ISCTE — INSTITUTO UNIVERSITÁRIO DE LISBOA

Master in Economics

MACROECONOMICS

Problem sets: The Real Business Cycle Model

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Problem 1 – Simulating the Real Business Cycle (RBC) Model

The fundamental objective of this exercise is to get students on the computer and be able to simulate the basic Real Business Cycle Model that was discussed in classes. Remember: we do not expect students to be able by now to write down a Matlab routine in order to put the computer running the model. This is the first macro course at the postgraduate level. So, we provide the Matlab routines that can perform that task. The files for this task can be found in the folder

RBC_Simulation.zip

In order to be able to go ahead with the simulation, you should notice the following.

1. Firstly, open and run one of the routines written down by Harald Uhlig (University of Chicago). For example, you can choose "exampl1.m". Notice that in order to get all that the routine can give you, you have to press on one keyboard step after step. That is, the first time you press on a key, the routine gives you:

   (a) Impulse response functions (IRF) as a result of a technological shock (figure)

   (b) the second time you press on a key, you get the figures of IRF from a shock to the capital stock (new figure)

   (c) at the third time, the computer gives you the time series associated with various variables (new figure)

(d) at the fourth time, you get a table ("Autocorrelation Table") in the Command Window with the correlation (GDP) and cross-correlation coefficients of various variables against GDP.

(e) finally, if you click the fifth time, you will get all results in the Workspace.

2. From the previous steps you should choose what you consider more relevant to exercise number two. But notice that most of those information items will be relevant to exercise number two.

3. Sometimes, one figure is worth of more than a thousand words. So instead of using the "Autocorrelation Table" that the routine gives you (see point d above), you could get a figure for the correlation and cross-correlation. You may use the routine "Corelation_CrossCorrelation.m", which is a very simple program I made in order to give you quick and easy graphical output about correlation and cross correlations. Notice that the figure that comes out from this routine represents:

   (a) first panel: cross-correlation of capital vs output

   (b) second panel: cross-correlation of consumption vs output

   (c) third panel: correlation of output vs output

Problem 2 – Comparing the RBC model with stylized facts from business cycles

In the previous exercise, you ran the RBC model and you got some numerical information about the model's output. Now you are required to compare that output with what you did (or supposed to have done) in the first assignment, in which you collected data for the US economy and obtained the major characteristics of its business cycles.

In particular, it is expected that you should be able to compare the model's output with the output from the US economy with respect to these items:

1. Volatility

2. Procyclical and countercyclical behavior

3. Persistence (you may have doubts with respect to persistence, but here I can help).