

ECON 311 - Intermediate Macroeconomics (Professor Gordon)

Final Examination: Fall 2014

Answer sheet

YOUR NAME: _____

Student ID: _____

INSTRUCTIONS:

1. The exam lasts **2 hours**.
2. The exam is worth 120 points in total (plus up to 4 time points): 30 points for the multiple choice questions , 60 points for the analytical problems, and 30 points for the essays.
3. **Multiple choice:** choose the **one** alternative that best completes the statement or answers the question. **Write your answers in the blanks below.** You won't get credit for circled answers in the multiple choice section.
4. **Place all of your answers for the analytical problems in the space provided.**
5. You must show your work for the analytical problems. There is no need to explain your answers for the multiple choice questions.
6. **You must write your essays with a pen.** Write clearly!
7. **You must turn in both the answers and the multiple-choice questions. DO NOT PULL THEM APART.**

Good luck and Happy Holidays!

PART A: Multiple Choice Problems

Answer multiple choice questions in the space provided below.

USE CAPITAL LETTERS.

1			6			11		16		21		26	
2			7			12		17		22		27	
3			8			13		18		23		28	
4			9			14		19		24		29	
5			10			15		20		25		30	

Grading: (do not fill out this part)

MC (30)	Q1 (13)	Q2 (4)	Q3 (10)	Q4 (5)	
Q5 (6)	Q6 (16)	Q7 (6)	Essay (30)	Time (4)	Total

PART B: Analytic Problems

QUESTION 1: SPDG Model (13 points)

Suppose the following equations describe an economy currently at long-run equilibrium:

$$\begin{aligned} p_t &= p_t^e + 0.2\hat{Y}_t + z_t \\ p_t^e &= 0.2p_{t-1}^e + 0.8p_{t-1} \\ p_0 &= p_0^e = \hat{x}_0 = 4 \quad \hat{Y}_0 = z_0 = 0 \end{aligned}$$

Recall that z represents supply shocks, $\hat{x} = x - y^N$ and $\hat{Y} = 100 \ln(Y/Y^N)$

(A) Write down the numerical SP and DG equations using the information above. (2 point)

SP	$p_{t} = 0.2 * p_{t-1}^e + 0.8 * p_{t-1} + 0.2\hat{Y}_{t} + z_{t}$ <p>for some reason I cannot get "equations" to work within a table, but this will be deleted before printing</p>
DG	$\hat{Y}_{t} = \hat{Y}_{t-1} + \hat{x}_{t} - p_{t}$ <p>for some reason I cannot get "equations" to work within a table, but this will be deleted before printing</p>

