**Assignment 2 (Labour Economic 8160)**

**Due 10pm, Wednesday, Dec. 9**

*Note: This assignment requires you to use Dynare. In addition to submitting the answers, you also need to submit the Dynare mod file and output file. Please combine all files into a single PDF file.*

Total marks: 40

1) (5 marks) You are given the volatilities of the key labour market variables from two sample periods. P1: period prior to the Great Recession (2000M12 to 2007M12), and P2: period after the Great Recession (2010M1 to 2020M2). Suppose in the data, the standard deviation of productivity (*p*) time series (logged and HP filtered) is 0.02. Define the relative volatility of a particular time series as the ratio of its standard deviation to the standard deviation of *p*. Compute the relative volatilities for the variables listed below and fill the results in Table 1. *u*: unemployment; *v*: vacancy; theta: labour market tightness; *f*: job finding rate.

Table 1: Standard Deviations for P1 and P2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | u | v | theta | f |
| S.D.: P1 | 0.108 | 0.126 | 0.230 | 0.079 |
| S.D.: P2 | 0.035 | 0.049 | 0.075 | 0.043 |
| Relative SD: P1 |  |  |  |  |
| Relative SD: P2 |  |  |  |  |

Note that all the time series are logged and HP filtered.

2) (10 marks) Use the parameters’ values discussed in class, and simulate the simple matching model using Dynare. Construct two tables: one for model predicted relative SDs; one for model predicted correlations. Discuss briefly the model’s performance in terms of generating labor market business cycle properties observed in the data. You are given the following correlation info observed in the data.

Table 2: Correlations of Key Labour Market Variables in Data (2000-07)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | u | v | theta | f |
| u | 1 |  |  |  |
| v | -0.97 | 1 |  |  |
| theta | -0.99 | 0.99 | 1 |  |
| f | -0.88 | 0.92 | 0.91 | 1 |

3) (5 marks) Use *b=0.9* instead of *b=0.4* while keeping all the other parameters unchanged. Simulate the model and compute the relative volatilities for unemployment and vacancies. Does increasing *b* lead to higher volatilities of these two variables?

4) (20 marks) You are given the following Tables 3 and 4 regarding the period after the Great Recession (P2).

Repeat questions 2) and 3) for P2. Note you will need to re-calibrate lambda (job separation rate in the model), a\_w\_ss (job finding rate in the model), and theta\_ss (labour market tightness in the model) to match the data averages (see Table 3 below)

Table 3: Sample Average (Monthly Frequency)

|  |  |  |
| --- | --- | --- |
| theta | f | s |
| 0.60 | 0.277 | 0.019 |

Note: theta: tightness; f: job finding rate; s: separation rate

Table 4: Correlations of Key Labour Market Variables in Data (2010-20)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | u | v | theta | f |
| u | 1 |  |  |  |
| v | -0.55 | 1 |  |  |
| theta | -0.84 | 0.92 | 1 |  |
| f | -0.50 | 0.42 | 0.52 | 1 |