

FINAL EXAMINATION VERSION A

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators or calculators with alphabetical keyboards are NOT permitted. Cell phones or other wireless devices are NOT permitted. Point values for each question are noted in brackets. Points will be subtracted for illegible writing or incorrect rounding. Maximum total points are 200.

I. Multiple choice: Circle the one best answer to each question. [1 pts each, 20 pts total]

- (1) Rational choice implies pursuing an activity until the marginal benefit of the last unit
- is much less than its marginal cost.
 - is much greater than its marginal cost.
 - begins to exceed its marginal cost.
 - begins to fall below its marginal cost.
- (2) "An increase in interest rates might cause a recession" is an example of
- a positive statement.
 - a normative statement.
 - both of the above.
 - none of the above.
- (3) Farm A can produce 100 units of corn or 25 units of soybeans. Farm B can produce 300 units of corn or 150 units of soybeans. Which farm has a comparative advantage in corn?
- Farm A.
 - Farm B.
 - Both farms.
 - Neither farm.
- (4) Monetary exchange is more common today than bartering because
- bartering is a lost art.
 - monetary exchanges are subject to less tax.
 - bartering requires a "double coincidence of wants."
 - bartering is often illegal whereas anything can be legally bought and sold with money.
- (5) Potential GDP does *not* depend on
- total hours of all workers
 - the total money supply.
 - total economic capital available.
 - technology or know-how available.
- (6) Taxes and government spending are components of
- foreign policy.
 - monetary policy.
 - international trade policy.
 - fiscal policy.
- (7) Investment spending in the national accounts does *not* include purchases of
- shares of stock in corporations.
 - new homes.
 - tractor-trailer trucks.
 - telecommunications equipment.
 - new factories.
- (8) The rate at which you can buy euros with your dollars is called the
- real interest rate.
 - trade balance.
 - market exchange rate.
 - purchasing-power parity exchange rate.
- (9) Government-sponsored employment agencies, which try to match workers to job vacancies submitted by employers, are likely to reduce the unemployment rate according to the
- Phillips curve theory of unemployment.
 - job rationing theories of unemployment.
 - job search theories of unemployment.
 - none of the above.
- (10) The so-called "natural rate of unemployment" does not include
- cyclical unemployment.
 - structural unemployment.
 - frictional unemployment.
 - unemployment for less than four weeks.
 - unemployment for more than four weeks.

(11) If the interest rate rises in the United States and remains constant in other countries, imports will increase and exports will decrease because

- a. the dollar will appreciate against other currencies.
- b. the dollar will depreciate against other currencies.
- c. consumers will increase their total spending.
- d. exporters will be unable to borrow money.
- e. foreign importers will be unable to borrow money.

(12) Hyperinflation is caused by excessive

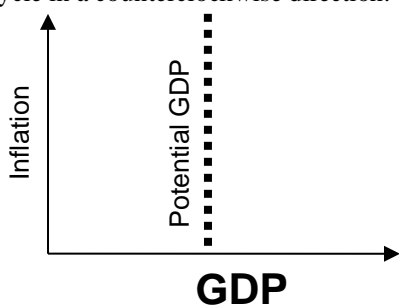
- a. taxes.
- b. government borrowing.
- c. government spending.
- d. growth of the money supply.
- e. consumption spending.

(13) Most economists believe that business cycles are caused mainly by fluctuations in

- a. the labor force.
- b. the capital stock.
- c. aggregate demand.
- d. the population.
- e. aggregate supply (that is, potential GDP).

(14) On a graph like that below, most economic fluctuations cause the economy to

- a. move horizontally left and right.
- b. move vertically up and down.
- c. cycle in a clockwise direction.
- d. cycle in a counterclockwise direction.



(15) Keynes's consumption function implies that if government purchases increase, then in the short run, GDP will

- a. decrease.
- b. increase by less than the change in government purchases.
- c. increase by exactly the same amount as the change in government purchases.
- d. increase by more than the change in government purchases.

(16) Which of the following is an "automatic stabilizer" for the economy?

- a. balanced-budget laws.
- b. defense spending.
- c. tax payments.
- d. the money supply.
- e. highway construction.

(17) U.S. states with the highest GDP per capita a hundred years ago have since then

- a. grown more slowly than other states.
- b. grown faster than other states.
- c. grown at the same rate as other states.
- d. stopped growing.

(18) Who wants to buy Euros and sell U.S. dollars?

- a. U.S. companies exporting to Europe.
- b. U.S. companies importing from Europe.
- c. Both of the above.
- d. None of the above.

