

REACTION OF BANKS AND MONETARY POLICY TO FISCAL CONSOLIDATION IN SERBIA: Empirical Evidence and DSGE Simulations

Original Scientific Article

*Miroљub LABUS
Professor of Economics,
retired from the Faculty
of Law, Department of
Economics and Law,
University of Belgrade*

The fiscal consolidation program in 2015 initiated a switch in the monetary policy of the National Bank of Serbia (NBS), and the commercial policy of banks. The NBS turned to monetary easing, which quickly reduced the effective repo rate and related market rates. The commercial banks switched away from lending to the corporate sector towards financing public debt. Lower interest rates brought about lower investment costs that had a positive effect on growth. However, a reduction in corporate lending upset growth and created illusions that a further increase in public debt was sustainable. The lesson learnt so far is that business climate depends overwhelmingly on measures of economic policy, but not entirely. Reaction of the Serbian banks, in the sense of providing more opportunity to the government for financing public debt, created an example of unexpected effects of the fiscal consolidation that increased default risks and uncertainties in the economy.

Key words: fiscal consolidation, DSGE models, monetary policy, crowding-out
JEL CLASSIFICATION: C68, E47, E62

*T*HE FISCAL CONSOLIDATION PROGRAM IN 2015 initiated a switch in the monetary policy of the National Bank of Serbia (NBS), and the commercial policy of banks. The NBS decided to launch a monetary easing

policy that immediately reduced the effective repo rate and related lending rates. The commercial banks switched away from lending to the corporate sector towards financing public debt. Lower interest rates brought about lower investment costs that had a positive effect on growth. However, a reduction in corporate lending upset growth and created illusions that a further increase in public debt was sustainable. The lesson learnt so far is that business climate depends overwhelmingly on measures of economic policy, but not entirely. Reaction of the banks created unexpected effects of fiscal consolidation that increased default risks and uncertainties in the economy.

We use in this paper empirical evidence and the QUEST_Serbia model, a Dynamic Stochastic General Equilibrium (DSGE) model of the Serbian economy, to assess outcomes of the first stage, and simulate effects of the next stage of fiscal consolidation policy, and the banking sector's reaction to it. The paper is structured in the following way. In the first part we provide evidence on crowding-out effects in 2015 that followed the introduction of fiscal consolidation. In the second part we compare our forecast made a year ago with actual results in the first year of the implementation of the new fiscal policy. In the third part we explain how the QUEST_Serbia model was adjusted to simulate effects of fiscal consolidation and the reaction of the banking sector to it. In the fourth part we present two *example causa* scenarios referring to the fiscal and banks' commercial policy. Finally, we briefly conclude.

1. CROWDING-OUT

The global recession dramatically hit world economy. Rising unemployment, mostly among youth; deterioration of the standard of living; unfair distribution of income and declining growth are just a few among numerous negative consequences. The global recession threatened to become a global depression more serious than the one of 1929. Therefore many governments decided to use monetary and fiscal measures to prevent such a development. Years later, we still face low interest rates and a large expansion of the money base. Probably rather soon this will be over since there are expectations that interest rates will go up with a termination of quantitative easing. Nevertheless, a relaxed monetary policy is prevailing for the time being. On the other hand, expansionary fiscal policy has already reached its limits. Boosting public consumption and financial supports

to failing banks have accumulated enormous public debt, which become largely unsustainable in many countries. Therefore, a lot of them turned to some kind of fiscal consolidation policy, which at least temporarily was detrimental to growth.

What happened to Serbia? Serbia went into recession three times in that period; more specifically in 2009, 2012 and 2014. There were some expectations that the National Bank of Serbia (NBS) would assist the business community and pursue quantitative easing either to decrease the repo rate or mandatory reserves in commercial banks. This did not occur. High and persistent inflation, coupled with a memory of two hyperinflation that recently destroyed the currency and the middle class, gave the moral ground to the NBS to keep restrictive monetary policy whatever the cost would be in terms of lost output. On the other hand, expansionary fiscal policy was not much successful in curbing high unemployment, and ended with a huge public debt. A risk of sovereign default persuaded the government to adopt the program of fiscal consolidation at the end 2014. Complementary to that, a drop in domestic demand and foreign prices of energy, together with rather high real repo interest rate and the appreciated real exchange rate, paved the way for the NBS to start relaxing monetary policy. The IMF supported that switch in monetary policy conditioned on a strict implementation of the fiscal consolidation program. The overall outcome was that inflation fell to 1.5 percent at the end of January 2016. Nevertheless, the target inflation rate was kept at 4.5 percent (plus/minus 1.5 percent), with official repo rate at 4.5 percent. It seems that the NBS doubts whether a permanent price stabilization has been achieved or not.

The program of fiscal consolidation reduced the fiscal deficit from 6.6 percent of GDP in 2014 to 3.7 percent in 2015. However, the share of public debt in GDP rose from 70 percent to 75 percent in the same period. The government did not finance public debt by issuing foreign bonds, but opted for domestic bonds either in terms of the euro or the dinar. The official yield slightly declined, but another negative effect suddenly emerged. Banks' lending to the corporate sector substantially shrank, while public borrowing markedly expanded. This was a classic example how public borrowing crowded out the private sector. Figure 1 illustrates this point.

