

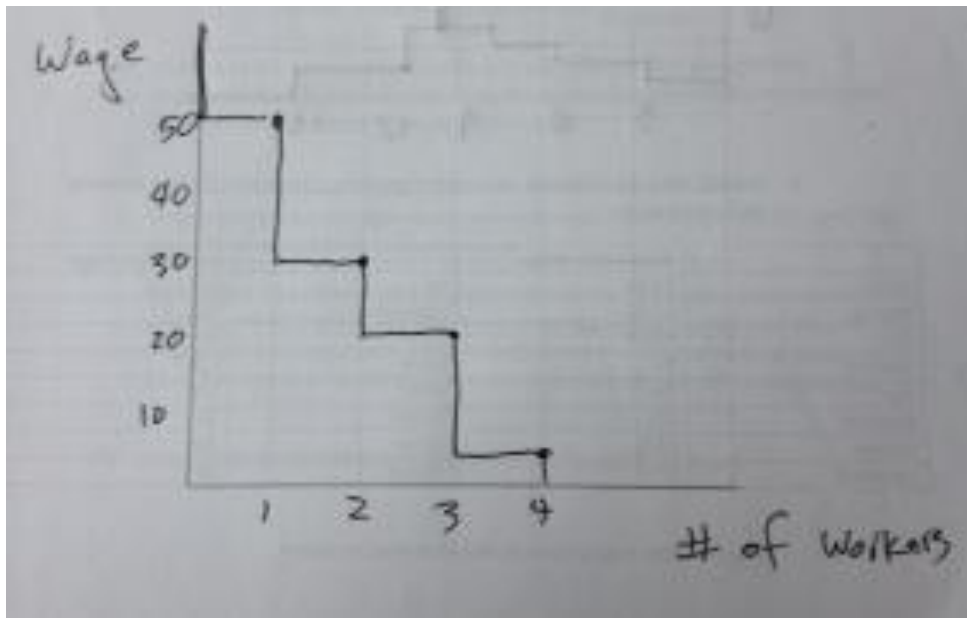
Name:

Econ 101 Extra Credit Homework #7

1. The Pizza Pile restaurant has the following production function. Assume pizzas sell for \$10 each and complete the following chart:

Fixed Inputs	# of Workers	Pizzas per hour	Marginal Product of Labor	Marginal Revenue Product of Labor
"3 ovens, 1 cash register, 400 sq. foot store, 1 big refrigerator"	0	0		XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX
" "	1	5	5	\$50
" "	2	8	3	\$30
" "	3	10	2	\$20
" "	4	10.5	0.5	\$5

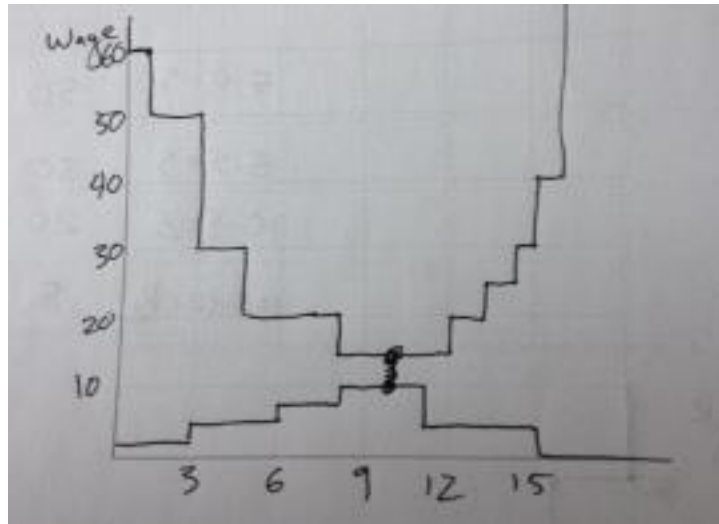
- a. Graph the *derived demand* curve for pizza-makers (workers) below:



- b. Assume there are three other pizzerias in town, with the following derived demand tables:

# of Workers	Pizza Pit	Pizza Hole	Pizza Trap
1	\$20	\$60	\$30
2	\$15	\$50	\$15
3	\$10	\$20	\$5
4	\$5	\$5	\$0

Draw the aggregate demand for pizza-makers, for the four restaurants – Pizza Pile, Pizza Pit, Pizza Hole and Pizza Trap.