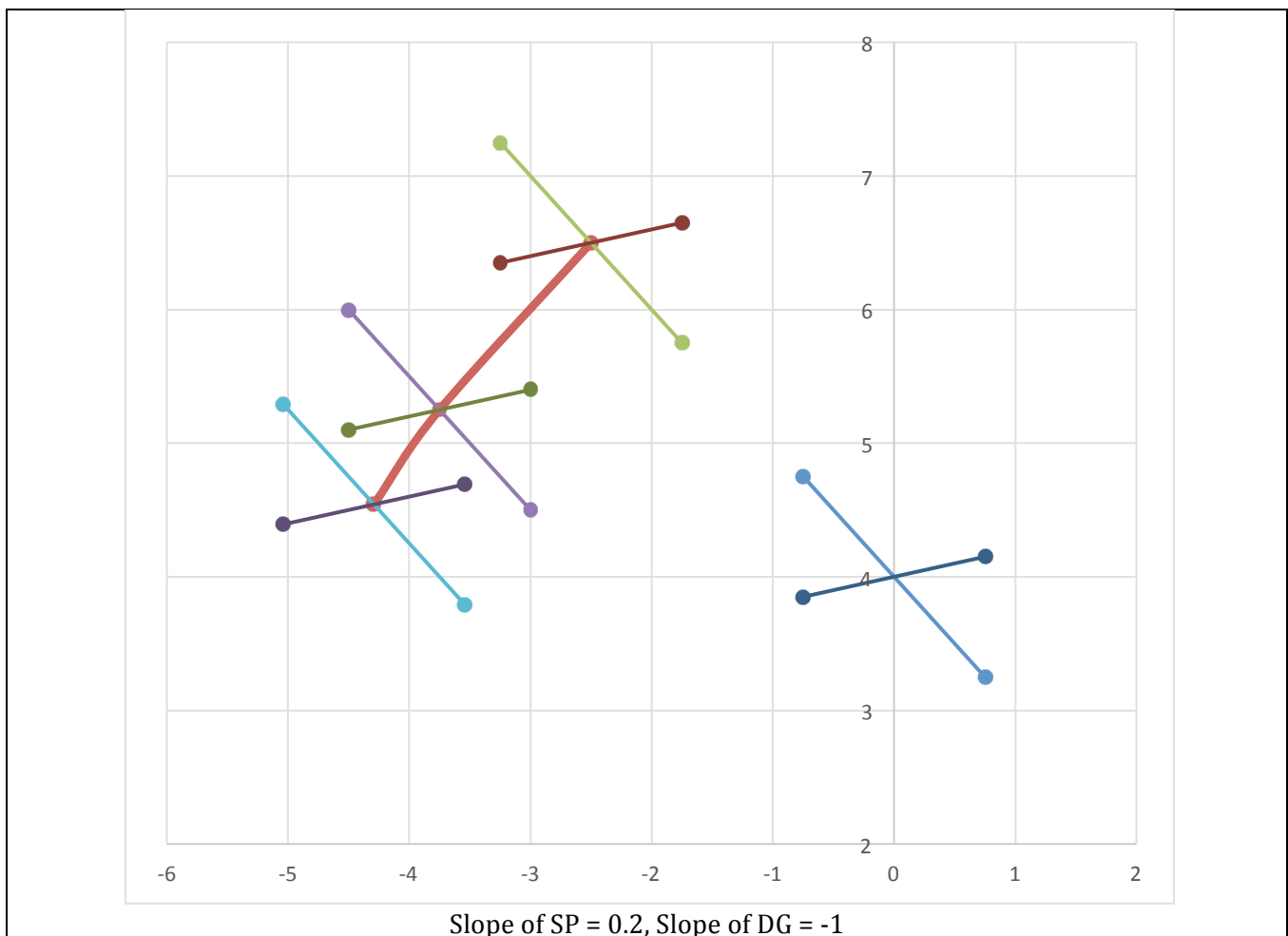
(B) Substitute the DG equation into the numerical SP equation and solve for p_t as a function of p_{t-1} , p_{t-1}^e , \hat{Y}_{t-1} , \hat{x}_t and z_t . (1 point)

$$\begin{aligned} p_t &= 0.2p_{t-1}^e + 0.8p_{t-1} + 0.2(\hat{Y}_{t-1} + \hat{x}_t - p_t) + z_t \\ p_t &= 1/6p_{t-1}^e + 2/3p_{t-1} + 1/6(\hat{Y}_{t-1} + \hat{x}_t) + 5/6z_t \end{aligned}$$

(C) Starting from the long-run equilibrium described above in period 0, assume that in period $t=1$, we observe a supply shock. Fill in the following table assuming that the central bank is following a neutral policy. (4 points)

T	p_t^e	\hat{Y}_t	\hat{x}_t	p_t	z_t
0	4	0	4	4	0
1	4	-2.5	4	6.5	3
2	6	-3.75	4	5.25	0
3	5.4	-4.29166667	4	4.54166667	0

(D) Using an 'output gap-inflation' coordinate system draw a graph tracing the economy's adjustment to a temporary supply shock between time $t=0$ and $t=3$. On the same graph show the movements of SP and DG curves in time (Hint: draw only 4 pairs of curves, each corresponding to a given time period; label the curves properly). What are the slopes of SP and DG curves? (4 points)



(E) Using an 'output gap-inflation' coordinate system draw the hypothetical path of the output gap-inflation pairs for the adjusting economy until it reaches the long-run equilibrium, assuming that there are no new shocks and the central bank keeps following a neutral policy. (2 points)



QUESTION 2: High-powered money (4 points)

Suppose that government spending $G = 1000$, real high-powered money $H/P = 2500$, and real government bonds $B/P = 2300$. The inflation rate equals 4 %, the nominal interest rate equals 5 %, and the economy is in a long-run steady state with fixed H/P and B/P .

