

Midterm Examination

Macroeconomics, 1062 Semester (Spring 2018)
College of Management, National Chiao Tung University
Instructor: Professor Alex YiHou Huang
April 16, 2018

Instructions

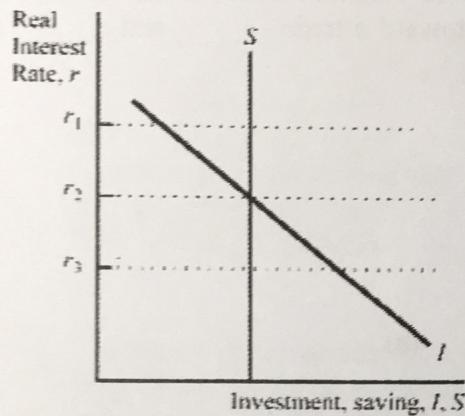
- Please read the questions carefully and make sure you provide answers to all parts of questions.
- Raise your hand if you have any problem. Please do not talk to or exchange notes with other students.
- No bathroom breaks are allowed.
- Turn off your cell phone(s) and any other electronic device.

Part I. Multiple Choice (72%, 3 points each, choose one correct answer):

1. When exports exceed imports, *all* of the following are true *except*:
 - (A) net capital outflows are positive.
 - (B) domestic saving exceeds domestic investment.
 - (C) net exports are positive.
 - (D) government spending exceeds tax revenue.
 - (E) domestic output exceeds spending.
2. If the fraction of employed workers who lose their jobs each month (the rate of job separation) is 0.01 and the fraction of the unemployed who find a job each month is 0.09 (the rate of job findings), then the natural rate of unemployment is:
 - (A) 1 percent.
 - (B) 5 percent
 - (C) 9 percent.
 - (D) 10 percent.
 - (E) about 11 percent.
3. If the nominal exchange rate falls 10 percent, the domestic price level rises 4 percent, and the foreign price level rises 6 percent, the real exchange rate will fall:
 - (A) 0 percent.
 - (B) 4 percent.
 - (C) 8 percent.
 - (D) 10 percent.
 - (E) 12 percent.

