mobility of capital, goods and financial assets. Differences in size and adjustment costs due to imperfect international integration must be taken into account in defining the steady-state properties of the Serbian economy.

In Serbia there is no full mobility of financial capital across the border lines, and households that save income and invest it in domestic and foreign bonds face no pressure to adjust their intertemporal preferences. The real interest rate in Serbia is permanently above the EU real interest rate. Additionally, the real interest rate convergence cannot be detected over past ten years. It means, in terms of the model, that the rate of time preference in Serbia is permanently lower than in the EU. In terms of utility, domestic households value present income over future income far more than their counterparts in the EU. QUEST III assumes that in the steady state, domestic and foreign rates of time preference are equal. We cannot do this since there is a permanent gap between domestic and foreign rates of time preference.

Figure 1: Original and in-sample one-step-ahead mean forecast



Note: Solid lines show historic data, dotted lines represent forecast

There is also no perfect mobility of goods across the border lines. Due to transaction costs, domestic inflation is permanently higher than the foreign inflation. In the steady state these differences are doomed to vanish if purchasing power parity holds. However, it does not hold in Serbia and QUEST_SERBIA had to respect this fact. Therefore, even in the steady-state the rate of inflation in Serbia is higher than in the EU. QUEST III, on the other side, assumes zero difference between domestic and foreign inflation rates.

QUEST III restricts the trade balance to zero in the long run. Quite the opposite, it is hard to expect that the Serbian economy will balance exports and imports over next ten years. The steady state value of the trade balance will be negative. Therefore, we need to assume a negative trade balance steady state level. The only doubt is how much it will be negative.

The Serbian economy is a small economy bound to grow much faster than large mature economies in the world, including the EU zone. There is no doubt that we need somehow to model the convergence process in which the steady state GDP rate of growth in Serbia must be higher than the GDP steady state rate of growth of the euro zone. The Serbian economy is currently in recession, which might veil this fundamental relation, but in the longer run the Serbian economy will resume a faster pace of growth compared to the EU economy.

Our steady state values for these fundamental differences are as follows. The rate of time preference is set at 0.989817, the convergence factor at 1.33, quarterly inflation difference is 0.0186, and the trade deficit is set at 15 percent of GDP.

Finally, the QUEST III model's equations are revised in order to capture specifics of the Serbian economy related to public debt management. The QUEST III assumes that the European authority sets a target level of the public debt and adjusts the fiscal revenue to achieve this policy goal. Things are different in Serbia. Despite the fact that the target level of public debt is set by law, it is not in practice a binding constraint for economic policy¹. Instead, the Serbian government commits itself to a certain level of the public debt and consequently restricts public expenditures. The

primary fiscal deficit has not to adjust to a target level of the public debt, as it is the case in the QUEST III framework, but quite the opposite, it is the main driving force of the public debt in Serbia and a key variable in the QUEST_SERBIA model. The level of public debt is a concern, but is assumed that the government can borrow as much as needed to meet a committed level of the public debt.

The data set for the Serbian economy was recently revised in line with the newly released European System of Accounts methodology for compiling national accounts, Eurostat and European Commission [3]. The new ESA 2010 is a major development of the previous version of 1995. It was released in 2013, and adopted rather quickly by the Statistical Office of Serbia. The Statistical Office of Serbia released on November 28, 2014 the latest update of quarterly data set for Serbia's GDP. GDP series – by final demand components and by sectors of value-added origin – were re-estimated for the period from Q1Y2003 to Q3Y2014 according to the new standards. The new methodology adjusted upward GDP for an average of 5.8%. This new data set forms the empirical background for the current version of QUEST_SERBIA model. We use 47 quarterly data points and estimated the model for the period between Q1Y2003 and Q3Y2014. All details about calibrated parameters, Bayesian estimation, steady states and the set of behavioral equations can be found in *Labus* [9].

Our approach for testing the fiscal consolidation package of the Serbian government depends on forecasting. For that reason, we reveal the model's accuracy of forecasting in Figure 1. Solid lines show historic data of selected macroeconomic variables, while dotted lines represent corresponding in-sample one-step-ahead forecasts. Below each graph the root-mean-squared-error (RMSE) is displayed. The one-step-ahead forecast was more accurate than the four-or-eight-step-ahead forecast. Thus, we rely on the one-step-ahead forecast, and report forecast figures which only take into account uncertainties about parameters. We skip forecasts that additionally integrate uncertainties about shocks, since their graphic presentation is far more complex. The general conclusion is that variables with share value are better forecasted compared to variables that are expressed in terms of growth rates. According to RMSEs, we assess that the model does

1 The debt target is set by law at 40 percent of GDP.

forecasts fairly well, and this fact justifies our decision to use a conditional and unconditional forecast for testing alternative macroeconomic policies.

Unconditional forecast

The QUEST III DSGE model of the European Commission was used to assess the effects of structural fiscal adjustment in the euro area. For example, the impact of a tighter credit policy on the effectiveness of discretionary fiscal policy was studied by *Roeger et al.* [13], while the influence of structural fiscal reforms on the temporary and permanent general-equilibrium effects on external balances in the euro area was addressed by *Vogel* [14]. The applied methodology in both cases relies on impulse response functions (IRF) and implied fiscal multipliers. In this paper we will use the QUEST_SERBIA model, and an alternative method of policy simulation based on a conditional forecast. We will compare the conditional forecast for selected macroeconomic variables with the values of the same variables that can be obtained by an unconditional one-step-ahead forecast.

