Master in International Economics and Public Policy 1st semester

Advanced Macroeconomics

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Tutorial 12: Unemployment

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1. Compute the change in the unemployment rate over time (differential equation in $u(t)$) as a function of the separation rate λ, and the job finding rate $p(\theta)$.

2. Find the optimal wage following Nash bargaining between the firm and the worker, express the wage in terms of the unemployment benefit b, the revenue of the firm y, and the expected cost of maintaining a vacancy $\theta(t) k$.

   Use the following results:

$$\dot{U}(t) = \rho U(t) - b - p(\theta(t))(W(t) - U(t))$$
$$\dot{W}(t) = \rho W(t) - w(t) - \lambda(U(t) - W(t))$$
$$\dot{V}(t) = \rho V(t) + k - q(\theta(t))(J(t) - V(t))$$
$$\dot{J}(t) = \rho J(t) - (y - w(t)) - \lambda(V(t) - J(t))$$

3. Derive the second differential equation of the classical matching approach to unemployment describing the evolution of labour market tightness. Draw the phase diagram for the equilibrium path of market tightness as a function of the unemployment rate, i.e. when $\dot{\theta} = 0$ and $\dot{u} = 0$. Give an interpretation.

   Use your answer from *(2)* above, as well as the differential equation of J given in *(2)*.