

Principles of Economics I: Microeconomics Final [1/16/2008]

1. Consider the industry of women purses. Assume that all firms have the same marginal cost, which is constant for any purse produced. Assume firms pre-commit (in the short run) to a fixed cost, which is spent on innovating new designs and/or advertisement. There are several types of firms in this industry:
  - a. (3%) Consider the following three types of firms:
    - i. LU (not to be confused with LV) spends millions of dollars in innovating the most fashionable designs and advertising them. Due to heavy advertisement, LU captures a group of loyal customers, and is the only company focused on luxurious purses.
    - ii. GK (not to be confused with CK) competes with other brands such as Coach or Gucci by providing customers products that have a different taste, but at reasonable price. Therefore, GK spends a moderate amount in innovation and advertisement, and is one of the many brand names that freely enter or exit the market of middle-range purses.
    - iii. Generic Purse is one of the numerous companies who spend nothing on design and advertisement, but copy whatever design is available and produce generic purses.Classify the above three firms as either monopoly, perfectly competitive, or monopolistic competition.
  - b. (19%) Consider LU, who spends a one-time fee of NT\$2,000,000 on design and advertisement, but then has a constant marginal cost of NT\$1,000 per purse produced.
    - i. Suppose the demand for LU purses is  $P=100,000-500Q$ , and the marginal revenue is  $MR=100,000-1,000Q$ . Solve for LU's profit maximization quantity, price and profit.
    - ii. Draw a diagram showing LU's demand, marginal-revenue, average-total-cost and marginal-cost curves. Label LU's profit-maximizing prices and quantity. Also indicate LU's markup over marginal cost and profit on the graph.
  - c. (13%) Now consider Generic Purse, who spends zero on design and innovation, but can produce up to 100 purses with a same constant marginal cost of NT\$1,000 as LU (and no more beyond):
    - i. Draw a diagram showing Generic Purse' demand, marginal-revenue, and marginal-cost curves. Label Generic Purse' profit-maximizing prices and quantity. Also show Generic Purse' markup over marginal cost and profit.
    - ii. How does the diagram differ from LU's diagram? Which company has the bigger markup? Explain.
    - iii. Which company has the bigger incentive for careful quality control? Why?
  - d. (25%) Final, consider GK who spends NT\$405,000 on design and advertisement, has the same constant marginal cost of NT\$1,000 as LU, and competes with many other brand names.
    - i. Suppose the demand for GK's purses is  $P=10,000-50Q$ , and the marginal revenue is  $P=10,000-100Q$ . Solve for GK's profit maximization quantity, price and profit.
    - ii. Draw a diagram showing GK's demand curve, marginal-revenue curve, average-total-cost curve, and marginal-cost curve. Label GK's profit-maximizing output and price.
    - iii. What is GK's markup and profit? Is the market in its long-run equilibrium? Explain.
    - iv. On your diagram, show the consumer surplus derived from the purchase of GK purses. Also, show the deadweight loss relative to the efficient level of output.
    - v. If the government forced GK to produce the efficient level of output, what would happen to the firm? What would happen to GK's customers?

2. (20%) Suppose workers from country Taiko can participate in two labor markets: the domestic market and the foreign worker (外勞) market in Daiwan. Foreign workers who work at Daiwan are covered by a binding minimum wage, but domestic workers are not.
  - a. Draw a diagram for each of these markets. Is the binding minimum wage higher or lower than the equilibrium wage of the domestic market? Is there a shortage or surplus in the foreign worker market in Daiwan?
  - b. If you were a Taiko worker, what is the maximum you are willing to pay to get a chance to work in Daiwan? Indicate with segments on your graphs.
  - c. Suppose there is only one middleman company who can apply for Taiko workers to work in Daiwan, how much would this company be charging the workers who want to apply? How much would the Taiko workers be actually earning (net pay)?
  - d. Suppose the Daiwanese government lowers the minimum wage for foreign workers in Daiwan. Indicate on your graphs how
    - i. actual wages earned (net pay) in both markets,
    - ii. the number of Taiko workers in Daiwan,
    - iii. the amount charged by the monopoly middleman company, would change.
 Would the shortage or surplus in Daiwan's foreign worker market increase or decrease? Who will be happy about this policy? Will anyone be unhappy with this policy? Explain. (Note: You would have to take into account how the decreased minimum wage in the foreign worker market would affect the domestic market.)
  - e. How much would the middleman company charge if the minimum wage drops to zero (non-binding)?
  - f. The Daiwanese government wants to increase the welfare of foreign Taiko workers in Daiwan. Would you suggest raising or lowering the minimum wage? Why?
  
