Workshop 4

Fiscal Policy in DSGE Models

Course on Monetary and Fiscal Policy Analysis with DSGE Models

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The objective of this workshop is to study the effects on the economy of government spending shocks and tax shocks using DSGE models. We will investigate the sensitivity of the results to the model assumptions and parameter values. The transmission channels of the fiscal policy will be studied by computing the fiscal multiplier and by plotting the dynamic behavior of key macroeconomic variables after the fiscal shock.

Measuring the fiscal multiplier. There are several definitions.

The impact multiplier defined as

$$Mul_{g,t}^{impact} = \frac{(y_t - y)}{(g_t - g)}$$

The cumulative multiplier

$$Mul_{g,t}^{cumulative} = \frac{\sum_{i=0}^{N}(y_{t+i} - y)}{\sum_{i=0}^{N}(g_{t+i} - g)}$$

The maximum cumulative effect

$$Mul_{g,t}^{cumulative} = \max\left\{\frac{\sum_{i=0}^{N}(y_{t+i} - y)}{\sum_{i=0}^{N}(g_{t+i} - g)}\right\}$$

and the present value multipliers

$$Mul_{g,t}^{PV} = \frac{\sum_{i=0}^{N}(1+r)^{-i}(y_{t+i} - y)}{\sum_{i=0}^{N}(1+r)^{-i}(g_{t+i} - g)}$$

Where (1+r) is the long-run real interest rate of the economy.

Tax multiplier can be computed similarly. For example,

$$Mul_{\tau,tau}^{cumulative} = -\frac{\sum_{i=0}^{N}(y_{t+i} - y)}{\sum_{i=0}^{N}(rev_{t+i} - rev)}$$

Where *rev* denotes the government revenue.

The Matlab code for these multipliers is available at the end of the dynare files for each question. For example, open the file NKMGasto_GHH.dyn in folder Q1 and look at how the multipliers are computed.

Questions

Closed Economy Models

1) The income effect, monetary policy and the size of the fiscal multiplier

The folder Q1 contains the Dynare codes for two NK models. The file NKMGasto_Sep.dyn has the code for a standard NK model without capital and a separable utility function. The file NKMGasto_GHH.dyn contains the code for the NK model with GHH preferences. Apart from these differences the models are the same.

a) For both models compute the fiscal multiplier assuming kappa=0. This assumption is equivalent to assume that prices are flexible. In which model the fiscal multiplier is larger? Can you explain the results?

b) In the model with GHH preferences, compute the fiscal multiplier assuming that kappa=40, that is, under sticky prices. Which fiscal multiplier is larger for the GHH preferences (flexible vs. sticky prices)? Can you explain the results?

c) In the model with GHH preferences, and assuming that kappa = 40, compare the fiscal multiplier for two values of the coefficient that controls the response of monetary policy to inflation. In the first case, set rho_pi = 1.5, and in the second case use rho_pi = 2.5. Which fiscal multiplier is larger? Can you explain the results? Hint: Look at the Taylor rule of the model.

2) The fiscal multiplier and the adjustment cost of investment

The folder Q2 contains the Dynare code for the NK model with quadratic investment adjustment costs and GHH preferences. The parameter *a* controls how costly adjusting investment is.

a) Compute the fiscal multiplier assuming $a = 0.6$ versus $a = 2.6$. In which case the fiscal multiplier is larger? Explain your results.

b) How can you explain the crowding out of private investment in this model?

3) **Public debt, distortionary taxation, and the Ricardian equivalence**

The folder Q4 contains the Dynare code for a New Keynesian closed economy model with distortionary taxes. The file name is NKMGasto_GHHnvesDistTaxes.dyn. There are taxes on consumption expenditure, labor, and capital income. The government spending consists of transfers to households and government consumption. In this exercise we will compare the multiplier effect of the different fiscal instruments. Compare the fiscal multiplier of the following fiscal plans.

a) Compute the balanced budget (Eq.21: bg=bgSS) fiscal multiplier, assuming government spending is financed with lump-sum taxes (Eq.18: tauL = (1-rhoTauL)*tauLSS + rhoTauL*tauL(-1) + sh_tauL;).

b) Compute the fiscal multiplier assuming that government expenditure is finance through debt. In this case, the fiscal rule is such that government transfers respond to the public debt accumulation. That is, the fiscal rule (Eq.21) is

tr = trSS-phib_tr*(bg-bgSS);

with phib_tr = 0.3.

c) Compute the fiscal multiplier of the government spending assuming constant transfers (Eq.21: tr=trSS) and adjusting labor taxes (Eq.18: tauL = tauLSS+phib_tr*(bg-bgSS)+sh_tauL;).

