

Sample Questions for Midterm

The midterm exam will have five questions in this general format. Because the sample questions are a study guide as well, the actual exam questions may be shorter. The sixth question is added for study.

1. Use the basic Solow growth model to answer the following questions when the economy is initially in steady state. Explain each of your answers.

- a) How does the growth rate depend on how far a country's economy is from the steady state?
- b) How does the loss of 10 percent of a country's population to a plague affect the growth rate of per capita output?
- c) How does the growth of GDP per capita respond to an increase in the investment rate from $\bar{s}$ to $\bar{s}'$?

2. This problem examines how an increase in labor force participation for country affects economic growth.

- a) Write down a version of the Solow growth model when the labor force is a fraction α of the population. Use $\bar{L}$ for population.
- b) Suppose α grows at a constant rate, g_α . How does this steady increase affect the growth rate of per capita income?

Extra math part: can you write the growth accounting equation to include g_α ?

- c) Explain how your answer to part b may help explain high growth rates in some developing countries of East Asia. Why is this source of growth necessarily temporary?

3. In this problem, you will explain the Romer model and its implications.

- a) Start by writing down the model and naming each relationship (for example, one is the production function and another is the resource constraint).
- b) Discuss the technological knowledge (ideas) production function answering the following questions. How does current knowledge enter the production of new knowledge? In this model, does current knowledge raise the productivity of labor used to

produce new ideas? Explain some of the reasoning behind this model. You can use an example to explain if you like.

c) How is the growth rate determined in this economy? Find the growth rate.

d) How does an increase in the share of employment in research and development affect the growth rate and the output of goods?

4. Over the last generation, real wages for college educated workers rose much faster than for workers who at most completed high school.

a) Explain this earnings differential in terms of human capital accumulation and worker productivity.

b) Suppose the digital revolution raised labor productivity for college educated workers more than it did for less educated workers. Explain how this could explain the rise in the earnings differential?

c) The ratio of real earnings for college graduates to those for workers who did not attend college is larger in Mexico than in the U.S. Suggest an explanation for this finding (hint: consider how access to college education affects the relative supply of well-educated workers).

5. This question adds money to the model of the long run.

a) Use the quantity theory of money to explain how the growth rate of the money supply determines long-run inflation.

b) How does a rise in the growth of total factor productivity affect inflation? Explain.

c) Suppose a government can no longer borrow and voters will not accept higher taxes. Can it use money growth to finance its expenditures? (Hint: define and explain seignorage.)

Extra study question

6. This question concerns the combined Solow-Romer growth model.

a) Explain how the Solow model can be combined with the Romer model. Write out the equations needed and label each relationship.

b) Explain the long-run balanced growth path for this economy. How is the long-run growth rate determined? Explain why we say this is a 'balanced' growth path?

c) How does an increase in the investment rate affect the balanced growth rate of per capita output?

d) Explain the transition dynamics following an increase in the investment rate. That is, how does the economy adjust from an initial balanced growth path to a new balanced growth path?