$\times + 6 - 4 = -10$

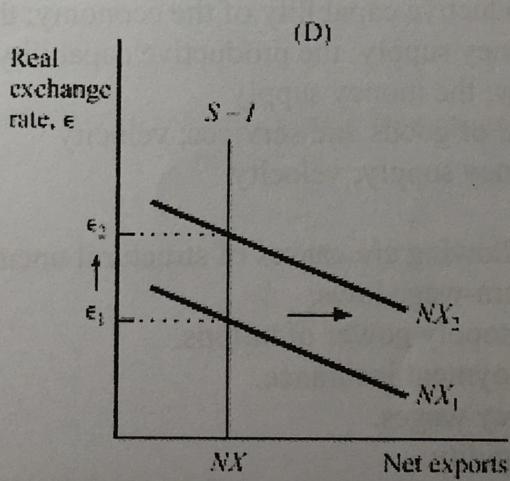
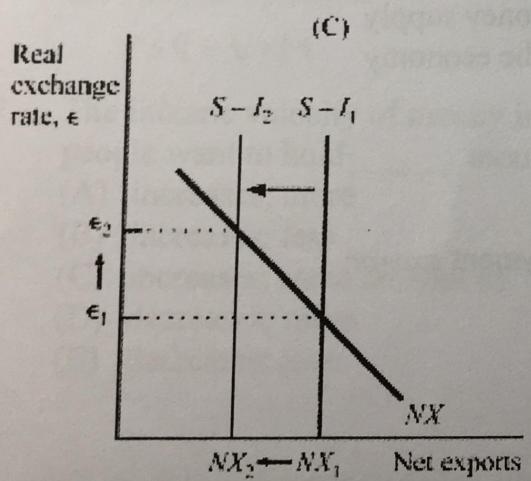
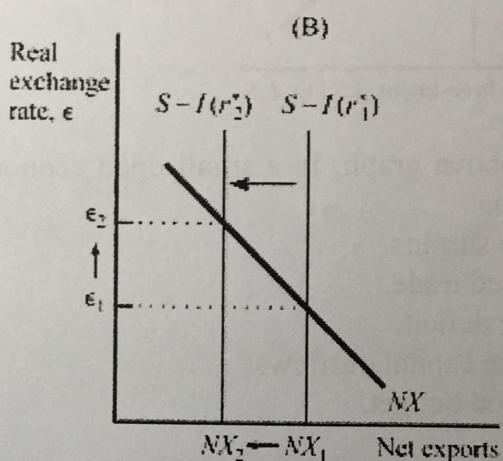
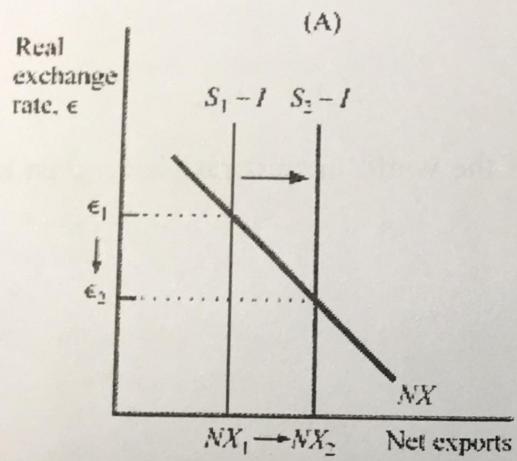
4. To reduce the money supply, the Central Bank:
- (A) buys government bonds.
 - (B) sells government bonds.
 - (C) print more money.
 - (D) creates demand deposits.
 - (E) destroys demand deposits.
5. Sectoral shifts:
- (A) lead to wage rigidity.
 - (B) encourage strong worker unions.
 - (C) explain the payment of efficiency wages.
 - (D) depend on the level of the minimum wage.
 - (E) make frictional employment inevitable.
6. In a small open economy, if exports equal \$15 billion and imports equal \$8 billion, then there is a trade _____ and _____ net capital outflow.
- (A) deficit; negative
 - (B) surplus; negative
 - (C) balance; negative
 - (D) deficit; positive
 - (E) surplus; positive
7. The income velocity of money increases and the money demand parameter k _____ when people want to hold _____ money.
- (A) increases; more
 - (B) increases; less
 - (C) increases; same amount of
 - (D) decreases; more
 - (E) decreases; less
8. All of the following policies were adopted by government in an attempt to reduce the natural rate of unemployment *except*:
- (A) government employment agencies.
 - (B) unemployment insurance.
 - (C) public retraining programs.
 - (D) establishing a website to exchange information about jobs and candidates.
 - (E) the bonus program for unemployment insurance claimants who found jobs quickly.
- $M \times V = P \times Y$
 $\frac{M}{P} = L(L)$



9. Based on above graph, in a small open economy if the world interest rate is r_3 , then the economy has:
- a trade surplus.
 - balanced trade.
 - a trade deficit.
 - positive capital outflows.
 - balanced budget.
10. In the long run according to the quantity theory of money and the classical macroeconomic theory, if velocity is constant, then _____ determines real GDP and _____ determines nominal GDP.
- the productive capability of the economy; the money supply
 - the money supply; the productive capability of the economy
 - velocity; the money supply
 - demand of goods and services; velocity
 - the money supply; velocity
- $M \times V = P \times Y$
11. All of the following are causes of structural unemployment except:
- minimum-wage laws.
 - the monopoly power of unions.
 - unemployment insurance.
 - efficiency wages.
 - wage rigidity.
12. In the classical model with fixed income, a reduction in the government budget deficit will lead to a:
- higher real interest rate.
 - higher level of net export.
 - higher level of output.
 - lower real interest rate.
 - lower level of output.

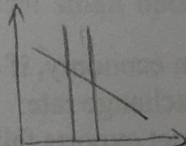
13. In a small open economy, starting from a position of balanced trade, if the government increases the income tax, this produces a tendency toward a trade _____ and _____ net capital outflow.

