

Principles of Economics I: Microeconomics – Midterm [2016/11/11]

Note: You have 3 hours (9:10am-12:10pm), and there are 118 points. Allocate your time wisely.

Part A (25%): Abstract of “風數據» YouBike 收費多 5 元 趕走了哪些人?” (風傳媒 2016/7/18)

為了改善日益惡化的交通，台北市長柯文哲規劃陸續進行各項大小手術，其中包括花費 40 億公帑興建「三橫三縱」自行車道，並廣闢 YouBike 站點達 248 站，希望能引導民眾將 YouBike 做為「第一哩路」與「最後一哩路」的「無縫運輸」接駁工具，讓民眾更方便的轉乘捷運、公車，以減少在路上趴趴走的私人運具。但搶救台北交通，YouBike 會是解藥嗎？台北市府自 2015 年 4 月起實施騎乘 YouBike 前 30 分鐘收費 5 元，又會對推動 YouBike 造成什麼影響呢？

Number of Usage (10,000/month)	Before (Jan. to Mar. 2015)	After (Apr. to June 2015)
0-15 minutes	118	82
15-30 minutes	53	38
31-45 minutes	14	12

Note: No change for 46 minutes and above.

1. (4%) Grouping the data for 0-15 and 16-30 minutes, what is the overall usage (10,000 times/month) before and after the price hike? Use the midpoint method to calculate the percentage change in quantity demanded.
2. (3%) Calculate the price elasticity of demand for the first 30-minutes usage of YouBike. (Use midpoint method!)
3. (4%) Suppose the usage survey below applies to the first 30-minute usage both before and after the price hike. What is number of usage for commuting to work (2nd row) before and after the price hike? What is the number of usage for recreation (last row) before and after the price hike?

Usage Type	Before (Feb. 2014)	After (June 2015)
Sports	4.4%	11.0%
Commuting to Work	17.3%	26.3%
Recreation	35.1%	24.3%

Note: Other types of usage omitted include commuting to school, business trips, and shopping.

4. (4%) Calculate the price elasticity of demand for recreation (within 30 minutes). Is the demand elastic or inelastic? What would happen to recreation usage if KP increase the price to NT\$10 for the first 30 minutes?
5. (5%) Calculate the price elasticity of demand for commuting to work (within 30 minutes). Is the demand elastic or inelastic? Is this an example violating the law of demand? Why or why not?
6. (5%) What is the number of usage for sports (1st row) before and after the price hike? Can you calculate the price elasticity of demand for sports? Why or why not? (What assumption could fail?)

Part B (15%): “蔬菜搶收供應量暴增 今菜價跌一成” from Apply Daily News (蘋果日報 Apple Daily 2016/9/27)

梅姬颱風侵台，但今天菜價對比上一個交易日(9/25)，下跌近一成。...(omitted)...根據農產品交易市場行情站資料顯示，今天台北果菜批發市場蔬菜到貨量 2213 公噸，多出上一個交易日近 3 成，平均批發價也從 41 元高點降至 37.6 元，降幅 9.3%，主要的葉菜類幾乎全部降價。...(omitted)...農糧署副署長蘇茂祥表示，根據颱風的天氣預報，農民周日起就開始搶收蔬菜，所以台北果菜批發市場蔬菜到貨量就已達 1600 公噸以上，高於夏季周六日日的平均值，然而周一休市，昨天天氣狀況佳，所以農民加快搶收腳步，今天到貨量再增加，突破 2 千公噸，整體價格下跌。...

1. (4%) Typhoon Magi hit Taiwan on 9/28; why did wholesale vegetable prices drop the day before? Draw a supply-demand diagram and explain.
2. (3%) Assume the article meant that today (9/27)'s wholesale vegetable quantity is 1.3 times that of Sunday (9/25), the previous trading day. What is Sunday's wholesale vegetable quantity? Is it higher than 1600 tons as stated by the governmental official?
3. (5%) What is the average wholesale vegetable prices for today (9/27) and Sunday? Utilize your answer to calculate the price elasticity of wholesale vegetable using the midpoint method.
4. (3%) Is this the elasticity of supply or demand (or neither)? State clearly the assumptions you make and explain.

