Florida International University
Department of Economics
Intermediate Macroeconomics (ECO 3203)

Instructor: Andra Hiriscau

Summer B, 2019

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Class Hours: Tu-Th 10:50 am- 2:10 pm

Class Room: ACH 3- 205

Course Description and Purpose

The primary goal of this course is to help you develop a consistent way of thinking about some key macroeconomic phenomena such as GDP, inflation and unemployment. We will cover the development of modern macroeconomics models by employing graphs and equations. We will try to address the following type of questions:

- What drives economic growth? What explains the large differences in economic performance across different countries of different times? What is the role of policy in economic growth?

- What are the determinants of consumption and saving? How do they matter for both the long run and the short run?

- Why are people unemployed? What should the government do about unemployment?

- Why does macroeconomic activity fluctuate? How do different shocks and policies affect employment, output, investment and consumption over the business cycle?

Required Materials

- Mankiw, N. Gregory (2019) Macroeconomics, *10th edition published by Worth Publishers* (ISBN-10: 1319105998; ISBN-13: 978-1319105990). You can use previous editions, but not older than 7th edition.

Prerequisites/Corequisites

Prerequisites: Students should have completed Principles of Macroeconomics (ECO2013) before enrolling in this class.
Students are also assumed to be familiar with basic algebra and graph representation.

Course Objectives

There are four units in this class: Introduction to Macroeconomics, Classical Theory, Growth Theory and Business Cycles.

- Upon completion of the unit on <u>Introduction to Macroenomics</u> successful students will be able to :

  - Distinguish between sticky and flexible prices, Real GDP and Nominal GDP
  - Summarize the GDP components
  - Compare CPI to the GDP and PCE deflators

- Upon completion of the unit on <u>Classical Theory</u> successful students will be able to :

  - Describe the circular flow of dollars through the economy. Illustrate how income is divided among factors of production and how factor prices depend on factor supplies
  - Discuss how fiscal policy alters the allocation of output and how it affects the equilibrium interest rate
  - Understand what money is and how central banks affect its supply
  - Explain the roles of monetary and fiscal policy in causing and ending hyperinflation
  - Define the terms real variable, nominal variable and money neutrality
  - Distinguish between frictional unemployment and structural unemployment

- Upon completion of the unit on <u>Growth Theory</u> successful students will be able to:

  - Summarize, the Solow Growth model, how saving and population growth determine the economy's steady-state capital stock and its steady-state level of income per person
  - Give example of an institutional difference between countries that might explain the differences in income per person

- Upon completion of the unit on <u>Business Cycle</u> successful students will be able to:

  - Understand the difference between how the economy works in the long run versus short run
  - Show the role of monetary policy
  - Summarize the Keynesian basic model of income determination
  - Describe why the IS curve slope downward and why LM curve slope upward
  - Discuss the IS-LM model which is a general theory of the aggregate demand for goods and services
  - Explain the differences between demand-pull inflation and cost-push inflation

Course Structure

Class Structure

The class is meeting twice a week for 3 hours and 20 minutes, split by two breaks of 10 minutes each. Unannounced quizzes will be given either at the beginning or ending of a class.

Grading Policy

I reserve the right to curve the scale dependent on overall class scores at the end of the semester. Any curve will only ever make it easier to obtain a higher letter grade. Incomplete will be given only under exceptional circumstances. Any kind of emergency has to be documented to receive an "I". Doing poorly in the course will not be considered a valid reason. The grade will be calculated using the following proportions:

- **30%** of your grade will be determined by in class midterm exam

- **20%** of your grade will be determined by homework

- **10%** of your grade will be determined by unannounced quizzes and class participation

- **40%** of your grade will be determined by final exam

$$Final\ Grade = (Midterm * 0.3) + (Homework\ Average * 0.2) + (Quizzes * 0.1) + (Final\ Exam * 0.4)$$

Table 1: Sample Grading Scheme

Letter	Range	Letter	Range	Letter	Range
A	95 or above	B	83- 86 %	C	70- 76 %
A-	90-94 %	B-	80- 82 %	D	60- 69 %
B+	87-88 %	C+	77- 79 %	F	59 or less

- Class participation is not equivalent to class attendance; it implies that you participate actively in the class discussions. Actively talking and thinking economics may be the most important element to further your economic intuition.

- You can miss/drop the "lowest score" homework assignment.

- Quizzes are unannounced and constitute of 10-15 min short questions related to the material taught in class. It should encourage you to keep up with the material. You can miss/drop the "lowest score" quiz. There would be no make-up for the quizzes. You need to download the appplication Kahoot Mobile App in order to be able to take the quizzes.

