

Principles of Economics I: Microeconomics - Final [1/3/14]

Note: You have 3 hours (9:10am-12:10pm), and there are 100 points. Allocate your time wisely.

Part I: Economics in the News – Taipei’s Garbage Collection

A. (20%) Garbage Bag Demand

Excerpts from “Taipei City touts waste management results”, by Rachel Chan, 02/20/2013, Taiwan Today

Taipei City Mayor Hau Lung-bin announced Feb. 19 that prices for the city’s designated garbage bags will be reduced starting next month as a way of thanking citizens for their unrelenting efforts in reducing waste and protecting the environment... (omitted)

Hau, who made the remarks during a tour of the Neihu site, said starting March 1 the government will offer a 20-percent discount on all garbage bags, reducing retail prices by NT\$6 (US\$0.2) to NT\$69 depending on size.

According to Hau, Taipei City has established itself as a model in environmental protection since introducing its pay-by-bag garbage collection system July 1, 2000. Together with other measures such as recycling, the city’s average daily household rubbish was cut by 66.8 percent from 2,970 metric tons to 986 metric tons in 12 years, the mayor said...

Answer the following questions:

1. (3%) The article claims that the average daily rubbish declined by 66.8% dropping from 2970 metric tons to 986 metric tons. Recalculate this percentage using the midpoint method. Is the answer the same as 66.8%? Why or why not?
2. (2%) Mayor Hau decides to reduce the cost of garbage bags by 20%, resulting in a drop of NT\$6 to NT\$69 per pack (depending on bag sizes). What is the range of full prices of garbage bags in Taipei?
3. (4%) Hence or otherwise, use the midpoint method to calculate the increase in garbage bag price, starting from zero (prior to July 2000) until the current full price. Is your answer different using the smallest pack vs. the largest pack? Why or why not?
4. (3%) Calculate the price elasticity of demand for garbage disposal based on the above numbers. Is the demand elastic or inelastic? Why is this to be expected for garbage disposal?
5. (3%) What assumptions are you making to make the above calculation? Do you think these assumptions are likely to hold? Why or why not?
6. (3%) Now consider the 20% discount Mayor Hau proposes. Recalculate the percentage of price change using the midpoint method. Is the answer the same as 20%? How big is the difference? Explain.
7. (2%) Assuming the elasticity of demand is unchanged, how much more (or less) garbage do you expect to see after this discount becomes effective?

B. (20%) Asking Someone Else to Take Out the Garbage for You

Suppose there are three households who create garbage.

Household	Garbage per day (kg)	Cost to dump garbage (per kg)
A	3	\$20
B	4	\$10
C	5	\$5

The government decides to require each household to take out their own garbage, each paying their cost to dump garbage, as well as a fixed fee of NT\$5 per bag (which can hold up to 5kg). First assume you are not allowed to ask others to help you dump your garbage.

- (3%) What is the cost for each household to dump their own garbage?
- (1%) What is the total cost for all households to dump their own garbage?

Now, Taipei City provides 24hr garbage disposal service at a cost of NT\$8 per kg:

免等垃圾車來 超商代收秤重計價 #秤重 1 公斤 8 元 超商賣場代丟垃圾 (台視新聞 2013-03-28)

很多民眾都有錯過垃圾車的經驗，沒關係，未來可能 24 小時都能夠丟！台北市政府率先和環保科技業者計畫合作，引進可以秤重的計費式垃圾冷藏設備。往後民眾只要到超商、賣場，或各大型政機關去丟垃圾，不用用環保垃圾袋，只要將垃圾放到機器上秤重計費，一公斤八塊錢，由超商或賣場幫你丟！初步規劃須由悠遊卡付錢，民眾未來倒垃圾將更方便！

- (3%) Which household(s) will use this service? What is the cost for this/these household(s) to dump their garbage?
- (1%) What is the total cost for all households to dump their garbage?

Now suppose Taipei City allows taking out others' garbage for them (instead of fining such behavior):

幫倒垃圾反被檢舉 24 人收 83 張罰單 (TVBS, 2013/05/03)

高雄三民區博惠里，...每天收垃圾時間是早上 7 點半，多數里民趕著上班，於是社區成立志工隊，幫忙蒐集垃圾，大夥兒趕在 7 點半前，把垃圾集中丟在路邊，讓志工看管，但檢舉影片中，7 點半前的畫面，都是里民丟垃圾就離開，旁邊無人看管，垃圾落地，環保局依法開罰。

- (3%) Which household(s) will provide private garbage disposal service(s)? Which households would buy this service?
- (2%) What is the price of such service? (Hint: The price is an interval)
- (3%) What is the cost for each household to dump their garbage?
- (1%) What is the total cost for all households to dump their garbage?
- (3%) Compared your answers in question 9, 11 and 15. What is your policy recommendation for Mayor Hau?