3. (10%) Baseball team owners have an oligopoly in the market of for baseball players.
  - a. What is the owners' goal regarding players' salaries? Why is this goal difficult to achieve?
  - b. What rules could (or actually did) team owners of CPBL (Chinese Professional Baseball League) impose to overcome such difficulty?
  - c. Below is a paragraph of how CPBL regards the entrance of TML (Taiwan Major League):
 

「另一聯盟之成立非但未對台灣的棒球界帶來正面的影響，反而斲傷台灣棒球運動之正常推展，在其以商業利益掛帥下爲了達成目的，陸續地向中華職棒球隊暨業餘棒球隊惡性挖角，其結果不僅整個棒球生態環境受到嚴重的破壞，而台灣的棒球前途亦幾乎毀於一旦。」

What does this refer to (regarding owners' goals)? Would the baseball players agree with this view? Why or why not?
  
4. (10%) Suppose that, in the short run, labor is the only variable input used by a perfectly competitive firm producing N95 masks. Suppose there was a local SARS outbreak.
  - a. How would this disaster affect the demand and equilibrium price of N95 masks?
  - b. How would this affect the marginal product and the value of marginal product of N95 mask makers?
  - c. How would this disaster affect the demand and equilibrium wage for these workers?

5. (Bonus 10%) Three groups of people are jointly deciding Daiwan national status. Assume each group has the same amount of voters. Here are their preferences:

	Group PB	Group SV	Group PG
1st choice	Reunite	De facto independence	De jure independence
2nd choice	De jure independence	Reunite	De facto independence
3rd choice	De facto independence	De jure independence	Reunite

- Group PB suggests a vote by majority rule. They propose that first they choose between de facto and de jure independence, and then choose between the winner of the first vote and reunite. If they all vote their preferences honestly, what outcome would occur?
  - Should group PG agree to group PB's suggestion? What alternative voting sequence would they prefer?
  - Group PB and SV convince group PG to go along with group PB's voting system. In round one, group PG dishonestly says they prefer de facto independence over de jure independence. Why might they do this?
  - What standard property of decision making (among those listed in Arrow's Impossibility Theorem) is violated here?
6. (Bonus 10%) You and your friend are playing rock, paper, scissors. The outcomes are:

		Your Friend		
		Rock	Paper	Scissors
You	Rock	Tie	You lose, he wins	You win, he loses
	Paper	You win, he loses	Tie	You lose, he wins
	Scissors	You lose, he wins	You win, he loses	Tie

- Does either player have a dominant strategy? If you choose a particular strategy (Rock, Paper or Scissors) and stick to it, what will your friend do? So can you think of a better strategy for you to follow?
- Read the following article. Is this consistent with your answers above? Why or why not?

玩家公開猜拳遊戲必勝絕招：先出剪刀 中央社／中央社 2007-12-19 23:05

(中央社台北十九日電) 媒體報導，大多數人都知道，在猜拳遊戲中，石頭贏剪刀，剪刀贏布，布勝拳頭，但很少有人知道，如何贏得這個相當普遍的遊戲。現在死忠玩家透露了必殺秘技：先出剪刀。

英國「每日郵報」報導，研究顯示在這種快速擺出手部姿勢的猜拳遊戲中，石頭是三種猜拳手勢中玩家最喜歡出的一種。如果你的對手預期你會出石頭，他們就會選擇出布來贏過你，因此你要出剪刀才能贏，因為剪刀贏布。

報導說，這套剪刀策略讓拍賣商佳士得前年成功贏得一千萬英鎊的生意。一名有錢的日本藝術品收藏家，無法決定要讓哪家拍賣公司來拍賣自己收藏的印象派畫作，於是他要求佳士得與蘇富比兩家公司猜拳決定。

佳士得向員工討教猜拳策略，最後在一名主管十一歲的女兒的建議下決定出剪刀。這名女孩現在還在讀書，經常玩猜拳，她推論「所有人都以為你會出石頭」。這代表蘇富比會出布，想要打敗石頭，因此佳士得應該選擇出剪刀。

一如預期，蘇富比最後出布，輸給了佳士得的剪刀，拱手將生意讓給對方。

- Can you come up with a reasoning to “rationalize” what is said here?