Part C (28%): Excerpts from “台大農場畜產品漲價 牛奶、羊奶漲一成多” (蘋果日報 Apple Daily 2015/09/01)

許多民眾常專程去台灣大學，買台大農場生產的乳製品。洪姓退休教師投訴，從今天起牛奶、羊奶等多項產品漲了 1 成多，他認為漲太多，他說台大員工（公務員）薪水沒調整，飼料等成本也沒漲，價格不應該有這麼大的波動。大瓶鮮奶由 75 元漲為 85 元，大瓶羊奶由 100 元漲為 115 元，另如貢丸、香腸、臘肉、優格、優酪乳也漲。台大農場回應，他們都依實際管銷成本販賣，已多年沒漲價，校方認為他們「績效不佳」；最近水費、電費、繳納給校方的店面租金及人事成本都增加，各項原物料及代理代售相關產品等成本也提高，才不得已漲價。...(omitted)...《蘋果》今下午到北市舟山路旁的台大農產品展示中心，下午 3 時大約有 50 多人排隊買牛奶，大多為中高齡人士。排第 1 個的是 70 多歲退休人士周美枝買優酪乳，他說台大自己養牛比較新鮮、喝起來不一樣，大瓶從 80 元漲到 90 元「沒漲很多」。家庭主婦林彥君帶小孩一起來買，先排隊買牛乳，再進門市買不用排隊的蘋果牛乳，林彥君說今天才知道漲價，覺得牛乳從 75 元漲到 85 元「有點多」，但還算可以接受。62 歲民眾朱勇生排了 2 次，先買鮮乳再買羊乳，他說「台大」的招牌有保障，他不確定是心理作用還是真的，但覺得喝起來比較香醇和安心；朱認為羊乳從 100 元漲到 115 元「還好」，每天只喝 1、2 杯，不認為漲價很「無良」。

1. (6%) What is the opportunity cost for 朱勇生 and 林彥君 respectively to queue up first to buy fresh milk? Why do you think both of them choose to queue up for fresh milk first? What does this imply about the market of fresh milk? Predict and compare the benefit of 朱勇生 buying cow milk and goat milk.
2. (6%) Is the elasticity of supply of livestock product of NTU farm elastic or inelastic? Explain. Does NTU farm has lower price elasticity of dairy products than other brands? Why or why not?
3. (3%) What are possible reasons for residents around NTU to be more tolerable to price hikes than consumers of other brands? Are they rational? Explain.
4. (5%) Are other dairy products such as frozen yogurt substitutes or complements for milk? Draw the supply-demand diagrams of the milk and yogurt to analyze how the price hike affects equilibrium price and quantity.
5. (6%) If many people find out they could make a profit in this milk industry, they would enter the market. In reality, firms have different cost structures though we often assume they are identical. Draw the supply curve assuming (1) firms have identical cost structures, (2) firms have different cost structures. Explain the curves in terms of economic profit.
6. (4%) If NTU farm imposes a price control of NT\$60 on milk, how would the consumer surplus, producer surplus and social surplus change? Draw a supply-demand diagram and explain.
7. (4%) NTU farm claims to raise the price of milk due to average total cost increase. Is this claim reasonable? How can you test this?

Part D (28%): Excerpts from “The 58 Billion Hidden Cost of the Flu on the US Economy” (CNBC, 2016/10/28)

A study from the University of North Carolina at Chapel Hill released this month looks at the impact of unvaccinated adults on the economy. And last year alone, the flu accounted for \$5.8 billion in health care and lost productivity costs. Some 80 percent of those losses were tied to people who chose not to get vaccinated... (omitted) ... while even with the vaccine there's no guaranteed way to avoid the flu, the authors of the Chapel Hill study note that strongly encouraging employees to do so could greatly reduce the impact on businesses.

"Vaccines save thousands of lives in the United States every year, but many adults remain unvaccinated," they wrote. "Low rates of vaccine uptake lead to costs to individuals and society in terms of death and disabilities, which are avoidable, and they create economic losses from doctor visits, hospitalizations and lost income."