Part II (35%): Economics in the News – Male vs. Female T-Shirts for National Public Radio

Excerpts from “Our Industry Follows Poverty’: Success Threatens A T-Shirt Business”, by MARIANNE MCCUNE December 02, 2013 (All Things Considered, NPR)

The Planet Money men's T-shirt was made in Bangladesh, by workers who make about \$3 a day, with overtime. The Planet Money women's T-shirt was made in Colombia, by workers who make roughly \$13 a day, without overtime.

The wages in both places are remarkably low by U.S. standards. But the gap between them is huge. Workers in Colombia make more than four times what their counterparts make in Bangladesh... (omitted)

The workers in both places are doing essentially the same thing: sewing T-shirts together. So why the big difference in their wages?

With a long tradition of apparel manufacturing and better technology, the Colombians can make T-shirts much, much faster than the Bangladeshis can. In Bangladesh, on one sewing line for our T-shirt, 32 people can make about 80 shirts per hour. One sewing line in Colombia has eight people and can make about 140 T-shirts per hour. The two lines aren't perfectly parallel — the Bangladeshi workers are completing a few more details of the shirt than the Colombians are. But the difference is striking nevertheless... (omitted) ...Crystal, the Colombian company that made the women's shirts, does everything... (omitted) ...Jockey, the company that coordinated the production of our T-shirt.

Colombia's economy has been growing like crazy for the past decade, and wages have been rising. That's good for the country as a whole, but it may wind up driving away the T-shirt industry.

"There is a saying that is going to sound horrible," Crystal's CEO, Luis Restrepo, told me. "Our industry follows poverty." It's an industry "on roller skates," he said, rolling from Latin America to China, to Bangladesh — wherever costs are lowest... (omitted)

But the growth of Colombia's economy means it's getting expensive to make simple products like T-shirts there. "Wages continue to go up, costs continue to go up," Smith said. Jockey plans to move production to several other countries, where its cost per shirt will be 20 to 30 percent lower, according to Smith.

The loss of Jockey will be a blow to Crystal. But as Colombia's economy has grown, Crystal has been transforming itself from a manufacturer of low-end clothes into a company that sells higher-end clothes under its own brands. The company has already opened 160 of its own stores across Latin America, and has plans for more.

"We decided we want to control our own destiny," Restrepo said.

Answer the following questions:

1. (5%) Assume Jockey is the only company that supplies Planet Money T-shirts to NPR, and it can buy as many shirts at the same cost-per-shirt stated above. Draw a diagram to analyze how Jockey determines the price and quantity when selling to NPR audience (to maximize profit).
2. (5%) What is the marginal product of labor for Bangladesh workers (in terms of T-shirt per hour)? What is the marginal product of labor for Colombian workers? How many times is the difference in productivity?
3. (3%) How many times is the Colombian workers paid (per day) compared to Bangladesh workers? Is this justified by the difference in productivity?
4. (3%) Assume Crystal is a price-taker in both the T-shirt market and the Colombian labor market, and Colombian workers work eight hours a day (without overtime). What is the “cost-per-shirt” that Jockey pays?
5. (2%) If Jockey moves to other countries, what is the range of cost-per-shirt it can find?
6. (4%) Assume the Bangladesh T-shirt firm is a price-taker in both the T-shirt market and the Bangladesh labor market. How many hours does Bangladesh workers need to work overtime (to make up the productivity difference)?
7. (4%) Suppose Crystal is willing to accept the current price in the long run. Draw a diagram and illustrate Crystal’s marginal cost and average total cost curves and market price.
8. (4%) Suppose Crystal would also accept the lower price you calculated in the previous question for now, but Jockey will still move to other countries in the long run. What can you infer about the average total cost and average variable cost of Crystal? Draw a graph and explain.
9. (5%) What does Crystal decide to do in response to Jockey’s move in the article? How would Crystal now determine its price and quantity at the product market? Draw a price-quantity diagram and explain. Compare your answer here with the first question.

Part III (10%): Economics in the News – Taiwan’s Fair Trade Commission Fines Apple Inc.

Excerpts from “Taiwan Fines Apple for iPhone Price-Plan Meddling: Island’s fair-trade body says Apple told mobile-service providers how to charge for handsets” By Jenny W. Hsu, Wall Street Journal, Dec. 25, 2013

TAIPEI— Apple Inc. has been fined 20 million New Taiwan dollars (US\$670,000) and ordered to stop interfering with mobile service providers and handset distributors' pricing, Taiwan's Fair Trade Commission said on Wednesday... (omitted) ...It found the Cupertino-based company violated article 18 of Taiwan's Fair Trade Act by telling Taiwan's three main service providers how much to sell iPhones for. Apple also asked Chunghwa Telecom Co., Far Eastone Telecommunication Co. and Taiwan Mobile Co. to adjust rates. The U.S. computer company has no right to meddle in companies’ iPhone pricing plans after selling them distribution rights, the commission said. The three carriers can distribute or resell iPhones at their complete discretion after paying Apple for those rights, the commission added. "Through the email correspondence between Apple and these three telecom companies we discovered the companies submit their pricing plans to Apple to be approved or confirmed before the products hit the market," it said in a statement... (omitted)

Answer the following questions:

1. (3%) Explain what “retail price maintenance” is and why the above article is a typical example.
2. (2%) Provide reasons why “retail price maintenance” in general could be anti-competitive.
3. (2%) Provide potential arguments why “retail price maintenance” in general could actually be in place for a good reason (and not anti-competitive).
4. (3%) In the case described in the above article, is Apple’s “interference” likely to be anti-competitive or not? Explain.

