

COMM 220 – J
ANALYSIS OF MARKETS
Practice Final 2017

PART 1 – PRODUCTION AND FINANCE

1. A production possibility curve represents...

- a. The aggregation of everyone's preferences for various combinations of goods
- b. The maximum quantity of one good that can be produced given the quantity of the other good or goods a firm produces
- c. Combinations of things that we are not really supposed to talk about
- d. All of the combinations of goods that return the same revenue for a firm
- e. The effect of the subsidization of one good on the production of another

2. Production possibility curves slope _____ because _____...

- a. Upwards; because they represent a tradeoff between two goods.
 - b. Downwards; because they represent a tradeoff between two goods.
 - c. Upwards; because the MRT is increasing.
 - d. Downwards; because the MRT is negative.
 - e. Production possibility curves can slope either upwards or downwards.
-

PART 2 – TAXES, SUBSIDIES, & LOAN MARKET

In the lost city of Lypnyland, businesses are taxed at 20% but are not allowed to deduct loan interest from their income for tax purposes. Lenders are taxed at 30% on all sources of income except loans. The current equilibrium interest rate is 5% and there are \$500 of loans currently outstanding.

The government has decided to change its tax plan. Now, businesses will be able to deduct their interest expense on loans and lenders will be taxed on the interest they earn from loans. Use this information to answer questions 3-6.

3. If the government of Lypnyland decides to adopt this new taxation policy, interest rates on loans will...

- a. Rise
- b. Fall
- c. Stay the same
- d. Explode
- e. Cause the people of Lypnyland to rebel

Taxing lenders on interest income will decrease supply and increase interest rate.

4. The new interest rate would be between _____ and _____ ...

- a. 6.25%; 6.86%
- b. 7.43%; 8.43%
- c. 6.25%; 7.14%**
- d. 5.35%; 7.14%
- e. 4.99%; 7.33%

$$\frac{0.05}{1-0.20} < r < \frac{0.05}{1-0.30} \rightarrow 6.25\% < r < 7.14\%$$

5. One of the following is the new equilibrium total of loans outstanding. Which one?

- a. 432**
- b. 586

The % changed more for lenders (0→30) than for borrowers (20→0). Therefore, supply decreased more than demand increased.

6. Suppose the new interest rate was 7.03%. What is the after-tax cost of a loan to borrowers?

- a. ≤ 5.55%
- b. ≤ 5.66%**
- c. ≤ 5.77%
- d. ≤ 5.88%
- e. > 5.88%

$$0.0703 = \frac{x}{1-0.20} \rightarrow x = 5.62\%$$

PART 3 – FLOORS AND CEILINGS

7. The government implementing a minimum wage is an example of a...

- a. Price ceiling
- b. Price floor**
- c. Quota

8. A price floor, like a price ceiling, generates deadweight loss.

- a. True**
- b. False

Any changes to a perfect market will generate dwl.

9. Elasticity of demand effects the amount of producer's surplus when a price floor is introduced.

- a. True
- b. False

See quiz 6, question 8.

PART 4 – FINANCIAL MATH

10. If interest is compounded semi-annually, what would the annual interest rate have to be for you to be able to triple your money in 20 years?

- a. $\leq 5.53\%$
- b. $\leq 5.57\%$
- c. $\leq 5.59\%$
- d. $\leq 5.63\%$
- e. $> 5.63\%$

$$\frac{\ln(3)}{\ln(x)} = 20$$

$$\ln(x) = \frac{\ln(3)}{20} = 0.0549306$$

$$e^{\ln(x)} = e^{0.0549306}$$

$$x = e^{0.0549306}$$

$$x = 1.056467 = 1+r \rightarrow r=5.6467\% \text{ EAR}$$

Now find APR.

