FORM 2

Name:
Section No.:
Student ID No.:
GSI:

Economics 102
Introduction to Macroeconomics
Prof. Alan Deardorff
Answers to Midterm Exam 1

February 8, 1999

INSTRUCTIONS: READ CAREFULLY!!!

1. Please do not open the exam book until you are told to do so.

2. **PLACE YOUR NAME, STUDENT ID NO. (ALL TEN DIGITS PLEASE!), SECTION NUMBER AND FORM NUMBER ON THE EXAM AND ON THE SCANTRON SHEET. *THIS IS WORTH TWO POINTS ON THE EXAM***.

3. This exam has 100 points and is designed to take 60 minutes to complete. You have 80 minutes to complete the test. Check that you have all 10 pages of the exam.

4. **Section A** of the exam consists of 15 multiple choice questions worth 4 points each. Answers to the multiple choice questions in Section A should be marked on the scantron sheet. There are no penalties for guessing.

5. **Section B** consists of 6 questions for which you must provide written answers. Point values for questions in Section B are indicated in parentheses. Please write in the space provided.

6. Good luck!

GSI	Sections	
Alan	#202 - Thu 10-11:30	#207 - Thu 11.30-1
Alick	#203 - Thu 11.30-1	#210 - Thu 8:30-10
Emma	#209 - Thu 1-2:30	
Jim	#206 - Thu 10-11:30	#208 - Thu 2:30-4
Phil	#204 - Thu 1-2:30	#205 - Thu 2:30-4

PART A: Multiple Choice
(4 points each; 60 points total)

Answers in bold

A1. Suppose that between 1997 and 1998 the CPI rose by 25%. If the price of a macroeconomics textbook in 1998 is $60, what is the REAL value of the textbook in terms of 1997 dollars?

(a) $15.00
(b) $38.00
(c) $45.00
(d) $48.00
(e) $75.00

A2. According to the Fed, as reported in the Wall Street Journal Jan 21, the US is "showing solid economic growth." Which of the following is NOT one of the reasons for this, according to the report?

(a) Low interest rates.
(b) Low inflation.
(c) High exports.
(d) High consumer spending.
(e) Increases in housing starts.

A3. All of the following are true about the Consumer Price Index (CPI) EXCEPT:

(a) The basket is comprised of all goods purchased by consumers in the base year.
(b) It suffers from substitution bias, where people may substitute away from higher priced goods.
(c) New products may not be included because the basket is determined in the base year.
(d) It estimates the nominal price level.
(e) It is typically the basis for indexing government transfers.

A4. Suppose that you accepted a $4,000 student loan on January 1, 1999, which you agree to repay with interest on January 1, 2000. This loan has a nominal interest rate of 8% per year. When the loan is taken out, inflation is expected to be 5%. Suppose, however, that inflation turns out to be 2% in 1999. Which of the following statements is CORRECT?

(a) As a result of the actual inflation, the lender is receiving a higher payment in real dollars than the lender expected to receive when the loan was issued.
(b) The real interest rate that you expect to pay as of January 1 1999 is approximately 6%.
(c) The nominal repayment you will make on January 1 2000 will be $4,200.
(d) The nominal repayment will be worth less in 1999 dollars than you expected when you received the loan.
(e) The real value of the loan repayment in 1999 dollars will be $4,320.

A5. In the basket of goods and services used to compute the Consumer Price Index, the largest category is:

(a) Transportation.
(b) Housing.
(c) Food and beverages.
(d) Entertainment.
(e) Medical care.

A6. Which of the following will NOT lead to a change in investment for purposes of the national accounts?

a) Ford builds a factory in Flint
b) Ford builds houses for its retiring employees as part of the pension plan.
c) Ford produces 100 more trucks this year than it manages to sell.
d) Ford buys steel for use in next year's production.
e) William Buffet invests $1,000,000 in Ford stock.

A7. A US alchemist extracts $10 worth of lead and $20 worth of henrihyde triclintide from her mines, and turns it into $500 worth of gold, which is sold to consumers. The contribution of this to US GDP is:

(a) $30
(b) $470
(c) $500
(d) $530
(e) none of the above.

A8. Looking at the growth of per capita GDP in the major countries of the world in the last century or so,

(a) The largest growth rate was achieved by the US.
(b) India, because of its population growth, suffered a fall in per capita income.
(c) The smallest increase was achieved by Japan, perhaps because of its destruction during World War II.
(d) The per capita incomes of most countries doubled.
(e) The fastest growing country recorded a growth rate of per capita GDP of more than 10% a year for the entire period.