- Exams are going to be composed of both multiple choice questions and problems. Final exam is cumulative and given according to the University rules during Finals Week.

- Class attendance will be taken with FIU Check-In. You can download FIU Check- In App.

Schedule and weekly learning goals

The schedule is tentative and subject to change. The learning goals below should be viewed as the key concepts you should grasp after each week, and also as a study guide before each exam, and at the end of the semester. Midterm exam will test on the material that was taught up until the exam date. The homework and quizzes in the second half of the semester tend to build on the concepts in the first half of the semester, so it is important to at least review those concepts throughout the semester. The final exam is cumulative.

Week 1. Introduction to Macroeconomics; Classical Theory: National Income

- Readings: Chapter 1, 2 and 3

- Concepts: Introduction: gross domestic product, consumer price index, unemployment rate; Classical Theory: basic classical model of national income, consumption, investment, government purchases and interest rate.

Week 2. Classical Theory: Monetary System, Inflation, Unemployment

- Readings: Chapter 4, 5 and 7

- Concepts: the quantity theory of money, inflation tax, Fisher effect, social cost of inflation, and the causes and costs of hyperinflation; dynamics of the labor market, natural rate of unemployment, job search, minimum wage laws and efficiency wages.

- Homework 1 due June 25th

Week 3. Growth Theory: Economics Growth I and Economic Growth II

- Readings: Chapter 8 and 9

- Concepts: Solow growth model, capital accumulation, population growth; technological progress. It uses the model to discuss growth experiences around the world as well as public policies that influence the level and growth of the standard of living.

- Homework 2 due July 2th

Week 4. Business Cycle Theory: Economic Fluctuations and Aggregate Demand I

- Readings: Chapter 10 and 11

- Concepts: short run fluctuation in economic activity, aggregate demand, Keynesian, IS-LM model.

- Homework 3 due July 9th

- **Midterm on July 11th**

Week 5. Business Cycle Theory: Aggregate Demand II and Aggregate Supply

- Readings: Chapter 12 and 14

- Concepts: use the IS-LM model to explain economic fluctuations and the aggregate demand, aggregate supply.

- Homework 4 due July 16th

Week 6. Alternative Perspective on Stabilization Policy

- Readings: Chapter 16

- Concepts: Lucas Critique, monetarists, time inconsistency, inflation targeting, automatic stabilizers.

- Homework 5 due July 23rd

- **Final Exam on July 25th**

Sources of Additional Macroeconomics Information

- Greg Mankiw's Blog

- The Economist

  – Free with Miami Dade Library Card Miami Dade Library Card
  – Free (UK edition) FIU- College of Business

- The New York Times

  – Activate your free access to NYTimes

- The Wall Street Journal

  – Activate your free access to WSJ

- Mark Thomas's Blog

- NPR Podcast- Planet Money

Course Policies

Attendance Policy

Class attendance is a necessary part of learning this material. Invariably, students who miss classes fall to the bottom of the grading ladder. Reading the textbook is a complement to the lectures, not a perfect substitute for missing classroom lectures. The lectures may deviate from the textbook, and you can only be aware of the appropriate material if you attend the class. Some material in the textbook may be skipped in the lectures, while other material may be studied in more detail than is presented in the textbook. I will give examples, make clarifications, answer questions, and offer interpretations that may not be found in the textbook. Announcements concerning which material in the textbook will be emphasized or ignored, will be made in class. Students are responsible for all announcements made in class. Students are also responsible for all subsequent changes in the syllabus that are announced. Missing a lecture is no excuse.

Policies on Late Assignments

Late assignments will be accepted for no penalty if a valid excuse is communicated to the instructor before the deadline. After the deadline, assignments will not be accepted. You can miss/drop the "lowest score" homework assignment.

Academic Integrity and Honesty

Students are required to comply with the F.I.U. university policy on academic integrity found in the Academic Misconduct. Cheating in exams, homework, or any other assignment will not be tolerated. Those found cheating in any way will be reported to the relevant authorities of the university

Accommodations for Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register at Disability Services Office. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or Florida International University policy and will not be tolerated.

Intermediate Macroeconomics
Advice from former students

Andra Hiriscau

Florida International University

Summer 2019

- <u>Student 1</u>

  My way of studying is really simple. I don't start studying a day or two days before a big exam as most of the students do, but I study maybe five or six days before the exam, two hours a day. That way, I don't get overwhelmed, and if needed, I can study more hours per day. When studying, I review all kinds of sources, including the slides, articles, YouTube videos, and especially the course textbook. The course textbook is my primary source when I study because I can find everything, from descriptions of a topic to graphs.