Let us start with panel (a). It shows the empirical relationship between growth rates of GDP (g_{GDP}) and corporate lending (g_{LOAN}) for the period between Q1Y2003 and Q4Y2015. It is immediately clear that there were co-movements

between the said time series. More technically, both series are cointegrated of the order one. Their long-term relation is described by the following equation:

$$(1) \quad g_{GDP} - 0.186 \cdot g_{LOAN} + 0.565 = 0 \quad (0.074) \quad [-2.505]$$

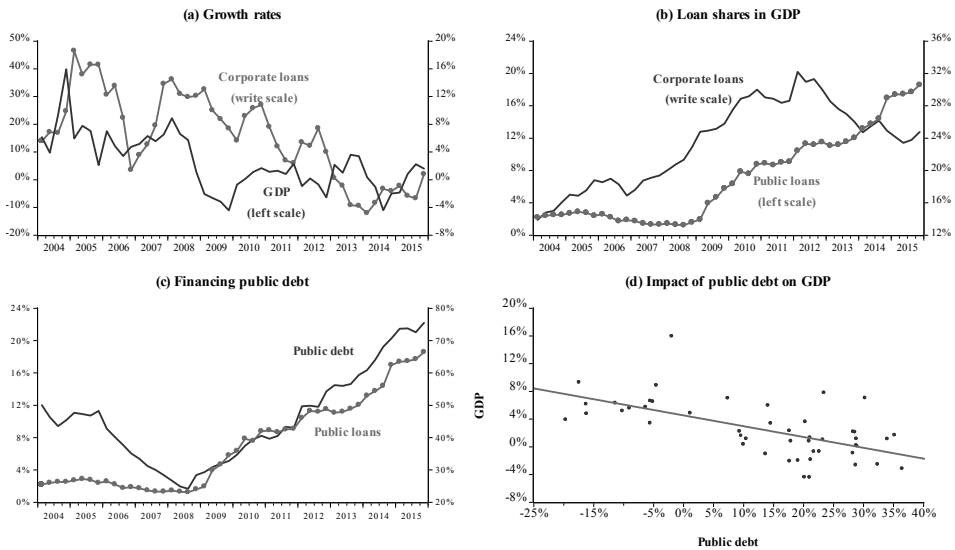


Figure 1: Macroeconomic evidence

It is characteristic for the Serbian economy that growth in the past was mainly promoted by expansion of domestic demand. Now we see that a part of this growth model is related to the way how this expansion was financed. However, the banks' reaction to the global recession was peculiar. Initially they did not squeeze loans to either the corporate or public sector. Quite the opposite, for a few years they provided even more loans. In the middle of 2012 that policy sharply changed. Banks continued to extend credit lines to the government, but started to reduce them to the corporate sector. This policy is illustrated in panel (b). Public borrowing was limited during the period of public debt reduction until the end of 2008¹. At that time the share of public borrowing from the domestic market was 2 percent of GDP. It has increased to 18 percent at the end of 2015 revealing a steep upward trend of public debt accumulation. Dynamics of the corporate sector bor-

1 The author of this paper led negotiation in 2001 with the Paris club creditors, which ended with 67 percent of write-offs of the Serbian sovereign debt.

rowing from domestic banks went the other way. Its share was 24 percent at the onset of global recession. Then, it rose to 32 percent, but reversed back to initial percentages in the middle of 2012. A clear crowding-out episode due to public borrowing was evident in the last three years.

Panel (c) shows two time series: public debt share in GDP and share of public loans in GDP. They are highly cointegrated. Finally, panel (d) warns us that there is a negative relationship between rates of growth of GDP and public debt. Steeper increase of public debt is linked to lower GDP growth rates.

It seems that expansionary fiscal policy did not assist the Serbian economy to fully recover from the shock received by the global recession. Public debt has contained GDP growth prospects. At the same time, commercial banks decided to reverse their credit policy; the higher the loans to the public sector, the less credit to the corporate sector. That switch in commercial policy was detrimental to growth in Serbia. The question is how fiscal consolidation policy affects growth and banking activity.

2. OUTCOME OF THE FISCAL CONSOLIDATION

Fiscal policy has been expansionary for years. Depending on the stage of the business cycle, it has been counter-cyclical or pro-cyclical, but always expansionary. During the period of high growth rates from 2003 until 2008, fiscal policy further stimulated GDP growth. Since the onset of the global recession, the Serbian economy has entered recession three times, and fiscal policy has unsuccessfully attempted to improve growth prospects. The final outcome has been a persistent fiscal deficit and rising public debt. When the debt-to-GDP ratio reached the level of 70 percent in 2014, it was clear that such a policy was not sustainable any more. Therefore the program of fiscal consolidation was designed and implemented so far with positive results.

On the other hand, monetary policy has never been counter-cyclical until last year. Arguing that a lower fiscal deficit would only provide room for the reduction of the repo interest rate, the National Bank of Serbia (NBS) turned to monetary easing in 2015. The IMF supported such a switch in monetary policy. Up to that point, the NBS has been only concerned with price stabilization and in order to achieve this goal advocated the policy of high interest rates at any cost in terms of lost output.