- (A) deficit; negative
- (B) surplus; positive
- (C) deficit; positive
- (D) balanced; balanced
- (E) surplus; negative



14. Which of the above graphs illustrates the impact on the real exchange rate of protectionist trade policies?
- (A) (A)
 - (B) (B)
 - (C) (C)
 - (D) (D)
 - (E) None of above

15. If the real exchange rate depreciates from 1 Taiwanese good per U.S. good to 0.5 Taiwanese good per U.S. good, then U.S. exports _____ and U.S. imports _____.
(A) increase; increase
(B) decrease; decrease
(C) do not change; increase
(D) increase; decrease
(E) decrease; increase
16. Evidence from the past 40 years in the United States supports the Fisher effect and shows that when the inflation rate is high, the _____ interest rate tends to be _____.
(A) nominal; high
(B) nominal; low
(C) real; constant
(D) real; high
(E) real; low
17. In the case of unions, the conflict of interest between different groups of workers results in insiders wanting _____, while outsiders want _____.
(A) more hirings; high wages
(B) high wages; more hirings
(C) fewer hirings; low wages
(D) high wages; fewer hirings
(E) fewer hirings; high wages
18. In a small open economy, when foreign governments reduce national saving in their countries, the equilibrium real exchange rate:
(A) rises and net exports fall.
(B) rises and net exports rise.
(C) rises and net exports remain constant.
(D) falls and net exports fall.
(E) falls and net exports rise.
19. According to the classical theory of money, inflation does not make workers poorer because wages increase:
(A) faster than the overall price level.
(B) more slowly than the overall price level.
(C) in proportion to the increase in the overall price level.
(D) in real terms during periods of inflation.
(E) when inflation is negative.



20. The recent reduced demand for unskilled workers relative to skilled workers has led to _____ for unskilled workers in Europe compared to _____ for unskilled workers in the United States.
- (A) unemployment; lower wages
 - (B) lower wages; unemployment
 - (C) more suicides; more unionization
 - (D) more unionization; efficiency wages
 - (E) efficiency wages; more unionization
21. Which of the following would decrease the real exchange rate in a small open economy in the long run?
- (A) a personal income tax cut
 - (B) a high unemployment rate
 - (C) a reduction in government spending
 - (D) a tariff on imports
 - (E) an increase in investment
22. In the case of an unanticipated inflation:
- (A) creditors with an unindexed contract are hurt because they get less than they expected in real terms.
 - (B) creditors with an indexed contract gain because they get more than they contracted for in nominal terms.
 - (C) no one gains or losses since inflation is not a real problem.
 - (D) debtors with an unindexed contract do not gain because they pay exactly what they contracted for in nominal terms.
 - (E) debtors with an indexed contract are hurt because they pay more than they contracted for in nominal terms.
23. In a small open economy, if consumer confidence falls and consumers decide to save more, then the real exchange rate:
- (A) rises and net exports fall.
 - (B) and net exports both rise.
 - (C) falls and net exports rise.
 - (D) and net exports both fall.
 - (E) remain constant and net exports fall.

Part II. Problems (31%, detail procedures must be provided):

1. (12 points) Suppose a government education program succeeds in getting households to save more. Using the long-run model of the economy developed in Chapter 3, graphically illustrate the impact of the higher saving rate by households. Be sure to label: (i) the axes; (ii) the curves; (iii) the initial equilibrium values; (iv) the direction curves shift; and (v) the terminal equilibrium values. In addition, state in words what happens to: (a) the real interest rate; (b) national saving; (c) investment; (d) consumption; and (e) output.
2. (9 points) Assume that in a small open economy with full employment, consumption depends only on disposable income. National saving is 300, investment is given by $I = 400 - 20r$, where r is the real interest rate in percent, and the world interest rate is 10 percent.
 - (A) If government spending rises by 100, does investment change? What is the level of investment after the change?
 - (B) Does the trade balance change if G rises by 100? If it changes, does it increase or decrease, and by how much?
 - (C) Will the real exchange rate rise, fall, or remain constant as a result of the change in G ?
3. (10 points) Suppose that the large industrial countries of the world are concerned about the depreciating currencies of a number of small open economies. Consequently, the large economies execute contractionary fiscal policy.
 - (A) Illustrate graphically the impact of the industrial countries' policies on the exchange rate of the small open economies.
 - (B) What will happen to the trade balance of the typical small open economy, assuming that it starts from a position of balanced trade?

INVESTMENTS

Midterm Exam – Wednesday, April 25, 2018 – 12:30 p.m. – 3:30 p.m.