(19) The inflation rate has been higher in Brazil than in the United States. In the long run, this should cause the exchange rate (the price of the U.S. dollar in terms of Brazilian currency) to

- a. rise.
- b. fall.
- c. remain unchanged.
- d. fluctuate randomly.

(20) A country that fixes its exchange rate can no longer have an independent

- a. foreign policy.
- b. monetary policy.
- c. fiscal policy.
- d. trade policy.
- e. industrial policy.

II. Problems: Insert your answer to each question in the box provided. Use graphs and margins for scratch work. Only the answers in the boxes will be graded. Work carefully: partial credit is not normally given for questions in this section.

(1) [Economic capital: 6 pts] Which of the following are examples of *economic capital*? Answer YES or NO.

a. Office buildings.

b. U.S. Treasury bonds.

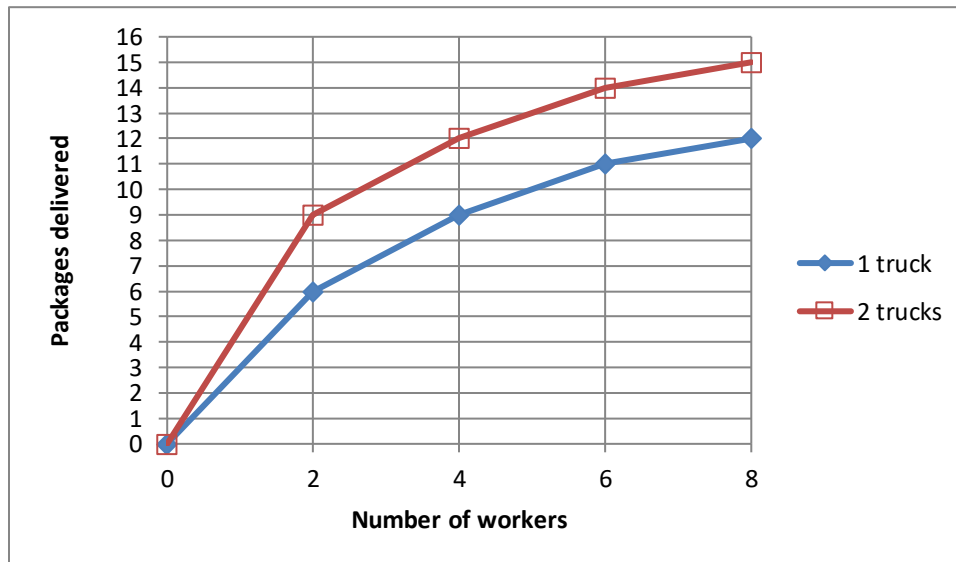
d. Shares of stock in corporations.

c. Farm tractors.

e. Oil drilling platforms.

f. Warehouses.

(2) [Production functions: 6 pts] Acme Package Delivery uses workers and trucks to deliver packages. Its production function is illustrated by the following graphs. Suppose the company employs **one truck and two workers**.



a. What is the average product of workers?

packages per worker

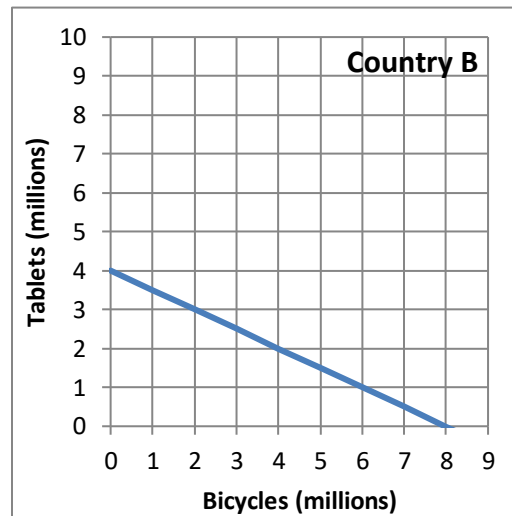
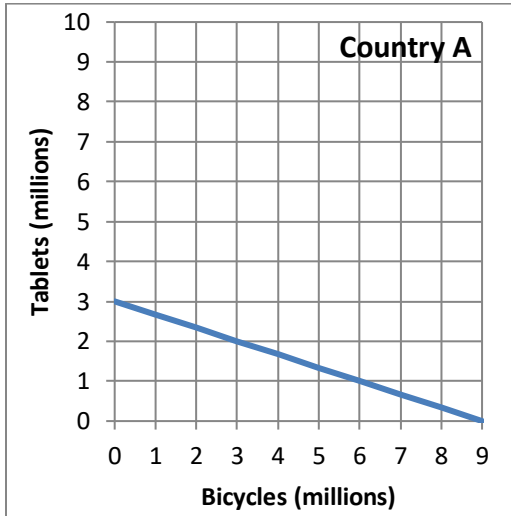
b. What is the marginal product per worker, if the number of workers were increased from two to four?