(A) What is the amount of seignorage? (2 points)

$$\text{seignorage} = p \cdot (H/P) = 4\% \cdot 2500 = 100.$$

(B) What is the real interest rate r and what is the amount of real interest the government pays on its bonds? (2 points)

$$r = i - p = 5\% - 4\% = 1\%.$$

$$\text{Real interest on bonds} = (i - p) \cdot (B/P) = 1\% \cdot 2300 = 23.$$

Question 3: Open IS-LM model (10 points):

Let the following represent the structure of a **SMALL OPEN ECONOMY** with **PERFECT CAPITAL MOBILITY** and **FIXED EXCHANGE RATES**:

$$C = C_a + 0.8(Y-T),$$

$$C_a = 60, T = 50, G = 50,$$

$$I_p = 70 - 5r,$$

$$NX = 100 - 0.05Y - 20e,$$

$$(M/P)^D = 0.4Y - 8r,$$

$$M^S/P = 256.$$

A) Assume that initially foreign and domestic interest rates are equal so that $r = r^f$. Let $e=1$. Using the IS and LM equations, find equilibrium income, interest rate, net exports (4 points)

$$k = 1 / (1 - 0.8 + 0.05) = 4$$

$$A_p = 60 - 0.8 \cdot 50 + 50 + 70 - 5r + 100 - 20e = 240 - 5r - 20e = 220 - 5r$$

$$\text{IS: } Y = 4 \cdot (240 - 5r - 20e) = 960 - 20r - 80e = 880 - 20r$$

$$\text{LM: } 256 = 0.4Y - 8r \rightarrow Y = 640 + 20r$$

$$Y = 760$$

$$r = 6$$

$$NX = 42$$

B) Imagine that the central bank of the small open economy decides to depreciate the currency to stimulate exports. It changes money supply so that $e = 0.5$. Find the new net exports, money supply, and output. (3 points)

$$\text{IS: } Y = 960 - 20r - 80e = 920 - 20r$$

$$\text{Since } r = r^f = 6, Y = 800$$

$$\text{LM: } M_s/P = M_d/P = 0.4 \cdot 800 - 8 \cdot 6 = 272$$

$$NX = 100 - 0.05 \cdot 800 - 20 \cdot 0.5 = 50$$

C) Suppose that after part B), the foreign interest rate suddenly drops to $r^f = 3$. What are the new IS and LM equations? What are the new net exports, money supply, and output? (3 points)

IS: $Y = 960 - 20r - 80e = 920 - 20r$
Since $r = r_f = 3$, $Y = 860$
LM: $M_s/P = M_d/P = 0.4 * 860 - 8 * 3 = 320$

QUESTION 4: Growth rates (5 points)

GDP grew by 5% annually from 2010 to 2012, and by 10% annually from 2012 to 2014. If GDP in 2014 was 100, what was GDP in 2010?

$GDP_{2014} = GDP_{2010} * \exp(2 * 0.05) * \exp(2 * 0.1)$
-> $GDP_{2010} = 100 / \exp(0.3) = 74.08$

QUESTION 5: Actual and natural employment deficits (6 points)

We are in a closed economy. In a long-run equilibrium (if employment is natural employment), the IS curve is given by $Y = k * A_p = 2 * (100 - 5r)$
The LM curve is $Y = 100 + 10r$
Taxes are $T = 0.2Y$ and government spending is $G = 35$.

(A) What is the natural employment deficit? (3 points)

Equilibrium: $Y = 150$, $r = 5$.
-> $T = 30$
-> Deficit: $T - G = -5$

(B) Suppose a temporary demand shock lowers A_p by 10. What is the actual deficit? (3 points)

Ap down by 10: new IS is $Y = 180 - 10r$
Equilibrium: $Y = 140$, $r = 4$
-> $T = 28$
-> Deficit: $T - G = -7$

QUESTION 6: Solow model (16 points)

Suppose the production function of a closed economy is given by $Y = AN^{\frac{1}{2}}K^{\frac{1}{2}}$ where K is capital, N is labor and A=10 is total factor productivity.