This method, compared to a traditional IRF/multipliers approach, contains both benefits and risks. On the benefits side, let us note that the economy evolves over time even with no government interventions. For instance, it is possible that public consumption for some periods in the future will be reduced without restrictive fiscal measures, because the government faces financial constraints anyway and has to restrict its purchases. If restrictive fiscal measures are applied - which reduce government purchases of goods and services over the reference period - it is highly recommended to distinguish government policy effects from hands-off policy development. Comparing conditional to unconditional forecasts of the same variables suits that purpose. On the risk side, we need to mention that forecasts are generally highly uncertain, due to unanticipated shocks and model-based biases. The IMF in the last release of World Economic Outlook [6] had to admit that one-year-ahead forecasts for global growth in 2011-14 were, on average, too optimistic, and felt a pressure to elaborate in details what factors contributed to such errors².

2 These forecasts have already been updated every quarter, so the potential size of forecast errors was substantially minimized.

Having said this, we dared to carry on with the baseline unconditional 12-quarter forecast and present in Table 1 the average annual growth rates of key macroeconomic variables. We used MATLAB and Dynare software to calculate the presented figures, *Adjemian et al.* [1]. Forecasted values refer to annualized growth rates. The IMF forecasts a smooth recovery of the Serbian economy over next three years, with annual growth rates of 1, 1.5 and 2 percent respectively³. The government's fiscal strategy for 2015-17, Government of Serbia [4], accepted the IMF's figures for 2016 and 2017, but reduced the growth rate in 2015 to a fall of -0.5 percent. The National Bank of Serbia (NBS) also expects the same drop of GDP growth rate in 2015. The European Bank for Reconstruction and Development (EBRD) revised its earlier prediction of growth in Serbia in 2015 from 2 percent to 0.5 percent⁴. We expect the Serbian economy to stagnate in 2015 – achieving a “zero-negative” growth rate – with a modest growth of 0.8 percent in 2016, and slightly stronger growth in 2017 of 1.6 percent. The IMF forecasts a 1.3 percent growth for the Euro Area in 2015, which is very close to our forecast of 1.2 percent with a low inflation of an average 0.7 percent⁵. Our forecast assumes that the NBS will effectively stick to the inflation targeting policy with a transparent rule of linking the repo policy rate to one-quarter-ahead expected inflation rate⁶, and regularly update size of the repo rate.

Conditional forecast

Making unconditional forecast is very similar to obtaining an IRF, except that the forecast does not begin at a steady state, but at the point corresponding to the last set of observations. We will now briefly explain the process of

3 It is still not clear whether this forecast will remain in place after the IMF adopts the SBA with Serbia in February this year.

4 “Serbia's economic woes are likely to continue this year and we now expect just 0.5 percent growth, rather than the 2 percent predicted last September. The introduction of a new IMF programme in Serbia, expected in the spring, will help restore fiscal discipline and investor confidence but will also be accompanied by front-loaded austerity measures that will keep domestic demand at depressed levels in the short term”, EBRD [2]

5 We did not take into account the latest easing of the ECB monetary policy, which might easily increase GDP growth with a higher inflation rate.

6 Different Taylor rule for conducting monetary policy will affect simulation results. However, this rule is generating lower RMSEs than the one based on four-quarter-ahead expected inflation rate.

Table 1: Unconditional one step ahead mean forecast

Annualized rates	2015	2016	2017
GDP	-0.1%	0.8%	1.6%
Domestic demand	-2.4%	5.3%	4.9%
Consumption	-0.1%	2.3%	2.5%
Public Consumption	-0.7%	2.3%	2.5%
Investment	0.2%	1.8%	0.1%
Public Investment	2.4%	1.8%	3.2%
Export	-1.6%	2.1%	1.4%
Import	1.5%	2.6%	1.4%
Transfers	2.7%	3.9%	3.3%
CPI	3.3%	1.3%	2.6%
Import prices	-1.2%	3.5%	-0.4%
Export prices	3.2%	-1.8%	-0.1%
Exchange rate	-0.4%	0.6%	0.3%
Employment	0.5%	0.1%	0.6%
Real wage rate	-0.7%	1.5%	0.9%
Repo policy rate	7.7%	5.8%	5.1%
EU GDP	1.2%	1.9%	1.7%
EU HICP	0.7%	1.2%	1.3%

computing IRFs, following *Juillard* [7], before moving to conditional forecasts. A DSGE model of rational expectations can be represented in general form by a set of first order and equilibrium conditions:

$$(1) \quad \begin{aligned} E_t \{f(\mathbf{y}_{t+1}, \mathbf{y}_t, \mathbf{y}_{t-1}, \mathbf{u}_t)\} &= \mathbf{0} \\ E(\mathbf{u}_t) &= \mathbf{0} \\ E(\mathbf{u}_t \cdot \mathbf{u}_t') &= \Sigma \mathbf{u} \end{aligned}$$

where E_t is an expectation operator, f are structural equations, \mathbf{y} is a vector of endogenous variables, and \mathbf{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:

$$(2) \quad \mathbf{y}_t = g(\mathbf{y}_{t-1}, \mathbf{u}_t)$$

The policy function g is computed by linearizing the system (1) around the steady state (\mathbf{y}_{ss}) using the first-order Taylor expansion and the certainty equivalence principle⁷:

⁷ DYNARE provides also the second and the third-order Taylor approximation around the steady state. The certainty equivalence holds only for the first-order Taylor expansion. However, if a higher-order approximation is performed, the conditional forecast is based only on a first order approximation.

$$\mathbf{y}_t = \mathbf{y}_{ss} + \mathbf{g}_y \cdot (\mathbf{y}_{t-1} - \mathbf{y}_{ss}) + \mathbf{g}_u \cdot \mathbf{u}_t$$

or

$$(3) \quad \tilde{\mathbf{y}}_t = \mathbf{g}_y \cdot \tilde{\mathbf{y}}_{t-1} + \mathbf{g}_u \cdot \mathbf{u}_t$$

where $\tilde{\mathbf{y}}_t = \mathbf{y}_t - \mathbf{y}_{ss}$. IRFs are directly calculated from the policy function (3). One has to 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.

