

Quiz 1 — The Solow–Swan model

The notations coincide with the ones in the lecture notes.

Questions	Answers
1. What is the share of capital income in total income?	☐ 1/3. ☐ α . ☐ It depends on the number of inputs in the production function. ☐ 2/3.
2. How does capital evolve between dates t and $t + dt$?	☐ $K_{t+dt} - K_t = C_t$. ☐ $K_{t+dt} - K_t = I_t dt - \delta K_t dt$. ☐ $K_{t+dt} - K_t = C_t dt - \delta K_t dt$. ☐ $K_{t+dt} - K_t = sY_t - \delta K_t$.
3. The golden rule states that:	☐ $F(k_t) = \delta$. ☐ $f'(k_t) = \delta + n + g$. ☐ $f'(k_t) = \delta$. ☐ $F'(k_t) = \delta + n + g$.
4. The steady state is defined as the situation in which:	☐ There are no more flows in the economy. ☐ Consumption is non-zero and maximized. ☐ All endogenous variables are non-zero and growing at constant rates. ☐ All exogenous variables are non-zero and growing at constant rates.
5. In the Solow–Swan model, at the steady state:	☐ Output is constant. ☐ Capital flows are constant. ☐ Growth depends on the saving rate. ☐ The government can change the saving rate to move to a different steady state.

Questions	Answers
6. Which property/properties of the production function ensure(s) convergence to a unique steady state in the Solow–Swan model?	☐ $F(K,0)=F(0,L)=0$. ☐ F is strictly increasing in both inputs. ☐ F has constant returns to scale. ☐ $F_K > 0, F_L > 0, F_{K,K} < 0, F_{L,L} < 0$.
7. In the Solow–Swan model, which of the following assumptions are made?	☐ $A(t)$ is exogenous. ☐ $\forall t, I_t = sY_t$. ☐ There is no government spending. ☐ The economy studied is closed and does not trade.
8. In the Solow–Swan model, studying the convergence of κ to its steady state is sufficient because of:	☐ The proportionality assumption made on aggregate demand. ☐ The endogeneity of $A(t)$. ☐ The degree-one homogeneity of the production function. ☐ Capital per head.
9. In continuous-time models:	☐ I can differentiate state variables w.r.t. time because they are necessarily continuous. ☐ The derivative of a stock w.r.t. time is a flow. ☐ I can differentiate control variables w.r.t. time because they are necessarily continuous. ☐ The derivative of a flow w.r.t. time is a stock.
10. What does the Lucas critique say and/or imply?	☐ A model cannot predict the reaction of an economy to a shock if it is based solely on past correlations. ☐ A model needs closed-form solutions to deliver predictions of aggregates following a shock. ☐ The Solow–Swan model has a unique equilibrium and therefore cannot predict the reaction of the economy to a shock. ☐ The Solow–Swan model with an exogenous saving rate does not capture changes in consumer behavior and therefore cannot be used to study the reaction of an economy to a shock.