A9. Which of the following would be LEAST helpful in increasing a country's *per capita* GDP growth:

(a) A high savings rate.
(b) A high population growth rate.
(c) A high post-secondary school enrollment rate.
(d) An intensive infrastructure development program.
(e) Tax credits for businesses to conduct research and development.

A10. Which of the following would most likely cause BOTH productivity and GDP to rise?

(a) The retirement age is lowered from 65 to 64.
(b) A hurricane causes $10 billion in damage in southern Florida.
(c) Foreign direct investment in the US increases by $1 billion.
(d) New legislation restricts high school students to work no more than 15 hours per week.
(e) The proportion of students leaving high school early to enter the work force increases.

A11. In testimony before Congress on Jan 26, Clinton administration officials predicted that, if the U.S. were to restrict imports, this might cause:

(a) Inflation
(b) Higher interest rates
(c) Deeper recession in foreign countries
(d) Retaliation by foreign importers
(e) All of the above

A12. The economies of poor countries often grow faster than those of rich countries because:

(a) Returns to capital tend to be higher in poor countries.
(b) Returns to labor tend to be higher in poor countries.
(c) Productivity tends to be higher in poor countries.
(d) Population levels tend to be higher in poor countries.
(e) Natural resources tend to be more abundant in poor countries.

A13. If there is decrease in the government budget surplus (or an increase in the government budget deficit) then the supply of loanable funds will _____, while the equilibrium real rate of interest will _____.

(a) Increase; decrease.
(b) Increase; increase.
(c) Remain unchanged; decrease.
(d) Decrease; decrease.
(e) Decrease; increase

A14. Suppose you are considering buying a bond on the bond market. You see a bond that will mature in one year with a face value (principal) of $1,000 that will also pay, at the end of that year, a fixed interest payment of $100. The current interest rate in the market is 5%. If the financial securities are priced according to the present value of the expected future cash flows, what is the approximate price of this bond?

a) $952
b) $1000
c) $1047
d) $1095
e) $1100

A15. Which of the following statements is FALSE?

(a) One major difference between stocks and bonds is that stocks represent equity (ownership) while bonds are debt.
(b) If interest rates in the economy are increasing, we would expect to find bond prices falling.
(c) Mutual funds are popular with small investors as they allow risk diversification without large outlays of money.
(d) A company's stock price will adjust to reflect (amongst other things) changes in market expectations regarding future profits of the company.
(e) Individuals who wish to avoid risk will always prefer to purchase stocks rather than bonds.

PART B: Written Answers
(38 points total)

B1. Consider an economy in which the GDP deflator is the official government price index. The GDP deflator for each year is calculated using prices from the last day of each year. Suppose you are given the following information about this economy.

The base year for the GDP deflator is 1996.
The inflation rate between the end of 1997 and the end of 1998 was 20%.
The GDP deflator for 1997 was 110.
Nominal GDP was 4200 in 1998.
Nominal interest rates are fixed at 25% throughout this period.
In 1997, Real GDP (measured in base year prices) was 2500.

Note: In this question partial credit MAY be given if your answer is incorrect, but your method is correct. For this reason, we urge you to show your working for all parts to this question.

As a starting point, it might have been useful to construct a table like the one below to help you answer this question.

Year	Real GDP	Nominal GDP	GDP Deflator	Inflation
1996			100	
1997	2500		110	**10%**
1998	**3181.82**	4200	**132**	20%

(a) What was the GDP deflator in 1998? (2 points)

We know inflation was 20% throughout 1998 which tells us that the GDP deflator was 20% higher at the end of 1998 than it was at the end of 1997. And we know that the GDP deflator at the end of 1997 was 110.

So the GDP deflator in 1998 = GDP deflator in 1997 $\times$ 1.2 = 110 $\times$ 1.2 = 132.

(b) What was Real GDP in 1998? (2 points)

Real GDP in 1998 = (Nominal GDP in 1998 / GDP deflator in 1998) × 100
= (4200/132) × 100
= 3181.82

(c) What was the growth rate in Real GDP between 1997-1998? (2 points)

Growth rate in real GDP = (Real GDP in 1998 – Real GDP 1997) / Real GDP in 1997
= (3181.82 – 2500) / 2500
= 681.82 / 2500
= 0.2727 = 27.27%

(d) What was the real interest rate on a loan between 1996 and 1997? (2 points)

Between 1996 and 1997 inflation was 10% (the GDP deflator increased from 100 to 110).

We know that the nominal rate of interest is 25%, so the real rate is approximately equal to 15% (i.e. the nominal rate minus the rate of inflation).

Or, more precisely, we know that:

$$(1+r) = \frac{(1+i)}{(1+\Pi)} = \frac{1.25}{1.10} = 1.1364$$

So that the real rate is equal to 13.64%.