packages per worker

c. What is the marginal product per truck, if the number of trucks were increased from one to two?

packages per truck

(3) [Comparative advantage, gains from trade: 17 pts] Country A and Country B each produce bicycles and tablets. They each face a tradeoff between these two products because their workforces are limited. Their production possibility curves are shown below.



- a. [2 pts] What is Country A's opportunity cost of producing a bicycle?
- b. [2 pts] What is Country B's opportunity cost of producing a bicycle?
- c. [2 pts] What is Country A's opportunity cost of producing a tablet?
- d. [2 pts] What is Country B's opportunity cost of producing a tablet?
- e. [2 pts] Which country has a comparative advantage in producing bicycles?
- f. [2 pts] Which country has a comparative advantage in producing tablets?

	tablets
	tablets
	bicycles
	bicycles

- g. [3 pts] Fill in the blanks: *Both* countries can consume combinations of bicycles and tablets *outside* their individual production possibility curves if _____ produces and exports **two million** tablets to _____, which produces and exports _____ million bicycles in return.
- h. [2 pts] **Plot** the trade that you propose in part (g) on the graph above. For each country, plot and label the starting point representing **production before trade**, and the ending point representing **consumption after trade**.

(4) [Shifts in demand and supply: 15 pts] Analyze each of the following markets according to the accompanying imaginary scenario.

a. Consider the market for **fish oil**. A new government report finds that consumption of fish oil prevents many diseases.

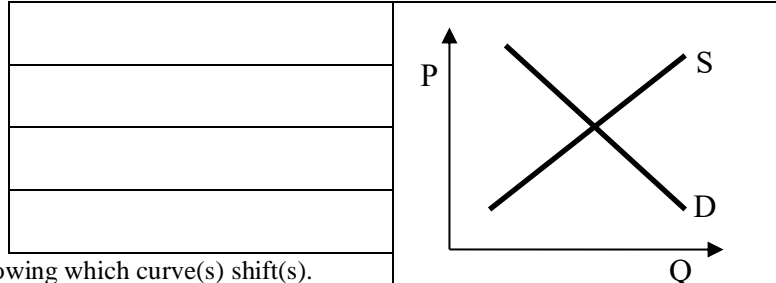
Does demand shift *left*, shift *right*, or remain *unchanged* ?

Does supply shift *left*, shift *right*, or remain *unchanged* ?

Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?

Does the equilibrium quantity *increase*, *decrease*, or *cannot be determined* ?

Sketch a graph of this scenario at right, showing which curve(s) shift(s).



b. Consider the market for **apple juice**. The price of raw apples (from which juice is made) rises.

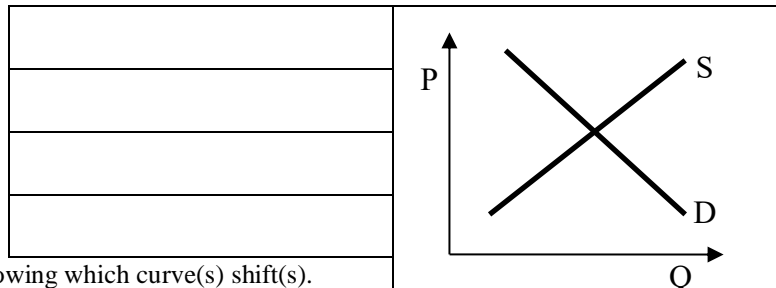
Does demand shift *left*, shift *right*, or remain *unchanged* ?

Does supply shift *left*, shift *right*, or remain *unchanged* ?

Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?

Does the equilibrium quantity *increase*, *decrease*, or *cannot be determined* ?

Sketch a graph of this scenario at right, showing which curve(s) shift(s).



c. Consider the market for **airline tickets**. The price of jet fuel rises. At the same time, a recession lowers consumers' incomes.

