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Spring 2026

Econ 252 Homework Exercise #3
The Solow Growth Model

Due 10:00pm via Glow,
Tuesday, April 14.

1. Setting up the model. *(20 points).* Review the full setup for the "stripped down" Solow growth model. As much as you can from memory, describe the underlying behavioral assumptions of the model and then show how you can convert these to per capita notation form. Next, show how you can derive the steady state condition and golden rule conditions for the model. Also, show how you can depict the steady state and the golden rule conditions in a diagram in terms of per capita notation. As usual, the more that you can answer this first question on the basis of your memory and understanding of the model after reviewing your notes rather than relying on your notes directly, the more useful this exercise will be for you.

2. An example of how to use the model numerically. *(40 points).* Imagine that an econometrician has estimated that for a given economy real per capita income is approximately 1.8 units (these could be tens of thousands of dollars), households consume 80% of their disposable income, and two thirds of all income goes to labor. The rate of depreciation of the capital stock is 5% per year. Imagine hypothetically that technology is not growing in this economy, so the technology index can be set to 1, and likewise imagine that the share of government spending and taxes is zero. Finally, labor is also not growing and can be treated as constant. Based on this information, show how you can use the model that you have described in (1) above to compute values for the following: *(i)* The current capital labor ratio *(ii)* The percentage by which per capita output will increase or decrease in the long run as the economy moves to the steady state equilibrium. *(iii)* Imagine households could choose their marginal propensity to consume. In this case, to what value should they change their marginal propensity to consume if their objective is to consume as much as possible in the long run steady state. *(iv)* The value of per capita output and consumption once households have chosen the marginal propensity to consume as described in (iii).

3. Using the extended Solow model analytically for basic policy experiments. *(20 points).* Consider the extended version of the Solow model with a government sector and with labor and technology growing. Imagine that the economy is already in steady state equilibrium and the annualized real interest rate is currently 6%. The population is growing at 3% per year and capital is depreciating at 5% per year. Now consider the consequences of having the size of the public sector as a fraction of the economy grow by a small amount. In other words, imagine that both government spending and taxes rise by a small (but unknown) equal amount. Show how you can tell analytically whether per capita incomes will rise or fall in moving to the new steady state, and likewise show how you can tell whether private per capita consumption will rise or fall in moving to the new steady state and similarly whether national per capita consumption will rise or fall in moving to the new steady state. Demonstrate your results in terms of an analysis of both the diagrams and equations of the model, and as usual, provide an intuition for why your answer makes sense.

4. General discussion questions.

a. *(10 points).* Explain the distinction between a steady state equilibrium and the more standard concept of an equilibrium. Explain as well as you can why it is the case that the economy automatically moves the steady state equilibrium in the very long run. In other word, what is the adjustment mechanism that returns the economy back to the steady state in the very long run? Use whatever equations and diagrams might be appropriate to support your intuition for this.

b. *(5 points).* Explain what the golden rule concept is about. Explain why it is potentially such an important concept for inter-temporal tradeoffs in resource allocation. Again, use whatever equations and diagrams might be appropriate to support your intuition for this.

c. *(5 points).* For the extended Solow growth model, explain why it makes sense that in per capita efficiency units, an increase in the growth rate of technology leads to a decrease in per capita efficiency output. Explain also why it makes sense that the growth rate of per capita output will increase in the new steady state, but the growth rate of per efficiency output will be unchanged. Again, use whatever equations and diagrams might be appropriate to support your intuition for this.