1. (2%) Diseases are costly and impact the whole economics, while getting vaccinated can stop flu from spreading. What is the relationship between the economy and the number of people getting vaccinated?
2. (2%) If all people are vaccinated and do not catch flu, how much health care and lost productivity costs can we save (compared to nobody being vaccinated)?
3. (2%) Are the people who are vaccinated receiving all of the social benefits calculated above? Why or why not?
4. (3%) Draw a supply-demand diagram and show how equilibrium quantity does not coincide with social optimal.
5. (3%) Use the supply-demand diagram to show how the government can use Pigovian subsidies to remedy this.
6. (3%) Suppose a similar situation occurs in Taiwan, and the medical cost of getting vaccinated is NT\$50, plus NT\$100 for transportation and your time. Assume studies show that 80% of the people who are vaccinated will not catch the flu, while the remaining 20% still do. Those who have been vaccinated but still catch the flu pay a medical fee of NT\$100, plus NT\$100 for transportation and time. In addition, he cannot go to work. If he goes to work, his daily salary is NT\$500. Calculate the net benefit of being vaccinated.
7. (3%) Suppose a new study shows that a person who was not vaccinated has 90% probability to catch the flu. Would you choose to get vaccinated or not? Explain.
8. (3%) Instead of per-unit subsidy, the government of Taiwan decides to buy vaccines and give it out for free to children and elder people. Is this policy more efficient than Pigovian subsidy? Why or why not?
9. (4%) How does the demand for masks change during a flu outbreak? Draw a supply and demand curve to analyze the change in equilibrium price and quantity.
10. (3%) Suppose initial equilibrium quantity of masks is 4 million and the equilibrium price is NT\$10, but during a flu outbreak, quantity jumps to 8 million while the price increases to NT\$40. Calculate the price elasticity of demand using the midpoint method. Is the demand elastic or inelastic?

Part E (9%): Excerpts of “讀書能多活兩年？耶魯大學發現讀書與長壽之間的聯繫” (端聞 2016/08/12)

讀書有什麼用？每個人都可以列出一大堆益處，比如增長知識、開闊視野等等。但很少有人會想到，多讀書可能會讓你延年益壽！美國耶魯大學公共健康學院的研究人員近日在學術期刊《社會科學與醫學》（Social Science & Medicine）發表論文稱，根據一項長達 12 年的跟蹤研究發現，受訪人中讀書者的壽命比不讀書者的平均要長接近兩年。研究人員共追蹤了 3635 名 50 歲以上的受訪對象，並將他們分為三組：沒有讀書習慣的人、每週最多讀書 3.5 小時的人（即平均每天半小時），以及每週讀書超過 3.5 小時的人。由於研究發現本就被認為普遍較長壽的女性、有大學學歷者及高收入人群更喜愛讀書，因此在數據分析中去除了性別、學歷、收入、年齡、種族、職業、健康狀況及婚姻狀況等因素的影響。在經過 12 年的追蹤觀察後，研究發現：每週最多讀書 3.5 小時的人比沒有讀書習慣的人死亡率低 17%；每週讀書超過 3.5

小時的人比沒有讀書習慣的人死亡率低 23%；總體而言，讀書者比不讀書者平均多活 23 個月。...(omitted)...論文第一作者 Avni Bavishi 認為，讀書能提高人的記憶力等認知能力，這或許是壽命得以延長的原因。比如在閱讀小說時，就需要記住人物、情節等，大腦必須強化並儲存這些記憶，從而讓讀者的記憶能力得到提升。...(omitted)

Abstract of “A chapter a day: Association of book reading with longevity” by Bavishi, Slade, and Levy (2016):