4) **The labor market structure and the role of rule-of-thumb consumers**

In folder Q5 there are two dynare files. The dynare file GLS_CompLabor.dyn and the file GLS_NonCompetitive.dyn. These files contain the code for the Ricardian and rule-of-thumb consumers model presented in Gali, Lopez-Salido, and Valles (2007). The only difference between the two models is the structure of the labor market. In the file GLS_CompLabor.dyn the labor market is competitive while in the file GLS_NonCompetitive.dyn the labor market is non-competitive.

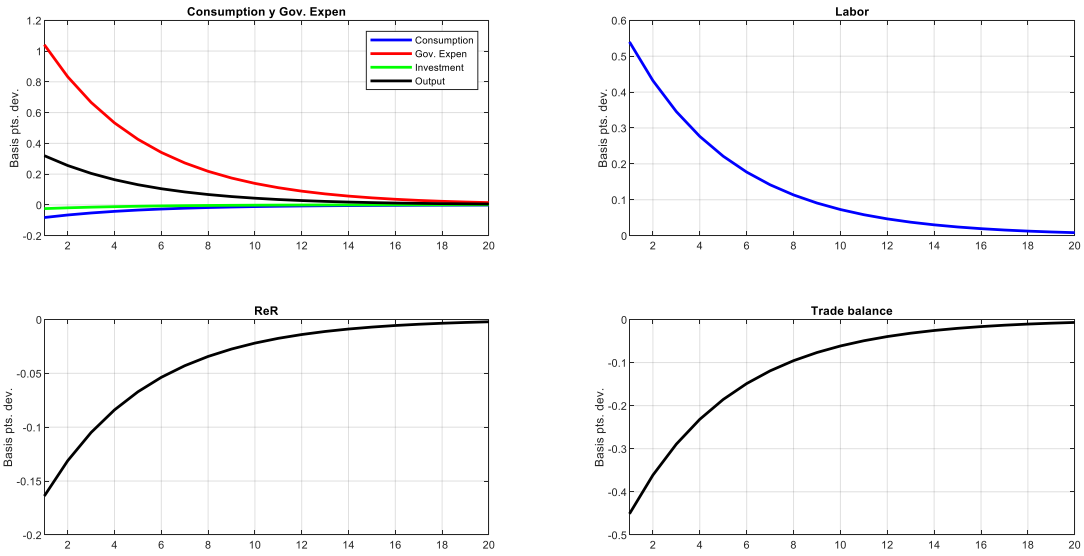
a) Compute the fiscal multiplier using the non-competitive labor market model and compare it with the fiscal multiplier obtained with the model with competitive labor markets. Assume in both cases that the share of rule-of-thumb agents in the economy is 0.5. In which model the fiscal multiplier is larger? How can you explain the results?

Open Economy Models

5) **Government spending, the real exchange rate, and the trade balance**

Consider the following simulations of the open economy model with a separable utility function and complete markets studied in class. Explain the transmission mechanism of a government

expenditure shock (see figure). Why does the exchange rate appreciate? Would the exchange rate depreciate under incomplete markets? What happens to the trade balance?



6) Government reversals and real exchange rate depreciations

The folder Q6/Spending Reversals contains the code for solving and simulating an open economy model with spending reversals.

a) Look for the equation describing the fiscal policy (Eq. 25) and explain why this equation implies government expenditure reversals.

b) Simulate the model assuming there are no spending reversals. What is the effect of a government consumption shock on the exchange rate? [comment and uncomment expressions in Eq.24 and Eq.26 as instructed; in parameters calibrate psiGb = 0]

c) Simulate the model assuming there are spending reversals. What is the effect of a government consumption shock on the exchange rate? Can you explain the results? [comment and uncomment expressions in Eq.24 and Eq.26 as instructed, in parameters calibrate psiGb > 0]