$$APR = m \left[(1 + EAR)^{\frac{1}{m}} - 1 \right]$$

$$APR = 2 \left[(1 + 0.056467)^{\frac{1}{2}} - 1 \right]$$

$$APR = 5.56916\%$$

11. You have a \$500,000, 20 year mortgage and you know your EAR is 5.8%. What is your EMR and monthly payment?

- a. $\leq \$2,504$
- b. $\leq \$2,875$
- c. $\leq \$3,000$
- d. $\leq \$3,500$
- e. $> \$3,500$

$$EMR = [1 + 0.058]^{\frac{1}{12}} - 1 = 0.00470942$$

$$PV = C \left[\frac{1 - \frac{1}{(1+r)^n}}{r} \right] \rightarrow 500,000 = C \left[\frac{1 - \frac{1}{(1 + 0.00470942)^{20 \cdot 12}}}{0.00470942} \right] \rightarrow C = \$3,482.30$$

12. Canadian mortgages are compounded _____ and paid _____.

- a. Monthly; annually.
- b. Semi-annually; semi-annually.

- c. Monthly; semi – annually.
 - d. Semi-annually; monthly.
 - e. Annually; monthly.
-

PART 5 – MARKET FAILURE

13. You have just purchased life insurance. To celebrate, you begin to binge on fatty foods, alcohol, and cigarettes. These actions decrease your life expectancy meaning an increased risk for the insurance company that covers you. Your behaviour is an example of...

- a. Moral Hazard
- b. *Ex post* agency cost
- c. *Ex ante* agency cost
- d. Adverse selection
- e. Natural selection

You are covered so now you act differently.

14. To protect themselves, insurance companies factor this into their price. This is an example of...

- a. Moral Hazard
- b. *Ex post* agency cost
- c. *Ex ante* agency cost
- d. Adverse selection
- e. Natural selection

Ex ante because it is based on projection and anticipation.

PART 6 – INTEREST RATE PARITY

Use the following table to answer questions 15- 25. And yes, interest rates really are that low...

Canadian Interest Rate	0.50%
United States Interest Rate	0.75%
Spot Price for USD	\$1.34

15. Uncovered interest rate parity tells us that the market expects the USD to...

- a. Appreciate
- b. Depreciate
- c. Stay the same
- d. Move to par with the Canadian dollar

$$\frac{1+r_d}{1+r_f} - 1 = \frac{1+0.0050}{1+0.0075} - 1 = -0.002481 < 0 \text{ which implies a depreciation of the USD}$$

16. The equilibrium expected spot price for the USD in one year's time is...

- a. $\leq \$1.25$ b. $\leq \$1.31$ c. $\leq \$1.32$ **d. $\leq \$1.35$** e. $> \$1.35$

$$E(p) = p \frac{1+r_d}{1+r_f} = (1.34) \frac{1+0.0050}{1+0.0075} = \$1.336675$$

17. By how much do you expect the USD to change over the next year?

- a. $\leq 0.14\%$ b. $\leq 0.23\%$ **c. $\leq 0.26\%$** d. $\leq 0.29\%$ e. $> 0.29\%$

$$\text{Change} = \left(\frac{1+r_d}{1+r_f} - 1 \right) \times 100 = \left(\frac{1+0.0050}{1+0.0075} - 1 \right) \times 100 = \mathbf{0.2481\%}$$

$$\text{OR: } \left(\frac{\text{old} - \text{New}}{\text{old}} \times 100 \right) = \frac{\$1.34 - \$1.336675}{\$1.34} \times 100 = \mathbf{0.2481\%}$$

18. What is the equilibrium one-year forward price of the USD?

- a. $\leq \$1.25$ b. $\leq \$1.31$ c. $\leq \$1.32$ **d. $\leq \$1.35$** e. $> \$1.35$

The forward price is the same as the future spot price so the answer is the same as question 16:

$$f^* = E(p) = p \frac{1+r_d}{1+r_f} = (1.34) \frac{1+0.0050}{1+0.0075} = \mathbf{\$1.336675}$$

19. You believe that next year, the you will be able to buy \$1 USD for \$1.32 Canadian. How would you speculate on your forecast?

