Economics 103, Economic Growth Module

Winter 2020

Bates College

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To complete this assignment, you should:

1. Watch the recorded lecture on Economic Growth. This will provide you with much of the necessary background.

2. Read this background on "what causes long-run economic growth" by Yi Chen from the St. Louis Fed.

3. Here is a summary of the literature on how education affects growth.

4. Finally, here is a brief biography of Robert Solow from the IMF which describes some of the background behind his model.

Instructions: Answer all parts of all questions. You are expected to independently craft your answers. Answers which incorporate current macroeconomic data are especially encouraged. The assignment is due by 11:59 PM on Monday, April 20.

To complete this assignment, you should:

1. True or False? A more generous welfare state (*e.g.* longer unemployment benefits, more sick and parental leave) reduces both potential output and societal welfare.

Sample Answer: It is true that, in the long run, more generous welfare benefits typically reduce steady state output. This is best seen in the labor market where labor supply is reduced, reducing the equilibrium levels of employment and output.

It is important to note that this is a long-run result. In a depressed labor market (like the one of April 2020), these labor supply effects are small. It is quite possible that extending unemployment benefits increases aggregate demand and thus short-run output.

Social welfare is a subjective variable that depends on many factors besides GDP or GDP growth. A more generous welfare state likely reduces the economic risk faced by individuals. It is reasonable to see this reduction as a tradeoff with lower output. Whether it is worth it is subjective.

2. Why do countries with higher savings rates, all else equal, have higher levels of output in the long run?

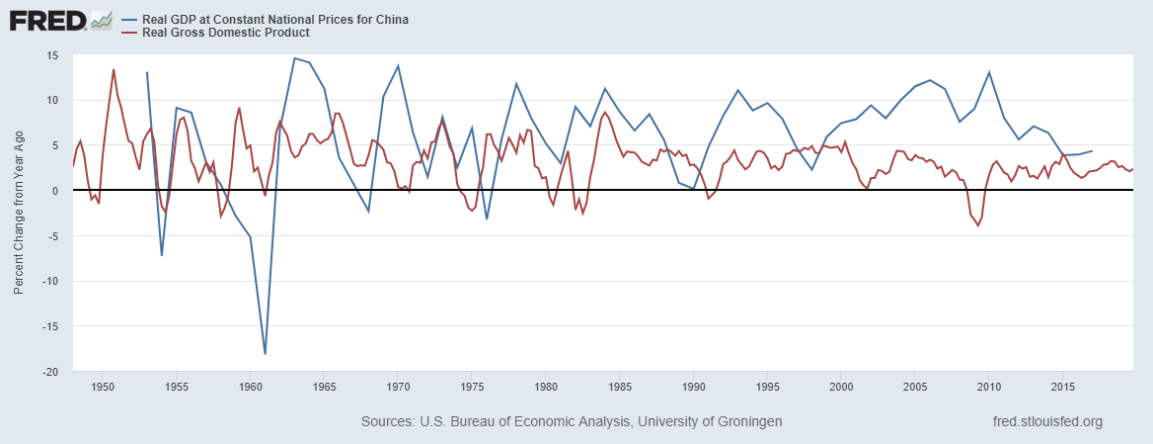
Sample Answer: In a closed economy, with no government, $S = I$. Higher savings thus leads to more investment and capital formation. Because capital is an input in production, output increases in the long-run.

This point can also be illustrated in the Solow Model. We considered an example of a higher savings rates shifting the savings function upwards and increasing steady state output.

3. How have Chinese and U.S. GDP growth rates compared over the past few decades?

Sample Answer: Figure 1 shows that real Chinese growth has averaged 7-8% since 1990 while real U.S. GDP growth has averaged between 2-3%.

Figure 1: Real GDP growth for the U.S. and China



4. Is it likely that Chinese growth will lead to its per-capita income to eventually exceed that of the United States?

Sample Answer: No, it is not. The literature on economic growth instead predicts *convergence.* This means that, all else equal, poorer countries grow faster than richer countries. This allows them to catch up. As they catch up, however, their growth slows so that they do not pass richer countries level of income unless some other factor (*e.g.* a higher savings rate) allows them to do so.

5. Chen (2015) breaks growth down into three categories: total factor productivity, labor force participation, and capital. Which of these three factors drove the largest share of U.S. economic growth between 2008 and 2013?

Sample Answer: Of the three, capital has been the most important, leading to about 1% annual growth in the United States. Total factor productivity and labor have each driven about 0.5% of annual growth.

6. If a country has previously experienced strong growth from one of the three factors discussed in Chen (2015), which source makes strong growth most likely to continue into the future?

Sample Answer: Chen (2015) shows that past growth from total factor productivity is most correlated with strong future economic growth. This suggests that total factor productivity growth might (causation is difficult to untangle) be the most sustainable source of growth in a developed economy like the United States.

7. How does a better educated population affect the capital stock, total factor productivity, and economic growth?

Sample Answer: Education is one part of total factor productivity (as are technology, institutions, etc.). We considered an example of higher total factor productivity in the context of the Solow Model. Both the production function and the savings function shift up, the latter because it is simply a scaled down version of the former. This increases long-run output. Intuitively, total factor productivity is an input and as it increases, so does output.

8. Does educational quantity (years of schooling) or educational quality (test scores) appear to have a bigger effect on economic growth?

Sample Answer: Hanushek and Wobmann (2010) provide evidence that educational quality is more predictive than education quantity. They actually find that, independent of quality, more years of schooling does not increase growth at all.

9. Education and growth are correlated. Does this prove, or suggest, that higher levels of education cause higher rates of growth?

Sample Answer: This is another question distinguishing between correlation and causation. It is possible that education causes growth, Given good economic theory showing this, this correlation may be suggestive, but not definitive proof, of a causal relationship.

It is also possible, that richer countries are simply able to afford better and longer education systems. this could also produce this correlation but suggests that the causation goes in the other direction. More sophisticated empirical analysis may be used to better understand these relationships.

10. Why is total factor productivity also known as the "Solow Residual?"

Sample Answer: Robert Solow estimated what share of output could be explained by differences in capital and labor. What is left is known as a "residual." In the Solow Model, this is also total factor productivity.