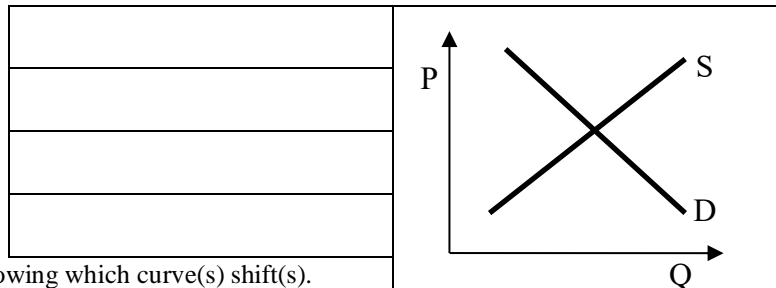
Does demand shift *left*, shift *right*, or remain *unchanged* ?

Does supply shift *left*, shift *right*, or remain *unchanged* ?

Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?

Does the equilibrium quantity *increase*, *decrease*, or *cannot be determined* ?

Sketch a graph of this scenario at right, showing which curve(s) shift(s).



(5) [Components of GDP: 16 pts] The imaginary country of Concrete Land has just four industries: the Raw Concrete Industry, the Building Construction Industry, the Road Construction Industry, and the Birdbath Industry. There are no other goods and no foreign trade. In a recent year:

- The Birdbath Industry produced and sold \$800 billion of birdbaths to consumers.
- The Road Construction Industry produced \$300 billion of roads for the government.
- The Building Industry produced and sold \$50 billion of buildings (a capital good) to each industry (including itself) for a total of \$200 billion in sales.
- The Raw Concrete Industry produced and sold, \$300 billion to the Birdbath Industry, \$100 billion to the Road Construction Industry, and \$50 billion of raw concrete to the Building Industry, for a total of \$450 billion in sales.

a. Compute the spending components of Concrete Land's GDP.

Consumption (C)	\$	billion
Investment (I)	\$	billion
Government purchases (G)	\$	billion
Total GDP (Y)	\$	billion

b. Compute value added by each industry in Concrete Land.

Raw Concrete Industry	\$	billion
Building Industry	\$	billion
Road Construction Industry	\$	billion
Birdbath Industry	\$	billion

(6) [GDP, saving, GDP per capita: 6 pts] The table below shows data for the United States as reported by the Bureau of Economic Analysis in *trillions*. [Hint: Some of the data are extraneous and not needed for solving this problem.]

	2010
Transfers	\$2.3
Government purchases	\$3.2
Consumption	\$10.2
Population in millions	310
Investment	\$2.1
Personal taxes	\$1.2
Net exports	\$-0.5

a. Compute GDP.

\$	trillion
\$	trillion
\$	

b. Compute national saving (S).

c. Compute GDP per capita to the nearest dollar.

(7) [Value added: 2 pts] Suppose a bookstore has sales of \$600,000 in a year. Over the same year, it pays its employees \$120,000, it leases the shop for \$40,000, and it purchases \$350,000 in books from publishers. Compute the value added by the bookstore.

\$

(8) [Nominal GDP, real GDP, and inflation: 7 pts] The following table shows data for Israel, in billions of *shekels* the Israeli currency.

Year	Nominal GDP	Real GDP	GDP price index or price deflator (to the nearest tenth)	Rate of inflation (to the nearest tenth of a percentage point)
2008	765	810		
2009	809	820		%
2010	866	866		%

a. [2 pts] Which is the base year for real GDP?

b. [3 pts] Compute the GDP price index for each year, to the nearest tenth, and insert it in the table above. [Hint: The price index should equal 100.0 in the base year.]

c. [2 pts] Compute the rate of inflation for the last two years, to the nearest tenth of a percentage point, and insert in the table above.

(9) [Measuring the labor force: 8 pts]] The U.S. Bureau of Labor Statistics reported the following data for January 2013. [Hint: Some of the data are extraneous and not needed for solving this problem.]

Labor force	155.7 million
Not in labor force	89.9 million
Mean duration of unemployment	35.4 weeks
Continued claims for unemployment insurance	3.2 million
Employed	143.4 million

- Compute the number of unemployed people to the nearest tenth of a million.
- Compute the unemployment rate to the nearest tenth of a percentage point.
- Compute the employment-to-population ratio to the nearest tenth of a percentage point.
- Compute the labor force participation rate to the nearest tenth of a percentage point.