Although books can expose people to new people and places, whether books also have health benefits beyond other types of reading materials is not known. This study examined whether those who read books have a survival advantage over those who do not read books and over those who read other types of materials, and if so, whether cognition mediates this book reading effect. The cohort consisted of 3635 participants in the nationally representative Health and Retirement Study who provided information about their reading patterns at baseline. Cox proportional hazards models were based on survival information up to 12 years after baseline. A dose-response survival advantage was found for book reading by tertile (HRT2 = 0.83, $p < 0.001$, HRT3 = 0.77, $p < 0.001$), after adjusting for relevant covariates including age, sex, race, education, comorbidities, self-rated health, wealth, marital status, and depression. Book reading contributed to a survival advantage that was significantly greater than that observed for reading newspapers or magazines (tT2 = 90.6, $p < 0.001$; tT3 = 67.9, $p < 0.001$). Compared to non-book readers, book readers had a 23-month survival advantage at the point of 80% survival in the unadjusted model. A survival advantage persisted after adjustment for all covariates (HR = .80, $p < .01$), indicating book readers experienced a 20% reduction in risk of mortality over the 12 years of follow up compared to non-book readers. Cognition mediated the book reading-survival advantage ($p = 0.04$). These findings suggest that the benefits of reading books include a longer life in which to read them.

1. (4%) The authors suggests that book reading causes higher survival. Explain what evidence they have to back this claim. Is the evidence truly causal? Why or why not?
2. (Bonus 5%) What are possible explanations for their finding, other than the one they propose? Do the authors attempt to control for these other factors? Can you think of a better way to test this hypothesis? Explain.

Part F (13%): Excerpts from “中國金牌數銳減變「小三」原因竟是...” (蘋果日報 Apple Daily 2016/8/17)

...據中國《新浪網》報導，中國自 2000 年以後的奧運會，金牌進帳絕對不少於 25 面，最爛也有 28 金，2008 年北京奧運占地主之利，更拿下 51 金，上屆倫敦奧運也有 38 金。但在今年，目前僅進帳 17 金，隨著奧運比賽即將進入尾聲，評論也分析很難有新金牌進帳。...(omitted)...此外，評論也稱有消息指出，中國體育總局對本屆奧運金牌的獎勵也大幅縮水。倫敦奧運一枚金牌獎勵 50 萬元人民幣(約新台幣 250 萬元)，里約只獎勵 20 萬元人民幣(約新台幣 100 萬元)。並稱在 1990 年代，當時奧運金牌獎勵還有 8 萬元人民幣，再比較物價水平，現在的 20 萬元人民幣比起當時貶值不少。

1. (3%) What is the monetary prize for winning a gold medal in the London Olympics for a Chinese athlete? What about the Rio Olympics? Use the midpoint method to calculate the percentage change.
2. (4%) How did the number of gold medals change between the two Olympics? Calculate the prize elasticity of supply for Chinese gold medalists using the midpoint method. Is this supply elastic or inelastic?
3. (2%) What assumptions are required to make the above calculation? Are they reasonable? Why or why not?
4. (2%) What are other possible explanations for the drop of gold medals won by Chinese athletes? Can you propose ways to test these alternatives?
5. (2%) Assuming fixed elasticity, how many gold medals would China earn if they eliminated the monetary prize?

Translation for Part A Article “風數據》YouBike 收費多 5 元 趕走了哪些人？” (風傳媒 2016/7/18)ⁱ

In order to improve Taipei’s deteriorating traffic, Mayor KP proposed various plans, including spending 4 billion taxpayer money to build "three horizontal and three vertical" bike lanes, and expanding YouBike to 248 sites. He hoped this could encourage people to use YouBike as a connection tool for the “first” and “last mile,” and promote "seamless transportation" so that people can transfer conveniently to MRT and bus, and reduce private vehicles on the road. But is YouBike the cure for Taipei traffic? What is the impact for Taipei City government to charge YouBike users NT\$5 for the first 30 minutes since April 2015?

Translation of Part B Article 蔬菜搶收供應量暴增 今菜價跌一成 (Apply Daily News 2016/9/27)ⁱⁱ

Magi typhoon invaded Taiwan, but the price today drops nearly 10 percent compared to the previous trading day (9/25)...(omitted)...According to According to the Agricultural Commodity Exchange Market, the volume of wholesale vegetables in Taipei today is 2,213 tons, 30 percent more than the last trading day’s volume, the average wholesale price fell from NT\$41 to NT\$37.6, a 9.3% drop, and almost all leafy vegetables’ prices have decreased...(omitted)...Su Maoxiang, deputy director of the Agriculture and Food Department, said that according to the weather forecast for typhoons, farmers began to pick up vegetables since Sunday, so the Taipei vegetable market traded more than 1,600 tons of vegetables today, higher than the daily average amount of vegetables on Saturdays and Sundays during summer. However, the market was closed on Monday, and the weather condition was good yesterday, so farmers speeded up harvesting vegetables, causing today’s amount of vegetables traded to jump to more than 2 thousand tons, as well as an overall price decline...