- <u>Student 2</u>

  To study for your class my approach was relatively simple. I don't take notes because the slides (as posted) can easily serve the same function. The lectures are super helpful, and even if you didn't require attendance by kahoot/turning in homework, I'd have still attended every lecture.

(easy for a six week class, but I absolutely get tempted to miss a lecture come fall/spring)

One of the most important things that a student should do is keep up with the reading. Technical material is not really like a novel, I think reading multiple chapters in one sitting is a mistake because it takes a bit of time to process. I typically won't read more than an hour or two in a sitting if it's course material. Reading the corresponding material to a section before doing the homework is a good approach to see how well this process is coming along. If by the time I do the homework after reading I don't understand the material, I go to office hours.

If I did the above correctly, exam prep is easy. At this stage if I'm 'learning new things' I failed at the above and the next section absolutely does not apply. I redid any quantitative exercises that you had up, gave a light reading of the slides, and usually had a short study session with a classmate. In general i didn't spend more than 4-5 hours for any exam, but probably averaged a higher than average grand total hours of study.

Another thing of note was your office hours situation. While I'm sure it'd be nice if you had your own office, it was really nice to have a collaborative environment that got students to work together on problems. I don't really think you'd have had 8 students before the exam if you had a regular office.

- <u>Student 3</u>

  Yeah I wrote about it a little in the spot survey but I really really just liked this class. Part of it is because I'm really interested in economics but I just liked how it was taught. I think the assessments between the power points were amazing and when you showed real examples of hyperinflation or the Great Depression it was really interesting.

  In terms of studying I would review the power points first and rewrite anything I thought was important. I would come to the office hours to do the homework which helped me so much not to just finish the hw but actually understand it.

- <u>Student 4</u>

  I employed a number of different strategies to study for the class. As you are probably aware, I took fairly detailed notes during the class lectures, which was almost always the first time that I would see the material. I then have to thank to a classmate because the next round of studying involved debating the course material with him while we did the homework together. We would go over the homework until we were both confident that we could walk any other student through the steps necessary to solve the problems you gave us without help.

  Finally, 1-3 days before the exams, I would go through the study guide that you gave us with however many students wanted to work with me, try to answer them on my own, compare my answers with the

answers of whoever was with me, and talk about the question until we reached a consensus. Additionally, for the midterm, since there was a whole bunch of new vocabulary that I wasn't familiar with, I wrote up a document with all of the relevant definitions and formulas and published it to the class' chat group, but I didn't feel that that was necessary for the final exam.

- Student 5

As far as my studying tips, one of them that truly made a difference is taking the time to rewrite the slides that you presented to us. As i wrote them on a separate sheet of paper, I was able to memorize each and every one of them. I also believe that it is imperative to attend the tutoring center at least two times a week, preferably before or after class as the notions are fresh within your head.

- Student 6

What I did to do great in the class was to pay as much attention as I could in class and solve the activities you made before showing the answers. That gave a base to apply my knowledge and retain the information to apply it to the homework, which even though it was harder, if I applied the theory and read the presentation slices they were easy to solve. I think it is also good to go over the homework in class to see early where people could have made a mistake for them to clarify their doubts. But that's what I mainly did, pay attention

in class, solve every activity by my own, review the slices, and doing the homework and reviewing it afterwards. And just to say one of the main things to pay attention in class is to the formulas you wrote on the board for every model. Which by learning them you can have a map of how the entire economy works for the class.

Intermediate Macroeconomics

Homework 3

Andra Hiriscau

Florida International University

Summer 2019

Instructions: Answer all the questions below. Show your work for every question. Total number of points is 120.

Due Date: Tuesday on July 9th, at the beginning of class.

1. (10 points) In the Solow model, how does the folowing shocks affect the steady state values of income per person (y^*), capital per worker (k^*) and investment per person (i^*). Explain and graph the following shocks:

    (a) The saving rate increases

    (b) Total factor productivity increases

2. (10 points) Review questions

    (a) In the steady state of the Solow model, at what rate does output per person grow? At what rate does capital per person grow? How does this compare with the U.S. experience?

(b) How can policymakers influence a nation's saving rate?

(c) How does endogenous growth theory explain persistent growth without the assumption of exogenous technological progress? How does this differ from the Solow model?

