Midterm (Answer Key)
100 possible points
ECNS 432
Fall 2018

_____Name

You are allowed a calculator and scratch paper for this exam, but nothing else!

1.) Suppose the output of jumbo shrimp from a shrimp bed is given by the following production function, where L represents the labor input and TP represents total product, or output, in shrimp.

Labor	TP
1	4
2	12
3	19
4	25
5	29
6	31
7	32
8 or more	32

Assume the market price for shrimp is $10 each and all shrimp gatherers can earn $40 per day in their next best alternative.

a.) **(8 points)** Suppose the shrimp bed is "common property", no one owns it and anyone who wishes can work the shrimp bed and share equally in the output. That is, the value of the total product is split evenly amongst however many workers decide to work the shrimp bed. How many workers will harvest shrimp in this case? Explain why common property is inefficient.

People will join the common property shrimp bed to farm it up to the point where VAP = w.

As a result, 8 workers farm the shrimp bed under common property

This is NOT socially efficient because workers 6, 7, and 8 could be reallocated elsewhere to be producing more output for society.
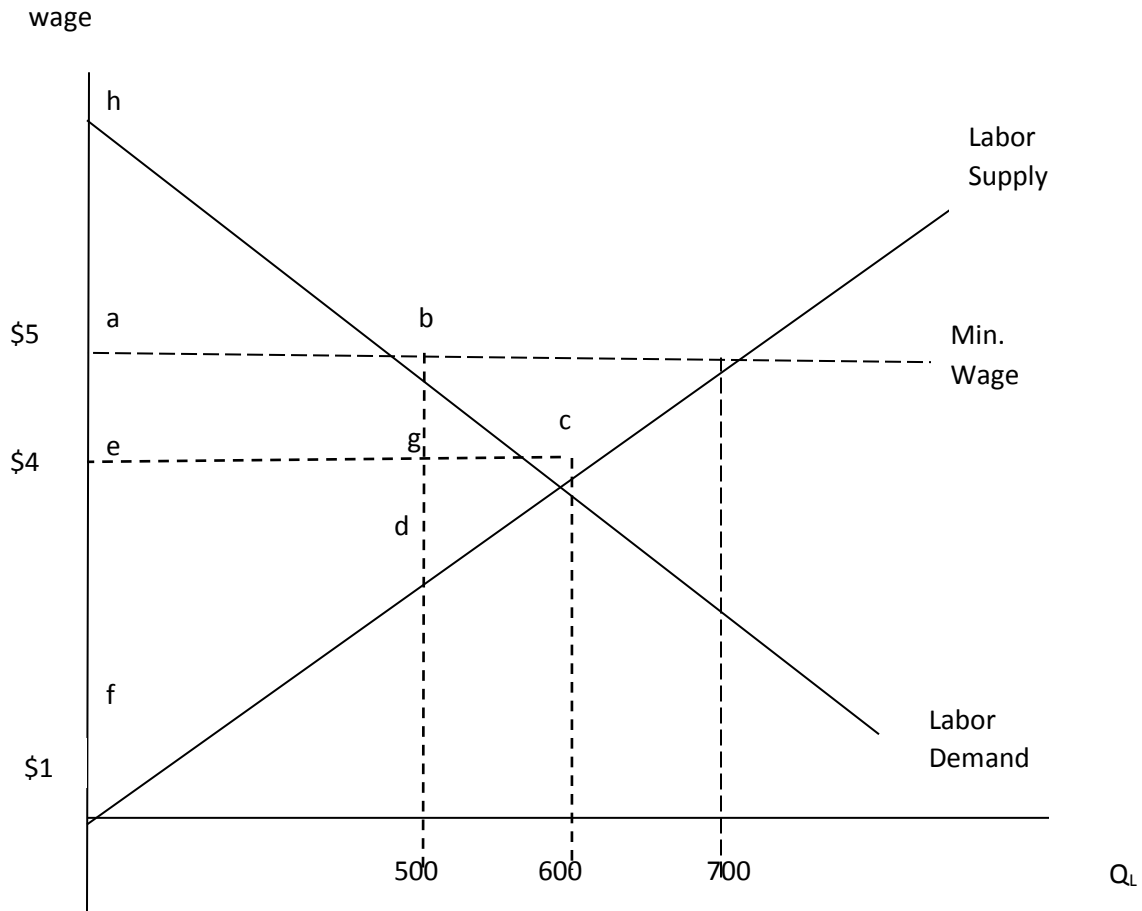
b.) **(7 points)** Suppose the shrimp bed is privately held by a profit maximizing owner. How many workers would the owner hire, and would it be an efficient allocation of resources?

Profit maximizing owner will hire up to the point where VMP = w.