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 policy maker in accordance with the policy scenario, which the policy maker aims to implement. The controlled variables are fully under control of the policy maker for all forecast periods and have the status as exogenous variables in a DSGE model. Uncontrolled variables are endogenous variables, which equilibrium values are solution of the underlying non-linear DSGE model. Not all endogenous variables have corresponding stochastic shocks. However, empirical or measurement variable must have associated stochastic shocks in order to facilitate Bayesian estimation of parameters. Each controlled variable must have an associated stochastic shock in order to perform a conditional forecast. In a DSGE framework shocks are stochastic variables with a known probability density distribution, variance and stochastic path modelled by a first-order autoregressive equations. Solutions of the conditional forecast suppress these autoregressive equations and compute the corresponding shocks that are 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 ($\tilde{\mathbf{y}}_t, \mathbf{u}_t$) are split up into controlled ($\bar{\mathbf{y}}_t, \bar{\mathbf{u}}_t$) and uncontrolled ($\hat{\mathbf{y}}_t, \hat{\mathbf{u}}_t$) ones to get:

$$(4) \quad \bar{\mathbf{y}}_t = \mathbf{g}_y \cdot \bar{\mathbf{y}}_{t-1} + \mathbf{g}_u^{\hat{\mathbf{y}} \hat{\mathbf{u}}} \cdot \hat{\mathbf{u}}_t + \mathbf{g}_u^{\bar{\mathbf{y}} \bar{\mathbf{u}}} \cdot \bar{\mathbf{u}}_t$$

Creating the vector of last model's observations \mathbf{y}_0 and putting $\mathbf{y}_{ss} = \mathbf{y}_0$, the system of equations (4) can be solved algebraically for controlled shocks ($\bar{\mathbf{u}}_t$). Then, using system (3) all uncontrolled variables can be easily obtained. Of

course, this should be done in a recursive way. As we see, running a forecast is very 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. Although controlled exogenous variables are taken as instruments perfectly under the control of the policy-maker, they are nevertheless random and unforeseen shocks from the perspective of the households and firms. Households and firms are in each period surprised by the realization of the shocks that keep the controlled endogenous variables at their respective level. They revise their optimal positions in each period according to new realization of shocks and available information. With a conditional forecast, therefore, a DSGE model does not lose its stochastic substance.

Fiscal consolidation

Reduction of the historically high general government deficit and the level of public debt are currently the main task for the Serbian government, and are a major challenge for it. The last year's external shock due to flood destruction of infrastructure and productive resources in energy and mining sectors made the starting point for fiscal consolidation particularly difficult. In principle, fiscal consolidation can follow expenditure-based or revenue-based approaches, reducing the debt-to-GDP ratio by lower government expenditure, higher government revenues, or a mix of expenditure and revenue components. Despite the legacy of an unfavorable macroeconomic framework, the government decided primarily to cut expenditures. Of course, there are some revenue measures also, but they are difficult to simulate in our model; hence we will neglect their effects.

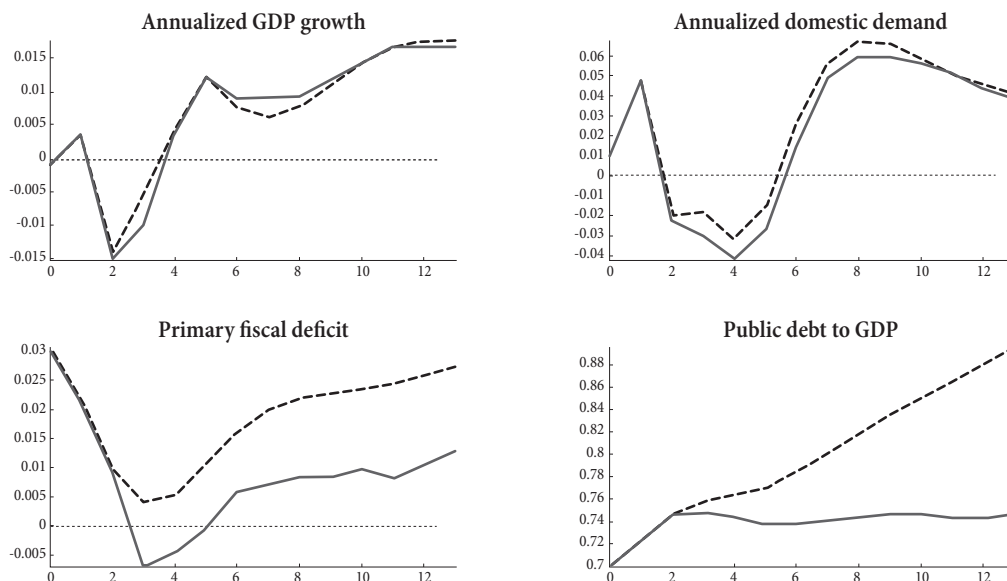
Among the expenditure-based measures, two classes of instruments are adopted. Firstly, one type of instrument addresses government consumption. Government consumption – as a final demand component of GDP – comprises compensation for public services, and purchases of goods and other services. Gross wages of public sector employees represent the market value of these services. They roughly contribute to 70 percent of the government

consumption. The wage bill in the public sector – including state owned enterprises (SOEs), public agencies, budget beneficiaries, public administration, and social services in health and education system – is scheduled to shrink by 0.5 percent of GDP. The reduction rate is linear and is set to 10 percent. It will apply to all public wage rates higher than RSD 25,000 monthly. Saving on public purchases is the other part of expenditure reduction. The spending base is quite large, since purchased goods and services account for one-third of total public spending or 7 percent of GDP. However, it is envisaged a rather modest reduction of public purchases with the estimated effect of only 0.1 percent of GDP. Finally, restructuring SOEs will require an improvement in their efficiency and shedding of the redundant workforce. It is estimated that reduction in unproductive workforce will save at least 0.3 percent of GDP. All together, these measures will reduce the government consumption between 0.9 and 1 percent of GDP.