Final Suggested Answers

[Note: The graphs have the wrong numbers and caption, but you get the idea.]

1. [This question combines Ch.17, Problem 5, 9, Ch.15, Problem 7, & Ch. 13, Problem 10.]

- a. (3%) LU is a monopoly; GK is in monopolistic competition and Generic Purse is a perfectly competitive firm.
- b. (19%) We solve numerically first before we graph our answer.
  - i. To maximize profit,  $100,000 - 1,000Q = MR = MC = 1,000$ . (2%) This yields  $Q=99$  (2%) and  $P = NT\$50,500$  (2%). LU's profit is hence,  $(P*Q) - (FC + MC*Q) = \$50,500*99 - (\$2,000,000 + \$1,000*99) = NT\$2,900,500$ . (4%)
  - ii. Figure 1 shows LU's demand, marginal revenue, average total cost and marginal cost curves. (3%) LU's price is  $P_{LU} = NT\$50,500$ , quantity is  $Q_{LU} = 99$ , its marginal cost is  $MC = NT\$1,000$ , (4%) and its markup over marginal cost is  $P_{LU} - MC = NT\$49,500$ . LU earns a profit of  $(P_{LU} - MC) * Q_{LU} - FC_{LU} = NT\$2,900,500$ . (2%)

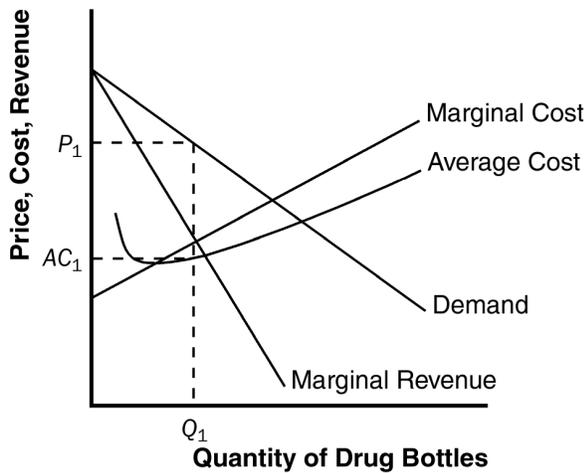


Figure 1

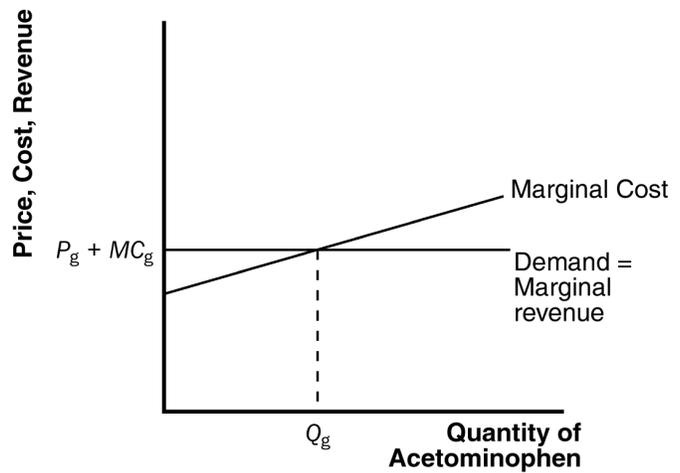


Figure 2

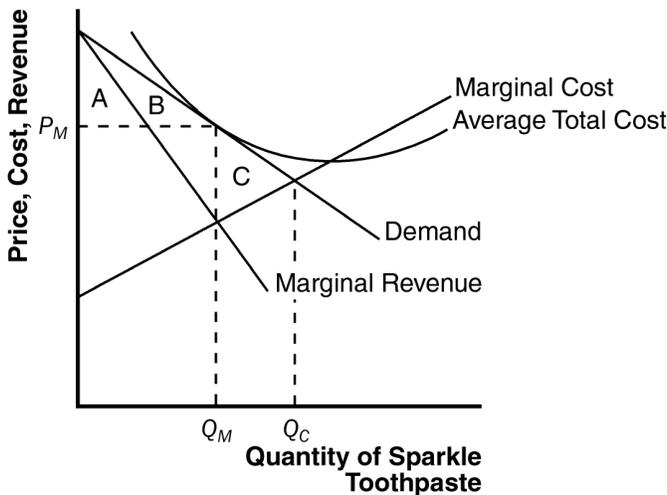


Figure 3

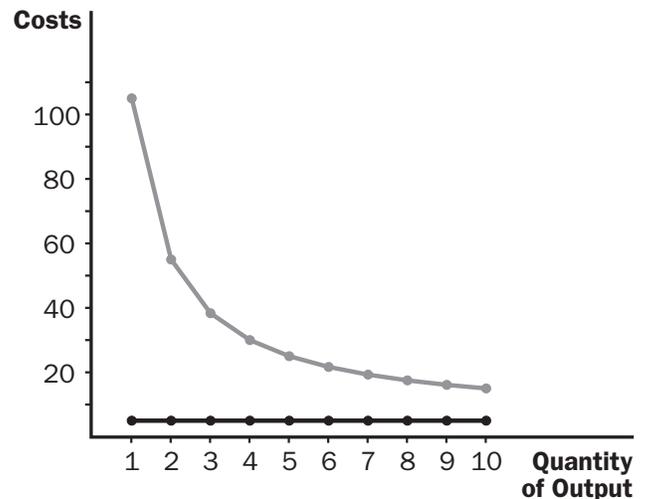


Figure 4

(Note: The MC and ATC curves in Figure 1-3 should all look like Figure 4.)

- c. (13%) Generic Purse has zero fixed cost, and marginal cost MC.
- Figure 2 shows the demand, marginal revenue, and marginal cost curves for Generic Purse. (3%) The profit maximizing price is  $MC = \text{NT\$}1,000$ , and quantity is anything below 100. (4%) The markup and profit are both zero. (2%)
  - The diagrams differ in that Generic Purse faces a horizontal demand curve, while LU faces a downward-sloping demand curve. Generic Purse has no markup of price over marginal cost, while LU has a positive markup, because it has market power. (2%)
  - LU has a bigger incentive for careful quality control, because if quality were poor, the value of its brand name would deteriorate, sales would decline, and its advertising would be worthless. (2%)
- d. (25%) We again solve numerically first before we graph our answer.
- To maximize profit,  $10,000 - 100Q = MR = MC = 1,000$ . (2%) This yields  $Q=90$  (2%) and  $P = \text{NT\$}5,500$  (2%). LU's profit is hence,  $(P*Q) - (FC + MC*Q) = \$5,500*90 - (\$405,000 + \$1,000*90) = \text{NT\$}0$ . (4%)
  - Figure 3 shows GK's demand, marginal revenue, average total cost and marginal cost curves. (3%) GK's price is  $P_{GK} = \text{NT\$}5,500$ , quantity is  $Q_{GK} = 90$ . (2%)