million
%
%
%

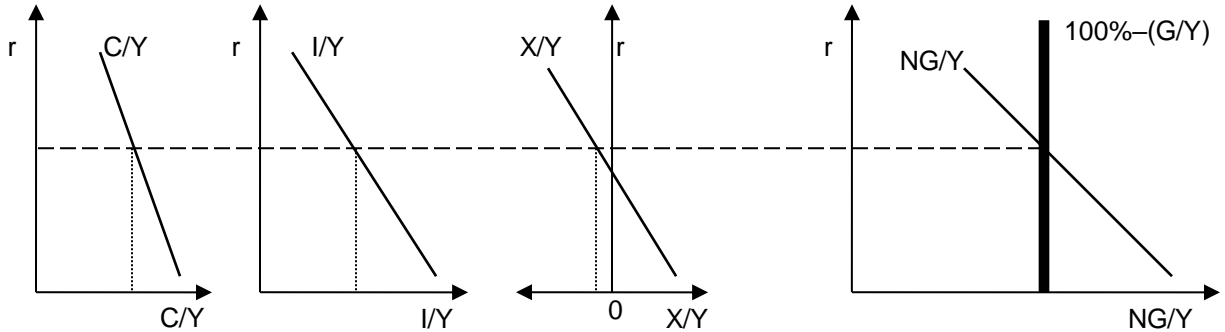
(10) [Growth of capital stock: 2 pts] The following data (in chained 2009 dollars) were reported by the U.S. Bureau of Economic Analysis.

Exports in 2007	\$1.6 trillion
Private capital stock at end of 2006	\$32.9 trillion
Imports in 2007	\$2.4 trillion
Labor income (compensation of employees) in 2007	\$7.9 trillion
Corporate profits in 2007	\$1.5 trillion
Depreciation in 2007	\$1.9 trillion
Government purchases in 2007	\$2.9 trillion
Consumption in 2007	\$10.0 trillion
Gross private investment in 2007	\$2.6 trillion

Compute the private capital stock at the end of 2007. [Hint: Some data are extraneous and not needed for this problem.]

\$	trillion
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(11) [Interest rate and GDP shares: 16 pts] Suppose government purchases' share of total output, that is (G/Y), decreases. Use the GDP shares model in the graphs below to answer the following questions.



- Does the consumption share (C/Y) curve shift *left*, shift *right*, or remain *unchanged*?
- Does the investment share (I/Y) curve shift *left*, shift *right*, or remain *unchanged*?
- Does the net exports share (X/Y) curve shift *left*, shift *right*, or remain *unchanged*?
- Does the downward-sloping nongovernment share (NG/Y) curve shift *left*, shift *right*, or remain *unchanged*?
- Does the vertical nongovernmental share line (labeled “ $100\%-(G/Y)$ ”) shift *left*, shift *right*, or remain *unchanged*?
- Does the real interest rate (r) *increase*, *decrease*, or remain *unchanged*?
- Does the long-run growth rate of potential GDP *increase*, *decrease*, or remain *constant*?
- Justify your answer to part (g).

(12) [Technical change: 4 pts] In Canada over the period 1965 to 1990, the annual growth rate of output per worker was 1.8%, and the annual growth rate of capital per worker was 3.3%. Assume that the share of capital income plus depreciation in national income was about $(1/3)$, as it is in the United States.

- Compute the contribution of capital to productivity growth, to the nearest tenth of a percentage point.
- Compute the contribution of technology to productivity growth, also called the Solow residual, to the nearest tenth of a percentage point.

	%
	%

(13) [Measuring the money supply: 8 pts] In January 2010, the U.S. government reported the following data. [Hint: Some of the data are extraneous and not needed for this problem.]

Travelers checks, demand deposits, and other checkable deposits	\$0.8 trillion
GDP for 2010	\$15.0 trillion
Commercial paper outstanding	\$1.1 trillion
Savings deposits, small time deposits, money-market mutual funds, and other deposits on which check writing is limited or not allowed	\$6.7 trillion
Total Federal debt	\$13.4 trillion
Bank reserves	\$1.1 trillion
Consumer credit outstanding	\$2.5 trillion
Currency	\$0.9 trillion

- a. Compute the money supply measure "M1."
- b. Compute the money supply measure "M2."
- c. Compute the velocity of "M1" to the nearest tenth.
- d. Compute the monetary base.