Spring 2018 – Instructor Han-Hsing Lee

I. Multiple Choices (40%)

1. D
2. A
3. A
4. C

$$\text{Index}_0 = \frac{\$10 + \$20 + \$80 + \$50 + \$40}{5} = 40$$

$$\text{Index}_1 = \frac{\$10 + \$20 + \$80 + \$50 + \$20}{X} = 40; X = 4.50$$

5. A

$$0.055 = r(1 - t); r = 0.055/0.75; r = 0.0733.$$

6. D
7. D
8. C
9. A

$$(\$437,000,000 - 37,000,000)/\$60.12 = 6,653,359.947.$$

10. D
 $500,000,000/2,000,000,000 = 25\%.$

11. A
In the dollar-weighted return, the stock's performance in the second year, when 200 shares are held, has a greater influence on the overall dollar-weighted return. The time-weighted return ignores the number of shares held.

12. E

Practitioners often use a 5% VaR, meaning that 95% of returns will exceed the VaR, and 5% will be worse.

13. B
14. A

15. D

$$\$35 * (32/182) = \$6.15$$

16. B

The bond price, which is indexed to the inflation rate, becomes $\$1,000 * 1.036 = \$1,036$. The interest payment is based on the coupon rate and the new face value. The interest amount equals $\$1,036 * .04 = \41.44 .

17. D

18. A

$$\$850 - \$810 = \$40.$$

19. D

20. D

II. Calculation (60%)

1.

a.

$$\text{Bank discount of 180 days: } 0.01 \times \frac{90 \text{ days}}{360 \text{ days}} = 0.0025$$

$$\text{Price: } \$10,000 \times (1 - 0.0025) = \$9,975$$

b.

$$\begin{aligned} \text{Bond equivalent yield} &= \frac{\text{Face value} - \text{Purchase price}}{\text{Purchase price} \times T} \\ &= \frac{\$10,000 - \$9,975}{\$9,975 \times \frac{90 \text{ days}}{365 \text{ days}}} = 0.01016 \text{ or } 1.016\% \end{aligned}$$

2.

The total before-tax income is $(44+2-40)=\$6$. After the 70% exclusion, taxable income is:

$$0.30 \times \$6 = \$1.80$$

Therefore:

$$\text{Taxes} = 0.20 \times \$1.80 = \$0.36$$

$$\text{After-tax income} = \$6 - \$0.36 = \$5.64$$

$$\text{After-tax rate of return} = \$5.64 / \$40 = 14.10\%$$

3.

The total cost of the purchase is: $\$40 \times 500 = \$20,000$

You borrow \$8,000 from your broker, and invest \$12,000 of your own funds. Your margin account starts out with net worth of \$12,000.

a. (i) Net worth increases to: $(\$44 \times 500) - \$8,000 = \$14,000$

$$\text{Percentage gain} = (\$14,000 - \$12,000) / \$12,000 = 0.1666 = 16.66\%$$

(ii) With price unchanged, net worth is unchanged.

$$\text{Percentage gain} = \text{zero}$$

(iii) Net worth falls to $(\$36 \times 500) - \$8,000 = \$10,000$

$$\text{Percentage gain} = (\$10,000 - \$12,000) / \$12,000 = -0.1666 = -16.66\%$$

The relationship between the percentage return and the percentage change in the price of the stock is given by:

$$\% \text{ return} = \% \text{ change in price} \times \frac{\text{Total investment}}{\text{Investor's initial equity}} = \% \text{ change in price} \times 1.666$$

For example, when the stock price rises from \$40 to \$44, the percentage change in price is 10%, while the percentage gain for the investor is:

$$\% \text{ return} = 10\% \times \frac{\$20,000}{\$12,000} = 16.66\%$$

b. The value of the 500 shares is $500P$. Equity is $(500P - \$8,000)$. You will receive a margin call when:

$$\frac{500P - \$8,000}{500P} = 0.2 \Rightarrow \text{when } P = \$20 \text{ or lower}$$

c. To restore initial margin requirement, equity = $\frac{1}{2} \times (\$20) \times 500 = \$5,000$

$$\text{Your own money in margin account is } \$12,000 - (\$40 - \$20) \times 500 = \$2,000$$

Thus, you are required to add at least $\$5,000 - \$2,000 = \$3,000$ to your margin account.

d. The value of the 500 shares is $500P$. But now you have borrowed \$10,000 instead of \$8,000. Therefore, equity is $(500P - \$10,000)$. You will receive a margin call when:

$$\frac{500P - \$10,000}{500P} = 0.2 \Rightarrow \text{when } P = \$25$$

With less equity in the account, you are far more vulnerable to a margin call.