3. (20 points) Consider the Solow growth model. Suppose that in a given country the per-worker production function is $y = k^{\frac{1}{2}}$, where y is output per worker and k is capital per worker. Assume the depreciation rate of capital is 10 % per year; that is, suppose that is $\delta = 0$

   (a) If the saving rate (s) is 0.4, what are capital per worker, production per worker, and consumption per worker in the steady state? (Hint: Use the equation of motion for k and recall the definition of the steady state in this model).

   (b) Find the steady-state capital per worker, production per worker, and consumption per worker if $s = 0.6$.

4. (40 points) Consider the following version of Solow's model of economics growth with no population growth and no technological progress:

$$y_t = k_t^{\frac{1}{2}}$$

$$c_t = (1 - s) * y_t$$

$$i_t = s * y_t$$

$$k_{t+1} = k_t + s * y_t - (n + \delta) * k_t$$

$$s = 0.25$$

$$\delta = 0.05$$

$$n = 0.00$$

(a) If $k_0 = 4.0$ (capital per worker at time 0), what will k_1, k_2, k_3 (capital per worker at time 1,2 and 3) be? What will y_1, y_2, y_3 be?

(b) What is the steady-state value of capital per worker (k^*) for this economy?

(c) When capital per worker reaches its steady-state value, what will incomer per person (y), consumption per person (c) and investment per person (i) be?

(d) If the saving rate (s) doubles from 0.25 to 0.50, what will the new steady-state value of capital per worker and incomer per person be?

5. (40 points) In the United States, the capital share of GDP is about 30 percent, the average growth in output is about 3 percent per year, the depreciation rate is about 4 percent per year, and the capital-output ratio is 2.5. Suppose that the production function is Cobb-Douglas with $MPK = \frac{\alpha}{\frac{K}{Y}}$ and that the United States has been in a steady state.

(a) What must the saving rate be in the initial steady state? [*Hint: Use the steady-state relationship* $s * \gamma = (\delta + n + g) * k)$]

(b) What is the marginal product of capital in the initial steady state?

(c) Suppose that public policy alters the saving rate so that the economy reaches the Golden Rule level of capital. What will the marginal product of capital be at the Golden RUle steady state? Compare the marginal product at the Golden Rule steady state to the marginal product in the initial steady state. Explain.

(d) What will the capital-output ratio be at the Golden Rule steady state? (*Hint: For the Cobb Douglas production function, the capital-output ratio is related to the marginal product of capital.*)

(e) What must the saving rate be to reach the Golden Rule steady state?

Intermediate Macroeconomics

Homework 3-Solutions

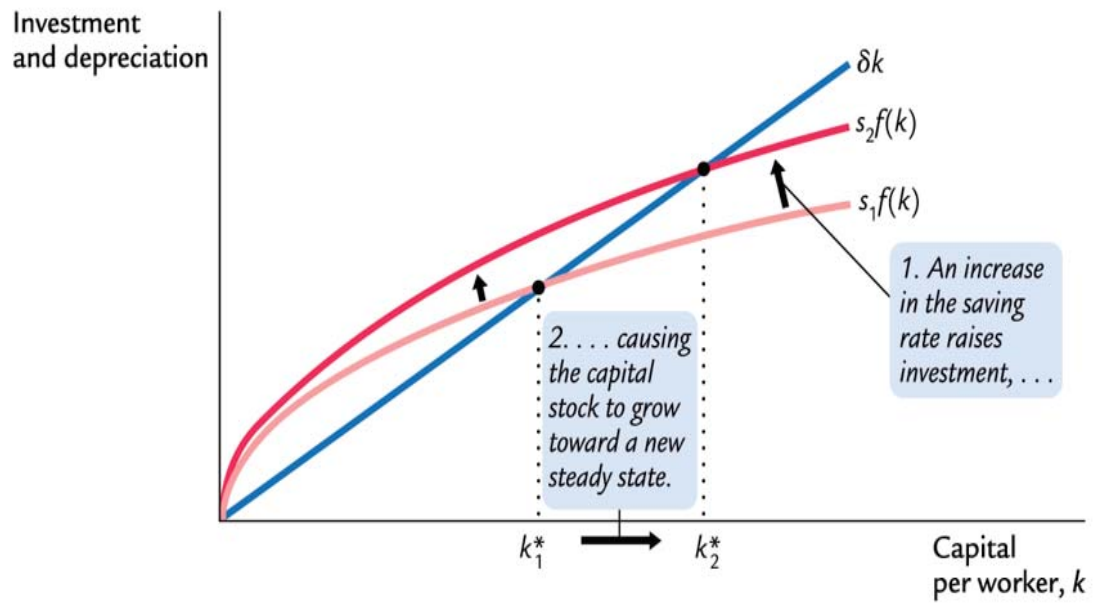Andra Hiriscau

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Summer 2019

1. (10 points) In the Solow model, how does the following shocks affect the steady state values of income per person (y^*), capital per worker (k^*) and investment per person (i^*). Explain and graph the following shocks:

