UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 202B
Spring 2007
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Problem Set 2
Due in lecture Thursday, February 1

1. In the usual Solow model, people consume a constant fraction of their income: $C(t) = (1-s)Y(t)$. Suppose instead, however, that consumption depends on income and on wealth. Specifically, suppose $C(t) = (1-s)Y(t) + aK(t)$, where a is a positive parameter. Assume that, as in the usual Solow model, investment is the difference between output and consumption.

How, if at all, does this change in the model affect the basic diagram for the Solow model -- that is, the diagram showing actual and break-even investment per unit of effective labor as functions of capital per unit of effective labor?

2. Saving rates may be higher at higher levels of income. This problem asks you to investigate the consequences of this possibility for economic growth.

Consider the Solow model without technological progress. For simplicity, assume that A is one, so that y and k are income per worker and capital per worker.

Now suppose that, in contrast to our usual assumptions:

-- The saving rate is zero if income per worker is less than some critical level, $f(\tilde{k})$.

-- The saving rate is s (where $s > 0$) if income per worker exceeds $f(\tilde{k})$.

Finally, assume that $sf(\tilde{k})$ is greater than $(n + \delta)\tilde{k}$.

a. Describe how, if at all, this change affects our usual diagram for the Solow model -- that is, the diagram showing actual investment per worker and break-even investment per worker as functions of capital per worker.

b. Describe what the behavior of output per worker over time will be if:

i. The initial level of capital per worker, k(0), is between 0 and $\tilde{k}$.

ii. The initial level of capital per worker, k(0), is slightly greater than $\tilde{k}$.

3. Suppose output in country i is given by

$$Y_i = A_i Q_i e^{\phi E_i} L_i, \qquad (*)$$

where E_i is each worker's years of education, Q_i is the quality of education, and the rest of the notation is standard. Higher output per worker raises the quality of education. Specifically, Q_i is given by $B_i[Y_i/L_i]^{\gamma}$, $0 < \gamma < 1$, $B_i > 0$.

Our goal is to decompose the difference in log output per worker between two countries, 1 and 2, into the contributions of: (1) Education; and (2) Everything else. We have data on Y, L ,and E in the two countries, and we know the values of the parameters ϕ and γ.

(a) Explain in what way attributing amount $\phi(E_2 - E_1)$ of $\ln(Y_2/L_2) - \ln(Y_1/L_1)$ to education and the remainder to everything else would understate the contribution of education to the difference in log output per worker between the two countries.

(b) What would be a better measure of the contribution of education to the difference in log output per worker?

(OVER)

4. If the citizens of a country start to spend more years in school:
A. Output will be higher in both the short run and the long run.
B. Output will be higher in the short run but may be either higher or lower in the long run.
C. Output will be lower in the short run and higher in the long run.
D. Output will be lower in the short run but may be either higher or lower in the long run.

EXTRA PROBLEMS (NOT TO BE HANDED IN/ONLY SKETCHES OF ANSWERS WILL BE PROVIDED)

5. Romer, Problem 1.9.

6. Romer, Problem 1.10.

EXTRA EXTRA PROBLEM (NOT TO BE HANDED IN/NO ANSWER WILL BE PROVIDED)

7. Romer, Problem 1.12.