e. By the end of the year, the amount of the loan owed to the broker grows to:

$$\$8,000 \times 1.05 = \$8,400$$

The equity in your account is $(500P - \$8,400)$. Initial equity was \$12,000. Therefore, your rate of return after one year is as follows:

$$(i) \frac{(500 \times \$44) - \$8,400 - \$12,000}{\$12,000} = 0.1333 = 13.33\%$$

$$(ii) \frac{(500 \times \$40) - \$8,400 - \$12,000}{\$12,000} = -0.0333 = -3.33\%$$

$$(iii) \frac{(500 \times \$36) - \$8,400 - \$12,000}{\$12,000} = -0.2 = -20.00\%$$

The relationship between the percentage return and the percentage change in the price of XTel is given by:

$$\% \text{ return} = \left(\% \text{ change in price} \times \frac{\text{Total investment}}{\text{Investor's initial equity}} \right) - \left(5\% \times \frac{\text{Funds borrowed}}{\text{Investor's initial equity}} \right)$$

For example, when the stock price rises from \$40 to \$44, the percentage change in price is 10%, while the percentage gain for the investor is:

$$\left(10\% \times \frac{\$20,000}{\$12,000} \right) - \left(5\% \times \frac{\$8,000}{\$12,000} \right) = 13.33\%$$

- f. The value of the 500 shares is $500P$. Equity is $(500P - \$8,400)$. You will receive a margin call when:

$$\frac{500P - \$8,400}{500P} = 0.2 \Rightarrow \text{when } P = \$21 \text{ or lower}$$

4.

- (a) Suppose you have \$1000 to invest. The initial investment in Class B shares is \$950 net of the front-end load. After 4 years, your portfolio will be worth:

$$\$950 \times (1.10)^3 = \$1,264.45$$

Class A shares allow you to invest the full \$1,000, but your investment performance net of 12b-1 fees will be only 9%, and you will pay a 2% back-end load fee if you sell after 3 years. Your portfolio value after 4 years will be:

$$\$1,000 \times (1.09)^3 = \$1,295.03$$

After paying the back-end load fee, your portfolio value will be:

$$\$1,295.03 \times 0.98 = \$1,269.13$$

Class A shares are the better choice if your horizon is 3 years.

(b) With a 15-year horizon, the Class B shares will be worth:

$$\$950 \times (1.10)^{10} = \$2,464.01$$

For the Class A shares, there is no back-end load in this case since the horizon is greater than 5 years. Therefore, the value of the Class B shares will be:

$$\$1,000 \times (1.09)^{10} = \$2,367.36$$

At this longer horizon, Class A shares are no longer the better choice. The effect of Class A's 1% 12b-1 fees cumulates over time and finally overwhelms the 5% load charged to Class B investors.

5.

a. Time-weighted average returns are based on year-by-year rates of return.

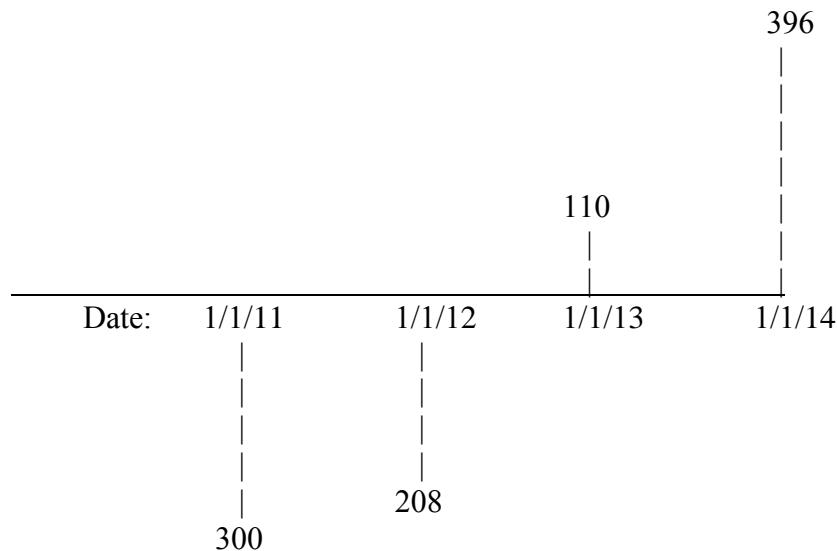
Year	Return = [(capital gains + dividend)/price]
2011-2012	$(110 - 100 + 4)/100 = 14.00\%$
2012-2013	$(90 - 110 + 4)/110 = -14.55\%$
2013-2014	$(95 - 90 + 4)/90 = 10.00\%$