- a. Borrow in Canada, invest in the US, and sell all of your USD at the end of the year
b. Borrow in the US, invest in Canada, and buy enough USD at the end of the year to pay off your US loan
 c. Borrow in Canada, invest in the US, and buy enough USD at the end of the year to pay off your loan
 d. Borrow in the US, invest in Canada, and sell all of your USD at the end of the year
 e. Sell everything you own, move to Siberia, and make sure you bring a warm parka

Interest rate parity says that the \$1 USD next year will be equal to roughly \$1.34 next year. You however believe that it will cost only \$1.32 CAD for each USD. You therefore want the option where you buy USDs in 1 year. Meaning that you will borrow now when USDs are expensive, invest in Canada, and pay off the loan in USD when you believe the currency will cheaper than everybody else believes.

20. What is your expected profit on \$75,000 speculated?

- a. ≤ \$1,020.54
- b. ≤ \$1,096.41
- c. ≤ \$1,116.22
- d. > \$1,116.22

$$\$75,000 \left| (1 + r_d) - \frac{1}{p} (1 + r_f) \hat{p} \right| = \$75,000 \left| (1 + 0.0050) - \frac{1}{1.34} (1 + 0.0075)(1.32) \right| = \$940.30$$

21. Is this arbitrage?

- a. Yes, because I am speculating on my forecast
- b. Yes, because I will make a profit
- c. No, because the profit involves taking on risk because I can't lock in the forward rate
- d. No, because I say so

For arbitrage to take place, you must make a riskless profit. In this situation, you would have to be able to lock in your forward rate of \$1.32CAD-\$1.00 USD.

22. You are determined to arbitrage the market so you ask your friend Jim what exchange rate he is willing to give you in one years time. Jim works at *CurrencyExchange* but flunked COMM 220 so he says \$1.33. You get him to sign a contract locking in this rate plus you know where he lives. How would you arbitrage the market?

- A. Borrow in the US, invest in Canada, and sell forward all of the USD you will earn
- B. Borrow in the US, invest in Canada, and buy enough USD forward to pay off your loan
- C. Borrow in Canada, invest in the US, and sell enough USD forward to pay off your loan
- D. Borrow in Canada, invest in the US, and sell forward all of the USD you will earn
- E. Do nothing because there is no arbitrage opportunity

The actual forward price of the USD is lower than the expected future spot price implied by interest rate parity.

23. Your arbitrage profit on \$75,000 invested would be...

- a. ≤ \$342.69
- b. ≤ \$454.23
- c. ≤ \$745.29
- d. > \$745.29

$$\$75,000 \left| (1 + r_d) - \frac{1}{p} (1 + r_f) f \right| = \$75,000 \left| (1 + 0.0050) - \frac{1}{1.34} (1 + 0.0075)(1.33) \right| = \$376.40$$

24. What is your 1-year return?

- a. ≤ 0.23%
- b. ≤ 0.44%
- c. ≤ 0.51%
- d. > 0.51%

$$\frac{376.40}{75,000} \times 100 = 0.5019\%$$

25. From everything you have learned about arbitrage profits, does it make sense that your return would be so low in a nearly efficient market?

- a. No, there shouldn't be any arbitrage in this market
- b. No, arbitrage profits should be "Huuuuge"
- c. Yes, Jim at *CurrencyExchange* drives a hard bargain
- d. Yes, arbitrage opportunities can exist if the market is not perfectly efficient but tend to be extremely small and short lived
- e. No, the TA clearly made a mistake with his calculations

PART 7 – GAINS FROM TRADE

The following table shows maximum production for pistachios and maple syrup for Iran and Canada. Both countries have constant marginal rates of transformation measured as **kg pistachio per L of maple syrup**:

	Iran	Canada
Pistachios (kg)	9,800	1,200
Maple Syrup (L)	2,600	7,700

26. What is Iran's marginal rate of transformation?

- a. ≤ 3.66
- b. ≤ 3.74
- c. ≤ 3.81
- d. > 3.81

$$MRT_{Iran} = \frac{Pistachios}{Maple Syrup} = \frac{9,800}{2,600} \approx 3.76$$

27. Which country has a comparative advantage in maple syrup production?

- a. Canada
- b. Iran

$$MRT_{Iran} = \frac{Pistachios}{Maple Syrup} = \frac{9,800}{2,600} \approx 3.76$$

$$MRT_{Canada} = \frac{Pistachios}{Maple Syrup} = \frac{1,200}{7,700} \approx 0.16$$

Canada has a smaller MRT than Iran meaning that they must sacrifice few pistachios in order to make an additional L of maple syrup.