  - GK's marginal cost is  $MC = \text{NT\$}1,000$ , and its markup over marginal cost is  $P_{GK} - MC = \text{NT\$}4,500$ . GK earns a profit of  $(P_{GK} - MC) * Q_{GK} - FC_{GK} = \text{NT\$}0$ . (2%) This monopolistic competition market is indeed in long-run equilibrium since the zero profit condition is satisfied. (2%)
  - The consumer surplus from the purchase of GK purses is areas A + B. (2%) The efficient level of output occurs where the demand curve intersects the marginal-cost curve, at  $Q_C = 180$ . The deadweight loss is area C, the area above marginal cost and below demand, from  $Q_{GK}$  to  $Q_C$ . (2%)
  - If the government forced GK to produce the efficient level of output, the firm would lose money because average total cost would exceed price, so the firm would shut down. If that happened, GK's customers would earn no consumer surplus. (2%)
2. [This question is similar to homework---Ch.19, Problem 2.]
- Figure 5 shows a diagram for the two labor markets. The labor market on the left is foreign worker market in Daiwan where workers are covered by a binding minimum wage. The labor market on the right is the domestic worker market in Taiko where workers are not covered by a minimum wage. (2%) For the minimum wage to be "binding," it must be higher than the equilibrium wage of the domestic market. Hence, there is a surplus of foreign workers. (2%)
  - Since I can earn the binding minimum wage  $W_{\min}$  instead of the equilibrium domestic wage  $W_u$ , I would be willing to pay up to the difference between the two. (2%)
  - Since everyone has the same willingness-to-pay, the monopoly middleman can charge exactly  $(W_{\min} - W_u)$  (2%), so the net pay of Taiko foreign workers is exactly  $W_u$ . (2%)
  - If the Daiwanese government lowers the minimum wage for foreign workers in Daiwan, the price floor would be less binding. Hence, there will be a smaller surplus of labor. (1%) More workers can now find a job in the foreign worker market and will leave the domestic market, decreasing the supply of labor as shown by Figure 6. This will increase the wage earned in the domestic market. Hence,
    - Actual wages earned (net pay) in both markets increase from  $W_{u2}$  to  $W_{u1}$ .
    - The number of Taiko workers in Daiwan increases from  $L_{c2}$  to  $L_{c1}$ .
    - The amount charged by the monopoly middleman decreases from  $(W_{\min2} - W_{u2})$  to