As already mentioned, fiscal consolidation was introduced at the end of 2014 and implemented during 2015. We would like to assess its impact on key macroeconomic variables. For that purpose we will use our QUEST_Serbia DSGE model. It was developed and initially explained in (Ratto et al, 2009). The model's modifications and adjustment to the Serbian economy were explained in (Labus, 2014a and 2014b, Labus & Labus, 2015). The model was used last year to forecast potential impacts of the fiscal consolidation package. Our method was based on a model-based counterfactual experiment of what would happen to the Serbian economy if the policy maker consistently implements the policy package. Results were compared with the estimates of what would happen to the same economy if the policy maker did nothing at all. We considered the differences between these two experiments as the net effect of the fiscal consolidation package. Technically speaking, the forecast of the spontaneous development was based on an unconditional forecast from the model, while controlled development was based on a conditional forecast.

In order to perform a conditional forecast, we needed to choose proper inputs for the model's simulation. On that account we worked with two types of fiscal instruments. Firstly, one type of them addressed government consumption. Government consumption – as a final demand component of GDP – consists of 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 contributed to 70 percent of 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 – was scheduled to shrink by 0.5 percent of GDP. The reduction rate was linear and set to 10 percent. It would apply to all public wage rates higher than 25,000 RSD monthly. Saving on public purchases was the other part of expenditure reduction. The spending base was quite large, since purchased goods and services accounted for one-third of total public spending or 7 percent of GDP. However, it envisaged a rather modest reduction of public purchases with the estimated effect of only 0.1 percent of GDP. Finally, restructuring SOEs would require an improvement in their efficiency and the shedding of the redundant workforce. It was estimated that reduction in unproductive workforce would save at least 0.3 percent of GDP. All together, these measures would reduce the government consumption between 0.9 and 1 percent of GDP.

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

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 an unconditional forecast for the fourth quarter of 2014, since the last historic data was available only for the third quarter of 2014 at that time. 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 2015–2017. 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 government consumption during the forecasted period. This means that we did not fix any particular level of 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.

The conditional forecast is presented by solid lines with markers in Figure 2. The unconditional forecast is presented by solid line without markers. Bars indicate actual values of macroeconomic variables. What can we infer from Figure 2? From panel (a) we conclude that the forecast of GDP growth rates was quite accurate concerning unknown factors. Among them, an increase in export and inflow of foreign direct investment were the most welcome surprise that unexpectedly increased output in the third quarter. The actual growth path supported our forecast in all quarters but the third one. Therefore, growth in the second half of the year outperformed our expectations and brought about annual higher results of 0.5 percent above our baseline forecast.

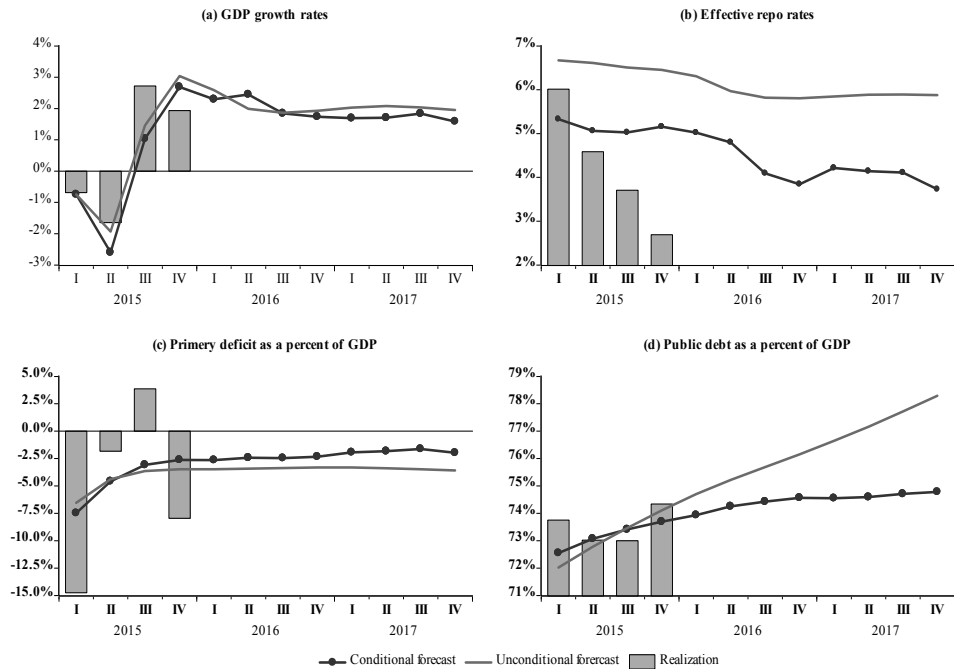


Figure 2: Forecast for 2015–2017 and realization in 2015

Panel (b) envisaged a fall in interest rates. Those interest rates are the effective repo rates. We have a complex system of repo operations in which the NBS only sells its Certificates of Debt (CoD), never buys treasury bills, sets the main refinancing rate with upper and lower bounds, offers a specific amount of CoDs at each session of the open market, and accepts the highest bid. Hence, the NBS sets both the rate and quantity of securities, and commercial banks respond to that by their offer of how much securities to buy and at what rate which is usually very close to the lower bound of the repo corridor. The closing rate at which transactions are accepted is called the effective repo rate. The effective repo rates are a combination of managed and free market interest rates with no risks. The drop of effective repo rates was higher than what we expected. The reason behind this difference was in the policy switch of the NBS. We admit that this switch was indicated by the NBS, but we were not fully convinced. This is a lesson for the conditional forecast. A credible trust of policy makers is absolutely vital for a conditional forecast, but policy makers should have a good credibility record, which is not often the case in Serbia. In any case we did not miss the trend, but the size

