PS2 2025 Questions (30 September 2025)

Due before class Week 4 (7 October 2025)

This Problem Set is based on the SW model we discussed this week. You will be simulating the SW model and examining various facets.

QUESTIONS

Q1. Go to the AEA website, search for "Wouters" and download (under "Additional Materials") the "DataSet". [You can also find this data at https://www.openicpsr.org/openicpsr/project/116269.]

Q2. The SW DataSet contains a file called "usmodel.mod" which is the original SW **Dynare** model. Note that you will have to ***delete*** the first line in the *model section* ("#usmodel_stst;") for the programme to work. Since this week concerns only simulation, you should also ***comment out*** the section starting with "estimated_params" through to the end of the mod-file (using "/*" at the beginning of the section and "*/" at the end of the mod-file).

Q3. Using the parameters already set by SW in "usmodel.mod", run a simulation and check that your results mirror those presented in the lecture this week. For your simulation, ***replace the original command*** in "usmodel.mod" with
stoch_simul(Tex,irf = 40) y c inve pinf r w k lab;

Q4. Attempt to ***reproduce Figure 2*** in SW2007, using as a basis the Matlab file (attached) entitled "SW2007_orig_Fig2.m". You will find that the results do not look at all like those in Figure 2!

Q5. The explanation for the problem in Q4 is that Figure 2 in SW2007 was constructed, not from the ***calibrated*** parameters given in the "usmodel.mod" file which you used in Q4, but from the ***results*** of their estimation, shown in ***Tables 1A and 1B***. Using the ***mode*** of the ***posterior*** distribution shown in Tables 1A and 1B, re-do the exercise of Q4 to obtain a new version of Figure 2. Your result should now look very like SW2007's Figure 2.

Q6. The SW2007 model does not include a ***fiscal sector***. They do this because all households are assumed to be ***Ricardian*** and therefore to act in a rational, forward-looking manner, and also because taxes are raised in lump-sum fashion, so that the particular time path of debt and taxes is irrelevant. Now assume that there are some Ricardians and some ***non-Ricardians*** in the economy. With non-Ricardian ("rule-of-thumb") households, however, the speed at which government debt is paid off with higher taxes matters for the model dynamics. It is therefore necessary to ***modify the model*** by adding a government budget constraint and a fiscal policy rule, and by including taxes explicitly for the non-Ricardians.

This has been done in the ***(attached)*** article by Cogan et al (2010), *Journal of Economic Dynamics and Control*, "New Keynesian versus old Keynesian government spending multipliers", 281-295. Using section A.3 of that article, adjust the ***original*** SW2007 model of Q3 ***(NOT that of Q5)*** by adding equations for the government budget constraint and the fiscal rule.

You will also need to ***separate out the Ricardians and non-Ricardians***, making use of their equation (A.4). In so doing, use the notation "_lc" for "liquidity constrained", hence non-Ricardian; and "_nlc" for "non-liquidity constrained", hence Ricardian. Equation (A.5) then provides for aggregate consumption. You will have to ***add similar equations*** to the ***flex-price*** economy part of the model.

For simplicity, you should also ***modify*** the exogenous spending shock equation to:

```
// exogenous spending (also including net exports)
g = eg;
```

Now run a simulation using the parameters already set by SW in "usmodel.mod" plus the following values for the new parameters (φ_b, φ_g, ω):

```
phi_b = 0.1;
phi_g = 0.1;
omega = 0.5;
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Compare your results with those obtained in Q3 above. What do you conclude?

Q7. In the model used in Q6 above, the exogenous spending shock "g" [which includes any fiscal shock] was simplified to "g = eg". Now ***revert to the original*** SW2007 specification for the exogenous spending shock (but otherwise keeping the model of Q6 intact), and compare your new results to those found in Q6.