B2. For each of the following expenditures discuss whether:

(i) It would change this year's GDP? Why or why not?
(ii) The item would appear in the C+I+G+NX decomposition of GDP? If so where? If not, why not?

(a) You buy a 1997 Ford Escort that has been sitting in the dealer's lot for 17 months. (2 points)

(i) This year's GDP would not change as there has been no new good or service produced. GDP would have increased in the year that the car was made.

(ii) The transaction would, however, appear in aggregate expenditure. Consumption spending would increase and Investment spending would decrease, leaving no change overall. When the car was not sold to a final consumer in the year it was produced, it went into the firm's inventory, hence increasing Investment in that year. In the year it was sold, the firm's inventory fell, causing Investment to fall also.

(b) A chicken farm in Bolivia purchases a John Deere tractor that is built for it at the factory in Illinois. (2 points)

(i) GDP would increase as there is extra output being produced on US soil.

(ii) This would count as an increase in Net Exports.

(c) The chef from The Mongolian Barbecue (a famous Ann Arbor restaurant) purchases 100 pounds of beef from an Ann Arbor butcher for use in the restaurant. (2 points)

(i) There is no final good or service being produced here as the beef is an intermediate good in the production of restaurant meals.

(ii) None of the components of aggregate expenditure are affected.

(d) Your room-mate buys lunch from "Le Burger", a French-owned fast food store operating in Ann Arbor. (2 points)

(i) The burger was produced on US soil so US GDP goes up. It does not matter whether it was a French or US-owned company that made the burger.

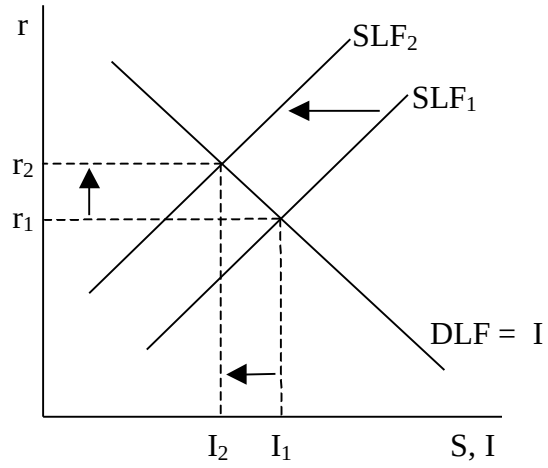
(ii) This is simply an increase in Consumption spending.

B3. In the space provided below, analyze how each of the following will affect the market for loanable funds. In each case you need to:

- Provide a brief written explanation of the effects on the equilibrium rate of interest and the level of savings and investment;
- Draw a diagram illustrating these effects;
- Assess the resulting effect of the change on GDP growth.

(a) The Federal Government spends an additional $100 million per year on building and operating a new military base in Alaska. Taxes remain unchanged. (4 points)

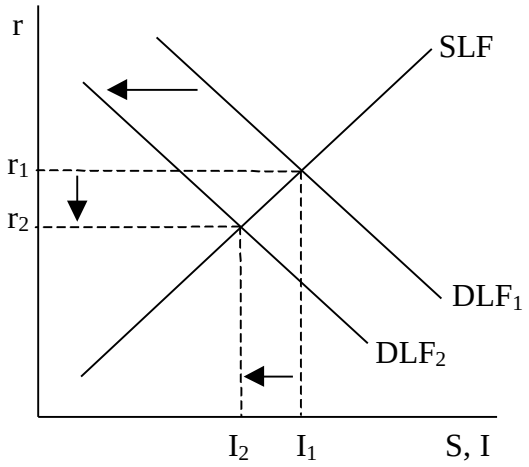
We know that National Savings = S + (T-G), so an increase in G will cause National Savings to fall. This is a shift inwards (to the left) of the savings curve in the market for loanable funds. As a result, the equilibrium real rate of interest will increase, and the level of investment will fall.



The decrease in investment means a decrease in the rate of growth of the capital stock, so GDP growth will fall.

(b) The Asian economic crises cause many US businesses to postpone planned expansions of their operations. (4 points)

This is often referred to as a decrease in business confidence. If firms postpone planned expansions, this is a decrease in investment. The demand curve for loanable funds will shift to the left. The equilibrium rate of interest will fall, as will the equilibrium level of savings and investment.



