

SECOND SESSION EXAM

I – PROBLEM - RBC MODEL

Consider a simple RBC model. The representative household maximizes

$$E_t \sum_{i=0}^{\infty} \beta^i u(c_{t+i}, 1 - n_{t+i}),$$

where c is consumption and n is time spent in production. The household faces a budget constraint given by

$$k_{t+1} = w_t n_t + r_t k_t + (1 - \delta)k_t - c_t,$$

rents capital and sells labor services to firms. Firms maximize profits, subject to a constant returns to scale technology for producing output, given by

$$y_t = e^{z_t} F(n_t, k_t),$$

where $z_t = \rho z_{t-1} + \varepsilon_t$, and $0 \leq \rho \leq 1$.

1 – Write down the equilibrium conditions for this economy (assume all markets are perfectly competitive).

2 – Assume

$$u(c_t, 1 - n_t) = \frac{c_t^{1-\sigma}}{1-\sigma} - \Psi \frac{n_t^{1+\eta}}{1+\eta} \quad \text{and} \quad F(n_t, k_t) = n_t^\alpha k_t^{1-\alpha}.$$

For each of the unknown parameters $(\alpha, \rho, \delta, \beta, \sigma, \eta, \Psi)$, briefly discuss how you might calibrate their value.

3 – Let's consider three characteristics of actual business cycles *(i)* output displays persistent fluctuations, *(ii)* employment and output are highly correlated, *(iii)* real wages are very weakly related to output. Are there parameter values for which the model of this question can account for these business cycle “facts”? If so, are these reasonable values for the parameters (i.e., are they the ones you would obtain from the calibrations described the preceding question)? If they are not, briefly discuss how might you modify the model to better match these three stylized facts?

II – QUESTION

The slope of the Aggregate Supply curve.