- c. Assume there are 16 people interested in becoming pizza-makers, for the following reservation wages:

	Reservation Wage		Reservation Wage
Aaron	\$2.50	Ian	\$10
Bernice	\$2.50	Josephine	\$10
Carl	\$2.50	Kurt	\$15
Deirdre	\$5	Laura	\$15
Earl	\$5	Matt	\$20
Francine	\$5	Naomi	\$25
George	\$7.5	Oliver	\$30
Henrietta	\$7.5	Patrice	\$40

Draw the labor supply curve on the same diagram above.

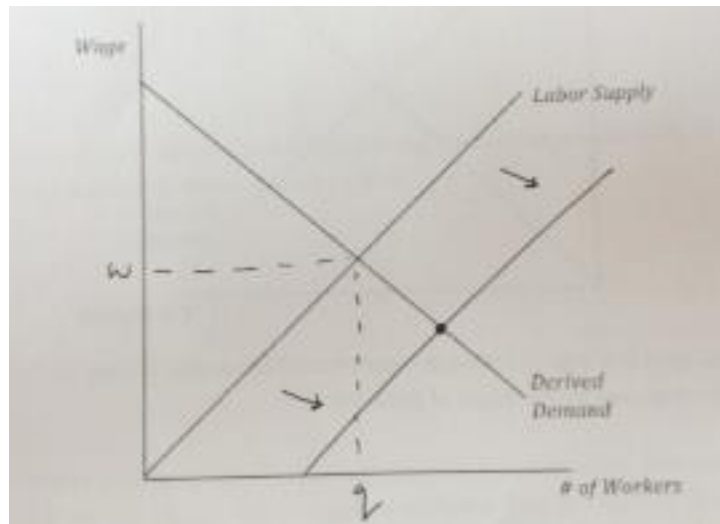
d. How many people are hired as pizza-makers in town?

10

e. What is the equilibrium wage for pizza-makers?

\$10

2. The following diagram corresponds to the supply and demand for unskilled labor in Texas.



- Indicate on the above chart the equilibrium wage and # of employed workers
- Suppose immigration increases and shifts the labor supply curve. Draw the new supply curve. What is the impact on the equilibrium wage?

*It falls*

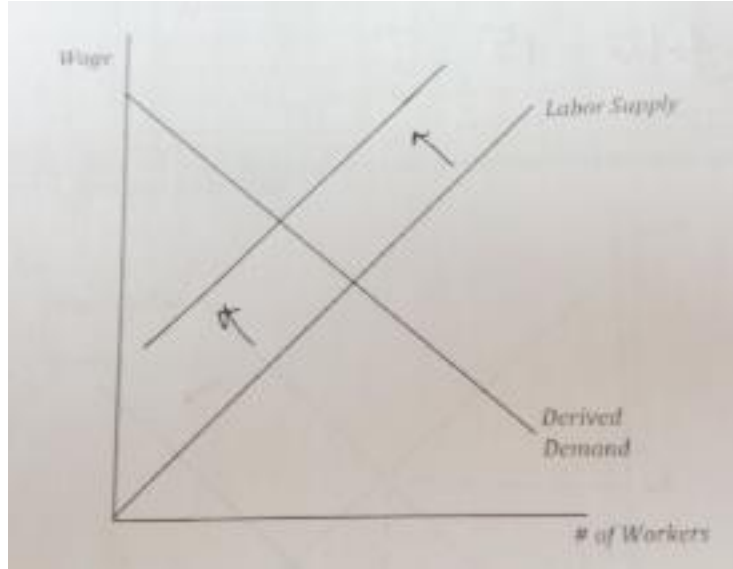
- In fact, immigration may also impact derived demand. To see why, circle the words that correctly completes the following sentence:

Immigration raises/lowers the # of buyers in all markets. This causes the demand for all goods to shift left/right. If supply costs are unchanged, this will raise/lower the price of all goods. This change in price will increase/decrease the marginal revenue product of labor. This change in the marginal revenue product of labor will shift derived demand right.