   Answer:

   (a) The saving rate increases

   In the Solow growth model, a higher saving rate leads to a larger steady-state capital stock and a higher level of steady-state output. Increasing the saving rate leads to faster economic growth only in the short run, as the economy converges to the new steady state. In a steady state, the growth rate of output (or income) is independent of the saving rate.

Investment and depreciation vs. Capital per worker, k

δk

$s_2 f(k)$

$s_1 f(k)$

1. An increase in the saving rate raises investment, . . .

2. . . . . causing the capital stock to grow toward a new steady state.
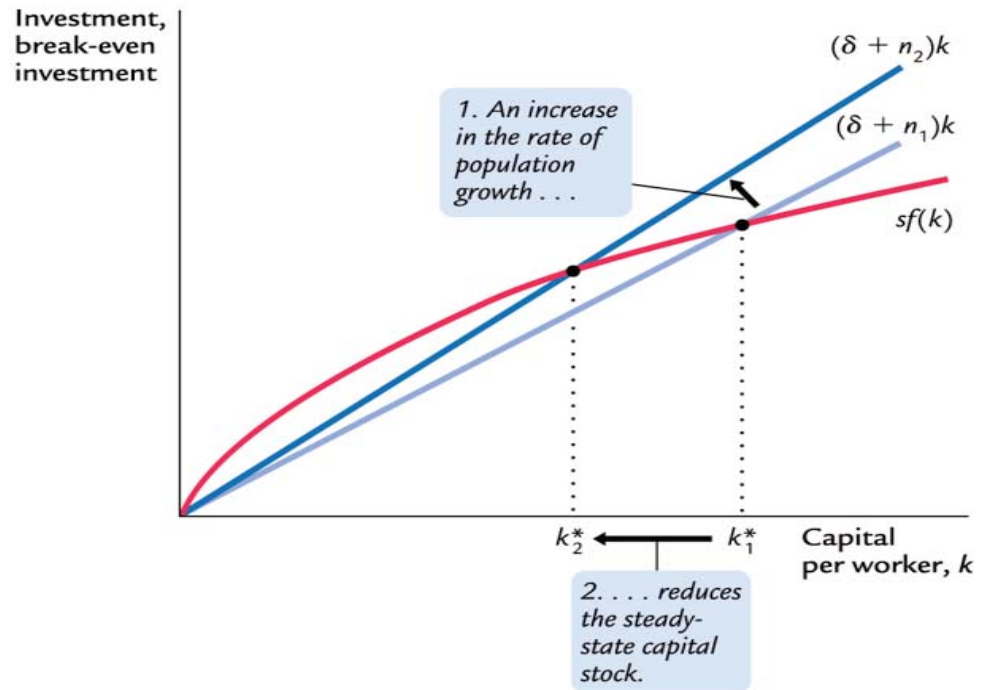
k_1^*

k_2^*

Mankiw, *Macroeconomics*, 10e, © 2019 Worth Publishers

(b) Total factor productivity increases

A increase in total factor productivity has a similar effect of an increase in the population growth. It leads to a lower level steady-state capital stock and output.

Investment, break-even investment

1. An increase in the rate of population growth . . .

$(\delta + n_2)k$

$(\delta + n_1)k$

$sf(k)$

k_2^* ← k_1^* Capital per worker, k

2. . . . . reduces the steady-state capital stock.

2. (10 points) Review questions

   (a) In the steady state of the Solow model, at what rate does output per person grow? At what rate does capital per person grow? How does this compare with the U.S. experience?

      Answer: In a steady state, output per worker in the Solow model grows at the rate of technological progress g. Capital per worker also grows at rate g. This then implies that output and capital per effective worker are constant in a steady state. In the U.S. data, output and capital per worker have both grown at about 2 percent per year for the past half-century.

(b) How can policymakers influence a nation's saving rate?