	\$	trillion
	\$	trillion
	\$	trillion

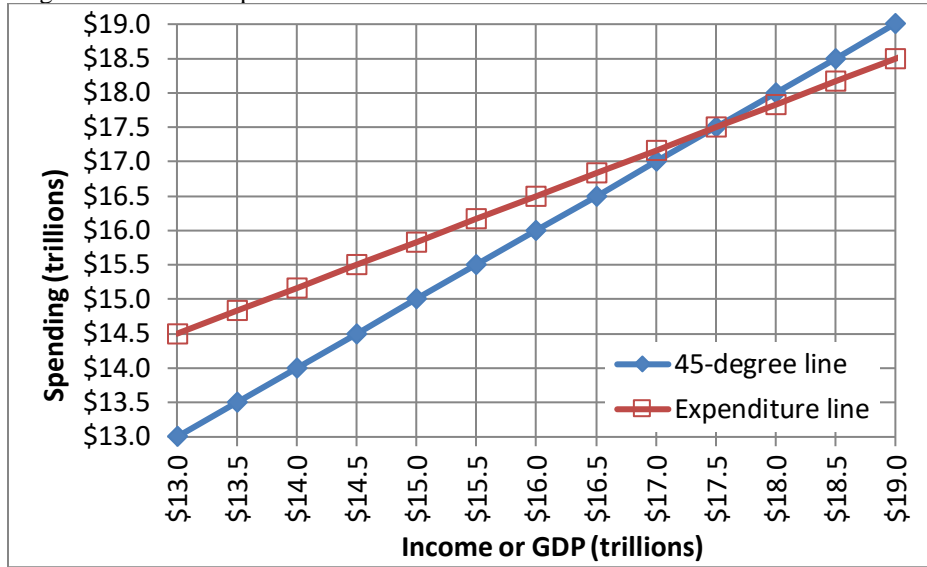
(14) [Quantity equation: 2 pts] Average annual growth rates for various items over the period 1980 to 2000 are reported below. [Hint: Some of the data are extraneous and not needed for this problem.]

Real investment spending	5.1%
Consumer credit	8.0%
Real GDP	3.4%
Nonfarm employment	1.9%
Money supply (M2)	5.8%

Assuming the velocity of money were constant, what should have been the average annual rate of inflation over this period, according to the quantity equation? Give an answer to the nearest tenth of a percentage point.

%

(15) [Keynesian cross, Keynesian multipliers: 12 pts] The following diagram shows a Keynesian cross diagram, including a 45-degree line and an expenditure line.



a. What is the current level of real GDP—that is, the point of "spending balance"?

\$	trillion
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Suppose government purchases *decrease* by \$ 0.5 trillion.

b. Does the expenditure line shift *up or down* in the short run?

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c. By how much (measured vertically)?

\$	trillion
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d. Does GDP *increase or decrease* in the short run?

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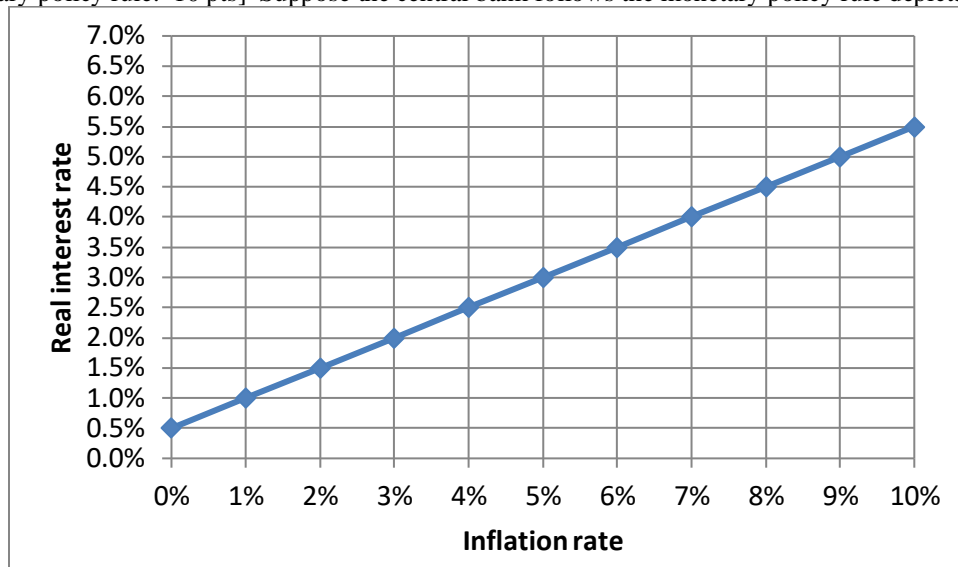
e. By how much?

\$	trillion
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f. Compute the government-purchases multiplier from your previous answers to this problem.