Secondly, the other class of measures refers to transfer payments. The principal reduction is related to monthly pension checks for the value over RSD 25,000. The rate of reduction is progressive, and the total fiscal saving will amount to 0.5 percent of GDP. The other type of transfer payment saving is related to budgetary transfers to local governments. These transfers will be reduced for 0.2 percent of GDP. All together, they will roughly contribute to fiscal savings of 0.7 to 0.8 percent of GDP.

The Government already applied some of these measures at the end of last year, and incorporated their initial effects in the revised budget for 2014. The measures will automatically apply to 2015 year with a commitment to continue with them in the subsequent two years. The fiscal consolidation package is not a one-off policy change, but has a three-year time horizon. Within this period there will be no linear reduction of the public debt-to-GDP ratio. Initially, the debt-to-GDP ratio will rise for the first two years reaching the peak in the fourth quarter of 2016. Public debt-to-GDP was 69.9 percent in the fourth quarter of 2014. It is envisaged to expand to 77.7 percent in 2015 and 79.2 percent at the end of 2016. The upward trend will be reverted in the 2017 fiscal year with a slight decline to 78.7 percent of GDP in the fourth quarter.

Figure 2: Three-year fiscal consolidation effects: Key variables



Note: Solid lines show fiscal consolidation, dotted lines show hands-off policy

In order to perform a conditional forecast, we need to choose proper inputs for the model's simulation. On that account, we stuck to the official figures about expenditure reduction that will be generated by above described fiscal measures. With this information, we proceeded with a conditional forecast of the key variables. We reduced the government consumption share in GDP by 1 percent for 12 consecutive quarters (three years). The starting point was our unconditional forecast for the fourth quarter of 2014, since the last historic data was available only for the third quarter of 2014. In this way we completed a data base for the whole year 2014 and prepared forecasting for the next three years. Then we inserted the target expenditure figures, period by period, and set them as the constrained path of the government consumption for 2015-17. The benchmark values, against which the target values were compared, were the share of government consumption in GDP that would be spontaneously achieved without any policy interventions - as these values had been forecasted by the model. The ratio between two of them should reveal a 1 percent GDP reduction of the government consumption during the forecasted period. This means we did not fix any particular level of the government consumption, but reduced its ongoing share in GDP for 1 percent, which otherwise would be spontaneously completed. Next, the same method for preparing input data was applied to transfer payments. Transfer payments were reduced

by 1 percent of GDP compared to the forecast of such payments that had been obtained by the model assuming no governmental actions.

Additional revenue measures as well as called-in guaranties of the SOEs (below-the line public debt) were not integrated into this calculations, partially because we don't have time series data for them, or partially because the model is not calibrated to take into account such specific non-tax revenue and expenditure items.

After inserting the input data, we performed a conditional forecast. Results are presented in Figures 2 and 3. How to interpret these figures? Figure 2 displays a conditional forecast (solid line) and unconditional forecast (dotted lines) of key variables for 12 quarters (the initial point refers to unconditional forecast for the last quarter in 2014). These variables are: (annualized) GDP growth rate, (annualized) growth rate of domestic demand, and share of primary fiscal deficit in GDP and debt-to-GDP ratio. Let us now infer basic macroeconomics from Figure 2.

Even without government intervention the Serbian economy will highly likely stagnate this year, then slightly recover in the next year, and resume growth in 2017. The fiscal consolidation package was designed to work through demand-side channels with restrictive fiscal measures that would initially reduce domestic demand. Ignoring the supply-side effects, it is reasonable to expect negative GDP growth or, in the best case, stagnation this

year. However, with the government intervention, the GDP growth rate will be depressed this year. Positive effects of the policy package can be expected in 2016 when the realized growth rates will be slightly higher than the benchmark growth rates predicted by the base-line scenario. In 2017 the positive effects of the fiscal consolidation package will disappear and the economy will resume growth as would be achieved without any governmental interventions.

Expectations that reduced expenditure will depresses domestic demand are correct. In any case domestic demand would decline this year, but fiscal consolidation would reduce it even more. Our forecast indicates that the domestic demand will stay below the base-line trajectory in the entire period of consideration.