Furthermore suppose that capital depreciates at $d=0.1$, the saving rate is $s=0.2$, and population growth is $n=0.1$.

(A) Find the steady state level of capital per capita (4 points)

$$Y/N = A(K/N)^{0.5}$$
$$s * A(K/N)^{0.5} = (n+d)*(K/N) \rightarrow K/N = (sA/(n+d))^2 = (2/0.2)^2 = 100$$

(B) Find the steady state level of output per capita and consumption per capita (2 points)

$$Y/N = A(K/N)^{0.5} = 100$$
$$C/N = (1-s)*(Y/N) = 80$$

(C) Suppose the **depreciation rate d goes down**. Would you expect steady state consumption per capita to go up or down or is the answer ambiguous and depends on the exact change in d? Briefly explain your answer. (4 points)

Up.

(D) Suppose the **saving rate s goes up**. Would you expect steady state consumption per capita to go up or down or is the answer ambiguous and depends on the exact change in s? Briefly explain your answer. (4 points)

Ambiguous. Can see easily that C/N would be higher if s was mildly higher (for instance if $s=0.3$) but C/N would be lower if s was too high (for instance if $s=0.999$).

(E) Suppose that total factor productivity increases to A=20. What should happen to the steady state level of capital per capita? (2 points)

up to 400

Question 7: International accounts (6 points)

Suppose there is an open economy that interacts with the world market. The balance of payments information for 2014 is listed below. In the table, all positive numbers indicate purchases or positive income from sources.

Exports	100
Imports	80
Net foreign assets purchased	40
Net domestic assets purchased by foreigners	60
Net income from foreign holdings	-80
Net transfer payments	20
Net revaluations of assets held	40

Hint: show your work so you can get partial credit if you make a mistake.

(A) What is the current account and capital account of this economy? (2 pts)

Current account: $100 - 80 - 80 + 20 = -40$
Capital account: $60 - 40 = 20$

(B) What is the balance of payments? (2 pt)

$-40 + 20 = -20$

(C) What is the change in the net international investment position (IIP) of this country? (2 pt)

$-40 + 40 = 0$

PART C: Essays

1. (15 minutes) The graphs in the textbook go up to the end of 2010. Describe the most important changes in the U.S. economy during the years 2011 to 2014, covering monetary policy, fiscal policy, output growth, productivity growth, labor market variables, and any additional features of economic activity that you wish to discuss.
2. (15 minutes) The unemployment rate in October and November 2014 was 5.8 percent. The most recent period when the unemployment rate was 5.8 percent was in the fourth quarter of 2003. Write a short essay comparing and contrasting the economic environment facing monetary and fiscal policy at the end of 2003 as compared with the end of 2014. What actions would you take now if you were in charge of monetary and fiscal policy?

PART A: Multiple Choice Problems

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) In the recent Global Economic Crisis, the negative wealth effect from a 50 percent decline in the stock market caused
 - A) LM curve to shift to the right.
 - B) IS curve to shift to the right.
 - C) IS curve to shift to the left.
 - D) LM curve to shift to the left.

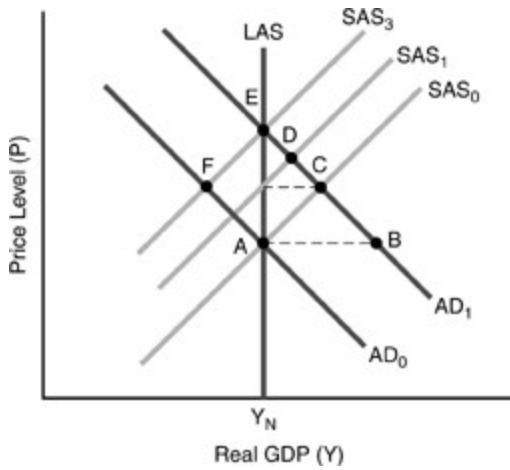
- 2) Suppose the government borrows to purchase military ammunition which is immediately used up in target practice. The rate of return on this investment is _____, and in this case the government debt _____ a burden on future taxpayers.
 - A) $-r$, is not
 - B) r , is
 - C) $-r$, is
 - D) 0 , is not
 - E) r , is not