- If derived demand shifts right, might your answer to part (b) change?

*It is no longer certain that wages will fall.*

3. The following diagram corresponds to the supply and demand for bartenders. Suppose the bartender lobby successfully lobbies the government to implement a requirement that all bartenders must take and pass an expensive course in mixology before being allowed to serve in a bar.



- How does this impact the labor supply curve? Draw your answer on the above diagram.
- What happens to the wages of bartenders?

*They will rise*

- What happens to the quantity of employed bartenders?

*It falls*

4. The above mentioned pizzerias have decided to advertise online, using Google's advertising system. Recall that Google sells ads with a second-price sealed bid auction. The four Pizzerias have the following Willingness-to-Pay (WTP) for ads, and the following bids:

Pizzeria	WTP for Advertising	Bid
Pizza Pile	\$1/ad	\$0.50/ad
Pizza Pit	\$0.75/ad	\$0.75/ad
Pizza Hole	\$2/ad	\$3/ad
Pizza Trap	\$5/ad	\$5/ad

- a. Who wins the auction, and how much do they pay for advertising?

*Pizza Trap wins, paying \$3/ad*

- b. Which Pizzerias are playing the optimal (best) strategy?

*Pizza Trap and Pizza Pit are playing  $WTP = bid$*

- c. Pizza Pit is frustrated that it keeps losing the auction, and decides to raise its bid until it starts winning. Why is this a bad idea?

*It is already bidding its willingness-to-pay. By raising its bid, if it wins, it will pay more than it values the advertising.*

- d. Notice that Pizza Trap has the highest WTP for advertising, and consequently, the highest bid. Explain how it might be suffering from the Winner's Curse.

*Pizza Trap may be overestimating the value of advertising, and hence overpaying.*

5. Suppose the New York Times knows it has two kinds of readers. There are 20 million "casual" readers, who will only read the paper (online) if it is free. At the same time, there are 5 million "avid" readers, who will pay \$20 per month to read the paper. Suppose the paper has a marginal cost of \$0, because once an article is online, it costs nothing for more visitors to read it. Finally, suppose the paper makes \$10 per month per reader from advertising.

- a. If the paper is free, how much money does the paper make?

*$\$10 \times (20 + 5) = \$250 \text{ million}$*

- b. If the paper costs \$20 per month, how much money does the paper make?