As a result, 5 workers will be hired to farm the shrimp bed.

This is socially efficient because these workers could not be reallocated elsewhere to be producing more output for society.

2.) Consider a low-wage labor market. Workers in this market are not presently covered by the minimum wage, but the government is considering implementing such legislation. If implemented, this law would require employers to pay workers a $5 hourly wage. Suppose all workers in the market are equally productive, the current market-clearing wage is $4 per hour, and that at this market-clearing wage there are 600 employed workers. Further suppose that under the minimum wage legislation, only 500 workers would be employed and 200 workers would be unemployed. Finally, assume that the market demand and supply curves are linear and that the market reservation wage, the lowest wage at which any worker in the market would be willing to work, is $1 per hour. The graph below depicts this situation.

a.) (3 points) Which area in the graph represents the change in employer surplus due to the minimum wage? Calculate this change in employer surplus (making sure to indicate whether it is positive or negative). abce is a loss in employer surplus. This amount is equal to –[($5-$4)*500 + (1/2)*100*($5-$4)] = - $550

b.) (3 points) Which area represents the new employee surplus? (i.e., employee surplus after the minimum wage has been implemented) Is the change in employee surplus positive or negative? abdf is the new employee surface. The gain in employee surplus of abge clearly outweighs the loss in employee surplus of gcd.

c.) (3 points) Which area represents a transfer from employers to employees? abge is a transfer from employers to employees

d.) (3 points) Which area represents the total impact of the minimum wage on employers and employees as a whole? Is this amount positive or negative? The DWL is bcd and this is clearly negative.

e.) (3 points) Finally, 100 workers are induced by the higher wage to enter the market. Do these workers experience a change in surplus that should be counted in a welfare analysis? Why or why not? Because these individuals neither had a job before or after the min. wage policy, they see no change in surplus.

3.) Suppose that the current market equilibrium for a good is such at p* = $50 and q* = 10. Also suppose that the elasticity of supply is 2.5 and the supply curve is linear.

a.) (5 points) Use the price elasticity of supply and market equilibrium to solve for the supply curve.

·In general, a linear supply curve can be represented by

$$q = a + (\Delta q/\Delta p)p \qquad\qquad (1)$$

·Using the formula for the elasticity of supply, we can solve for the slope of the supply curve

$$\varepsilon_s = (\Delta q/\Delta p)(p/q)$$

=> $2.5 = (\Delta q/\Delta p)(50/10)$
=> $\Delta q/\Delta p = 2.5/5 = 1/2$

·Plugging the slope and market equilibrium points into (1), we can solve for the intercept:

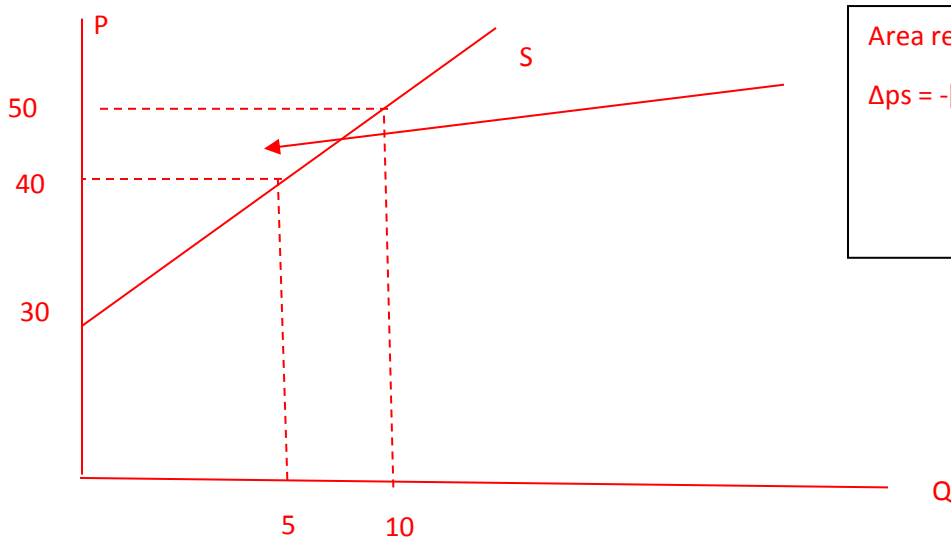 $10 = a + (1/2)(50)$
=> $a = -15$

·Finally, we can write the supply curve as

     $q = -15 + (1/2)p$

b.) (5 points) Suppose a policy is enacted such that the price falls from $50 to $40. By how much does producer surplus fall? Show this graphically and calculate the actual Δps.

Area represents loss in PS due to price fall.