A similar situation exists regarding the primary fiscal deficit as shown by panel (c) in Figure 2. The annualized size of the deficit was forecasted pretty well, but the actual path was fairly missed. This was a consequence of the Government policy, which sharply squeezed public expenditure in the second and third quarter of the year in order to have better negotiation position with an IMF mission that was supposed to review the Stand-by Agreement. That policy did not respect entitlement rights of the budget beneficiaries and ended with accumulated arrears. The lesson from panel (c) is that implementation of the public expenditure policy is hardly possible to predict on the ongoing bases.

As for the share of public debt in GDP, our forecast was quite the accurate. Panel (d) in Figure 2 supports that conclusion. Public debt continued to rise, as expected, according to its short-term trend, and reached 75 percent by the end of 2015.

Let us briefly conclude that a conditional forecast crucially depends on conditions imposed upon the model. Those conditions should be appropriately revealed by policy makers in a policy framework governed by rules. It is an open issue whether the public trusts them, and incorporate into the forecast and business decisions. For sure, the program of fiscal consolidation was properly applied in the first year of its implementation. The NBS kept the promise to reduce the repo rate if the fiscal deficit went down, but ceased with this policy in the last quarter. It is not clear whether this action is temporary or permanent.

3. THE MODEL ADJUSTMENT

QUEST_SERBIA follows the main lines of the QUEST III model's platform with some substantial differences. In our model there are two distinct parts: the domestic economy and the foreign economy, where the euro zone is treated as the rest of the world. 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 had to be taken into account in defining steady-state properties of the Serbian economy.

We underline the following four fundamental specifics of the QUEST_SERBIA model. Firstly, there is no full mobility of financial capital across borders and

households that save income and invest in domestic and foreign bonds face no pressure to adjust their intertemporal preferences. Therefore, the real interest rate in Serbia is permanently above the EU real interest rate. Additionally, the real interest rate convergence cannot be detected over the past ten years. This means 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 much more than their counterparts in the EU. Quite differently, QUEST III assumes that steady state domestic and foreign rates of time preference are equal. We cannot do this. Hence, there is a permanent gap between domestic and foreign rates of time preference.

Secondly, there is also no perfect mobility of goods across borders. Due to transaction costs, domestic inflation is permanently higher than foreign inflation. In the steady state these differences are destined to vanish if purchasing power parity holds. However, this 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 interest rates.

Next QUEST III states the trade balance is zero in the long run. The Serbian case is quite the opposite; it is hard to assume that the Serbian economy will balance exports and imports over the next ten years. The steady state value of the trade balance will be negative. The only doubt is how negative it will be.

Finally, the Serbian economy is a small economy bound to grow much faster than large mature economies in the world, including the EU. 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.

These four fundamental distinct properties of the Serbian economy were taken into account by modifying original QUEST III model codes. The next two specifics are more technical than fundamental: The data set underlying QUEST III model is much richer than our data set. The European Commission originally estimated the model using quarterly data for the period between Q1Y1978 and Q4Y2007, which uses 149 data points. In our case, we use only 52 data points and estimate the model from Q1Y2003 to Q4Y2015.

18 Also parameters are modified to the macroeconomic framework of the Serbian economy. In some cases, we used the same initial values as in QUEST III.

Since these parameters are overridden by the Bayesian estimation, a possible initial bias is substantially reduced if not completely eliminated.

We will further modify the model in this paper in order to endogenize fiscal revenue categories, and include banks' commercial policy. As for the fiscal part, the main idea is to link fiscal revenue to business cycle conditions. This was not present in the original QUEST_Serbia model. The expenditure side indeed responded to an output gap, while the revenue side was modeled mostly in a way to reflect government fiscal policy stances. We now endogenize the revenue side as well, and make it correspond to the business cycle path.

Before we explain this modification of the model, let us rewrite the expenditure side. Government expenditure constitutes public purchases of consumer goods and services, government investments and transfer payments:

$$(1) \quad EXP_t^G = C_t^G \cdot P_t^C + I_t^G \cdot P_t^C + TRAN_t$$

Government consumption is directly exposed to changing business cycle conditions. This is modeled by its temporary deviations around the long-term growth rates:

$$(2) \quad \Delta g_t^G = \tau_{\alpha g}^G \Delta g_{t-1}^G + \tau_{\alpha dj}^G \cdot \Delta g_t^{G/Y} + \tau_{gap}^G \cdot \Delta g_t^y + \zeta_t^G$$

Where $(\Delta g_t^G = g_t^G - g)$ is the deviation of the government consumption growth rate around the steady-state GDP growth rate, $\Delta g_t^{G/Y}$ is the deviation of the government consumption share in GDP from its target level. Parameter $(\tau_{\alpha g}^G)$ indicates the level of inertia in the reaction process, while parameter (τ_{gap}^G) captures the delay with which the fiscal response to an output gap takes place. The remaining parameter $(\tau_{\alpha dj}^G)$ measures the speed of adjustment of temporary deviations to the target share of government consumption in GDP. Finally, the whole process is subject to permanent stochastic shocks (ζ_t^G) .