Part IV (15 + bonus 10%): Economics in the News – Black Friday or Forever Friday

Excerpts from “‘Black Friday’ Feels Like a Month: Holiday Kickoff Now Begins Way Before and Ends Way After Thanksgiving,” By Shelly Banjo, Wall Street Journal, Nov. 26, 2013

Black Friday used to last one day. Now it feels more like a month.

Retailers clamoring for their share of shoppers' stagnant holiday budgets are kicking off their discounts long before the traditional pinnacle of the annual shopping bonanza, the Friday after Thanksgiving... (omitted)

"Forget Black Friday," said Marshal Cohen, an analyst at retailing consultancy NPD Group Inc. "Now it's Forever Friday."

There is evidence that the earlier deals are merely pulling forward the business from later shopping days, not adding to overall sales. As the share of Black Friday weekend sales that occurred on Thanksgiving increased to 15% last year from 7% the year before, the percentage of sales on Friday dropped to 59% from 66%, according to Applied Predictive Technologies, a retail analytics company.

Black Friday retail sales last year declined for the first time in more than a decade, in part because more retailers opened on Thursday, according to an analysis by investment bank Piper Jaffray & Co. Overall sales during the holiday weekend rose 2.7% from the year before, according to the report.

It used to be that stores saved their best discounts on popular toys and televisions for the day after Thanksgiving when shoppers would pull out their newspaper marketing inserts, circle the items they want and head out at the crack of dawn to land discounts on KitchenAid mixers or PlayStation videogame consoles.

But with online rivals aggressively trying to get a step ahead of the annual shopping frenzy by offering deals on Thanksgiving Day and earlier, brick-and-mortar chains are under pressure to follow suit... (omitted)

The intense discounting comes amid continued weak consumer spending—which means retailers can grow only at their rivals' expense. Stubbornly high unemployment and stagnant

wages have many shoppers cutting back this year and has retailers including Wal-Mart and Macy's Inc. warning their profit margins will take a hit this holiday season as they offer aggressive promotions to win sales.

Answer the following questions:

1. (5%) Consider the game played between online stores and brick-and-mortar chains. Each side can either offer a sale on Black Friday, or offer sales on both Thanksgiving and Black Friday. Total sales revenue is \$100m, and will be split between the two if they choose the same strategy. If only one side offers sales on both days (while the other doesn't), it will earn three quarters of the sales. The production cost for these retail sales is fixed at 80% of the revenue (so the profit margin is always 20%). However, offering sales on Thanksgiving requires an additional marketing/promotion cost of \$3m. Draw the payoff matrix of this game.
2. (3%) Is there any dominant strategy for each side? If so, what is this dominant strategy?
3. (2%) What is the Nash equilibrium of this game?
4. (3%) Is the outcome in question 3 social optimal (for these two sides)? If not, please comment what you will do in order to induce the social optimal outcome.
5. (2%) Is the "social optimal outcome for these two sides" also the social optimal outcome for the entire society? Why or why not?

Bonus: Now both sides have a third strategy possible: offer promotions for the whole thanksgiving week. Assume both sides split sales if they choose the same strategy and if one side chooses more days to offer sales, that side will earn three quarters of the sales, but has to incur an additional marketing/promotion cost of \$3m for Thanksgiving day and \$5m for the whole week. The production cost is 80% of the revenue.

6. (bonus 6%) What is the new pay off matrix? Do players have dominant strategies? What is the Nash equilibrium of this game?
7. (bonus 2%) Suppose the other side is offering promotions for the whole thanksgiving week. What would happen to your profits if you choose to offer deals on Black Friday? Is it worse than also offering sales for the whole week as well? Explain. (Note Mr. Kulle's comment below!)
8. (bonus 2%) What would happen if players were allowed to offer discount insurance? Explain. (In fact, some companies actually did offer such guarantees. See below.)

Further Excerpts from the same article:

- But Daniel Kulle, president of H&M North America, disagrees with the trend. "If you ask me, just open on Black Friday," Mr. Kulle said. "The pulling of the opening hours is going in the wrong direction."
- In an attempt to reassure shoppers amid the flurry of deals, Wal-Mart Stores Inc. and Best Buy Co. this year are offering a type of "discount insurance." For customers who bought an item and then found it at a lower price later in the holiday season, the retailers will refund the difference, with the exception of Black Friday deals. "The customer really doesn't have to wait for the traditional Black Friday anymore," said Joel Anderson, who heads Wal-Mart's U.S. e-commerce business.