

# Macroeconomics II - Problem set 6

## Topic 3 - Second Block

### Topic 3: Capital accumulation, technology, and the population growth rate.

1. Consider the Solow Growth Model where the aggregate production function is given by  $Y_t = AK_t^{0.3}L_t^{0.7}$ . Assume also that the saving rate is  $s = 0.25$ , that the population growth rate is  $n = 0.02$ , that the depreciation rate is  $\delta = 0.12$ , and that the TFP is  $A = 1$ . Then,
  - A) Obtain the per capita values for the capital, output, and consumption in the Steady State.  $(k^*, y^*, c^*)$ .
  - B) Assume now that the economy is at period  $t = 0$ , and that the capital per capita is  $k_0 = 2.07$ . Obtain the per capita values for the capital, output, investment, and consumption at period  $t = 1$ .
  - C) Obtain the growth rate of per capita output at period  $t = 1$ .
2. Consider the Solow Growth Model, and assume that the economy is located at its Steady State. Graphically, analyze the effect, on the steady state value of per capita output, of the following changes:
  - A) An increase in the depreciation rate.
  - B) An increase in the saving rate.
  - C) An increase in the TFP.
  - D) An earthquake that destroys 50 percent of per capita capital.
3. Consider the Solow Growth Model where the aggregate production function is given by  $Y_t = AK_t^\alpha[(1 - u_t)L_t]^{(1-\alpha)}$ , where  $u_t$  is the unemployment rate. Then,
  - A) Obtain the output per worker
  - B) Obtain the capital per capita in the steady state.