The response of government investments to changing business conditions is formulated in a symmetric way:

$$(3) \quad \Delta g_t^{IG} = \Delta g_{t-1}^{IG} + \tau_{\alpha dj}^{IG} \cdot \Delta g_t^{IG/Y} + \tau_{gap}^{IG} \cdot \Delta g_t^y + \zeta_t^G$$

where $(\Delta g_t^{IG} = g_t^G - g - g^{TFP})$ is the deviation of the government investment growth rate around the steady-state GDP growth rate corrected for embodied technological progress, stands for the deviation of the government investment

share in GDP from its target level. No inertia is assumed in this process, while parameters (τ_{adj}^{IG}) , and (τ_{gap}^{IG}) capture some delays in adjustment to the policy target and friction in responding to the output gap.

The transfer payment system acts as an automatic stabilizer in a business cycle by coupling the income of unemployed people and of pensioners with the actual implementation of wage payments in the economy. We assume that the government regards the share of transfer payments to the wage bill (or alternatively to GDP) as a decision variable, and on top of that, it provides income for unemployed people:

$$(4) \quad \frac{TRAN_t}{W_t L_t} = \left(\frac{TRAN}{WL} \right)_{target} + b \cdot (LO - L_t) + \zeta_t^{TRAN}$$

The target share of transfer payments to the wage bill is $\left(\left(\frac{TRAN}{WL} \right)_{target} \right)$, the target labor participation rate is (LO) , and parameter (b) measures the generosity of the social safety net. The whole process is subject to a stochastic shock (ζ_t^{TRAN}) .

Let us now turn to the revenue side, where we made most of the adjustments. Government revenue (REV_t^G) is collected from taxes on labor income, including SSC, consumption, and profit, as well as from lump-sum taxes:

$$(5) \quad REV_t^G = (tax_t^W + tax_t^{SSC}) \cdot W_t L_t + tax_t^{VAT} P_t^C C_t + tax_t^{PF} i_t^K P_t^K K_t + tax_t^{LS}$$

PIT, SSC, VAT and tax on profit are linear and fixed by two components, proportional and progressive levies on the corresponding tax bases. The first component refers to the average rates set independently of business cycle conditions $(\tau_0^W, \tau_0^{SSC}, \tau_0^{VAT}$ and τ_0^{PF} respectively). The second component is the progressive tax rate that captures cycle fluctuations $(\tau_1^W, \tau_1^{SSC}, \tau_1^{VAT}$ and τ_1^{PF} respectively). It serves as an automatic stabilizer during business fluctuations.

All taxes are derived in a similar way, as a first-order Taylor expansion around zero output gap. Hence, labor income tax is:

$$(6) \quad tax_t^W = \tau_0^W \cdot (1 + \tau_1^W \cdot \tilde{y}_t) + \zeta_t^W$$

In a similar way we model SSC, VAT and tax on profit:

$$(7) \quad tax_t^{SSC} = \tau_0^{SSC} \cdot (1 + \tau_1^{SSC} \cdot \tilde{y}_t) + \zeta_t^{SSC}$$

$$(8) \quad tax_t^{VAT} = \tau_0^{VAT} \cdot (1 + \tau_1^{VAT} \cdot \tilde{y}_t) + \zeta_t^{VAT}$$

$$(9) \quad tax_t^{PF} = \tau_0^{PF} \cdot (1 + \tau_1^{PF} \cdot \tilde{y}_t) + \zeta_t^{PF}$$

Tax revenue is uncertain since it depends on cyclical fluctuations and the efficiency of tax collection. Therefore, it is subject to stochastic shocks (ζ_t^W , ζ_t^{SSC} , ζ_t^{VAT} , ζ_t^{PF} , respectively). Shocks are modeled as first-order autoregressive processes with zero mean and standard deviations set by the modeler. Their coefficients are estimated by using Bayesian technique. The empirical part of the model is based on time series of PIT, SSC, VAT and tax on profit for the period Y2003Q1 –Y2015Q4.

Finally, a lump-sum tax is included in order to facilitate the government in controlling public debt. It approximates in an ordinary way the government's trial-and-error practice to enforce the collection of one-off fiscal revenue from state-owned enterprises (SOEs) even if they run losses or are insolvent. In the model, the government sets the target share of public debt in GDP (B_{target}). If the achieved share of public debt in GDP in the previous period is higher than the target debt-to-GDP ratio, the government will apply an additional tax rate (τ^B). Also, the government monitors the trend of debt-to-GDP ratio. If this ratio is increasing, meaning that the rate of its change is positive ($\Delta \left(\frac{B_t}{P_t Y_t} \right)$), the government will charge additional taxes at the rate (τ^{DEF}):

$$(10) \quad \Delta t_t^{LS} = \tau^B \left(\frac{B_{t-1}}{P_{t-1} Y_{t-1}} - B_{target} \right) + \tau^{DEF} \Delta \left(\frac{B_t}{P_t Y_t} \right)$$

As we already mentioned, this happens in theory. In reality, the government compares a desired level of public debt with the one actually achieved and accordingly enforces various temporary means of collecting non-tax revenue. Therefore, the burden of the lump-sum tax falls more on taxpayers than on consumers and their disposable income.