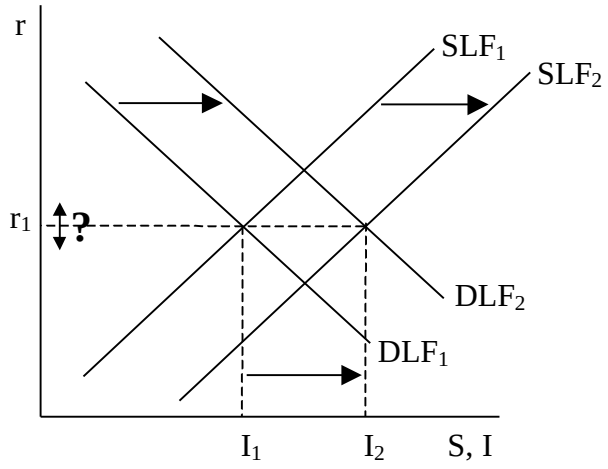
The decrease in investment means a decrease in the rate of growth of the capital stock, so GDP growth will fall.

(c) Congress passes a law which mandates that employers match employee retirement savings. The same law also reduces businesses' tax liability in years where they purchase new plant and equipment. (4 points)

The part of the law requiring employers to match their employees retirement savings will provide a greater incentive to save and imply an outward shift of the savings curve in the market for loanable funds. On its own, this would put downward pressure on the rate of interest.

The part of the law reducing businesses' tax liability when they purchase investment goods will provide a greater incentive to invest and cause an outward shift in the investment curve in the market for loanable funds. On its own, this would put upward pressure on the rate of interest.

One of the changes is putting upward pressure on the rate of interest, while the other is putting downward pressure on the rate of interest. Overall, then, we do not know the effect on the rate of interest. The way it is drawn below, it does not change, but we know that it could also have either increased or decreased. However we do know that the level of investment and saving in equilibrium certainly increases.



Investment certainly goes up so the rate of growth in the capital stock increases and GDP growth increases.

B4. What are three problems with using GDP per capita as a measure of the well-being of a country? (3 points)

- GDP does not take into account the cost to the environment from production.
- GDP does not account for the value of leisure.
- Only market activities are included in GDP.
- The composition of output is not examined (e.g. crashing my car increases GDP when I have it repaired).

B5. In class we have discussed various reasons why some countries are relatively rich, while other countries are relatively poor (as measured by GDP per capita).

(a) Based on what you have learned in class, suggest two ways in which the government of a country with low GDP per capita could help boost GDP growth. (2 points)

(b) Explain, using the production function introduced in class, the mechanism by which these policies will work. (2 points)

Production function: Y=AF(K,L,H,N). Government policy will generally affect GDP per person by influencing the level of physical capital (K), human capital (H), research and development (which affects the technology parameter A), and population growth.

Ways in which the government can do this:

i. Maintaining political stability. The production function plots all the points on a country's Production Possibility Frontier. Recall from Econ 101 that if a country is operating on its PPF then it is operating efficiently. If it is operating inside is PPF it is inefficient, as it is not getting all the output it could from its resources. Promoting political stability as a means to improve GDP per capita can be modeled as ensuring that the economy is on its PPF as much as possible, and hence is getting all the output it can given its resources.

ii. Encouraging saving and/or investment, by using policies such as tax exemptions. Savings and investment lead to growth in the physical capital stock. A higher capital stock means higher GDP and higher GDP per person.

iii. Providing education and training. This increases the human capital stock and hence increases GDP per capita.

iv. Allowing free trade. Free trade allows us to use our resources more efficiently, as through specialization and trade we can take advantage of our comparative advantages, hence increasing GDP and GDP per person.

v. Providing incentives to reduce population growth. Although population growth increases the labor force, which – as we can see from the production function - increases the *level* GDP, population growth will tend to decrease GDP *per capita*. Because of diminishing returns in the production function, as the level of labor supply increases we get extra output, but at a decreasing rate. If the population growth rate is higher than the growth rate of GDP due to increases in the labor supply, the level of GDP per capita will fall.

vi. Facilitate research and development. Research and development has the potential to increase the value of the technology parameter (A) in the production function.

B6. Name one group in the economy for whom the measurement of the rate of inflation via the Consumer Price Index matters, and explain why. Would that group be made better off or worse off if the Boskin Commission recommendation were followed? (3 points)

The measurement of the CPI will matter for anyone whose payments are indexed to the CPI, such as social security recipients, union members whose wage contracts provide for automatic cost of living increases based on the CPI, or holders of inflation indexed bonds.

This group would be made worse off if the recommendation of the Boskin Commission were adopted, as this would cause the increase in the measured CPI to be smaller.

The Boskin Commission found that the CPI as it is measured overstates the cost of living by approximately 1.1%, due to factors such as the substitution bias, and suggested ways in which a more accurate price index could be constructed. This would result in smaller annual increases for individuals whose payments are indexed to the CPI.