Answer: Economic policy can influence the saving rate by either increasing public saving or providing incentives to stimulate private saving. Public saving is the difference between government revenue and government spending. Public saving can be increased by reducing government expenditure or raising taxes. A variety of government policies affect private saving. The decision by a household to save may depend on the rate of return to saving; the greater the return, the greater the incentive to save. Tax incentives such as tax-exempt retirement accounts for individuals and investment tax credits for corporations increase the rate of return and encourage private saving.

(c) How does endogenous growth theory explain persistent growth without the assumption of exogenous technological progress? How does this differ from the Solow model?

Answer: Endogenous growth theories attempt to explain the rate of technological progress by modeling the decisions that determine the creation of knowledge through research and development. This differs from the Solow model, which takes the rate of technological progress as given. In the Solow model, the saving rate affects growth temporarily, but diminishing returns to capital eventually force the economy to approach a steady state in which growth depends only on exogenous technological progress.

By contrast, many endogenous growth models assume that there are constant (rather than diminishing) returns to capital, which can be interpreted as including both physical and human capital. Hence, changes in the saving rate can lead to sustained growth.

3. (20 points) Consider the Solow growth model. Suppose that in a given country the per-worker production function is $y = k^{\frac{1}{2}}$, where y is output per worker and k is capital per worker. Assume the depreciation rate of capital is 10 % per year; that is, suppose that is $\delta = 0.10$

(a) If the saving rate (s) is 0.4, what are capital per worker, production per worker, and consumption per worker in the steady state? (Hint: Use the equation of motion for k and recall the definition of the steady state in this model).
Answer: We need to find k^*, y^* and c^* in the steady state. In particular, k^* is the value such that

$$\Delta k = 0$$

And since the equation of motion for capital per worker is

$$\Delta k = sf(k) - \delta k$$

k^* is the value such that

$$sf(k^*) - \delta k^* = 0$$

From which we get that k^* solves

$$sf(k^*) = \delta k^*$$

With our values we have that

$$0.4(k^*)^{\frac{1}{2}} = 0.10 k^*$$

From this we solve for k^*. Manipulation the above equation we get

$$\frac{0.4}{0.10} = \frac{k^*}{(k^*)^{\frac{1}{2}}}$$

and

$$4 = k^*(k^*)^{\frac{-1}{2}}$$

which becomes

$$4 = (k^*)^{\frac{1}{2}}$$

Squaring both sides and rearranging we get

$$k^* = 16$$

From which follows that

$$y^* = f(k^*) = (k^*)^{\frac{1}{2}} = 16^{\frac{1}{2}} = 4$$

and finally

$$c^* = (1 - s)f(k^*) = (1 - 0.4) * 4 = 2.4$$

(b) Find the steady-state capital per worker, production per worker, and consumption per worker if $s = 0.6$.

Answer: We again use

$$sf(k^*) = \delta k^*$$

With the new value of s we have

$$0.6(k^*)^{\frac{1}{2}} = 0.10k^*$$

Solving for k^*

$$k^* = 36$$

and then

$$y^* = f(k^*) = (k^*)^{\frac{1}{2}} = 36^{\frac{1}{2}} = 6$$

and finally

$$c^* = (1 - s)f(k^*) = (1 - 0.6) * 6 = 2.4$$

4. (40 points) Consider the following version of Solow's model of economics growth with no population growth and no technological progress:

$$y_t = k_t^{\frac{1}{2}}$$

$$c_t = (1 - s) * y_t$$

$$i_t = s * y_t$$

$$k_{t+1} = k_t + s * y_t - (n + \delta) * k_t$$

$$s = 0.25$$

$$\delta = 0.05$$

$$n = 0.00$$

(a) If $k_0 = 4.0$ (capital per worker at time 0), what will k_1, k_2, k_3 (capital per worker at time 1,2 and 3) be? What will y_1, y_2, y_3 be?

Answer: If $k_0 = 4$ then $y_0 = 4^{\frac{1}{2}} = 2$

$$i_0 = 0.25 * 2 = 0.5$$

$$k_{t+1} - k_t = s * y_t - (n + \delta) * k_t$$

$$\Delta k_{0,1} = 0.5 - 0.05 * 4 = 0.3$$

$$k_1 = k_0 + \Delta k_0 = 4 + 0.3 = 4.3$$

Then, we have

$y_t = k_t^{\frac{1}{2}}$ which means $y_1 = (4.3)^{\frac{1}{2}} = 2.073$

Similarly,

$$k_2 = k_1 + i1 - (0.05)k_1 = 4.3 + 0.25 * (4.3)^{\frac{1}{2}} - 0.05 * (4.3)$$

$$k_2 = 4.603 \qquad y_2 = (4.603)^{\frac{1}{2}} = 2.074$$

$$k_3 = k_2 + i2 - (0.05)k_2 = 4.603 + 0.25 * (4.603)^{\frac{1}{2}} - 0.05 * (4.603)$$

$$k_3 = 4.909 \qquad y_2 = (4.909)^{\frac{1}{2}} = 2.216$$

(b) What is the steady-state value of capital per worker (k^*) for this economy?

