Macro Theory
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# Problem Set #4 - 2012

1. Consider an economy described by the following production function $Y = 100*K^{.3}L^{.7}$ and the remaining equations of Model 1G.
   a. Rewrite the production function in per worker terms.
   b. Assuming no population growth or technology growth, find the steady-steady levels of income per worker, capital per worker, and consumption per worker.
   c. Determine the savings rate that yields the highest steady state level of consumption per worker.
   d. Determine the amounts paid to laborers and capitalists if both labor and capital markets are competitive.

2. Replace the production function in Model 1G with $Y = K^{.5}L^{.7}$. Redo parts a – d of question 1 and indicate whether the results generated for part d are feasible.

3. Technological progress
   a. Explain why improvements in technological progress might have more influence on the long run economic growth rate than growth in the stock of capital.
   b. The form of technological progress incorporated in the production function influences the magnitude of its effect on the long run economic growth rate. Explain.

4. Consider a Solow-type growth model with the following production function.
   $\mathbf{Y_t = (K_t)^{1/3}(L_t)^{2/3}}$ where t is the time period so $K_t$ – the capital stock in time t
   This production function features capital augmenting technical change
   $K_t = Tech_t*K_o$ and $K_o$ = initial stock of capital

   Assume that the growth rate of labor is endogenous, that technology grows at 2% per year, that the savings rate equals 10%, and that the depreciation rate equals10%.

   a. Write the production function in terms of output per unit of labor.
   b. Determine the steady-state path of output per unit of labor.
   c. Determine the capital-output ratio for this economy. Does it vary over time?
   d. How fast does output per labor grow in this model? (Explain why.)
   e. If the depreciation rate were to double what would be the impact on output per unit of labor? On output?