- 3) In the early 1980s, there was a massive _____ of the dollar while at the same time U.S. net exports _____, which is _____ the modeling of net exports presented in the textbook.
 - A) appreciation, fell, in accord with
 - B) depreciation, fell, in accord with
 - C) appreciation, rose, in violation of
 - D) depreciation, rose, in violation of
 - E) appreciation, rose, in accord with

- 4) After a period of building up debt to foreigners, the associated interest payments mean that ending the foreign debt increase will require
 - A) a zero balance in the capital account.
 - B) a zero balance in the current account.
 - C) a capital account surplus.
 - D) a current account surplus.
 - E) a current account deficit.

- 5) If there are perfectly flexible prices and the economy is operating at $Y(N)$, then an increase in government expenditures
 - A) will lead to complete nominal crowding out and have the price level unchanged.
 - B) will increase real GDP and the price level.
 - C) will not lead to complete real crowding out.
 - D) will increase nominal GDP and the raise price level.

Figure 7-5



- 6) In Figure 7-5 above, from initial point E, suppose AD_1 shifts to AD_0 . Under the assumptions of classical macroeconomics, we would
- stay at point E.
 - almost immediately move to and then stay at point F.
 - almost immediately move to and then stay at point A.
 - almost immediately move to and then stay at point B.
- 7) If the government raises the growth of nominal GDP in response to a supply shock,
- employment can be maintained so long as expectations are unaffected by the supply shock.
 - inflation will decelerate and unemployment will fall.
 - inflation will accelerate and unemployment will worsen.
 - None of these results follow an increase in the growth of nominal GDP.
- 8) If nominal GDP growth in an economy is a constant 7 percent, the economy's long-run equilibrium is at Y equal to _____ with inflation of _____.
- 100, 7 percent
 - 103.5, 3.5 percent
 - 107, zero
 - 107, 7 percent
 - 100, zero
- 9) "Okun's Law" refers to
- the trade-off between inflation and unemployment.
 - the relationship between real and nominal output growth.
 - the relationship between the unemployment rate and the ratio of actual to natural output.
 - minimum wage laws and the impact of price controls.
- 10) From the quantity equation we find that the rate of inflation is equal by definition to the growth rate of the money supply _____ the growth rate of velocity _____ the growth rate of real GDP.
- plus, minus
 - minus, minus
 - plus, plus
 - minus, plus
- 11) Which of the following would NOT reduce the natural rate of unemployment?
- a tax cut
 - wage or price controls
 - an increase in government expenditures

D) all of the above

12) When mismatch unemployment characterizes an economy

- A) monetary and fiscal policies to raise AD are the appropriate government action.
- B) only general (not specific) fiscal policy will be effective.
- C) monetary and fiscal policies to raise AD are not the appropriate government action.
- D) only monetary policy will be effective.

13) During the Global Economic Crisis, low unemployment rate in Germany is attributed to the policy of

- A) "99-ers."
- B) "work-sharing."
- C) "money creation."
- D) "money powering."

14) The application of Solow's growth theory to the explanation of the slowdown in productivity growth in the United States suggests that the slowdown is primarily caused by

- A) slow residual growth of the capital stock.
- B) reduced growth in the technical change or total factor productivity.
- C) ignorance since people save and invest less.
- D) reduced growth in the capital stock per hour of work.

15) One of the shortcomings of the Solow growth model is that in it the rate of technological change is

- A) left unexplained.
- B) assumed to be equal to the population growth rate.
- C) assumed to be zero.
- D) zero unless the saving rate exceeds the depreciation rate.

16) In Chapter 11, depreciation is assumed to be

- A) a fixed absolute amount.
- B) zero.
- C) a fixed proportion of the capital stock.
- D) a fixed proportion of the capital-labor ratio.
- E) a fixed proportion of real GDP.