Translation for Part C Article “台大農場畜產品漲價 牛奶、羊奶漲一成多” (Apple Daily 2015/09/01)ⁱⁱⁱ

Many people often go to NTU to buy dairy products from NTU farm. Retired teacher Hong complained that the price of milk, goat milk and many other products increased more than 10 percent. He thought the price hike is too much, since NTU employees’ salaries are the same, hay and other costs did not increase, meaning the price should not have such a big jump. Large milk from went from NT\$75 to NT\$85. Large goat milk went from NT\$100 to NT\$115. Prices of other commodities such as meatballs, sausages, bacon, yogurt also increased. NTU farm said that they set prices based on actual management and marketing costs, and have not increased prices for years. The university thinks that they are underperforming, and recently the costs of water, electricity, rent and personnel costs have all increased, as well as raw material and agency costs, so they have no choice but to increase prices...(omitted)...Around 3 p.m. this afternoon there were about 50 people, most middle-aged, lining up in front of NTU’s agricultural exhibition center. First-in-line was the 70-year-old retirees Zhou Mei-chih who wanted to buy yogurt, and she said that NTU's milk is fresher, unlike milk in other places. The price of a large yogurt increased from NT\$80 to NT\$90, which "is not a big increase." Lin Yanjun was with her child, lining up to buy milk and apple-flavored milk. She said she didn’t know the price increased till today, and thought that the price increased “quite a bit” from NT\$75 to NT\$85, though still acceptable. The 62-year-old Mr. Zhu Yongsheng lined up twice to buy milk and goat milk. He said the "NTU" brand name is more reliable, though not sure whether it is psychological or real, and NTU’s milk tasted mellower and safer. He thought that the price hike of goat milk from NT\$100 to NT\$115 was “okay,” since he only drinks 1 to 2 cups a day, and hence, the price adjustment is not “outrageous”.

Part D Article “The 58 Billion Hidden Cost of the Flu on the US Economy” (CNBC, 2016/10/28)^{iv} is in English

Abstract of Bavishi, Slade, and Levy (2016)^v provided for Part E Article 讀書能多活兩年？耶魯大學發現讀書與長壽之間的聯繫” (端聞 2016/8/12)^{vi}

Translation for Part F article 中國金牌數銳減變「小三」 原因竟是... (Apple Daily 2016/8/17)^{vii}

...According to Chinese internet media Sina.com, China has won no less than 25 gold medals in each Olympic Game since 2000, the worst was 28 gold medals. In the 2008 Beijing Olympic Games, China was the host and won 51 gold medals. In London Olympics China still won 38 gold medals. But this year, China only won 17 gold medals so far. As the Olympic Game is coming to an end, it is unlikely for China to win more gold medals...(omitted)...In addition, the commentary also said that the Chinese Sports General Administration Department shrunk the award for gold medals dramatically. In the London Olympic Game, the award for a gold medal was 500,000 RMB (about NT 2.5 million). In the Rio Olympic Game, the award is only 200,000 RMB (about NT 1 million). And in 1990s, the award was 80,000 RMB, which after adjusting for inflation is still higher than the current 20 million RMB the award....(Omitted)

ⁱ URL: <http://www.storm.mg/article/143141>

ⁱⁱ URL: <http://www.appledaily.com.tw/realtimenews/article/new/20160927/956824/>

ⁱⁱⁱ URL: <http://www.appledaily.com.tw/realtimenews/article/new/20150901/682710/>

^{iv} URL: <http://www.cnbc.com/2016/10/28/the-58-billion-hidden-cost-of-the-flu-on-the-us-economy.html>

^v URL: <http://dx.doi.org/10.1016/j.socscimed.2016.07.014>

^{vi} URL: <https://theinitium.com/article/20160811-dailynews-read-book/>

^{vii} URL: <http://www.appledaily.com.tw/realtimenews/article/new/20160817/930322/>