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(16) [Monetary policy rule: 10 pts] Suppose the central bank follows the monetary policy rule depicted below.

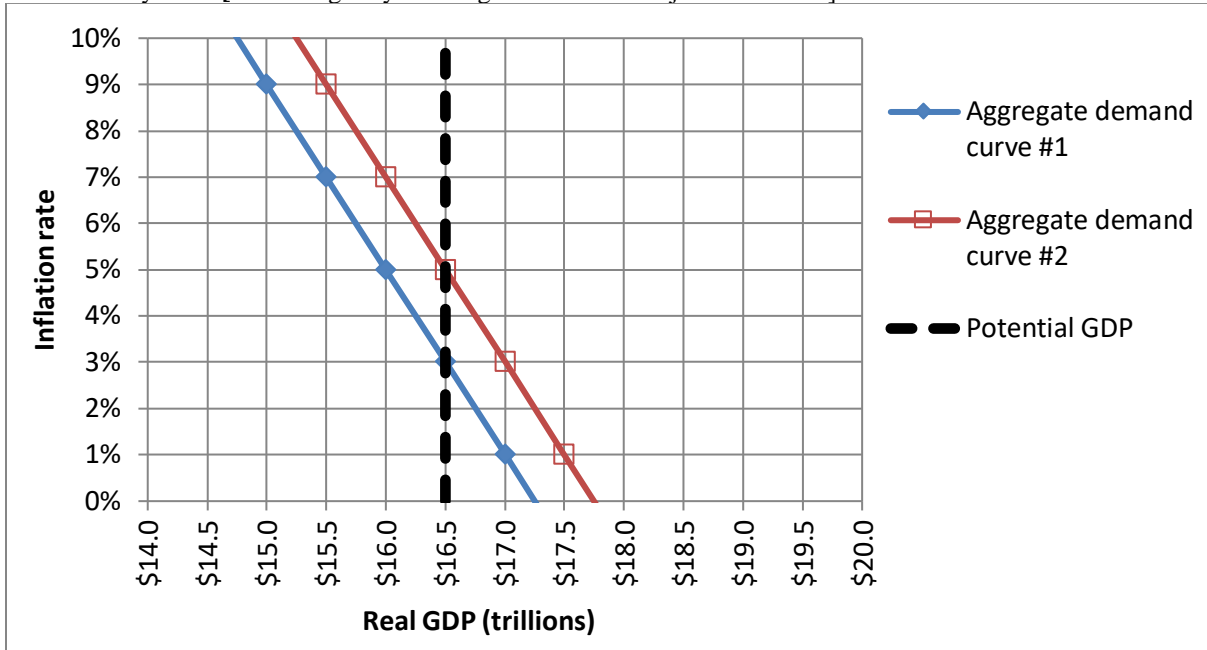


Suppose the inflation rate is now **3 %**.

- What level of the *real* interest rate will the central bank set?
- What level of the *nominal* interest rate does this imply?
- Suppose monetary policy is “tightened.” Does that mean that the policy rule curve shifts *up*, shifts *down*, or remains *unchanged*?
- In the *short run*, will GDP *increase*, *decrease*, or remain *unchanged*?
- In the *short run*, will the inflation rate *increase*, *decrease*, or remain *unchanged*?

	%
	%

(17) [Inflation adjustment: 16 pts] Consider the following graph of the macroeconomy, similar to those in Taylor's textbook. Suppose that the aggregate demand curve is currently at "aggregate demand curve #1" and the inflation rate is currently 3%. [Hint: Begin by drawing the "inflation adjustment" line.]



a. What is the current level of real GDP?

\$	trillion

b. Is the unemployment rate currently *greater* than the natural rate, *less* than the natural rate, or *equal* to the natural rate of unemployment?

Now suppose the government passes a large spending increase and the aggregate demand curve shifts to "aggregate demand curve #2."

c. What is the level of real GDP in the short run?

\$	trillion
%	

d. What is the inflation rate in the short run?

e. Is the unemployment rate *greater* than the natural rate, *less* than the natural rate, or *equal* to the natural rate of unemployment in the short run?

f. What will be the level of real GDP in the long run?

\$	trillion
%	

g. What will be the inflation rate in the long run?

h. Is the unemployment rate *greater* than the natural rate, *less* than the natural rate, or *equal* to the natural rate of unemployment in the long run?

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(18) [Fiscal policy, tax rates: 4 pts] Suppose person has income of \$100,000 and owes a total of \$19,000 in taxes.

a. Compute this person's *average tax rate*.