The share of fiscal deficit in GDP is defined as follows:

$$(11) \quad def_t^G = \frac{EXP_t^G - REV_t^G}{Y_t \cdot P_t}$$

As for the investment process, we distinguish between real investment expenditures (I_t) and physical investments (J_t). The real investment expenditures with respect to capital are subject to convex adjustment costs, where (γ_K) and (γ_I) are parameters of sluggish capital and investment adjustments. The adjustment costs are given by:

$$(12) \quad I_t = J_t \cdot \left[1 + \frac{Y_K}{2} \cdot \left(\frac{J_t}{K_{t-1}} \right) \right] + \frac{Y_I}{2} (\Delta J_t)^2$$

Those costs modify the optimization problem of households. They maximize an infinite flow of discounted utility subject to constraints of the investment adjustment cost and accumulation of capital. It reads as follows:

$$(13) \quad \max_{\{J_t\}} E_0 \sum_{t=0}^{\infty} \{ \beta^t U(C_t, 1 - L_t) - \lambda_t \beta^t \left[\frac{K_t}{K_{t-1}} \left(J_t \left(1 + \frac{Y_K}{2} \frac{J_t}{K_{t-1}} \right) + \frac{Y_I}{2} (\Delta J_t)^2 \right) \right] - \zeta_t \beta^t [K_t - J_t - (1 - \delta)K_{t-1}] \}$$

After taking the first-order condition (FOC) with respect to investment expenditure and some rearrangements, we get the expression for the growth rate of private investment (g_t^I) as follows²:

$$(14) \quad r_K \cdot [g_t^K - (g + \pi - \pi^I)] + r_I \cdot [g_t^I - (g + \pi - \pi^I)] - r_I \frac{1}{1 + r_t} [g_{t+1}^I - (g + \pi - \pi^I)] = Q_t - 1$$

We denote with (g_t^K) the growth rate of capital, (Q_t) Tobin's Q, (r_t) the real interest rate, and steady state values of GDP growth (g), overall inflation (π) and inflation in the sector of investment goods (π^I).

We handle the influence of banks' commercial policy on private investment beyond the households' optimization problem since it depends on bankers' decisions and is highly uncertain. We assume that there is some inertia in the investment growth rate that is captured by parameter (ρ_I). The remaining dynamics of investment growth rate depends on the growth rate of loans extended by banks to the private sector (g_t^{loan}):

$$(15) \quad g_t^I = \rho_I g_{t-1}^I + (1 - \rho_I) g_t^{loan} + \zeta_t^{loan}$$

The uncertainty captures variable (ζ_t^{loan}) that is modelled as an auto-regressive process of the first order in which (ε_t^{loan}) represents a sudden shock that might hit this decision process:

$$(16) \quad \zeta_t^{loan} = \rho_{loan} \zeta_t^{loan} + \varepsilon_t^{loan}$$

² The process of deriving this equation is explained in detail in Labus, 2014b, pp. 23–27.

Parameters (ρ_I) and (ρ_{loan}) have been estimated by the Bayesian technique based on empirical series of the growth rates of banks' lending to the corporate sector.

4. KEY SIMULATIONS

We have solved the model by using the latest set of data that includes data from the fourth quarter of 2015. There was a flash estimate of GDP for the fourth quarter of 2015 done by the Statistical Office.³ Fiscal data were released in January this year for the entire 2015 by the Ministry of Finance.⁴ The NBS has also released data on banking activity for 2015.⁵ That means the available data has encompassed outcomes of the fiscal consolidation program in 2015. Based on this empirical data set, the Bayesian estimation of parameters has taken the latest development into account. As for forecast, we extended it for the next three years, from 2016 to 2018. We present in Figure 3 forecasted series as solid lines with markers. This is an unconditional mean forecast⁶. Of course, point forecast should show more variations in forecasted series than mean forecast due to shocks effects. This is evident from Table 1 where we present figures for both mean and point forecasts.

We are assuming that the program of fiscal consolidation will spontaneously continue for the next three years. We expect lower rates of growth in the first half of 2016 and their increase in the second half. As panel (a) indicates, the average annual growth rate is around 2.5 percent. Hence, growth is not spectacular, but an initial disadvantage of fiscal consolidation will be overcome. On the other hand, panel (b) points out that the period of declining effective repo rates might be over. Unless additional measures were taken by the NBS, the effective repo rate would return to the level of 5 percent annually. It is not clear whether the NBS would

3 Statistical Office of the Republic of Serbia, <http://webrzs.stat.gov.rs/WebSite/public/PublicationView.aspx? pKey=41&pLevel=1&pubType=2&pubKey=3420>

4 Ministry of Finance, Republic of Serbia database <http://www.mfin.gov.rs/pages/article.php?id=11901>.

5 National Bank of Serbia, http://www.nbs.rs/export/sites/default/internet/latinica/80/monetarni_sektor/SBMS03.xls

6 Mean forecast takes into account only the uncertainty about parameters since the distribution of uncertainties about shocks is averaged out. Point forecast, however, contains the uncertainty about both parameters and shocks. See Adjemian et al. 2011.

further ease monetary policy. If not, the period of low interest rate would be terminated rather soon.