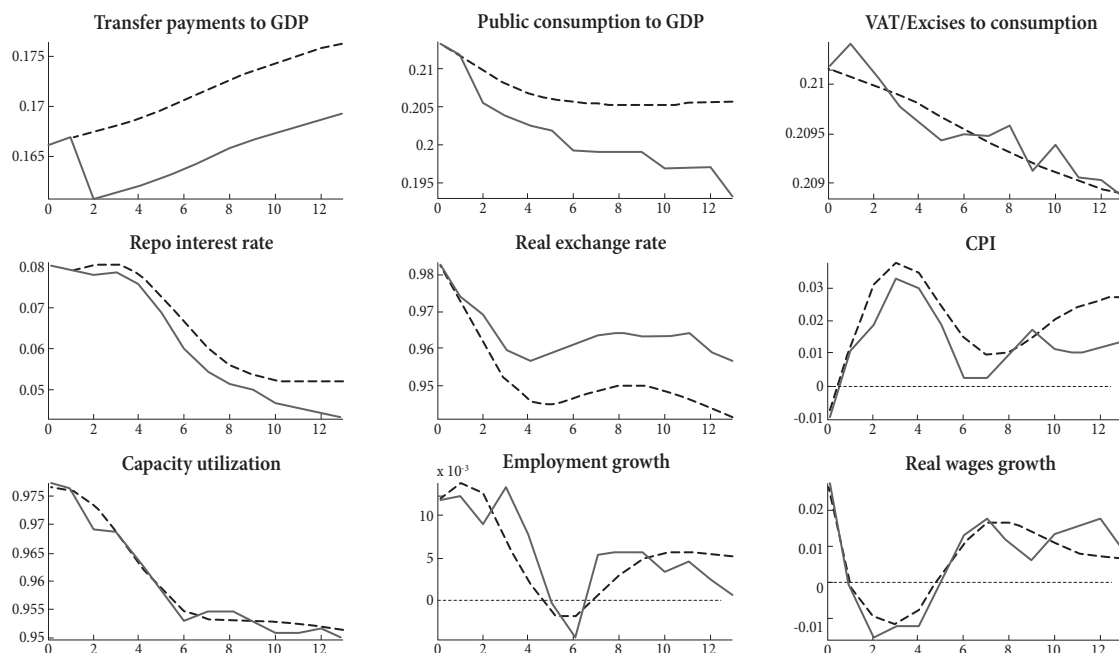
This inference from the model justifies the severity of the fiscal measures, since the cost in terms of forgone growth will be similar to those as if doing nothing at all. At the end of the forecasted period, the spontaneous and the policy managed growth path will match each other. However, there is a crucial difference. The debt-to-GDP ratio under the spontaneous scenario is not sustainable. After the fourth quarter of this year, it sets up to an exponential path that cannot be control or revert any more. At the end of 2017, it will be higher than 85 percent of GDP. In

order to avoid sovereign default, fiscal consolidation was the correct policy option.

The fiscal consolidation will be quite successful in stabilizing the public debt fairly quickly, but may not be sufficient to reverse its trend in 2017 as expected by the policy maker. Our conditional forecast is warning that debt might be a concern beyond the planning horizon. As our conditional forecasts specify, primary fiscal deficit will improve strongly in the first years of implementing the new policy package. Indeed, it will turn to a surplus which, however, will not stay for a long period. It will resume a rising path in the second and the third year with a very slow pace of growth. There are no hints for reversing the upward trend of primary fiscal deficit. Nevertheless, the debt-to-GDP ratio will not increase since the corresponding costs of financing debt will go down. We predicted GDP growth rate in 2017 at the level of 1.6 percent, the policy maker expects stronger growth for 0.4 percent points or growth rate of 2 percent, but no one of these rates is sufficiently high to reverse the public debt.

The model’s policy simulation points to another important conclusion. The indicated debt-contained growth scenario would only be realized *mutatis mutandis*, i.e. if other things changed which need to be changed. Those other things are presented in Figure 3.

Figure 3: Three-year fiscal consolidation effects: Key instruments



Note: Solid lines show fiscal consolidation, dotted lines show hands-off policy

Figure 3 displays conditional (solid lines) and unconditional (dotted lines) paths of policy instruments. In the first row of Figure 3 fiscal instruments are located: VAT proceeds (including excise duties) with respect to consumption, transfer payments and government consumption of goods and services (including gross wages of the public administration) as shares in GDP. In the second row of Figure 3 there are monetary instruments: repo interest rate, real exchange rate (depending on domestic and foreign inflation and the nominal exchange rate) and inflation represented by the annualized change of GDP deflator (partially controlled by the government, as administrative prices are concerned, and partially under the influence of the inflation targeting monetary policy). The last row of Figure 3 is reserved for factors of production: capacity utilization (under the business control and the institutional environment influence how easy it is to do business in Serbia), (annualized) labor growth rate and (annualized) real wage change (under the influence of trade unions, associations of domestic and foreign investors, and the government). Competences over policy instruments are divided between the Ministry of Finance (fiscal instruments), the NBS (monetary instruments), and labor and capital markets (use of productive factors).

In our policy experiment, we controlled the path of two out of nine policy instruments. Remaining seven instruments had to be adjusted by policy makers in the indicated way if the debt-to-GDP target would have been attained.

Let us discuss first how fiscal instruments have to adjust in order to achieve the target debt-to-GDP ratio. In this context we refer only to VAT rates and excise taxes since transfer payment and government consumption were already integrated in the policy experiment. There is still ongoing discussion on whether the VAT rate should be increased or not, whether excise duties should compensate for falling crude oil prices, and so on. Our variable links total VAT and excise proceeds with the value of the private consumption. As from the historic perspective, its peak value was achieved in 2007 with the size of 21.5 percent. It dramatically dropped below 18 percent at the beginning of 2009. Since then, there is a permanent, but

cyclical, recovery in tax collection, and this share reached 21 percent at the end of 2014. The government is serious on fighting against the shadow economy with a view to get additional fiscal revenue of at least 1 percent of GDP. We agree that improving fiscal discipline and shrinking the shadow economy is a legitimate and important goal, but we should notice that our model does not support tightening of the indirect taxation on private consumption. The reason is simple and appealing: indirect taxes discourage consumption and growth. In line with this view, it will be reasonable to relax this restriction and align domestic demand with the target debt-to-GDP ratio.

We will skip discussion about the second row in Figure 3 for the next section of the paper, and address now the third row in Figure 3. Functioning of the labor market is mostly neglected in the fiscal consolidation package. In our view, flexibility of the labor market is an absolutely vital point for better outcomes of the fiscal consolidation policy. It is tacitly assumed that institutional changes related to the labor law and the privatization law adopted last year are sufficient to promote a better business environment and improve employment. This may or may not be the case. So far there is no evidence for either one. Our model reminds us about the fundamental relation between employment and real wages. Both the unconditional base-line forecast and the conditional forecast reveal a U shape of employment and real wage growth rates. The lowest points are strictly negative. This will happen this year with the average real wage rate, and the next year with the employment rate. The fiscal consolidation package will not generate employment. Equally important, the fiscal consolidation will not depress real wages. The real wage rate will decline anyway due to the down stage of the business cycle and the fiscal consolidation will not contribute to this drop. The question is whether these subtle details will be publicly recognized or not. A moderate employment increase will be achieved in the second half of the forecasted period, and it corresponds to a moderate GDP growth and an increase in real wages.