28. Which country has a comparative advantage in pistachio production?

- a. Canada
- b. Iran

Using the same calculations as question 27, we see that Iran must sacrifice more pistachios to make more maple syrup. The inverse suggests that they must sacrifice less maple syrup to make more pistachios. Each country must have a comparative advantage in one resource. If Canada has the comparable advantage in maple syrup, Iran must have a comparative advantage in pistachios. Fun fact: Iran is in fact the world's largest pistachio producer.

29. If each country specializes in the manufacture of goods in which it has a comparative advantage, what will be the world gain in pistachios per 243L of maple syrup?

- a. ≤ 777
- b. ≤ 795
- c. ≤ 823
- d. ≤ 866
- e. > 866

$$= q|MRT_{Iran} - MRT_{Canada}| = 243 \left| \frac{98}{26} - \frac{12}{77} \right| = 878$$

30. What is Canada's gain in pistachios if 500L of maple syrup is traded with Iran at terms of 3.22kg of pistachios per L of maple syrup?

- a. ≤ 722
- b. ≤ 755
- c. ≤ 762
- d. ≤ 791
- e. > 791

$$= q|p - MRT_{Canada}| = 243 \left| 3.22 - \frac{12}{77} \right| = 1,532$$

PART 8 – FISHER SEPARATION

Your name is Jane and you are the happy, sole owner of an all-equity company in a riskless, Fisher two-period economy. Your endowment is (\$136,543, \$159,232), and you have the 4 investment opportunities shown in the table. The interest rate is 5.4%. Note: for this question, choose projects based on your goal of maximizing the present value of your wealth.

	Cost (t=0)	Return (t=1)
Project 1	\$34,436	\$37,343
Project 2	\$54,602	\$63,530
Project 3	\$22,517	\$27,433
Project 4	\$75,232	\$85,533

	Cost (t=0)	Return (t=1)	ROI	NPV
Project 1	\$34,436	\$37,343	8.44%	\$993.79
Project 2	\$54,602	\$63,530	16.35%	\$5,673.14
Project 3	\$22,517	\$27,433	21.83%	\$3,510.51
Project 4	\$75,232	\$85,533	13.69%	\$5,918.85

31. How much will you invest?

- a. ≤\$87,443
- b. ≤\$91,003
- c. ≤\$112,343
- d. ≤\$129,834
- e. All of it

\$75,232 + \$54,602 = \$129,834 Accepting projects 2 and 4 will give you a combined NPV of **\$11,591.99** whereas accepting projects 1,2, and 3 will give you an NPV of **\$10,177.44**. Therefore, to maximize return based on your limited income, accept projects 2 and 4.

32. What is the net present value of your investment?

- a. ≤\$9,544.32
- b. ≤\$9,674.38
- c. ≤\$9,864.77
- d. ≤\$9,942.99
- e. >\$9,942.99

Add up all NPVs for projects you accept.

\$5,918.85 + \$5,673.14 = \$11,591.99

33. How wealthy will the investment make you?

- a. ≤\$199,544.32
- b. ≤\$221,343.54
- c. ≤\$255,537.87
- d. ≤\$278,303.54
- e. >\$278,303.54

$\$136,543 + \frac{\$159,232}{1.054} + \$11,591.99 = \$299,208.99$

PART 9 – LIFE CYCLE THEORY

You are now 19, but in 2 years, you will be 21 and you will begin working. Your JMSB B.COMM degree has helped land you a job with a starting salary of \$52,000 per year. You drive a hard bargain and have negotiated a deal where your income will grow by 0.2% per year. You are extremely loyal and have decided to stay with the company until you retire at 65. Also, and I do regret to tell you this, but you will die at 76 (lay off the red meat if you want to get that number up). Other facts about you: you own a condo worth \$265,432 and a portfolio worth \$35,434. You also have some gold that you keep under your bed worth \$59,000 which makes for a lumpy sleep. The interest rate is 0.0%.