Δps = -[(1/2)(5)(10) + (5)(10)] = -$75

4.) Suppose we have an efficiently operating market for cigarettes (our primary market good). Also, consider the secondary markets for chewing tobacco and whiskey. Cigarettes and chewing tobacco are substitutes, while cigarettes and whiskey are complements.

Now assume the government imposes a tax of t_x per pack on sellers in the cigarette market.

a.) (5 points) Suppose the supply schedule in the market for whiskey is perfectly elastic and this market operates efficiently. Do we count changes in surplus that occur in the market for whiskey (due to the tax in the primary market) in our welfare analysis of the primary market? Why or why not? Keep your answer to a sentence or two.

No, all changes are accounted for already in the primary market. We do not want to double count the increase in consumer surplus.

b.) (10 points) Suppose the supply schedule in the market for chewing tobacco is upward sloping. Furthermore, suppose there exists a government maintained price support (aka price floor) in this market. **Illustrate graphically** what happens in this market when the tax in the primary market is imposed (assume the demand for chewing tobacco shifts such that the price floor is still binding). Do we count any changes in this secondary market in our welfare analysis of the primary market?

-We do not count changes in consumer surplus (already accounted for)…because the price floor is still binding after the demand shift, price has not changed for the consumer.

-Producer surplus in the secondary market does not change given that the government buys up the surplus and the price floor remains binding after the demand shift.

-BUT, the DWL gets smaller…and this is a change that we would want to count!

5.) (5 points) To finance a policy, the government will impose a per unit tax on either cigarettes or apples. The government wishes to minimize leakage when imposing the tax. Given this, which good do you think the government should tax? Make sure to briefly explain your answer. No explanation, no points. (Recall: Leakage = DWL/Tax Revenue)

Imposing the tax on an item with a relatively inelastic demand will likely yield a much smaller DWL to society. Cigarettes likely have few substitutes relative to apples. So, on these grounds, tax cigarettes.

6.) Suppose we have a three person neighborhood consisting of a gardener named Arnold and his neighbors Sylvester and Jean Claude. Arnold plants flowers in his garden every year because he gets benefits from being able to enjoy a nice looking yard. In addition, Sylvester also gets benefits from being able to enjoy the flowers that Arnold plants. However, Jean Claude has bad allergies and the pollen from the flowers make his allergies worse. Assume that Arnold gets $100 of benefits from each batch of flowers that he plants. Also, assume that Sylvester gets $50 in benefits from each batch of flowers that Arnold plants. Lastly, assume that Jean Claude's allergy medication costs increase $20 for each batch of flowers that are planted. In addition, suppose that Arnold faces the following marginal cost schedule for planting flowers:

Q(# of batches of flowers)	Arnold's MC
1	25
2	40
3	65
4	80
5	100
6	125
7	150
8	180

a.) (7 points) Due to Arnold's extremely thick accent he cannot communicate with his neighbors (i.e. transaction costs to communication and negotiation are prohibitively high). How many batches of flowers will Arnold plant? Is this outcome socially efficient? Why or why not?

Arnold will plant to the point where his pvt. MC = pvt. MB. He plants 5 batches of flowers.

This is not socially efficient b/c this is not taking into consideration benefits/costs to the other guys.

b.) (8 points) Now assume Sylvester and Jean Claude each have an interpreter so they can understand Arnold. Assume the interpreters are free of charge so communicating with each other is now costless (i.e. transaction costs are zero). How many batches of flowers will Arnold plant? Is this outcome efficient?

Now, Arnold will plant to the point where soc.MC = soc.MB. Thus he plants 6 batches. This is efficient because all mutually beneficial gains from trade have been exhausted.

7.) Suppose we have an efficiently operating market for good X. Also, suppose the government adds a sufficiently large quantity of good X to the market such that the price of good X decreases (as shown in the graph below).