It is equally important to notice capacity utilization rate. The model-consistent solution shows a persistent downward trend of capacity utilization. The fiscal

consolidation package neither made this development worse nor improved the situation. There is no doubt that higher growth rates require better utilization of the existing productive capacity. Restructuring of SOEs may reverse this trend, but this analysis is beyond the scope of our paper.

Monetary easing

The NBS controls the repo interest rate and makes money cheap or expensive, plenty or scarce. Generally speaking, money has been scarce and pricey in Serbia since the dawn of the global recession. This fact rises doubts about functioning of the inflation targeting system in time of crises in Serbia, but we now do not challenge it. We will review the policy which may govern the size of repo rate under the framework set by the fiscal consolidation programme. For that purpose we will perform two basic experiments. In the first one, it is assumed that the NBS will adjust its repo rate according to the model-consistent trajectory generated by the fiscal consolidation programme. We call this option an active accommodation of the monetary policy, since the fiscal programme is implicitly calling for monetary relaxation. The NBS, by assumption,

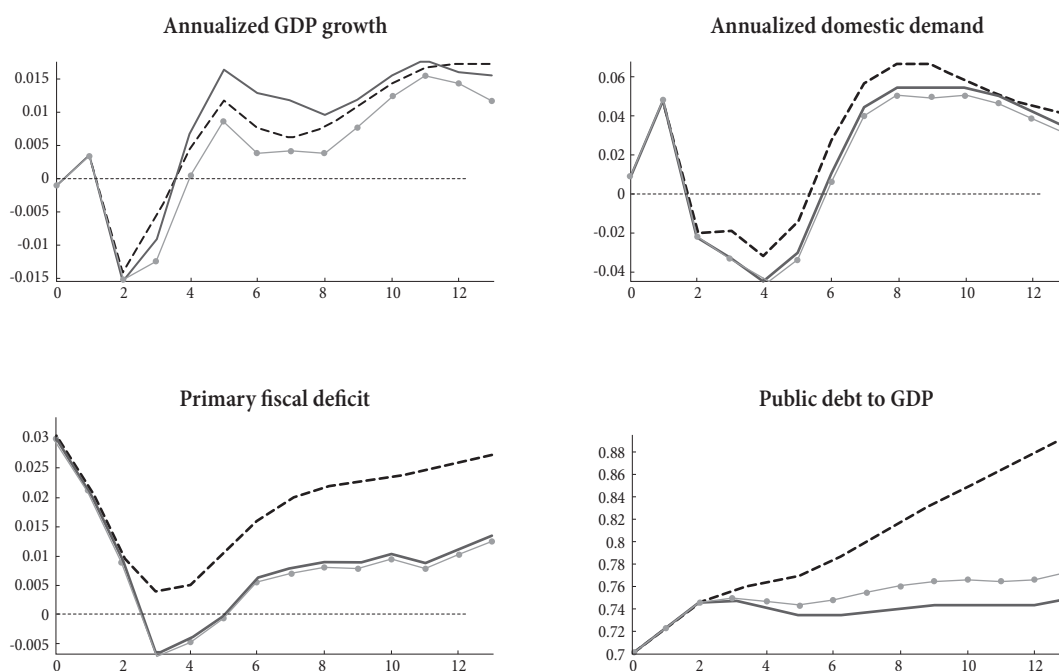
immediately proactively reacts, which qualifies this policy as being an active and accommodative one. This result will be confronted with a spontaneous development of the economy without any fiscal intervention, but under the same assumption that monetary policy quickly satisfies market requirements.

In the second experiment we will confront the active accommodative monetary policy with a slow and reluctant response of the NBS. The alternative policy is defined as a sluggish accommodative monetary policy. In that case the NBS makes money more available and cheaper but with some delays. This may be or may not be followed with an adjustment of the exchange rate.

As indicated, in both experiments we stay in a framework of easing monetary policy. Tightening of the monetary policy is beyond our concern, because it strongly contradicts to the fiscal consolidation programme. Finally, to complete the framework for our discussion, we will take into account the expected paths of inflation and real exchange rate.

In fact, we have already done the first experiment by launching the fiscal consolidation programme. We analyzed a part of it in the previous section. By now, we examine the monetary instruments, which responses are presented