Answer: In the steady-state equilibrium $k_{t+1} - k_t = 0$, so $s * y_t = (n + \delta) * k_t$

$$0.25(k^*)^{\frac{1}{2}} = 0.05k^*$$

$$\frac{0.25}{0.05} = \frac{k^*}{(k^*)^{\frac{1}{2}}}$$

$$5 = (k^*)^{\frac{1}{2}}$$

$$k^* = 25$$

(c) When capital per worker reaches its steady-state value, what will incomer per person (y), consumption per person (c) and investment per person (i) be?

Answer: When $k = k^* = 25$,

$$y = k^{\frac{1}{2}} = (25)^{\frac{1}{2}} = 5$$

$$c = 0.75y = 0.75 * 5 = 3.75$$

$$i = 0.25y = 0.25 * 5 = 1.25$$

(d) If the saving rate (s) doubles from 0.25 to 0.50, what will the new steady-state value of capital per worker and incomer per person be?

Answer: If $s = 0.5$, then in the steady-state equilibrium,

$$0.5(k^*)^{\frac{1}{2}} = 0.05k^*$$

$$k^* = 100$$

$$y = k^{\frac{1}{2}} = (100)^{\frac{1}{2}} = 10$$

$$c = 0.75y = 7.5$$

$$i = 0.25y = 2.5$$

5. (40 points) In the United States, the capital share of GDP is about 30 percent, the average growth in output is about 3 percent per year, the depreciation rate is about 4 percent per year, and the capital-output ratio is 2.5. Suppose that the production function is Cobb-Douglas with $MPK = \frac{\alpha}{\frac{K}{Y}}$ and that the United States has been in a steady state. We are given the following:

- The production function is Cobb–Douglas, and capital's share of income is $= 0.3$.

- The growth rate of output is $n + g = 0.03$.

- The depreciation rate is $= 0.04$.

- The capital–output ratio is $\frac{K}{Y} = 2.5$. Because $\frac{k}{y} = \frac{[\frac{K}{LE}]}{[\frac{Y}{LE}]} = \frac{K}{Y}$. We also know that $\frac{k}{y} = 2.5$

(a) What must the saving rate be in the initial steady state? [*Hint: Use the steady-state relationship* $s * \gamma = (\delta + n + g) * k)$]

Answer: We begin with the steady-state condition $sy = (+n + g)k$ and divide both sides by y to obtain

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$$s = (+n+g)\frac{k}{y}$$

$$s = (0.04 + 0.03)(2.5)$$

$$s = 0.175$$

The initial saving rate is 17.5 percent.

(b) What is the marginal product of capital in the initial steady state?

Answer: $MPK = \frac{\alpha}{\frac{K}{Y}}$

$$MPK = 0.3/2.5 = 0.12$$

(c) Suppose that public policy alters the saving rate so that the economy reaches the Golden Rule level of capital. What will the marginal product of capital be at the Golden RUle steady state? Compare the marginal product at the Golden Rule steady state to the marginal product in the initial steady state. Explain.

Answer: In the Golden Rule steady state, the marginal product of capital must be

$$MPK = n + g + \delta$$

$$MPK = 0.03 + 0.04 = 0.07$$

In the Golden Rule steady state, the marginal product of capital is 7 percent, whereas it is 12 percent in the initial steady state.

Hence, this economy needs to increase k to reach the Golden Rule steady state.

(d) What will the capital-output ratio be at the Golden Rule steady state? (*Hint: For the Cobb Douglas production function, the capital-output ratio is related to the marginal product of capital.*) **Answer:** We know that, for a Cobb–Douglas production function, $MPK = \frac{\alpha}{\frac{K}{Y}}$. Solving for capital-output ratio, we obtain

$$\frac{K}{Y} = \frac{\alpha}{MPK}$$

$$\frac{K}{Y} = \frac{0.3}{0.07}$$

$$\frac{K}{Y} = 4.29$$

In the Golden Rule steady state, the capital–output ratio is 4.29, and the current ratio is 2.5.

