Microeconomics for Public Policy I
Fall 2025

Problem Set 7
Due Lecture 8

On what and how to submit

- Due before Lecture 8.

- Name the file "ps07_[lastname].pdf". For example, my file would be "ps07_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. Gruber Chapter 19, Question 2

Assume that the statutory incidence falls upon the consumer.

This question didn't provide enough information to assess whether the statutory incidence falls on the consumer or the producer. To simplify, I assumed that the statutory incidence fell on the consumer.

Before we begin the analysis of taxation, find the original market equilibrium price. I do this by setting $Q_D = Q_S$:

$$2000 - 100P = 200P - 100$$
$$2100 = 300P$$
$$P = 7$$

We know that in equilibrium, the market price is 7.

If the consumer bears the burden of the tax, demand shifts downward by the amount of the tax: at any quantity, the consumer is willing to pay the producer less, since the consumer must also pay the government.

First, express the original demand curve in terms of price:

$$100P = 2000 - Q$$
$$P = \frac{2000 - Q}{100}$$

Now, add the tax to this original demand curve, letting P_{tax} be the price the consumer is willing to pay when he must also pay the tax, and letting P_o be the original price the consumer was willing to pay (at any quantity). Then

$$\begin{aligned} P_{tax} &= P_o - 2 \\ &= \frac{2000 - Q}{100} - 2 \\ &= \frac{2000 - Q}{100} - \frac{200}{100} \\ &= \frac{1800 - Q}{100} \end{aligned}$$

To facilitate the solution, we can rewrite the final equation in terms of Q: $Q = 1800 - 100P$.

Find the new equilibrium price (and quantity if you wish) by setting the new demand curve equal to the original supply curve and solving for price:

$$\begin{aligned} 1800 - 100P &= 200P - 100 \\ 1900 &= 300P \\ P &= \frac{19}{3} = 6\frac{1}{3} \end{aligned}$$

Now find the tax burdens. The consumer has to send \$2 to the government, but enjoys a price decrease of $\frac{2}{3}$ $(= 7 - 6\frac{1}{3})$. On net, the consumer's burden is therefore \$ $1\frac{1}{3}$.

The producer's burden is the lowered price in the market, or \$ $\frac{2}{3}$.

The tax incidence is shared, but falls more heavily on the consumer.

See picture at the end for both this and the following question.

2. Gruber Chapter 19, Question 3

Now assume that the statutory burden of the tax falls on producers. First, find the new supply curve with the tax. Note that the supply curve shifts upward: given that producers must mail in \$2 to the government for every unit sold, producers charge higher prices for each unit sold.

Write the supply curve in terms of price: $P = \frac{Q+100}{200}$.

Note that, using the same notation as in the previous question, $P_{tax} = P_o + 2$. Plugging in,

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we find that

$$P_{\text{tax}} = P_o + 2$$
$$= \frac{Q + 100}{200} + \frac{400}{200}$$
$$= \frac{Q + 500}{200}$$

Express this new supply curve in terms of Q, and set this new supply curve equal to the original demand curve to find the new market equilibrium.

$$2000 - 100P = 200P - 500$$
$$2500 = 300P$$
$$25 = 3P$$
$$P = \frac{25}{3}$$
$$P = 8\frac{1}{3}$$

For the consumer, the price increases by $1\frac{1}{3}$, which is the consumer's burden.

The producer gets the benefit of an increase in price of $1\frac{1}{3}$, but has to mail in a check to the government for \$2. Therefore, the producer's burden is \$ $\frac{2}{3}$.

Note that these burdens – as expected! – are the same, regardless of the side of the market on which the tax is levied.

3. New EV Tax Credit

The Inflation Reduction Act included a \$7,500 dollar tax credit for US citizens for the purchase of electric vehicles. Think of this credit as a negative tax. For purposes of this problem, we assume that the supply of new cars is relatively more inelastic than the demand for new cars. Given this, explain whether you expect the price of electric cars to increase by the full amount of the tax. Who is likely to bear the incidence of this tax credit?