$$(W_{\min 1} - W_{U1}) \quad (3\%)$$

All Taiko workers, domestic and foreign, will be pleased, while the middleman company will be unhappy about the decrease in the minimum wage. In addition, employers whom the foreign workers work for may be happy as well (since they pay lower wages). (2%)

e. If the minimum wage is no longer binding, the equilibrium wages for the two markets should be the same. Hence, the middleman company cannot charge anything. (2%)

f. The Daiwanese government should simply lower the minimum wage of Taiko foreign workers in Daiwan, so that the middleman company cannot ask for a lion share of what they earn. Counter-intuitively, this will give them the highest net pay. (2%)

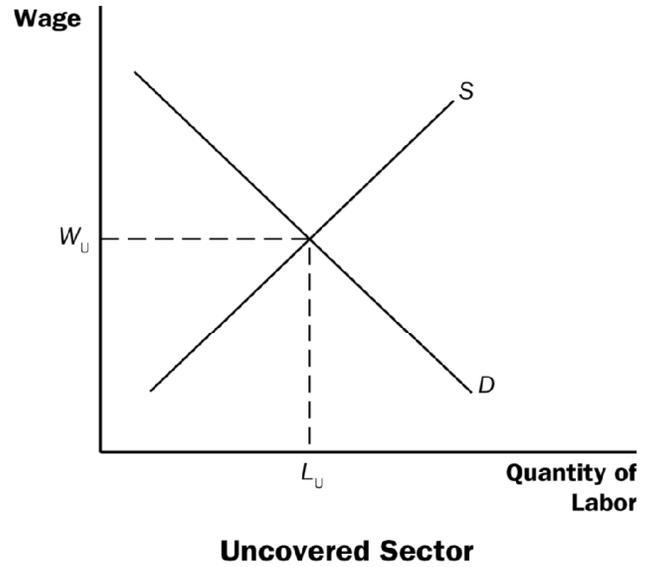
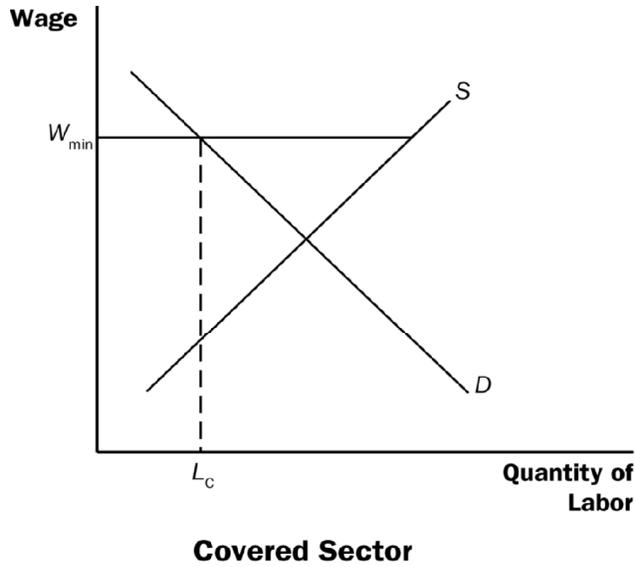
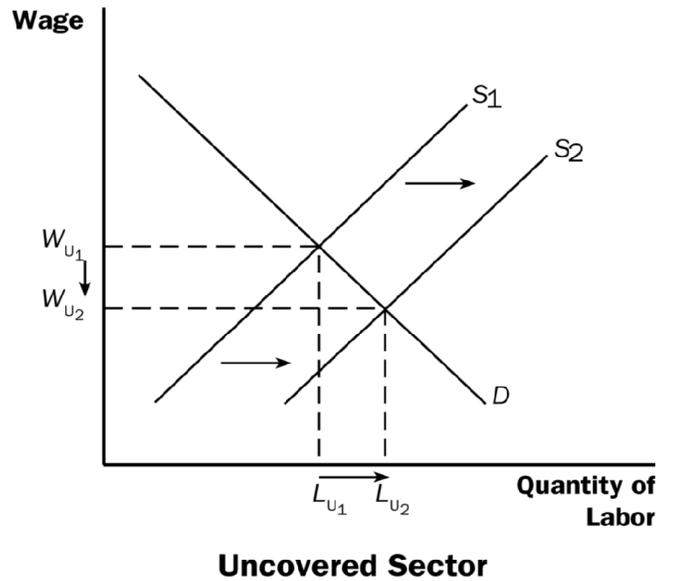
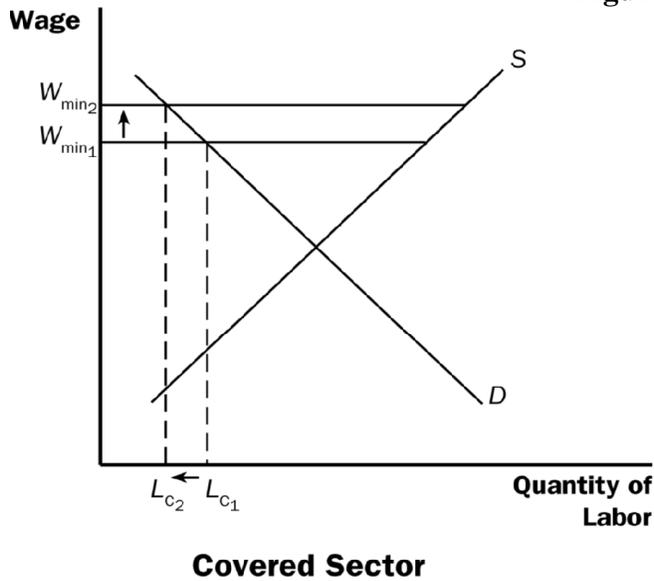


Figure 5



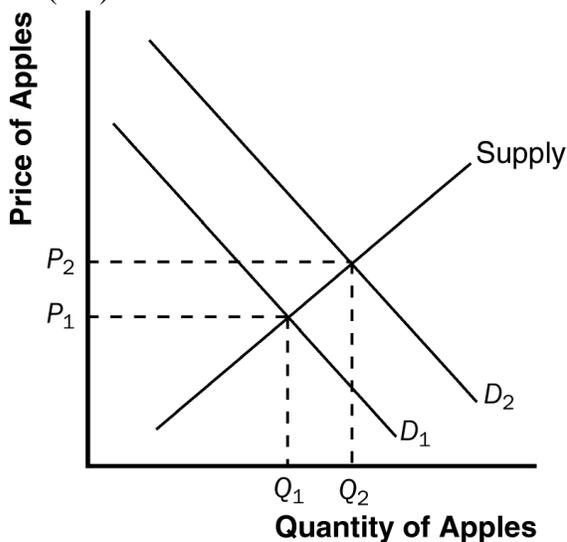
**Figure 6**

3. [This question is similar to homework---Ch.16, Problem 4.]

