

University of Minnesota  
Department of Economics  
Econ 4331W: Economic Development  
Practice Midterm - Summer 2014 (Uy)

## 1 Short Answers.

1.1 What does Olson believe accounts for why some countries are rich while other remain poor? Explain.

1.2 What variables determine the steady state output per worker in the Solow model? How do they affect the steady state level of output per worker? Explain.

1.3 Consider regressing final year output per capita on the average savings rate and average population rates. What sign does one expect for the coefficients of the average savings rate and average population rate?

## 2 True of False.

- \_\_\_\_\_ 1. Higher population growth is why some countries are richer than others.
- \_\_\_\_\_ 2. The return to skilled labor relative to unskilled labor has fallen over time.
- \_\_\_\_\_ 3. Population growth leads to fewer ideas hence lowering both output and growth.
- \_\_\_\_\_ 4. Mankiw-Romer-Weil show that adding human capital improves the fit of the Solow model.
- \_\_\_\_\_ 5. Lucas believes that the world income distribution will be less dispersed in another 100 years.
- \_\_\_\_\_ 6. GDP growth results in changes to the levels of GDP as well.
- \_\_\_\_\_ 7. Capital accumulation changes growth rates in the Solow model.
- \_\_\_\_\_ 8. The richest countries now have always been the richest countries in the world.
- \_\_\_\_\_ 9. Olson believes that big bills are never left on the sidewalk.
- \_\_\_\_\_ 10. Jones does not believe institutions and policy reform are important for growth.

### 3 Solow Model

Consider the standard Solow growth model with aggregate output given by

$$Y = K^\alpha (AL)^{1-\alpha}, \quad (1)$$

where  $K$  denotes aggregate capital,  $L$  labor (or population) and  $A$  is the technology. Capital depreciates at the rate  $d$  and consumers save a fraction  $s$  of their total income. The economy is closed, so savings equals investment and capital evolves according to

$$\dot{K} = sY - dK. \quad (2)$$

Population and technology grow at constant rates  $n$  and  $g$  respectively, that is

$$\frac{\dot{L}}{L} = n \quad \text{and} \quad \frac{\dot{A}}{A} = g. \quad (3)$$

Denote capital and output per capita by  $k = K/L$  and  $y = Y/L$ . Denote capital and output per efficient units of labor by  $\tilde{k} = K/AL$  and  $\tilde{y} = Y/AL$ .

Suppose the government decides to tax both labor and capital income so that instead of receiving  $wL + rK = Y$ , consumers receive  $(1 - \tau)wL + (1 - \tau)rK = (1 - \tau)Y$  where  $\tau$  is the tax rate. What is the effect of this tax on output per worker in the short and long run? Justify your answer.

### 4 Mankiw-Romer-Weil's Augmented Solow Model

Consider an augmented Solow growth model with aggregate output given by

$$Y = K^\alpha H^\alpha (AL)^{1-2\alpha}, \quad (1)$$

Human capital is accumulated like physical capital in the standard model so its law of motion follows

$$\dot{H} = sY - dH. \quad (2)$$

As before, we have that physical capital evolves according to

$$\dot{K} = sY - dK. \quad (2)$$

Population and technology grow at constant rates  $n$  and  $g$  respectively, that is

$$\frac{\dot{L}}{L} = n \quad \text{and} \quad \frac{\dot{A}}{A} = g. \quad (3)$$

Solve the model for the path of output per worker along a balanced growth path as a function of  $s, n, g, d, \alpha, \beta$ . Justify your answer.