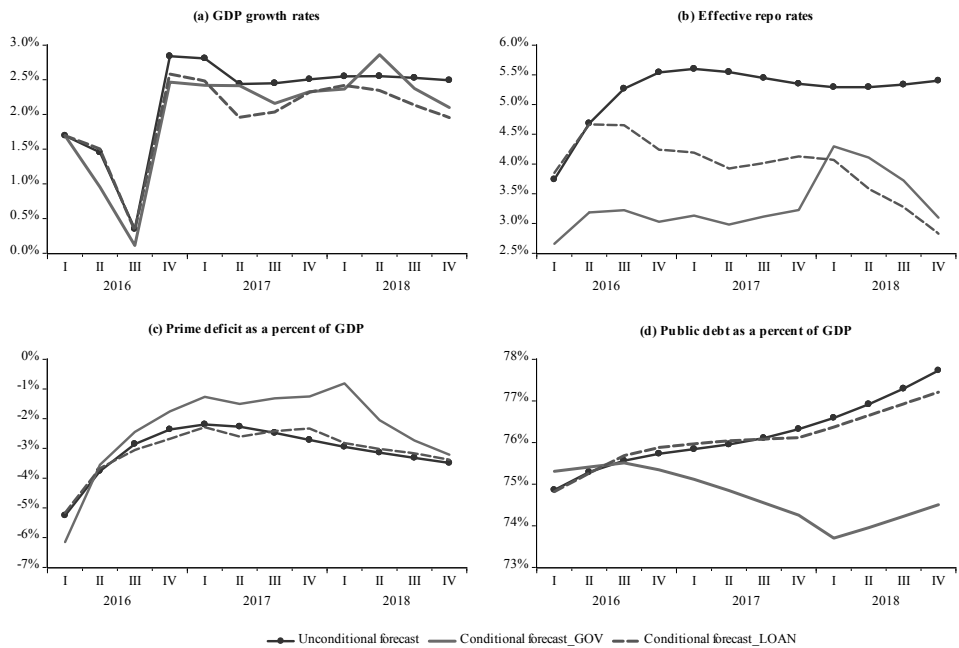


Figure 3: Forecast

The primary fiscal deficit is expected to decrease in 2016 to the point of 3 percent annually. Under this assumption, the share of public debt in GDP would slowly increase aiming at 80 percent by 2018. This probably will not happen as available information indicate that there is some hidden public debt that must be accommodated in the future.

This brings us to the conditional forecast. The conditional forecast is all about sudden changes in some variables or switches in policy regime that may not be expected under normal circumstances and incorporated in the forecast. We did not speculate how big the shock of hidden debt would be, but assumed that a reduction of public consumption must continue in order to absorb that shock. Particularly, we assumed a further decrease of public consumption by one percent of GDP in the period of next eight quarters (two years).⁷ This implies that we expect the program of fiscal consolidation to end in 2017 afterwards a spontaneous market development will take place.

24 ⁷ In order to make things simpler, we ignore a reduction in transfer payments.

Table 1: Mean and point forecasts

	GDP growth rate		Effective repo rate		Primary deficit		Public debt	
	Mean	Point	Mean	Point	Mean	Point	Mean	Point
2016Q1	0.0169	0.0169	0.0374	0.0377	-0.0525	-0.0470	0.7485	0.7488
2016Q2	0.0145	0.0123	0.0468	0.0364	-0.0376	-0.0336	0.7529	0.7558
2016Q3	0.0034	-0.0061	0.0526	0.0407	-0.0285	-0.0304	0.7556	0.7618
2016Q4	0.0283	0.0126	0.0553	0.0160	-0.0236	-0.0330	0.7573	0.7647
2017Q1	0.0280	0.0093	0.0560	0.0070	-0.0219	-0.0280	0.7583	0.7633
2017Q2	0.0243	0.0083	0.0554	-0.0092	-0.0227	-0.0312	0.7595	0.7611
2017Q3	0.0244	0.0169	0.0544	-0.0097	-0.0247	-0.0213	0.7610	0.7540
2017Q4	0.0250	0.0285	0.0534	-0.0065	-0.0271	-0.0244	0.7632	0.7475
2018Q1	0.0254	0.0376	0.0529	0.0165	-0.0294	-0.0194	0.7659	0.7431
2018Q2	0.0255	0.0402	0.0529	0.0149	-0.0314	-0.0143	0.7691	0.7397
2018Q3	0.0252	0.0383	0.0533	0.0056	-0.0331	-0.0275	0.7729	0.7420
2018Q4	0.0249	0.0273	0.0540	0.0061	-0.0348	-0.0212	0.7772	0.7391

Conditionally forecasted series are presented as solid lines in Figure 3. It is evident that fiscal consolidation generates costs in terms of lost growth. GDP growth rates will be below the baseline level for eight quarters. They will finally recover in the last year. Reduction in government spending depresses domestic demand and consumption, which should have a negative impact on growth. On the other hand, this would be instrumental for reducing the primary fiscal deficit and reverting the trend of public debt. It is interesting to note that the effective repo rate will continue at the present level with a slight increase toward the end of period. Reduction in public consumption is good for public debt, but bad for growth.