Figure 4: Monetary reaction on fiscal consolidation: Key variables



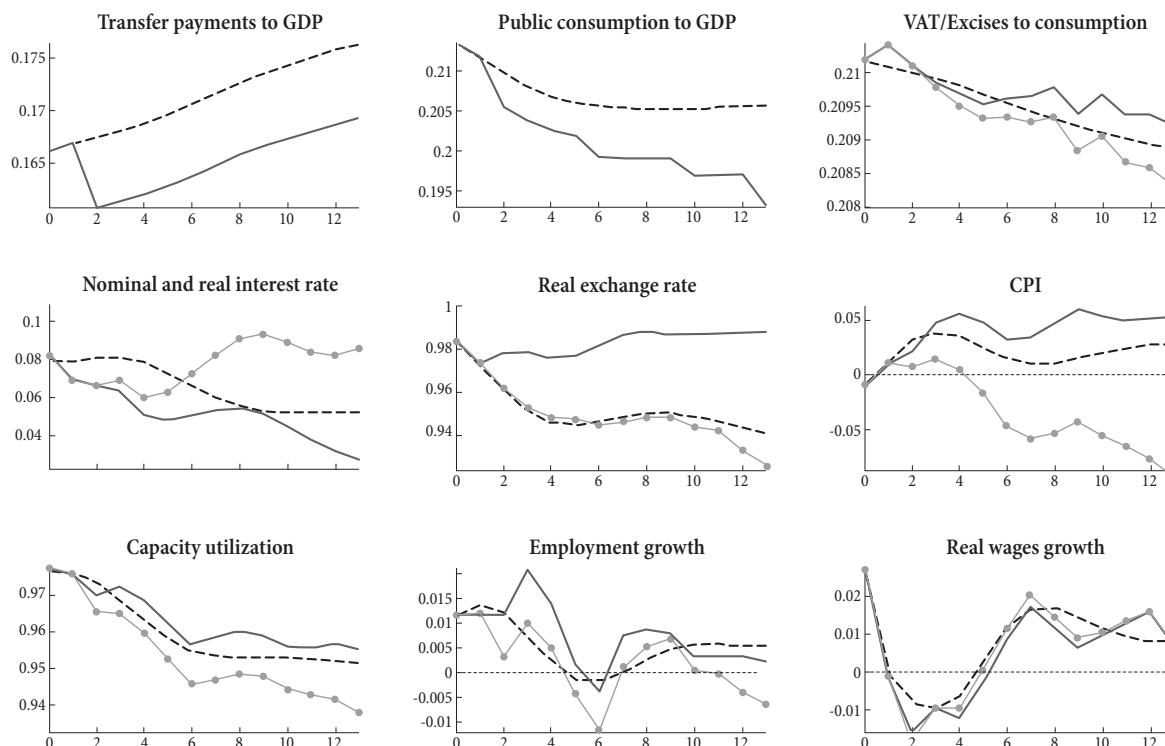
Note: Solid lines represent the policy mix, lines with dots show sluggish monetary easing, dotted lines show hands-off policy

in the second row of Figure 3. The model-consistent repo rate – the repo rate unconditionally forecasted within the model’s base-line scenario – is somewhat lower than its historic counter-part in the first quarter of 2015. It oscillates around 7.5 percent for the next three quarters, and after that point in time it steadily declined to the level of 5.5 percent annually. The unconditional model solution implies monetary easing in any way. The fiscal consolidation package is not expected to make fundamental deviations from this scenario even if details show some differences. The corresponding model-consistent repo rates (solid line) will have the similar shape and path as the base-line interest rate (dotted line). However, the gap between these two lines will widen as the time goes on. At the end of the planning period, the fiscal consolidation requires one percent lower interest rate than otherwise it will be. The model-consistent solution anticipates easing of the monetary policy. The fiscal consolidation programme reiterates this trend and calls for extra relaxation of the monetary policy.

In the same period, conditional forecast of consumer price index (CPI) is persistently below the base-line inflation. Since the inflation calculation does not include administratively controlled prices, we need to ignore the state control of the market⁸. Under this assumption, inflation will be at historically low level all the time. This fact will provide a room for easing of the monetary policy. As risks are concerned, there is no risk of high inflation in the entire period of consideration. Quite the opposite, there is a risk of deflation.

Nevertheless, we expect that inflation in the Euro zone will be even lower than in Serbia. The nominal exchange rate will initially regain purchasing power against the EURO and afterwards stabilize at the achieved level. The nominal exchange rate change will oscillate around the zero path and will not compensate for price differentials between the domestic and foreign inflation rate. Therefore, the real exchange rate will appreciate over the first year, and since then stabilize. The fiscal consolidation package will slightly slow down the real exchange appreciation.

Figure 5: Monetary reaction on fiscal consolidation: Key instruments



Note: Solid lines represent the policy mix, lines with dots show sluggish monetary easing, dotted lines show hands-off policy

8 This fact must not be ignored in conducting actual economic policy. A more elaborated design of the conditional forecast should include the path of expected changes in the administratively controlled prices.

Let us now turn to the second experiment with a sluggish accommodative monetary policy within the fiscal consolidation framework. We consider this scenario to be highly likely adopted by the monetary authority. The rationality behind this view is the following. The NBS is an inflation-averse institution. For this reason it is reluctant to reduce the repo rate as much as the model-consistent trajectory indicates. Also, it has a fear-of-floating relating to the nominal exchange rate, and is ready to defend its stable level by interventions on the foreign exchange market. Serbia does not have a free-float, but managed exchange rate regime. Thus, the exchange rate is heavily managed by both the repo interest rate and the NBS's foreign exchange interventions financed from the official reserve.

We model monetary and exchange rate policies in two steps and present their outcomes in Figure 4 and Figure 5. In the first step, we input into the model restrictions based on 1 percent of GDP reduction in both the government consumption and transfer payments shares in GDP. On top of these figures, we constrained the path of the repo interest rate to mimic the trajectory as in the case of no fiscal consolidation, but with the two-quarter delay. This is how we define "sluggishness" of the monetary policy. The monetary policy adjusts to a spontaneous development of the market, but with a delay.

The outcomes of the conditional forecast are displayed as lines with dots in corresponding figures. What are the main conclusions from this scenario? A delay in easing the monetary policy may have the following effects:

- The rate of GDP growth is permanently lower than in the base-line scenario,
- The aggregate demand growth is not only lower with respect to the base-line case, but is also absolutely depressed for the first half of the planning period,
- The both outcomes are a consequence of the lower capacity utilization and decreasing employment,
- Additionally, prices deflate, which dramatically drives up the real interest rate,
- The real exchange rate further appreciates, and
- The debt-to-GDP ratio rises; it is still below 80 percent, but has a rising trend with no sign of the reverse at the end of 2017.