17) In Chapter 10, the variable N can be regarded as total population, workers, work-hours, or "effective" work-hours, all proxies for each other if they are assumed to grow at the same rate. To define (Y/N) as the standard of living, N is particularly regarded as

- A) work-hours.
- B) total population.
- C) workers.
- D) "effective" work-hours.

18) If the growth rate of multifactor productivity is 1.775, $b = 0.15$, $n = 1$, and $y = 3$, then the growth rate of capital is

- A) 2.5.
- B) 1.45.
- C) 4.0.
- D) 1.225.

19) Which of the following is a method by which a poor country might import technological change without having to incur the heavy expense of research and development (not to mention human and physical capital formation) out of its own saving?

- A) Copy modern products made in rich countries.

- B) Obtain investment by foreign firms.
- C) Purchase imported machinery that embodies the latest technology.
- D) All of the above.

- 20) Comparison of the European and U.S. labor markets suggests that
- A) the U.S. labor market is more "flexible" than the European labor market.
 - B) it is relatively cheap to hire workers in the United States.
 - C) job security and income equality are greater in the European labor market.
 - D) A and B.
 - E) all of the above.

- 21) In a lecture the state of Texas was singled out in relation to which topic?
- A) illegal immigration
 - B) housing finance
 - C) effect of oil exports on the balance of payments
 - D) structural unemployment

- 22) The effect of quantitative easing has been
- A) increase required reserves
 - B) increase excess reserves
 - C) reduce ratio of net debt to gross debt
 - D) raise the ratio of net debt to gross debt
 - E) B) and C)
 - F) B) and D)

- 23) Which of the following did not happen between 2002 and 2006
- A) U. S. current account became more negative
 - B) U. S. international indebtedness position became more negative
 - C) U. S. dollar depreciated
 - D) U. S. international indebtedness position became more positive
 - E) B) and C)
 - F) C) and D)

- 24) Which of the following was not a myth about the Great Depression, according to the *Economist* reading?
- A) The Great Depression started with the stock market crash of October, 1929
 - B) Policymakers did nothing in response to the collapse of output
 - C) The Great Depression started with actions by policymakers
 - D) New Deal policies hastened the recovery

- 25) Which of the following is false
- A) Supply shocks were adverse during 1997-99
 - B) Supply shocks were adverse during 1973-75
 - C) Supply shocks were beneficial during 1982-85
 - D) Supply shocks were adverse during 1979-81

- 26) The implied real interest rate is the nominal 10-year bond rate minus an estimate of expected inflation. Which of the following is true of the implied real interest rate
- A) It was constant 1970-2014
 - B) It was high during 1973-75
 - C) It was low during 1982-86
 - D) It was low during 2010-2014

- 27) Which of the following interest rates can be negative
- A) nominal interest rate on TIPS bonds
 - B) nominal 10-year treasury bond rate
 - C) nominal federal funds rate
 - D) real federal funds rate
 - E) A) and D)
 - F) B) and D)
- 28) In lecture the natural rate of unemployment was described as
- A) constant before 2007 then rising after 2007
 - B) falling in the 1990s and rising after 2007
 - C) falling in the 1980s and rising in the 1990s
 - D) rising in the 1980s, constant in the 1990s, then constant after 2000
- 29) Which of the following is lower in 2014 than in 2007
- A) unemployment rate
 - B) labor-force participation rate
 - C) involuntary part-time workers
 - D) employment-population ratio
 - E) A) and C)
 - F) B) and D)
- 30) As pointed out in class, which country has the smallest rise in real GDP per capita 2007-14?
- A) U.S.
 - B) Germany
 - C) Italy
 - D) Japan

- 1) C
- 2) C
- 3) A
- 4) D
- 5) D
- 6) C
- 7) A
- 8) A
- 9) C
- 10) A
- 11) D
- 12) C
- 13) B
- 14) B
- 15) A
- 16) C
- 17) B
- 18) A
- 19) D
- 20) E
- 21) B
- 22) E
- 23) B
- 24) C
- 25) A
- 26) D
- 27) E
- 28) B
- 29) F
- 30) C