Let us now turn to the simulation of banks' commercial policy. Its outcome is presented by dotted lines in Figure 3. We assumed that the share of corporate loans in GDP would decline by one percent over the next eight quarters. This assumption draws on the empirical trend that banks steadily shrink their exposure to the corporate sector in Serbia. The induced effect on growth will be negative and much stronger than reduction of public spending. The primary fiscal deficit and public debt would not be much affected. The initial increase in the effective repo rate would later on diminish, and the rate would fall. Crowding-out effects produce a similar negative impact on growth as fiscal consolidation. Their combined effects would be, of course, much stronger.

5. CONCLUSION

In this paper we adjusted our QUEST_Serbia DSGE model to accommodate the impact of fiscal policy measures and a switch in the commercial policy of banks. We have simulated effects of a continual reduction of public spending and restrictive banks' lending policy toward the corporate sector. Our findings point out to negative effect of both policy options. Therefore, some counterbalancing policy measures are needed in order to neutralize initial fiscal consolidation impacts.

We enter now in the second year of fiscal consolidation. Despite fiscal consolidation, public debt was stubbornly rising. The business community would like to know whether the program of fiscal consolidation will continue in the present form or in a different way with more public spending restrictions. Additionally, they would like to know how commercial banks will react to this option. Banks, so far, have supported the rising public debt by extending loans to the Government. By financing public debt at a larger scale, banks have reduced available funds to the corporate sector. In that sense, public debt has crowded out private borrowing.

The lesson learnt so far is that business climate depends overwhelmingly on the measures of economic policy, but not entirely. The reaction of banks is also important and must be taken into account. They have created unexpected effects of crowding-out that increased default risks and provided additional uncertainties in the economy.

References:

- Adjemian Stéphane, Bastani Houtan, Juillard Michel, Karamé Frédéric, Mihoubi Ferhat, Perendia George, Pfeifer Johannes, Ratto Marco, and Villemot, Sébastien. 2011. "DYNARE: Reference Manual, Version 4." *DYNARE Working Papers* 1, CEPREMAP.
- IMF. 2015. Central, Eastern, and Southeastern Europe, Reconciling Fiscal Consolidation and Growth. Regional Economic Issues, November, Washington, D.C.
- Kneller Richard, Bleaney Michael, and Gemmell Norman. 1999. "Fiscal policy and growth: evidence from OECD countries." *Journal of Public Economics* 74: 171–190.
- Labus, Miroljub (2014a). "Fiscal consolidation and total factor productivity." *Ekonomika preduzeća* 62(1–2): 35–46.
- Labus, Miroljub. 2014b. "QUEST_Serbia: DSGE Model with Practical Guide", *Belox Working Papers Series*, WP6/2014, <http://www.belox.rs/en/articles/publications/working-papers/wp6-2014-quest-serbia-dsge-model-with-practical-guide.html>.

- Labus, Mirosljub and Labus Milica [2015]: “Policy Mix for Fiscal Consolidation in Serbia: Conditional Forecast Approach”, *Ekonomika preduzeća*, vol.63, No.1-2, pp. 17–30.
- Ratto Marco, Werner Roeger, and Jan in’t Veld. 2009. “QUEST III: An Estimated Open-Economy DSGE Model of the Euro Area with Fiscal and Monetary Policy.” *Economic Modeling* 26(1): 222–233.

Rezime:

**REAKCIJA BANKARSKOG I MONETARNOG SEKTORA
NA FISKALNU KONSOLIDACIJU U SRBIJI: empirija i
DSGE simulacije**

Program fiskalne konsolidacije inicirao je 2015. godine promene u monetarnoj politici Narodne banke Srbije (NBS), kao što se očekivalo, ali i promene u komercijalnoj politici banaka, što se nije očekivalo. NBS je počela da labavi monetarne stege, što je brzo dovelo do smanjivanja efektivne repo kamatne stope i drugih kamatnih stopa. Reagujući na to, banke su se okrenule kreditiranju javnog deficita na teret smanjenja kredita realnom sektoru. Makroekonomski efekti su bili protivrečni. Niže kamatne stope smanjile su troškove investiranja, što je imalo pozitivan efekat na rast investicija i BDP-a. Na drugoj strani, smanjenje kredita realnom sektoru oštetilo je privredni rast i stvorilo je iluziju da je moguće neograničeno finansirati javni dug iz domaćih izvora. Lekcija koju smo do sada naučili jeste da poslovna klima značajno zavisi od mera ekonomske politike, ali da one mogu da izazovu neočekivane rezultate. U tom smislu reakcija banaka u Srbiji, koje su promenile svoj kreditni portfelj u korist države, a na štetu privrede, dobar je primer neočekivanih posledica fiskalne konsolidacije koja je, umesto da smanji, na duži rok povećala rizik javnog zaduživanja.

Ključne reči: fiskalna konsolidacija, DSGE modeli, monetarna politika, kreditno istiskivanje

JEL CLASSIFICATION: C68, E47, E62

Paper submitted: 15. I 2015.

Paper reviewed: 10. II 2015.

Paper accepted: 20. III 2015.