34. What is your permanent income according to the life-cycle theory of savings and consumption?

- a. ≤\$49,544.32
- b. ≤\$51,343.54
- c. ≤\$55,537.87
- d. ≤\$58,303.54
- e. >\$68,303.54

Wealth = Market value of assets plus present value of income stream

Market value of assets = \$265,432 + \$35,434 + \$59,000 = \$359,866

PV (income stream):

$$PV = m \left[\frac{1 - \left(\frac{1+g}{1+r} \right)^N}{r-g} \right] = 52,000 \left[\frac{1 - \left(\frac{1+0.002}{1+0} \right)^{65-21}}{0-0.002} \right] = 2,389,196$$

Total = \$2,389,196 + \$359,866 = \$2,749,062

Per year: \$2,749,062 / (76-21) = \$49,983

35. By how would your permanent income change if the mandatory retirement age was raised to 70?

- a. ≤\$3,000
- b. ≤\$4,000
- c. ≤\$5,000
- d. ≤\$6,000
- e. >\$6,000

$$PV = m \left[\frac{1 - \left(\frac{1+g}{1+r} \right)^N}{r-g} \right] = 52,000 \left[\frac{1 - \left(\frac{1+0.002}{1+0} \right)^{70-21}}{0-0.002} \right] = 2,674,226$$

Total = \$2,674,226 + \$359,866 = \$3,034,092

Per year: \$3,034,092 / (76-21) = \$55,165

Difference = \$55,165 - \$49,983 = \$5,182

36. By how much would your permanent income change if the value of your portfolio, right before you determine your permanent income, decreased by 10% (keep retirement age at 65 and compare to answer in 34)?

- a. No change
- b. \$400
- c. \$64
- d. \$957
- e. \$1,126

Market value of assets = \$265,432 + \$35,434(1-10%) + \$59,000 = \$356,323

$$PV = m \left[\frac{1 - \left(\frac{1+g}{1+r} \right)^N}{r-g} \right] = 52,000 \left[\frac{1 - \left(\frac{1+0.002}{1+0} \right)^{65-21}}{0-0.002} \right] = 2,389,196$$

Total = \$2,389,196 + \$356,323 = \$2,745,519

Per year: \$2,745,519 / (76-21) = \$49,919

Difference = |\$49,919 - \$49,983| = \$64

PART 10 – TERM STRUCTURE OF INTEREST

Two spot rates of interest and the forward rate for the intervening period. The forward rate is not necessarily an equilibrium rate. Assume quarterly compounding.

Short-term spot rate	3 years	3.39%
Long-term spot rate	9 years	4.44%
Actual 3-year forward rate	6 years	4.68%

37. What arbitrage strategy should you follow?

- A. Borrow long term, invest short term, rollover investment
- B. Borrow long term, invest short term, invest proceeds of short-term investment forward
- C. Do nothing because the arbitrage profit is zero
- D. Borrow short term, invest long term, rollover loan
- E. Borrow short term, invest long term, borrow forward to cover the short-term loan

$$\left(1 + \frac{0.0444}{4} \right)^{4*9} \text{ vs } \left(1 + \frac{0.0339}{4} \right)^{4*3} \left(1 + \frac{0.0468}{4} \right)^{4*6}$$

$$\left(1 + \frac{0.0444}{4} \right)^{4*9} = 1.49$$

$$\left(1 + \frac{0.0339}{4}\right)^{4 \cdot 3} \left(1 + \frac{0.0468}{4}\right)^{4 \cdot 6} = 1.46$$

You earn more money investing long term so borrow short term and borrow forward.

38. What arbitrage profit can you earn on \$345,000?

- a. ≤\$7,000
- b. ≤\$8,000
- c. ≤\$9,000
- d. ≤\$10,000
- e. >\$10,000

$$345,000 \left| \left(1 + \frac{0.0444}{4}\right)^{4 \cdot 9} - \left(1 + \frac{0.0339}{4}\right)^{4 \cdot 3} \left(1 + \frac{0.0468}{4}\right)^{4 \cdot 6} \right| = \$8,631.36$$

PART 11 – BONDS

Use the following information to answer bond questions.

