

## Problem 1 (50%)

Consider a Solow model with aggregate production function  $Y = AK^\alpha (hL)^{1-\alpha}$ , where  $A$  is productivity,  $K$  is capital,  $L$  is employment and  $h$  is human capital. There is no population growth or productivity growth.

1. Derive the intensive form of the production function.
2. Human capital in the economy doubles. What is the impact on income per capita in the steady state? Consider the cases
  - (a) The capital stock is fixed (i.e. no capital accumulation).
  - (b) The capital stock evolves according to  $\dot{K} = \gamma Y - \delta K$ , where  $\delta$  is the depreciation rate and  $\gamma$  is the savings rate. Explain why your answer differs under a) and b).
3. The savings rate  $\gamma$  in the economy increases.
  - (a) Describe with words and a diagram what will happen to income per capita in the short run and long run.
  - (b) Do we have empirical evidence for the relationship you found in a)?
4. Consider the same increase in the savings rate  $\gamma$ . Is it true that consumption per capita will always increase? Discuss.

## Problem 2 (50%)

Consider an economy with two sectors, Metals (M) and Agriculture (A). There are two factors of production, labor (L) and capital (K). Labor is mobile across sectors but capital is not. All markets are perfectly competitive,

standard assumptions about the production function hold, and trade is free. Agricultural products are imported while metals are exported.

1. Lobbyists from the agricultural sector demand an import tariff on agricultural goods. Analyze the impact on employment in M and A, real wages and the real return to capital in M and A. Explain the economic mechanisms and why some groups lose and others win.
2. The lobbyists state that an import tariff will increase overall living standards because it will help the agricultural sector become more productive, i.e. they appeal to infant industry protection. Discuss whether this claim is true or false, or under which circumstances it is true/false.