For purposes of this problem, think of the quantity along the horizontal axis as the units of "car services" you are buying – the niceness of the ride, the infrequence of the maintenance, etc.
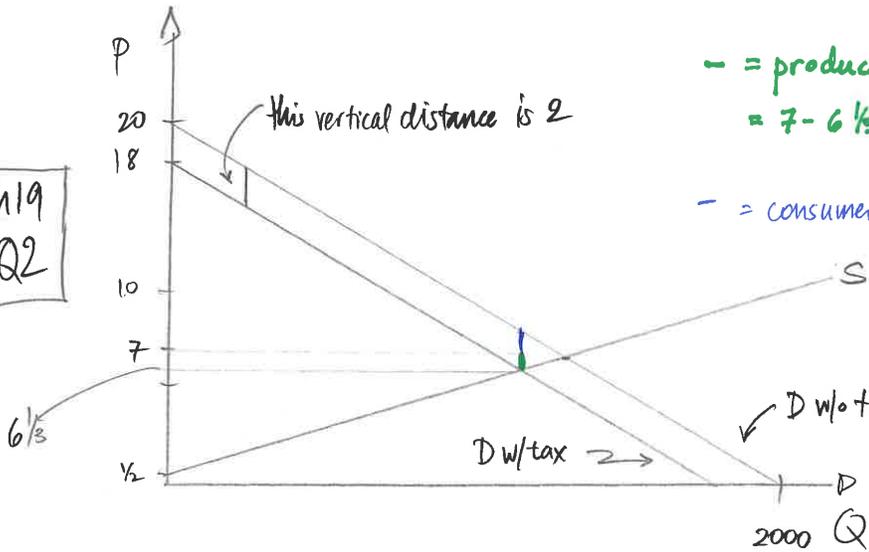–

In late-pandemic America, the supply of new cars of all types was quite inelastic. Demand for cars was relatively elastic.

A tax credit of $7500 makes consumer demand for cars shift up by $7,500. However, if the supply side of the market is more inelastic than the demand side, we expect the price to rise, perhaps by the total amount of the tax credit. See the picture at the end for a depiction.

Thus, the car dealers (or automakers.. this part is hard to say) is bearing the incidence (here getting the benefit of) the subsidy.

If the car dealers get the entire tax subsidy, does this mean this is bad policy? Instead of subsidizing consumers, the federal government is effectively subsidizing the production of electric vehicles. The question therefore, is whether using federal dollars to directly subsidize automakers is good policy. Economics doesn't give an immediate clear answer here, as it depends on multiple factors, including some information about how you weigh different priorities. One important factor is the extent to which electric cars have externalities, a topic we will explore in Lecture 13.
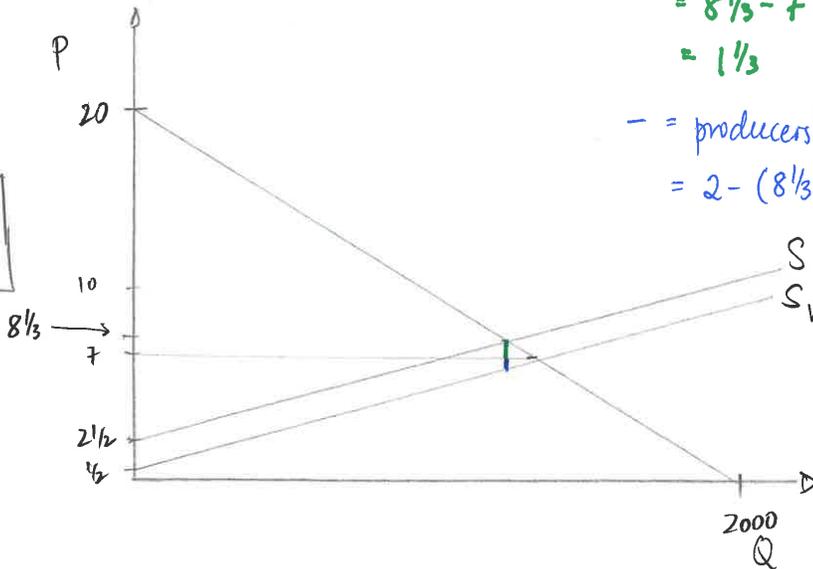
Ch19 Q2

P

20
18

this vertical distance is 2

10

S

7

6⅓

½

D w/tax →

D w/o tax

2000 Q

— = producer's burden
= 7 − 6⅓ = ⅔

— = consumer's burden
= 2 − (7 − 6⅓)
= 2 − 1⅓
= 2 − ⅔
= 1⅓

Ch19 Q3

P

20

10

8⅓ →
7

2½
½

S w/ tax.
S w/o tax

2000
Q

— = consumers' burden
= 8⅓ − 7
= 1⅓

— = producers' burden
= 2 − (8⅓ − 7) = 2 − 1⅓ = ⅔

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Question 3

Graph showing price (P) on vertical axis and quantity/quality of EV (Q) on horizontal axis.

Labels on graph:
- vertical distance is tax subsidy for EVs
- S
- $P_{tax\ credit}$
- P_{orig}
- this increase in price is slightly smaller than the tax credit amount
- D, w/ tax credit
- D, original
- Q_{orig}
- $Q_{tax\ credit}$
- quality of EV