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Optimal fiscal and monetary policy action in a closed economy

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ABSTRACT

We study optimized monetary and fiscal feedback policy rules. The setup is a New Keynesian DSGE model of a closed economy which is solved numerically using common parameter values and fiscal data from the Euro area. Our aim is to welfare rank alternative tax-spending policy instruments used for shock stabilization and debt consolidation when, at the same time, the monetary authorities can follow a Taylor rule for the nominal interest rate.

1. Introduction

Policymakers use their instruments to react to economic conditions. For instance, central banks may respond to inflation, the fiscal authorities to the state of public finances, and both of them to real economic activity. It is nevertheless believed that the use of fiscal policy is more complex and controversial than the use of monetary policy (see e.g. Leeper, 2010). The debate over the use of fiscal policy has been intensified since 2009 when most European governments embarked on the difficult task of reducing their public debts at a time of stagnant or negative growth.[1] What is the best policy reaction to economic conditions within this environment?

In this paper, we search for the best mix of monetary and fiscal policy actions in a closed economy, when the policy role is twofold: to stabilize the economy against shocks and to improve resource allocation by gradually reducing the public debt burden over time. In order to do so, we welfare rank various fiscal policy instruments used jointly with nominal interest rate policy.

Following most of the related literature (see below), we work with feedback policy rules. In particular, we specify feedback rules for public spending, the tax rate on labor income, the tax rate on capital income and the tax rate on consumption, when these fiscal policy instruments are allowed to respond to a number of macroeconomic variables used as indicators, while, at the same time, monetary policy can be used in a standard Taylor-type fashion. We optimally choose the magnitude of feedback policy reaction to those indicators. The welfare criterion is household's expected discounted lifetime utility. This type of policy is known as "optimized" feedback policy rules (see Schmitt-Grohé and Uribe, 2005, 2007, and many others). This enables us to welfare rank alternative policies in a stochastic setup, without our results – and, in particular, our welfare ranking of alternative policies – being driven by ad hoc differences in feedback policy coefficients, as it happens in most of the related literature on debt consolidation (see below). We compare two policy environments. In the first, used as a benchmark, the authorities just stabilize the economy from exogenous shocks. In the second, the fiscal authorities also aim at reducing the ratio of public debt to output gradually over time, which means that now we combine shock stabilization with resource allocation policies.

The setup is a rather standard New Keynesian DSGE model of a closed economy featuring imperfect competition, Calvo-type price fixities and wage rigidities. The model is solved numerically employing commonly used parameter values and fiscal data from the Euro area. The steady state solution of this model (called the status quo) serves as a point of departure to study the implications of various policies aiming at shock stabilization and debt consolidation. To solve for optimized policy rules, we adopt the methodology of Schmitt-Grohé and Uribe (2004, 2007), in the sense that we take a second-order approximation to both the equilibrium conditions and the welfare criterion and, in turn, we compute the welfare-maximizing values of feedback

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[1] Even in normal times, fiscal imbalances can jeopardize the stability of the whole Euro area. Hence the arguments for the restrictions of the Stability and Growth Pact. After the global financial crisis of 2007 and the sharp deterioration of public finances (in the Euro area, the ratio of public debt to output was around 69% in 2008 and increased to around 95% in 2013), in view of growing concerns about fiscal sustainability, many countries have been forced to initiate substantial fiscal adjustments. However, the resulting spending cuts, and in particular the reliance on tax revenue measures, are believed to cause a significant burden on real activity. See e.g. European Commission (2013) and CESifo (2014).

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policy rules, and the associated social welfare, under various policy scenarios.

Our main results are as follows. First, in all cases studied, the monetary authorities should aggressively react to inflation and the fiscal authorities should react to public debt. Also, in all cases studied, interest rate reaction to the output gap should be smaller in magnitude than reaction to inflation (this happens even if the policy target for output is the so-called natural level of output). In other words, the main concern of monetary authorities should be inflation stability rather than the real economy. On the other hand, the degree of fiscal reaction to the output gap (the so-called fiscal activism) relative to reaction to public debt, and hence what should be the main concern of fiscal authorities, depends crucially on the distorting effects of each fiscal instrument used and the degree of rigidities in the labor market. The more distorting a fiscal policy instrument is, the less it should be used for debt consolidation and the more it should be used to support the real economy. This applies in particular to labor taxes all the time and to capital taxes in the medium and long terms. Rigidities in the labor market provide further arguments for fiscal activism. All this means that, under optimized rules, the final, or net, change in fiscal policy instruments is determined by the reconciliation of two typically opposing aims: to reduce public debt and to stimulate the economy. The final, or net, effect is a quantitative matter (see our fourth result below).

Second, when we focus on lifetime utility only, welfare differences between debt consolidation and no debt consolidation look to be small. However, this happens only because short-term effects work in opposite direction from medium- and long-term effects, so that the net, or lifetime, effects are small. In particular, the comparison of outcomes with consolidation to outcomes without consolidation implies that, in most cases, consolidation is costly in the short run and that these costs are not trivial. By contrast, in the medium- and long-term, debt consolidation becomes superior across all cases and this more than offsets its short-term costs, so that eventually lifetime, or net, utility is higher with debt consolidation.