Use the graph below to answer the following:
a.) (3 points) The gain in consumer surplus is given by what area on the graph? P_0abP_1
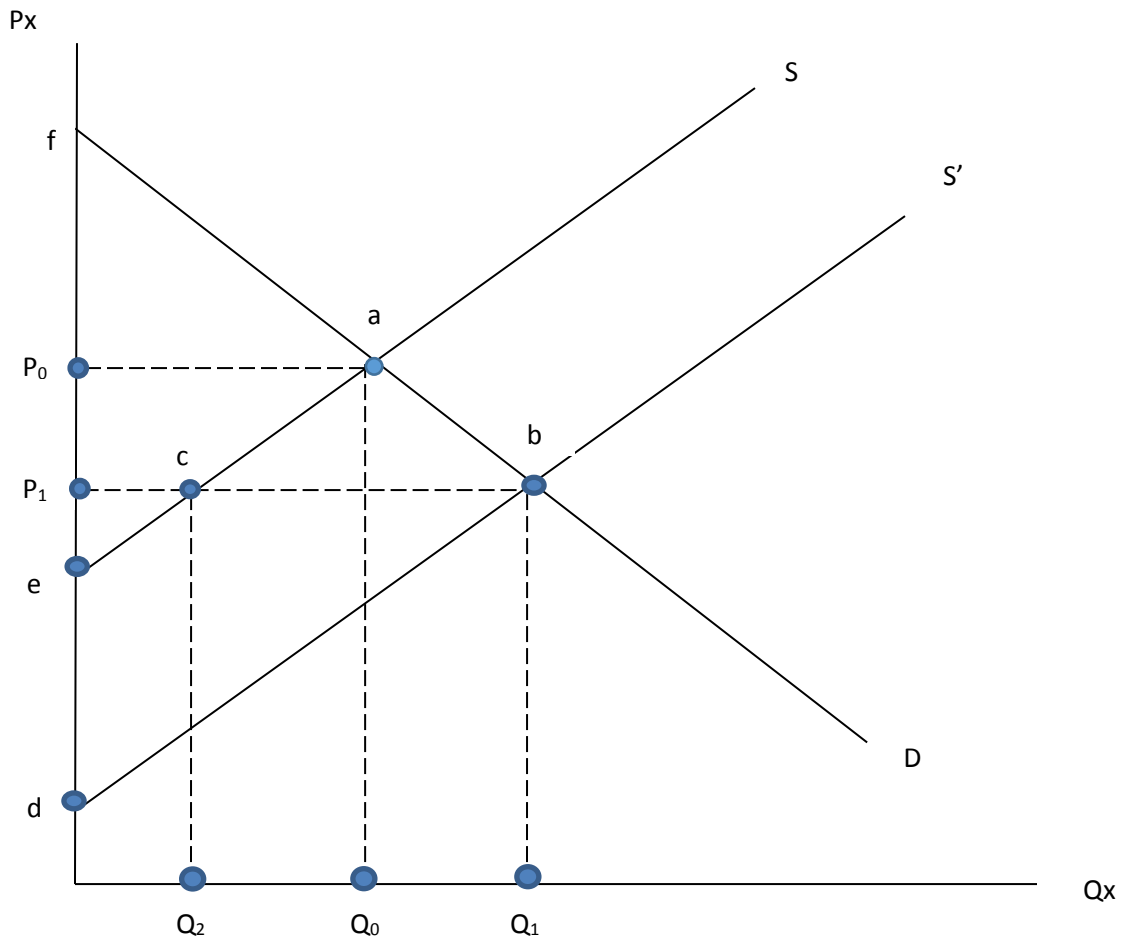
b.) (2 points) Which supply curve do private sector suppliers operate on, S or S'? S

c.) (3 points) The loss in producer surplus is given by what area on the graph? P_0acP_1

d.) (2 points) What area on the graph represents the net surplus among producers and consumers? Is this net surplus positive or negative? abc, and this amount is positive

e.) (3 points) Government surplus is given by what area on the graph? Q_2cbQ_1

f.) (2 points) The overall gain in social surplus is given by what area on the graph? Q_2cabQ_1

8.) (10 points) "The Marshmallow Test" is a famous psychological experiment in the delay of self-gratification. It goes something like this…A researcher gives a child a marshmallow and tells her that she can either eat the marshmallow now or wait and receive another marshmallow later. Before leaving the room, the researcher instructs the child that she will receive the second marshmallow upon the researchers return if the original marshmallow is uneaten.

It turns out that research finds that the children who are able to delay self-gratification actually do better in terms of long-run outcomes (e.g., educational attainment, employment, likelihood of incarceration, etc.). Based on these findings, many schools have adopted lessons where they stress teaching children the delay of self-gratification and emphasize to parents that this is a vitally important early-childhood skill. This research, however, is generally based on raw correlations between marshmallow-test performance and a long-run outcome of interest.

Do you think these raw correlations are sufficient evidence to support allocating resources to teaching delay in self-gratification to school-aged children? Why or why not? As an aspiring economic researcher, what would be some of the first things you would want to do to test the robustness of these correlations? Be brief and to the point in your discussion below.

No, definitely not. Even in the most basic analysis, one would want to control for factors such as parental education, family socioeconomic status, etc. It is entirely possible that, when controlling for these potential confounds, the observed relationship between performance on the marshmallow test and subsequent outcomes goes away. In fact, a recent study by Watts et al. (2018) in *Psychological Science* found this exact result…the marshmallow test does a much poorer job predicting adult outcomes after holding constant factors such as family background, early cognitive ability, and home environment.