Advanced Macroeconomics

Leopold von Thadden
Winter Term 2013/14
Problem Set 7:
Solow Model

Problem 1: Solow-model and golden-rule discussion
Consider the central steady-state equation in $k^{\#}$ characterizing the Solow-model (as derived in the Lecture Notes):

$$s \cdot f(k_{So}^{\#}) = (\delta + \mu_{N^{\#}}) \cdot k_{So}^{\#}$$

a) Find a relationship between $c_{So}^{\#}$ and $k_{So}^{\#}$.

b) Let $k_{GR}^{\#}$ denote the golden-rule level of the capital stock per unit of effective labour. Show that $\frac{\partial c_{So}^{\#}}{\partial s} > 0$ if $k_{So}^{\#} < k_{GR}^{\#}$.

c) Consider a permanent increase in the savings rate (starting out from a steady-state constellation characterized by $\frac{\partial c_{So}^{\#}}{\partial s} > 0$). Find a graphical representation of the time paths of $c_t^{\#}$ (ie consumption per unit of effective labour) and c_t (i.e. per capita consumption) before and after the shock occurs.

d) Consider the Cobb-Douglas function

$$f(k^{\#}) = (k^{\#})^{\alpha}$$

Let $\alpha = 1/3$ and $s = 0.15$. Show that these values imply $\frac{\partial c_{So}^{\#}}{\partial s} > 0$.