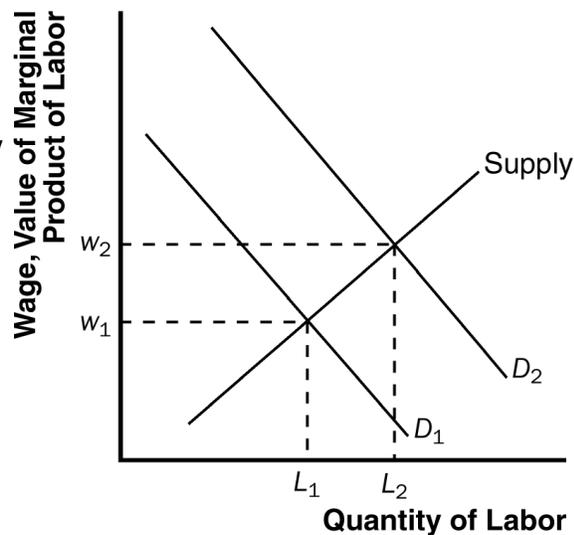
- a. Buyers who are oligopolists try to decrease the prices of goods they buy. The owners of baseball teams would like to keep players' salaries low. (2%) This goal is difficult to achieve because each team has an incentive to cheat on any agreement, because they will be able to attract better players by offering higher salaries. (2%)
- b. CPBL team owners did not allow any player to become a free agent. No team could accept players who left another team, unless the original team agrees (trade). This formalized the collusion on salaries and helped to prevent any team from cheating. (2%)
- c. When the paragraph refers to "Taiwan's baseball environment," it literally meant the status quo of "low player salary." From its point of view, "Taiwan's baseball future" will only depend on the owners' goal of keeping players' salaries low. (2%) The baseball players would definitely not agree to this view since high player salary attracts good players to join CPBL, instead of going to the US Major League. (2%)

4. [This question is similar to homework---Ch.18, Problem 1.]

- a. The disaster increases the demand for N95 masks. As shown in Figure 7, demand shifts from  $D_1$  to  $D_2$ , increasing the price from  $P_1$  to  $P_2$ , and increasing quantity from  $Q_1$  to  $Q_2$ . (2%)



**Figure 7**



**Figure 8**

- b. Because the price of N95 masks increases, the value of marginal product increases for any given quantity of labor. There is no change in the marginal product of labor for any given quantity of labor. However, firms will choose to hire more workers and thus the marginal product of labor at the profit-maximizing level of labor will be lower. (4%)
- c. As Figure 8 shows, the increase in the value of marginal product of labor shifts the demand curve of labor from  $D_1$  to  $D_2$ . The equilibrium quantity of labor rises from  $L_1$  to  $L_2$ , and the wage rises from  $w_1$  to  $w_2$ . (4%)
5. **[This question is similar to homework---Ch.22, Problem 8, but adds in Problem 6.]**
- a. In a vote between *de facto* and *de jure independence*, *de jure independence* would win. In a vote between *de jure independence* and *reunite*, *reunite* would win. Thus, Group PB's first choice (*reunite*) would win. (2%)
- b. No, this would lead to the least preferred scenario for Group PG. (2%) Instead, they would want to vote between *de facto independence* and *reunites* first, with the winner then competing in a second vote with *de jure independence*. That way, their preferred choice (*de jure independence*) would win. (2%)
- c. If people in Group PG (insincerely) say they prefer *de facto independence* over *de jure independence*, *de facto independence* will then compete in a vote against *reunite* (which it will win). This way, Group PG will not have to face their "dooms-day" scenario (*reunite*). (2%)
- d. Transitivity is violated here. (2%)
6. **[This question is similar to homework---Ch.16, Problem 10, but adds something else.]**
- a. Neither player has a dominant strategy in this game. Both of you should play rock if the other person plays scissors, play scissors if the other person plays paper, and play paper if the other person plays rock. (2%) Thus, if you stick with a particular strategy (rock, paper or scissors), your friend would be able to guess it easily after a few plays. (2%) A better strategy for you is to randomly choose whether to play rock paper or scissors, sometimes playing rock, other times playing paper, and yet other times playing scissors. (2%)
- b. The answer above is not consistent with the article. What the article says depends on what your opponent believes about what you play. (2%)
- c. This is an open question. However, the key to "rationalize" the article is to think about player beliefs: If your opponent really thinks you are naively playing rock, and hence would play paper, you should definitely play scissors instead. (However, it is not clear how your opponent would form such belief in the first place. Maybe he would do so if he reads and naively believe the "research" mentioned in the article.) (2%)