Arithmetic mean: $[14\% + (-14.55\%) + 10\%]/3 = 3.15\%$

Geometric mean: $\sqrt[3]{(1+14\%)(1-14.55\%)(1+10\%)} - 1 = 2.33\%$

b.

Time	Cash flow	Explanation
0	-300	Purchase of three shares at \$100 per share
1	-208	Purchase of two shares at \$110, plus dividend income on three shares held
2	110	Dividends on five shares, plus sale of one share at \$90
3	396	Dividends on four shares, plus sale of four shares at \$95 per share



$$0 = -\$300 + \frac{-\$208}{1 + IRR} + \frac{\$110}{(1 + IRR)^2} + \frac{\$396}{(1 + IRR)^3}$$

Dollar-weighted return = Internal rate of return = -0.1661%

6.

- a. Initial price, $P_0 = 798.70$ [n = 10; PMT = 50; FV = 1000; i = 8]

Next year's price, $P_1 = 869.70$ [n = 9; PMT = 50; FV = 1000; i = 7]

$$HPR = \frac{\$50 + (\$869.70 - \$798.70)}{\$798.70} = 0.1515 = 15.15\%$$

- b. Using OID tax rules, the cost basis and imputed interest under the constant yield method are obtained by discounting bond payments at the *original* 8% yield to maturity, and simply reducing maturity by one year at a time:

Constant yield prices: compare these to actual prices to compute capital gains

$P_0 = \$798.70$

$P_1 = \$812.59$ so implicit interest over first year = \$13.89

$P_2 = \$827.60$ so implicit interest over second year = \$15.01

Tax on explicit plus implicit interest in first year

$$= 0.40 \times (\$50 + \$13.89) = \$25.56$$

Capital gain in first year = Actual price at 7% YTM – constant yield price

$$= \$869.70 - \$812.59 = \$57.11$$

Tax on capital gain = $0.30 \times \$57.11 = \17.13

Total taxes = $\$25.56 + \$17.13 = \$42.69$

- c. After tax HPR $HPR = \frac{\$50 + (\$869.70 - \$798.70) - \$42.69}{\$798.70} = 0.0981 = 9.81\%$

7.

a.

$$\text{Current yield} = \text{Coupon}/\text{Price} = \$70/\$980 = 0.0714 = 7.14\%$$

b.

Realized compound yield is 4.049% (semiannually), or 8.098% annual bond equivalent yield.

To obtain this value, first calculate the future value of reinvested coupons. There will be four payments of \$35 each, reinvested semiannually at a per period rate of 4%:

$$[\text{PV} = 0; \text{PMT} = \$35; n = 4; i = 4] \text{ Compute FV} = \\ 35(1 + 4\%)^3 + 35(1 + 4\%)^2 + 35(1 + 4\%)^1 + 35(1 + 4\%)^0 = \$148.63$$

The bond will be selling at par value of \$1,000 in two years, since coupon is forecast to equal yield to maturity. Therefore, total proceeds in two years will be \$1,148.63. To find realized compound yield on a semiannual basis (i.e., for four half-year periods), we solve:

$$\$980 \times (1 + r_{\text{realized}})^4 = \$1,148.63 \Rightarrow r_{\text{realized}} = 4.049\% \text{ (semiannual)}$$

8.

- a. The forward rate (f_2) is the rate that makes the return from rolling over one-year bonds the same as the return from investing in the two-year maturity bond and holding to maturity:

$$1.1 \times (1 + f_2) = (1.09)^2 \Rightarrow f_2 = 0.0801 = 8.01\%$$

- b. According to the expectations hypothesis, the forward rate equals the expected value of the short-term interest rate next year, so the best guess would be 8.01%.

- c. According to the liquidity preference hypothesis, the forward rate exceeds the expected short-term interest rate next year, so the best guess would be less than 8.01%.