%	
\$	

b. Suppose this person's *marginal tax rate* is 28%. Compute the **total** amount this person would owe in taxes if this person's income were \$100,500.

\$	
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(19) [Monetary policy: 6 pts] According to the *Wall Street Journal*, “one rule of thumb at the Fed is that long-term interest rates fall 0.03 percentage point ... for every \$100 billion of long-term bonds that the central bank purchases.”¹ Use this rule of thumb to answer the following questions.

First, suppose that the Fed **buys \$500 billion** of long-term bonds.

- a. Will the money supply *increase* or *decrease*?
- b. Will interest rates *increase* or *decrease*?
- c. By how much--that is, by how many percentage points?

percentage points

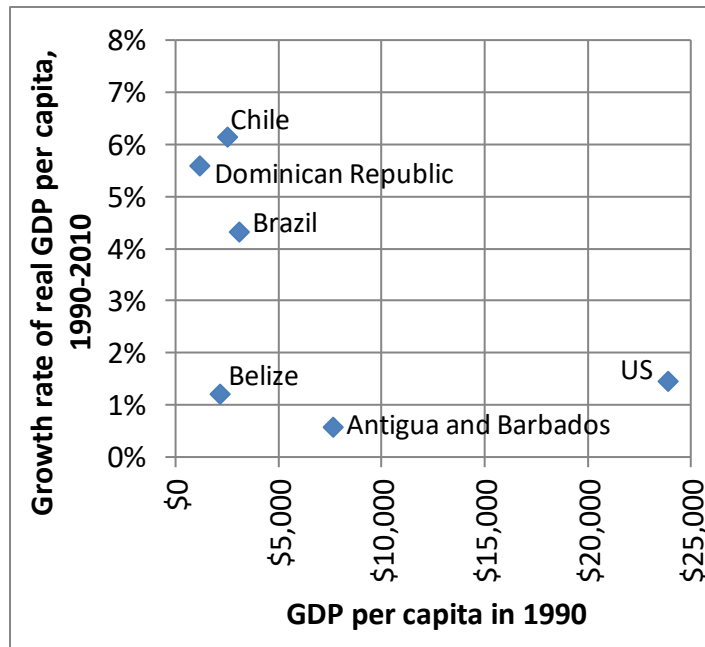
Alternatively, suppose that the Fed wants to **raise interest rates by 0.45** percentage points.

- d. Will the Fed *buy* bonds or *sell* bonds?
- e. How much?
- f. Will the money supply *increase* or *decrease* as a result?

\$ billion

(20) [GDP growth around the world: 10 pts] The graph at right plots the growth rate of real GDP per capita from 1990 to 2010, against initial real GDP per capita in 1990, for six countries. Which countries’ real GDP per capita *converged* toward that of the United States over this period? Answer YES or NO.

a. Antigua and Barbados	
b. Belize	
c. Brazil	
d. Chile	
e. Dominican Republic	



¹ *Wall Street Journal*, June 21, 2012, p. A14.

(21) [International accounts: 4 pts] The table below shows U.S. international transactions for 2009 as reported by the Bureau of Economic Analysis.

Exports of goods	\$1.1 trillion
Imports of goods	\$1.6 trillion
Exports of services	\$0.5 trillion
Imports of services	\$0.4 trillion
Income payments	\$0.5 trillion
Transfer payments	\$0.2 trillion
Income receipts	\$0.6 trillion
Transfer receipts	\$0.1 trillion

a. Compute the trade balance.

\$	trillion
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b. Compute the current account balance.

\$	trillion
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III. Critical thinking: Write a one-paragraph essay answering ONE question below (your choice). [3 pts]

- (1) The *Wall Street Journal* reported last week that “currencies across the globe are tumbling against the greenback.”² Countries like Japan, which is on the brink of recession, are seeing the value of their currency fall against the U.S. dollar. How could Japan’s central bank raise the value of its currency, the yen? Would you recommend that the central bank do that? Why or why not?
- (2) In an opinion piece in the *Wall Street Journal*, a writer argues that a good way to reduce the U.S. trade deficit is to encourage savings.³ Do you agree or disagree? Why?

Please circle the question you are answering and write your answer below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling.

[end of exam]

² Nicole Friedman, “Dollar’s Rise is Pain Abroad,” *Wall Street Journal*, December 4, 2014, pp. A1, A12.

³ Charles Wolf Jr, “Our Misplaced Yuan Worries,” *Wall Street Journal*, December 15, 2007, page A12.