NIU – Spring 2017 – Econ 450/550 - Assignment 11: Tax incidence theory, results, and complications [20 points + 2 point extra credit]

Name: ____________________________ Student ID #: ___________________

Due: Beginning of class on Monday, April 24

Note: If you have decimal values, round them to the nearest hundredth as soon as it arises.

1. [10 points] Consider the following monthly supply and demand functions (quantity in terms of price) for a hypothetical smartphone market (quantity is in hundreds of smartphones; smartphone price (P) is in dollars).

$$D: Q = 60 - \frac{1}{10}P$$

$$S: Q = \frac{2}{10}P - 1$$

i. (0.5 point) What is the smartphone market's willingness-to-pay curve (price in terms of quantity from the demand curve) in equation form?

ii. (0.5 points) What is the smartphone market's marginal cost curve (price in terms of quantity for the supply curve) in equation form?

iii. (1 point) Plot this smartphone market in (Q, P) space (this is just a normal market graph). Label your demand curve D_1 and your supply curve S_1.

iv. (1 point) What is the market equilibrium (Q_1^*, P_1^*)? Clearly indicate this point in your market graph (reader should know what the numerical value is and that they are equilibrium values).

v. (0.5 points) Assume the government levies an excise tax of $30 per smartphone on producers. Write the market's new marginal cost curve (hint: does the tax increase marginal cost by $30 or supply by $30)?

vi. (0.5 points) Graph this new marginal-cost curve in your market graph (label it S_2).

vii. (1 point) What is the post-tax market equilibrium (Q_2^*, P_2^*)? Clearly indicate this point in your market graph in the same manner you did for the pre-tax market equilibrium.

viii. (0.5 points) What is the gross price after the tax is imposed? Who pays or receives this price (consumers or producers)?

ix. (0.5 points) What is the after-tax price for consumers? What is the after-tax price for producers? Hint: one of these groups' after-tax price is the same as the gross price.

x. (0.4 points) What is the consumer burden of the tax? Show your work.

xi. (0.4 points) What is the producer burden of the tax? Show your work.

xii. (0.2 points) Which group bears the higher tax burden? ___________________________________.

xiii. (0.5 points) What is the elasticity of demand <u>at the post-tax market equilibrium</u>?

xiv. (0.5 points) What is the elasticity of supply <u>at the post-tax market equilibrium</u>?

xv. (1 point) Considering the elasticities calculated in parts xiii and xiv, why does it make sense the group you determined bears the higher tax burden does so?

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xvi. (1 point) What is the excess burden of the tax? Hints: It may help to graph this on our original market graph to know how it is calculated. It will be a non-isosceles triangle, so you will need to calculate the burden on each party and add them together. Note: the answers should be <u>very</u> "convenient."

xvii. (0.5 points) Assume instead the excise tax of $30 per smartphone was levied on consumers instead of producers. Write the market's new willingness-to-pay curve (hint: if a consumer was previously willing to pay at most $X for a smartphone, the <u>total amount</u> they are at most willing to pay for a smartphone does not change. The only thing that changes is the maximum <u>market price</u> they are willing to pay).

xviii. (0.5 points) Replot the pre-tax smartphone market below. Add onto it the new demand curve you solved for in part xvii, and label it D_2.

xix. (1 point) What is the new post-tax market equilibrium (Q_3^*, P_3^*)? Clearly indicate this point in your market graph in the same manner you did for the pre-tax market equilibrium.

xx. (0.5 points) What is the gross price after the tax is imposed? Who pays or receives this price (consumers or producers)?

xxi. (0.5 points) What is the after-tax price for consumers? What is the after-tax price for producers?

xxii. (0.5 points) What is the consumer burden of the tax? Show your work.

xxiii. (0.5 points) What is the producer burden of the tax? Show your work.

xxiv. (1 point) TRUE/FALSE the tax burden differs when the tax is imposed on producers instead of consumers.

xxv. (2 points extra credit) In the long run, what burden distribution would we typically expect on consumers and producers in percentage terms in a perfectly competitive market? Why? ________
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2. (1 point) TRUE/FALSE For a tax system to minimize excess burden when raising a fixed amount of revenue, <u>equal</u> taxes should be applied to all goods.

3. (2 points) List two complications that arise in <u>actual</u> estimation of tax burden that are not considered in our model of tax incidence.
   i. ____
   ____.

   ii. ____
   ____.

4. (2 points) Our model of tax incidence is a PARTIAL/GENERAL equilibrium model. This means that our model considers how a tax affects ONLY ONE/MULTIPLE markets.