The dynamic ASAD model

In this exercise you should use the excel file ASAD.xls. The model is based upon the mathematical formulation of a dynamic ASAD model that is presented in "understanding business cycles". In the columns B and C I have programmed the difference equations that are derived in that text.

In the excel file there are two sheets "calculations" and "figures". On the figure sheet you will find the ASAD figure together with a figure over the time paths of inflation and the output gap. The ASAD figure is also copied in the calculations sheet in order to make it possible to see the effects immediately when you change any of the numbers.

In the sheet "calculations" there are four yellow columns. You make your experiments by changing these numbers. Note that the first two rows that are not yellow should not be adjusted.

In the column "nominal money growth μ" (D) you specify monetary policy. You will specify the nominal money growth in each time period. In this model we assume that the long run growth trend in production is zero. That is a simplification. However an alternative interpretation of the model is that the specification of nominal money growth is equal to the difference between nominal money growth and the long run growth trend in production.

In the column "active fiscal policy" (F) you specify active fiscal policy. In the column "other demand chocks" (J) you define other demand chocks than monetary or fiscal policy, for example a change in household consumption. In the column "supply chocks s" (M) you should define supply chocks, for example price increases in important imported inputs. You should write your answers in a word document. Your text should be well structured and you should clearly explain what is happening in the model.

The model is calibrated by adjusting the parameter values in the green cells. These numbers give the equations their exact formulations. If you where to make a similar model in reality you would ideally estimate these parameters, using econometric techniques in order to end up with realistic equations. Here we will just use some guesses and we will experiment and se what happens when we change them.

The role of expectations

Exercise A

In this exercise we should investigate the impact from rational expectations. First you should replicate the experiment that is run in "understanding business cycles".

To begin with there is a stable inflation rate of two percent due to the nominal money growth of two percent. Assume now that from period 6 the central bank changes its target for the inflation rate to 1 percent. To implement that, they reduce nominal money growth to 1 percent from period 6 and onwards. Note that period 6 is on row 7.

Hint; in order to simplify you may just print "1" in cell 7 and then you can copy this cell and paste into all the cells that should have this number. You should use the following parameter values.

λ	0.1
a1	0.9
a2	0.4
a3	0.1
a4	0
b	0.4

With rational expectations last period value of inflation will have a low impact of core inflation thus you should plug in a high value on lambda. Moreover last period value of the output gap would have a low impact on this period expenditure meaning that you should plug in a low value of a_1. Use the following parameter values.

λ	0.9
a1	0.1
a2	0.4
a3	0.1
a4	0
b	0.4

Copy the the two figures in the sheet "figures" into your word document, both with rational expectations and with adaptive expectations, i. e. both before and after you changed the parameter values. Explain why they differ.

Expansionary fiscal policy

In exercise B and C we will analyze expansionary fiscal policy that is undertaken in a period where the economy is in equilibrium.

Exercise B

Start again from a sheet where the nominal money growth is 2 percent in all periods, i. e. print 2 in all rows of the μ column. Use adaptive expectations, i. e. $\lambda = 0.1$ and $a_1 = 0.9$

Assume in period 8 there is an election in this country. In order to maximize voters the parties make a lot of expensive promises. I.E. in period 8 there is a fiscal expansion. In the accurate column you should print 5 in period 8. Note that you should have a zero in period 9 since there is no fiscal expansion that period we keep the same level of expenses. In period 15 politicians starts to worry about the increasing governmental debt. To deal with that problem they decide upon a goal for the government budget of a surplus of 2 percent per year. In order to achieve that goal the cut expenditures by 3 in period 15, 2 in period 16 and 2 in period 17. Print -3,-2 and -2 in the accurate cells.

When the debt has decreased to 10 the goal is reduced to 1 percent and when the debt is paid back they change the goal to a zero budget deficit. Implement even this fiscal policy.

Copy the two figures in the sheet "figures" to your word document and describe the scenario with your own words. Note that for the periods where you have zeros in the columns for fiscal policy and supply chocks you must explain the movements in the ASAD figure from the rate of inflation and level of the output gap.

Exercise C

In this exercise you should keep the same fiscal policy as in exercise B.

What do you think the central bank should do with respect to all the proposed expenses? Assume the policy is known already in period 7 since it is declared before the election. Adjust the nominal money growth from period 7 and onwards. In this exercise you do not need to have the same money growth each period but are free to choose different numbers every period from period 7 and onwards. Copy the figures and describe the scenario.

Note that for this exercise there is not a correct answer. You are not assumed to suggest the "right" policy. Just to propose something reasonable, arguing for why and describe what happens.

Supply chocks

In exercise **D – F** we will investigate the impact from supply chock. In all these exercises you should have a supply chock of 2 in period 8 and zeros for supply chocks in all other periods.

Exercise D will give us a baseline, exercise E we investigates a different assumption about how politicians react according to the business cycles. In exercise F you will act as policy maker and decide both what the central bank and the government should do to deal with this supply chock.

Exercise D

Once again start with the default sheet i.e nominal money growth equal to 2 percent all periods and no demand disturbances. Assume that there is an oil price increase in period 8 resulting in an increase of the general price level of 2 percent. I.E. write 2 in the row for period 8 in the s column. After that price increase the oil price is stable i.e. there are no more positive or negative supply chocks. Copy once again the two figures in the sheet "figures" to your word document and describe the scenario with your own words.

Exercise E

We will now investigate the role of automatic stabilizers. Assume politicians do not make any active changes of the expenditures according to the business cycle but that the impact on taxes and transfers automatically makes fiscal policy expansive in the recessions. In other word assume politicians let the automatic stabilizers work. Plug in the value of -5 for the parameter a_4. Copy once again the two figures in the sheet "figures" to your word document and describe the difference from the previous exercise.

Exercise F

Assume once again that a_4 is 0. That is, politicians increase expenditure in booms just as much as to destroy the automatic stabilizers but not as much to make fiscal policy procyclical. Propose a mix of fiscal and monetary policy to meet the supply chock. Copy the figures and describe the scenario.

Note that for this exercise there is not a correct answer. You are not assumed to suggest the "right" policy. Just to propose something reasonable, arguing for why and describe what happens.