Third, in the case of debt consolidation, the choice of fiscal policy instrument matters for how quickly public debt should be brought down. For instance, in our baseline experiments, public debt reduction from 85%, which is its average value in the recent Euro area data, to the 60% target level, which is the reference level of the Maastricht Treaty, should be achieved within 5 to 12.5 years depending on how distorting the fiscal instrument is (5 years if we use public spending or consumption taxes, and 12.5 years if we use capital taxes). This pace should be slower if there are labor market rigidities since, in the presence of such rigidities, fiscal policy should be mainly concerned about the real economy. On the other hand, if we use labor taxes, which are a particularly distorting instrument at any time, the pace of public debt reduction should be very slow, following an almost unit root process, and this is irrespectively of the degree of labor market rigidities.

Fourth, the choice of fiscal policy instrument matters for welfare too. If there are no rigidities in the labor market, the concern for public debt should dominate the concern for output and, in this case, it is better to use public spending along with interest rate policy. Practically, this means that, if there are no labor market rigidities, the best fiscal policy action is to cut public spending initially so as to bring public debt down. On the other hand, if there are rigidities in the labor market, the concern for output should dominate the concern for public debt and, in this case, it is better to use income (labor or capital) taxes on the side of fiscal policy. Practically, this means that, if there are labor market rigidities, the best fiscal policy action is to cut labor and capital taxes initially so as to stimulate the real economy and only in turn raise them to bring public debt down gradually over time.[2]

How does our work differ? Although there has been a rich literature on the interaction between fiscal and monetary policies,[3] as well as on public debt consolidation,[4] there has not been a welfare comparison of the main tax-spending policy instruments in a unified framework of a closed economy, and how this comparison depends on policy goals (shock stabilization only, or shock stabilization plus debt consolidation) as well as on the presence of labor market rigidities. Also, as said above our results are based on optimized policy rules.

The rest of the paper is organized as follows. Section 2 presents the model. Section 3 presents the data, parameter values and the steady state solution. Section 4 explains how we work. The main results are in Sections 5 and 6. Robustness checks are in Section 7. Section 8 closes the paper. Details are in Appendix sections.

2. Model

The model is a standard New Keynesian model featuring imperfect competition and Calvo-type nominal rigidities, which is extended to include a relatively rich menu of state-contingent policy rules.

2.1. Households

There are $i = 1, 2, \ldots, N$ identical households. Households act competitively. The objective of each i is to maximize expected discounted lifetime utility:

$$E_0\sum_{t=0}^{\infty}\beta^t U\left(c_{i,t}, n_{i,t}, m_{i,t}, g_t\right) \tag{1}$$

where $c_{i,t}$ is i's consumption bundle (defined below), $n_{i,t}$ is i 's hours of work, $m_{i,t}$ is i's real money balances, g_t is per capita public spending, $0<\beta<1$ is the time preference rate and E_0 is the rational expectations operator.

In our numerical solutions, we use a utility function of the form (see also e.g. Galí, 2008):

$$u_{i,t}\left(c_{i,t}, n_{i,t}, m_{i,t}, g_t\right) = \frac{c_{i,t}^{1-\sigma}}{1-\sigma} - \chi_n\frac{n_{i,t}^{1+\eta}}{1+\eta} + \chi_m\frac{m_{i,t}^{1-\mu}}{1-\mu} + \chi_g\frac{g_t^{1-\zeta}}{1-\zeta} \tag{2}$$

where χ_n, χ_m, χ_g, σ, η, μ, and ζ are standard preference parameters.

The budget constraint of each household i (written in real terms) is:

$$\begin{aligned}(1+\tau_t^c)c_{i,t} + x_{i,t} + b_{i,t} + m_{i,t} = \left(1-\tau_t^k\right)\left(r_t^k k_{i,t-1} + d_{i,t}\right) + \\ +(1-\tau_t^n)w_t n_{i,t} + R_{t-1}\frac{P_{t-1}}{P_t}b_{i,t-1} + \frac{P_{t-1}}{P_t}m_{i,t-1} - \tau_{i,t}^l\end{aligned} \tag{3}$$

where P_t is the price index and small letters denote real variables, e.g. $b_{i,t}\equiv\frac{B_{i,t}}{P_t}$, $m_{i,t}\equiv\frac{M_{i,t}}{P_t}$, $w_t\equiv\frac{W_t}{P_t}$, $d_{i,t}\equiv\frac{D_{i,t}}{P_t}$, and $\tau_{i,t}^l\equiv\frac{T_{i,t}^l}{P_t}$. Here, $x_{i,t}$ is i's real investment at t, $B_{i,t}$ is i's end-of-period nominal government bonds, $M_{i,t}$ is i's end-of period nominal money holdings, r_t^k is the real return to inherited capital $k_{i,t-1}$, $D_{i,t}$ is i's nominal dividends paid by firms, W_t is the nominal wage rate, $R_{t-1}\geq 1$ is the gross nominal return to government bonds between $t-1$ and t, $\tau_{i,t}^l$ is the real lump-sum taxes/transfers made to each i from the government, and $0\leq\tau_t^c$, τ_t^k, and $\tau_t^n<1$ are respectively the tax rates on consumption, capital income and labor income.

[2] These results should be contrasted to those in an open economy facing sovereign risk premia and a non-zero probability of default, where fiscal policy instruments should be earmarked to debt consolidation almost in all cases (see Philippopoulos et al., 2013).

[3] See e.g. Leeper (1991), Schmitt-Grohé and Uribe (2005 and 2007), Leith and Wren-Lewis (2008) and Leeper et al. (2009). For reviews, see e.g. Kirsanova et al. (2009), Wren-Lewis (2010) and Leeper (2010).

[4] See e.g. Coenen et al. (2008), Forni et al. (2010a, 2010b), Bi et al. (2012), Cantore et al. (2012), Cogan et al. (2013), Erceg and Lindé (2013) and Philippopoulos et al. (2013, 2014).