Face Value	\$1,000
Coupon	3.6%
Interest rate	4.0%
Years to maturity	7
Compounding periods per year	4

39. What is the value of the bond?

- a. ≤ \$967.54
- b. ≤ \$976.45
- c. ≤ \$985.23
- d. ≤ \$987.36
- e. > \$987.36

$$PV = C \left(\frac{1 - \left(1 + \frac{r}{m}\right)^{-mT}}{r} \right) + F \left(1 + \frac{r}{m}\right)^{-mT} = 36 \left(\frac{1 - \left(1 + \frac{0.04}{4}\right)^{-4 \cdot 7}}{0.04} \right) + 1000 \left(1 + \frac{0.04}{4}\right)^{-4 \cdot 7}$$

$$= \$975.68$$

40. If this bond's maturity had been longer by a few years, its value would be...

- a. Better
- b. Faster

- c. Stronger
- d. Lower
- e. Higher

Coupon rate is lower than interest rate. Change T to 9 and see what you get.

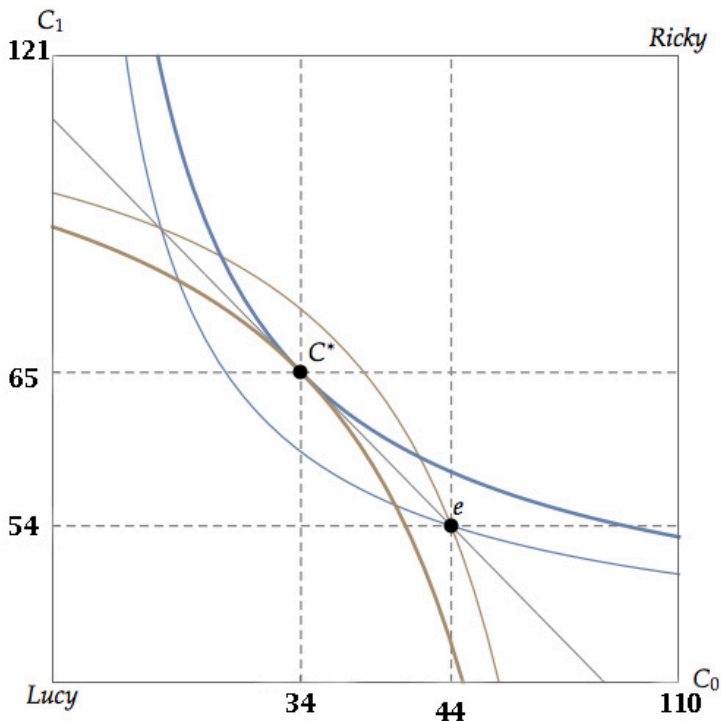
41. Suppose that the interest rate was not 4.0%, but you knew that the price of the bond was \$981. What is the yield-to-maturity?

- a. $\leq 3.89\%$
- b. $\leq 3.90\%$
- c. $\leq 3.91\%$
- d. $\leq 3.92\%$
- e. $> 3.92\%$

Guess and check or put it in your financial calculator, $r=3.9116\%$

PART 12 – INTEREST RATE IN GENERAL EQUILIBRIUM

Use the following information to answer questions 42-45.



42. What is the equilibrium interest rate?

- a. 4%
- b. 6%
- c. 8%
- d. 10%
- e. 12%

$$\frac{\Delta y}{\Delta x} = \left| \frac{65-54}{44-34} \right| = 1.10 = 1 + r \rightarrow r = \mathbf{10\%}$$

43. What is the growth rate of the economy?

- a. 2%
- b. 4%
- c. 10%**
- d. 14%
- e. 16%

$$\frac{121-110}{110} = \mathbf{10\%}$$

44. Must these two always be equal (interest rate and growth rate)?

- a. Yes
- b. No**

The interest rate is dependent on several factors including growth rate.

45. What transaction led to equilibrium?

- A. Lucy borrowed from Ricky because her MRTP was greater than his
- B. Lucy borrowed from Ricky because her MRTP was less than his
- C. Lucy lent to Ricky because her MRTP was greater than his
- D. Lucy lent to Ricky because her MRTP was less than his**
- E. We don't discuss those kinds of things around here

END