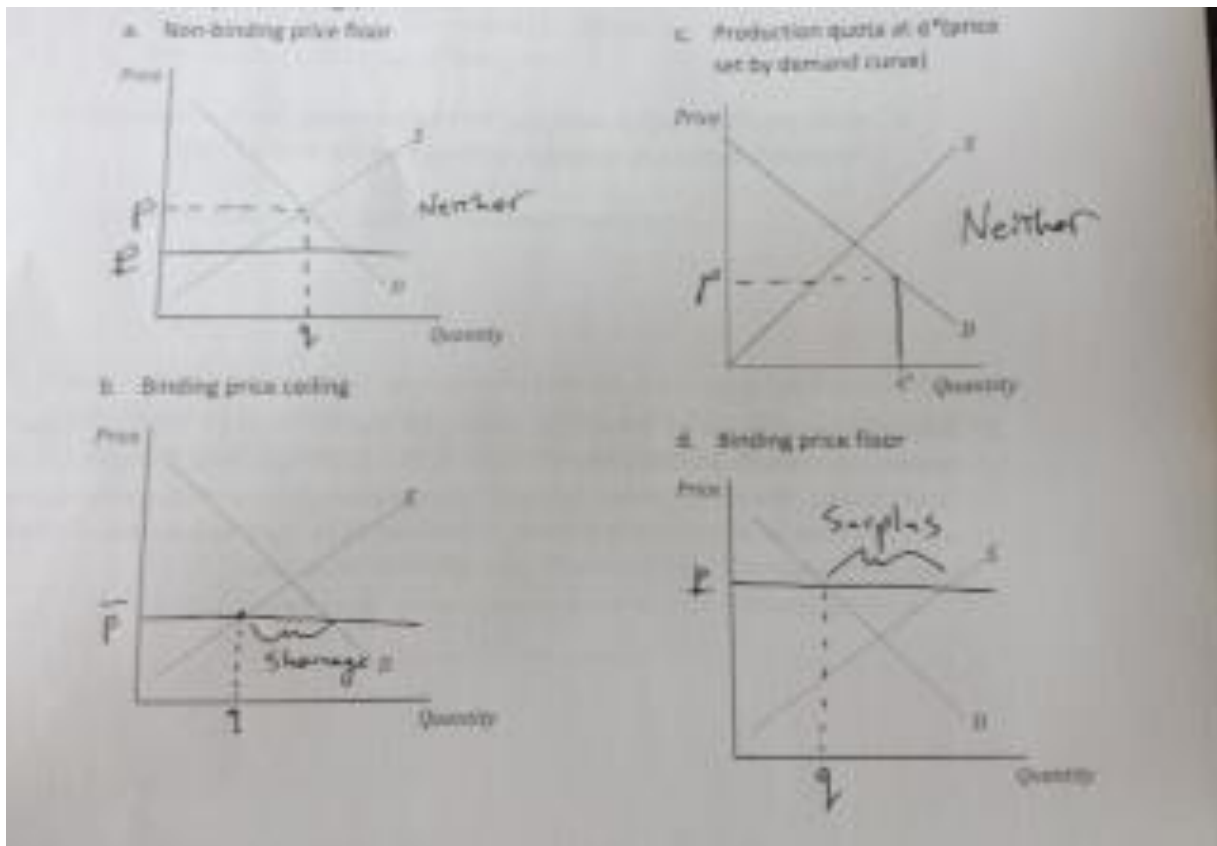
$(\$20 + \$10) \times 5 = \$150 \text{ million or}$

$\$20 \times 5 = \$100 \text{ million (some people interpreted the problem as saying that a subscription service means there will be no advertising)}$

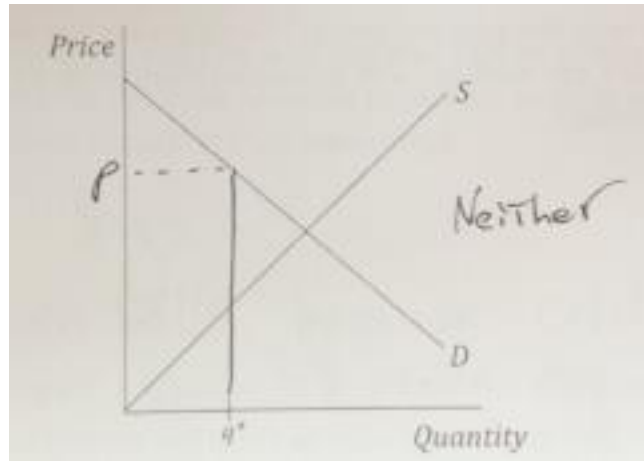
- c. In fact, the New York Times lets you read 10 articles per month for free. To read more, you must obtain a \$20 subscription. Why might the paper use such a strategy?

*This way it can charge avid readers \$20 a month, but still hold onto casual readers. This maximizes profit, relative to a uniform pricing scheme.*

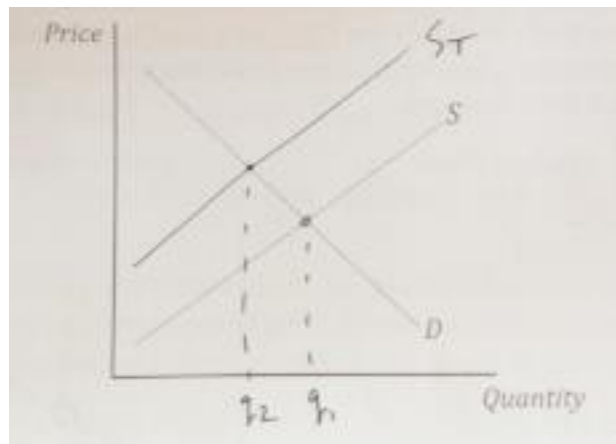
6. For the following diagrams, indicate on the chart the policy, the quantity sold, the price, and if there is a surplus, shortage, or neither:



- a. Production quota at  $q^*$  (price set by demand curve)



7. Hog lots are common in Iowa but their smell imposes a negative externality on households located downwind. The following diagram gives the private supply and demand for hogs faced by an individual lot.



