The New Keynesian Model: Exercises

Weeks 09 and 10

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Exercise 1.

In your opinion, what are the main differences between the Real Business Cycle Model and the New Keynesian Model, in terms of their fundamental assumptions?

Exercise 2

What part do banks play in the RBC model? Discuss. Are there any differences in the role banks play in the RBC model and in the NKM? Discuss.

Exercise 3

Do you find any major inconsistency in the NKM? Discuss.

Exercise 4

Facing an exogenous shock that leads to a deep recession and high unemployment, what should public policy institutions (government and the central bank) do to correct the economy? Discuss taking into account the New Keynesian Model (NKM) and the RBC model.

Exercise 5

Consider the criticisms of the NKM raised by Estrella and Furher, which were presented with detail in the slides. Do you agree with them? Discuss.

Exercise 6

Consider the NKM with a supply shock, described by the set of equations below:

$$
\begin{aligned}
&\text{IS :} && \hat{y}_t = \mathbb{E}_t \hat{y}_{t+1} - \tfrac{1}{\sigma}\left(i_t - \mathbb{E}_t \pi_{t+1} - r^n\right) \\
&\text{Taylor rule :} && i_t = \pi_t + r^n + \phi_\pi(\pi_t - \pi^T) + \phi_y \cdot \hat{y}_t \\
&\text{AS :} && \pi_t = \kappa \cdot \hat{y}_t + \beta \cdot \mathbb{E}_t \pi_{t+1} + s_t \\
&\text{Supply shock :} && s_t = \rho_s s_{t-1} + \varepsilon_t^s \quad , \quad \varepsilon_t^s \sim N(0,1) \\
&\text{Output allocation :} && \hat{y}_t = \hat{c}_t \\
&\text{Labor supply :} && \hat{\ell}_t = \left(\tfrac{1-\sigma}{1+\gamma}\right) \hat{y}_t \\
&\text{Technology :} && \hat{a}_t = \left[1 - \tfrac{\alpha(1-\sigma)}{1+\gamma}\right] \hat{y}_t
\end{aligned}
$$

- **(a)** Write the model ins state space representation.
- **(b)** Consider the following set of parameters:

σ	ρ_u	μ	ψ	β	π^T	r^n	ϕ_π	ϕ_y	α	γ
0.75	0.75	0.8	1.2	0.98	0.0	0.0	0.5	0.5	0.6	0.6

  Simulate this model's version in a Pluto notebook. For this task, you can create a new Pluto notebook from scratch (which we do not recommend) or use a copy of the notebook used in class to simulate an NKM with a demand shock (this is the option we strongly suggest). Using an existing notebook that has already been formatted for our course is a much easier and safer option for solving exercises and for future assignments and tests.

- **(c)** Do you find any major inconsistency in the results of your simulation? Discuss.

Exercise 7

Take into account the NKM with a shock to monetary policy decisions. This version of the model is presented below:

$$
\begin{aligned}
&\text{IS :} && \hat{y}_t = \mathbb{E}_t \hat{y}_{t+1} - \tfrac{1}{\sigma}\left(i_t - \mathbb{E}_t \pi_{t+1} - r^n\right) \\
&\text{Taylor rule :} && i_t = \pi_t + r^n + \phi_\pi(\pi_t - \pi^T) + \phi_y \cdot \hat{y}_t + e_t \\
&\text{AS :} && \pi_t = \kappa \cdot \hat{y}_t + \beta \cdot \mathbb{E}_t \pi_{t+1} \\
&\text{Monetary policy shock :} && e_t = \rho_e e_{t-1} + \varepsilon_t^e \quad , \quad \varepsilon_t^e \sim N(0,1) \\
&\text{Output allocation :} && \hat{y}_t = \hat{c}_t \\
&\text{Labor supply :} && \hat{\ell}_t = \left(\tfrac{1-\sigma}{1+\gamma}\right) \hat{y}_t \\
&\text{Technology :} && \hat{a}_t = \left[1 - \tfrac{\alpha(1-\sigma)}{1+\gamma}\right] \hat{y}_t
\end{aligned}
$$

- **(a)** Write the model ins state space representation.

- **(b)** Consider the following set of parameters (the same as in Exercise 6):

σ	ρ_u	μ	ψ	β	π^T	r^n	ϕ_π	ϕ_y	α	γ
0.75	0.75	0.8	1.2	0.98	0.0	0.0	0.5	0.5	0.6	0.6

  Simulate this model version in a Pluto notebook.

- **(c)** Do you find any major inconsistency in the results of your simulation? Discuss.