The negative effects of such a monetary policy are evident. They will not prevent the fiscal authority to reduce the public debt, but this policy mix is unbalanced and hardly sustainable. However, the negative effects of the sluggish monetary adjustment might be mitigated by an adequate exchange rate policy. If we reiterate the constraints from the previous scenario, but allow the exchange rate to nominally increase in such a way as to keep the real exchange rate fluctuating around the starting level, we will get new outcomes represented by solid lines in Figure 4 and Figure 5.

Comparing to the above scenario, the right policy mix shows the improved results as follows:

- The rate of GDP growth is similar to the base-line scenario in the first year, but higher in the remaining two years,
- The aggregate demand growth is still slightly lower than in the base-line case, but
- The capacity utilization and employment are higher than expected in the base-line scenario, which indicates that the economic recovery is driven up by the supply-side,
- CPI will be above the base-line level, which might be considered as a threat to market stability, but it is still manageable by the monetary authority,
- The exchange rate policy will resemble a crawling peg regime, and finally
- The debt-to-GDP ratio stabilizes around the level of 75 percent.

An adequate fiscal-monetary-cum-exchange rate policy mix is able to stabilize public debt with reasonable social costs of adjustment.

Conclusion

The fiscal consolidation as proposed is a doable policy, if the policy mix of monetary and exchange rate policies is properly designed and timely implemented. Under these assumptions, the rising debt-to-GDP ratio will be contained and stabilized at the affordable level. For the more optimistic expectations that the debt-to-GDP ratio will reverse its trend in 2017, the economy needs additional structural measures.

In order to document this conclusion, we presented in this paper four policy scenarios: the base-line scenario with no government interventions, the alternative fiscal consolidation scenario, and two policy-mix scenarios of monetary and exchange rate policies reaction to the fiscal consolidation. The first scenario is simulated by using unconditional forecast, the all remaining scenarios are done by enforcing conditional forecast. In a DSGE framework, conditional forecast approach requires that an endogenous variable and its related exogenous stochastic shock swap their status in the model. A predetermined path is assigned to the originally endogenous variable, which then become an exogenous variable. In such a way, the variable reflects the policy target that is set by the policy maker. The DSGE model is still able to achieve a solution since the associated shock adjusts to new equilibrium conditions.

The chief counterfactual experiment simulates the fiscal consolidation package that has been adopted by the Serbian government and parliament at the end of 2014. We extracted two critical components of this package both related to expenditure cuts. One is related to cuts in the public wage bill, government purchases of goods and services, and restructuring of SOEs that will generate redundant employment and further reduction in public wage bill. From the point of view of compiling national accounts, all three components belong to the government consumption. These reductions amount to fiscal savings of 1 percent of GDP. Another fiscal saving of a similar size is related to reduction in transfer payments due to lower pension checks and restricted fiscal transfers to local municipalities.

The government envisaged various measures with the impact of another percent of GDP, but we have skipped them due to their temporary character. We assume that government will stick to the announced fiscal policy over next three years. Therefore, the fiscal effects of expenditure cuts are by definition permanent, not temporary. We specify the target paths for government consumption and transfer payments for each 12 quarters in the forthcoming period. We apply expenditure cuts not to the empirical level of variables preceding the simulation, but to the unconditionally forecasted levels which would be obtained without any governmental actions. In this way, we separated

the induced effects of the fiscal consolidation policy from those effects that would spontaneously take place.

We also assumed in the base-line scenario that all other policies – particularly monetary and exchange rate policies – smoothly adjust to the trajectories generated by the fiscal measures. Under this assumption, the social costs of fiscal consolidation are not dramatically high. The IMF has indicated a potential easing of monetary policy with no further elaboration of this idea. There is a risk that adjustment of the monetary policy might be done with some delays and an improper mix with the exchange rate policy. Our simulations clearly demonstrate that improper monetary easing is a bad scenario. We suggest that a proper monetary policy should encompass an exchange rate policy that will promote a rather stable real exchange rate level. This policy mix is the most superior response to the fiscal consolidation policy that the monetary authority might design.

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Miroљub Labus

is Professor of Economics at the Faculty of Law, University of Belgrade, and former Deputy Prime Minister of Serbia. He has received BA in law and PhD in economics from the University of Belgrade. Before joining academia, he practiced law in a Belgrade's law firm working on tort cases, protection of patent rights, and international credit arrangements. In his academic work, Miroљub Labus is currently focused on dynamic macroeconomics, and economic analysis of anti-trust cases. He has valuable experience in statistics and applied general equilibrium modelling (CGE and DSGE). He set up statistical journal „Economic trend“ and business survey “Market barometer”, and served as their first editor in chief. As Deputy Prime Minister, Miroљub Labus was instrumental in negotiating Serbia's return to international financial institutions after a period of sanctions, settling the Country's huge foreign debts, and promoting the SAA with the EU. After resigning from politics, Miroљub Labus founded in 2007 consulting firm Belox Advisory Services.



Milica Labus

is a Partner in Belox Advisory Services company. She graduated Computer Science from the Faculty of Mathematics in Belgrade. She also has Master of Science degree in Computer Science from Stanford University, USA and Executive MBA (Master of Business Administration) degree from COTRUGLI Business School in Belgrade. She is currently a PhD student at the Faculty of Organizational Sciences in Belgrade, with the Department of E-business. Milica Labus has over 12 years of experience in information technology industry and has worked on many projects in financial and public sectors. In the last few years she has been intensively engaged in DSGE modeling and Matlab/DYNARE programming. Milica Labus is a member of the Information Systems Audit and Control Association (ISACA), and passed the CISA certification exam in December 2014.