

Problem Set 3

On what and how to submit

- For this and all future problem sets, questions are from the “Problems” section of the questions at the end of the chapter.
- Due before Lecture 3.
- Name the file “ps03_[lastname].pdf”. For example, my file would be “ps03_brooks.pdf”.
- Turn in via this [google survey](#).
- Make sure your name is at the top of the submission.
- You do not need to type your submission. Any **legible** submission in pdf format is ok. For example, you can write the problem set with hand-drawn graphs, take a picture, make a pdf, and submit the pdf.

1. GLS Chapter 2, Question 20, parts (a)-(c) only

For this question, make a logically consistent argument. There may not be one “right” answer.

- (a) sign of cross-price elasticity for shampoo and conditioner Let the cross price elasticity be

$$E = \frac{\% \Delta Q_{shampoo}}{\% \Delta P_{conditioner}} .$$

The answer is the same if we define

$$E = \frac{\% \Delta Q_{conditioner}}{\% \Delta P_{shampoo}} .$$

For my answer, I assume that shampoo and conditioner are complements. If the price of conditioner goes up (denominator in the first equation), I want to consume less conditioner. If I consume less conditioner, I also want to consume less shampoo. This second part means that the numerator is negative. Therefore, we are interested in

$$E = \frac{-}{+} \implies E < 0$$

- (b) Cross price elasticity for gasoline and ethanol

Assume for purposes of this answer that gasoline and ethanol are substitutes. You can use them interchangeably – together or separately. We are therefore interested the cross-price elasticity, defined as

$$E = \frac{\% \Delta Q_{gasoline}}{\% \Delta P_{ethanol}} .$$

The answer is the same if we define

$$E = \frac{\% \Delta Q_{ethanol}}{\% \Delta P_{gasoline}} .$$

If gasoline and ethanol are substitutes, and the price of ethanol increases (the denominator in the first equation), I want to consume less ethanol. If I consume less ethanol, I also want to consume more gasoline – as nothing else has changed except the prices. This second part means that the numerator is positive. Therefore, we are interested in

$$E = \frac{+}{+} \implies E > 0$$

(c) Cross price elasticity for coffee and shoes

I am going to assume that I am sufficiently wealthy so that total spending on food is unlikely to impact my total spending on clothing (you can make a different assumption! just make sure your assumption is clear). We are interested in

$$E = \frac{\% \Delta Q_{coffee}}{\% \Delta P_{shoes}} .$$

The answer is the same if we define

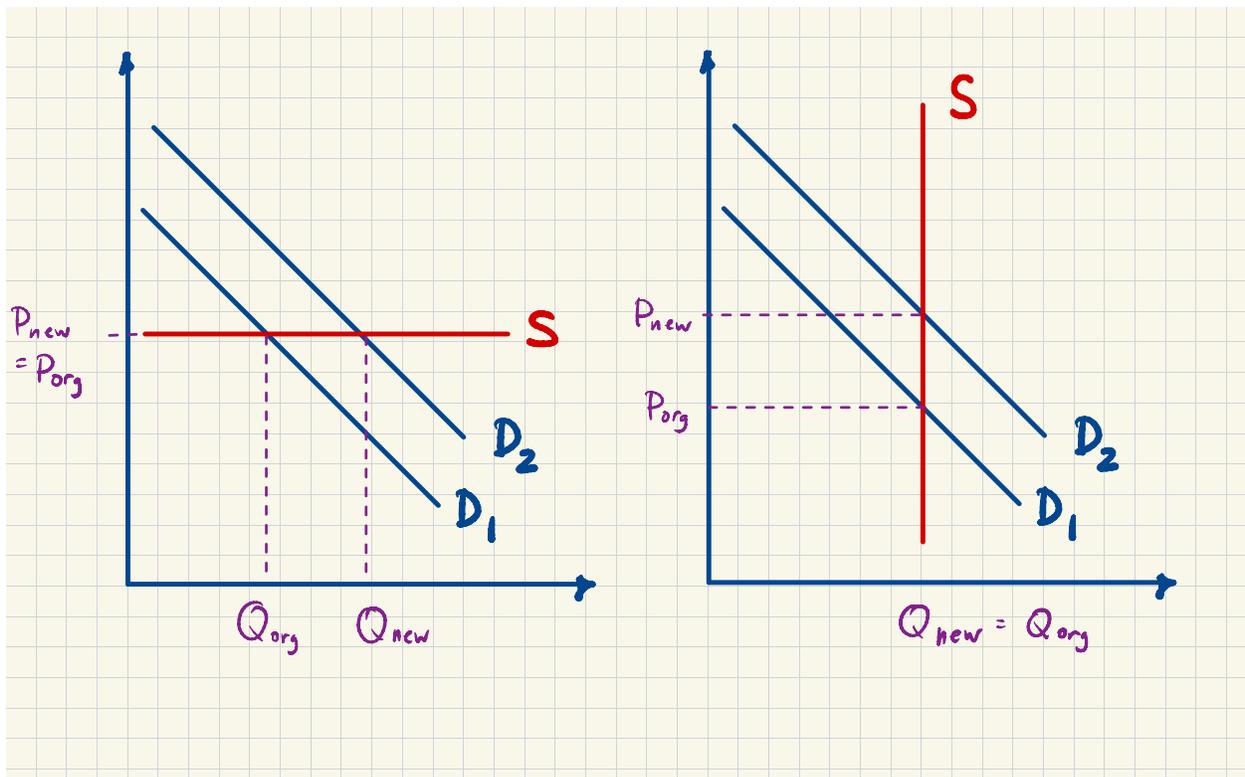
$$E = \frac{\% \Delta Q_{shoes}}{\% \Delta P_{coffee}} .$$

If the price of shoes increases (the denominator in the first equation), I want to purchase fewer shoes, and I substitute to another clothing category. My consumption of coffee is unchanged (numerator is 0) . Therefore

$$E = \frac{0}{+} \implies E = 0$$

For me personally, I never want coffee, so this elasticity really is zero.

2. GLS Chapter 3, Question 4 (Hint: draw cases with elastic and inelastic supply.)



In the figure above, the left panel has elastic supply and the right panel has inelastic supply. Consumer surplus increases on the left side, because the price stays the same. This means that the consumer surplus triangle – above the price, and below the demand curve – gets larger. In contrast, in the right panel, the price increases, and the consumer surplus triangle stays the same size. It is higher on the graph, but its overall size hasn't changed.

3. Price regulations

Find a specific example of a price ceiling or floor – not one from class or from the textbook. Roughly, what was the impact of this regulation on quantity supplied and quantity demanded?

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We accept any logically argued answer here.