(e) What must the saving rate be to reach the Golden Rule steady state? **Answer:** We know from part (a) that in steady state,

$$s = (+n+g)\frac{k}{y}$$

In the Golden Rule steady state, $\frac{k}{y} = \frac{K}{Y} = 4.29$. Plugging in this

value and those established above, we have

$$s = (0.04 + 0.03) * (4.29) = 0.3$$

To reach the Golden Rule steady state, the saving rate must rise from 17.5 percent to 30 percent. Notice that, with a Cobb–Douglas production function, a saving rate equal to capital's share of income achieves the Golden Rule steady state

	Recorded Date	Q26 - Which aspect of the course is MOST helpful to you?	Q28 - Which aspect of the course is LEAST helpful to you?	Q32 - What is your favorite method of improving your macroeconomics knowledge?
☐	Jul 9, 2019 10:45 AM	Practice question when we partner up	How fast we move through the formulas, feels vague	Short videos from class lectures
☐	Jul 5, 2019 4:18 PM	The Exercises done in class after showing an example on the slides.	None. All of the procedures are crucial and essential. Very well organized.	Short videos from class lectures
☐	Jul 5, 2019 8:17 AM	the professor	nothing	Short videos from class lectures
☐	Jul 2, 2019 2:11 PM	The exercises from class	Long homeworks.	Case studies from the book
☐	Jul 2, 2019 11:01 AM	Professor is very engaged and encourages participation.	Morning office hours.	Articles (NYT, The Economist etc)
☐	Jul 2, 2019 8:58 AM	The exercises between powerpoints and after	I like this class just need more exercises to understand everything better	Short videos from class lectures
☐	Jul 2, 2019 8:57 AM	I think the practice questions that we do in class are extremely helpful. The homework also helps a lot.	N/A	Articles (NYT, The Economist etc)
☐	Jul 2, 2019 8:53 AM	office hours	so long	NPR Planet Money

Student Perceptions of Teaching survey (SPOTs)

SIPA - ECONOMIC-2

Summer 2019

Instructor: Hiriscau, Andra M

Total Enrolled: 27

Class Number: 53396

Course: ECO 3203 U01B

Title: Intermed Macroecon

Completed Forms: 24

Course Structure

		Excellent		Very Good		Good		Fair		Total	
1	Description of course objectives and assignments	19	79%	3	12%	2	8%	0	0%	24	100%
2	Expression of expectations for performance in this class	18	75%	3	12%	2	8%	1	4%	24	100%
3	Description of grading policies in the course syllabus	20	83%	2	8%	1	4%	1	4%	24	100%

Learning Support

		Excellent		Very Good		Good		Fair		Total	
4	Consistency in following the course syllabus	21	88%	1	4%	1	4%	1	4%	24	100%
5	Preparation for class	21	88%	1	4%	1	4%	1	4%	24	100%
6	Use and management of class time	20	83%	2	8%	1	4%	1	4%	24	100%
7	Knowledge of course content	20	83%	2	8%	1	4%	1	4%	24	100%
8	Communication of ideas and information	20	83%	2	8%	1	4%	1	4%	24	100%
9	Stimulation of interest in course	19	79%	2	8%	1	4%	2	8%	24	100%
10	Facilitation of learning	18	75%	3	12%	2	8%	1	4%	24	100%
11	Provide feedback about your performance	18	75%	2	8%	2	8%	2	8%	24	100%

Student-Instructor Interaction

		Excellent		Very Good		Good		Fair		Total	
12	Availability to assist students in or out of class	19	79%	3	12%	1	4%	1	4%	24	100%
13	Respect and concern for students	21	88%	1	4%	1	4%	1	4%	24	100%
14	Fairness of instructor	21	88%	1	4%	1	4%	1	4%	24	100%
15	Overall assessment of instructor	19	79%	3	12%	1	4%	1	4%	24	100%

		A		B		C		Total	
17	What grade do you expect to receive in this course?	6	25%	10	42%	8	33%	24	100%

		Yes		No		Total	
18	Is this course required for your program?	22	92%	1	4%	23	96%

		Freshman		Sophomore		Junior		Senior		Special Student		Total	
19	What is your class level?	1	4%	2	8%	15	62%	4	17%	2	8%	24	100%

		3.0 - 4.0		2.0 - 2.9		1.0 - 1.9		N/A		Total	
20	What is your current GPA?	8	33%	9	38%	2	8%	5	21%	24	100%

		Not Applicable		Total	
18	Is this course required for your program?	1	4%	1	4%