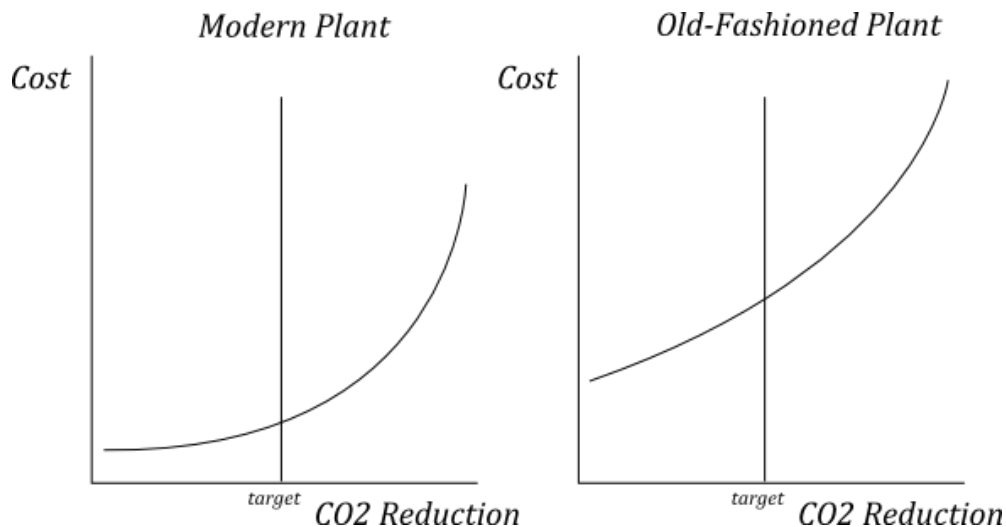
- The smell from each additional hog imposes a cost on households downwind. Draw a “true” cost supply curve on the above diagram.
- Indicate on the above diagram the quantity of hogs produced in the absence of any intervention in the market. Label this quantity  $q_1$
- Indicate on the above diagram the quantity of hogs that should be produced, if all costs and benefits to society are taken into account. Label this quantity  $q_2$ . If the market is left to alone, will  $q_1$  be greater or less than  $q_2$ ?

$q_1$  will be greater.

- d. Suppose the households complain to their local government, which rules that the hog lot must not emit any smells. This means the hog lot will have to shut down. Is there any deal it can work out with downwind households to stay open? What would such a deal look like?

*The hog lot can pay the households for the right to make bad smells.*

8. Climate Change is regarded by many as the biggest threat faced by society today. Suppose there are two power plants which emit CO<sub>2</sub> (the primary determinant of climate change) as a by-product of producing electricity. By spending money (for example on more efficient processes, on planting trees, on “scrubbers,” and on carbon sequestration) the plants can reduce their CO<sub>2</sub> emissions. The marginal cost of reducing CO<sub>2</sub> at each plant is given below. Notice that firms can reduce their CO<sub>2</sub> emissions by a small amount for relatively cheaply, but each additional unit of CO<sub>2</sub> gets more and more expensive.



- a. Suppose the government mandates that each firm cuts its CO<sub>2</sub> emissions in half, as indicated in the diagram above. Each firm is issued permits for half of its CO<sub>2</sub>. All CO<sub>2</sub> in excess of the permits must be reduced. Which firm has to spend more to comply with the government’s mandate?

*The Old-Fashioned Firm.*



- b. Suppose the government does not care *who* cuts their CO<sub>2</sub> emissions, so long as half of the total CO<sub>2</sub> emissions are cut. If the firms can trade their permits, which firm will want to buy permits, and which will want to sell them. Why?

*The old fashioned firm will want to buy permits from the modern firm. This is because the old-fashioned firm is willing to pay more for a permit than it would cost the modern firm to reduce emissions.*

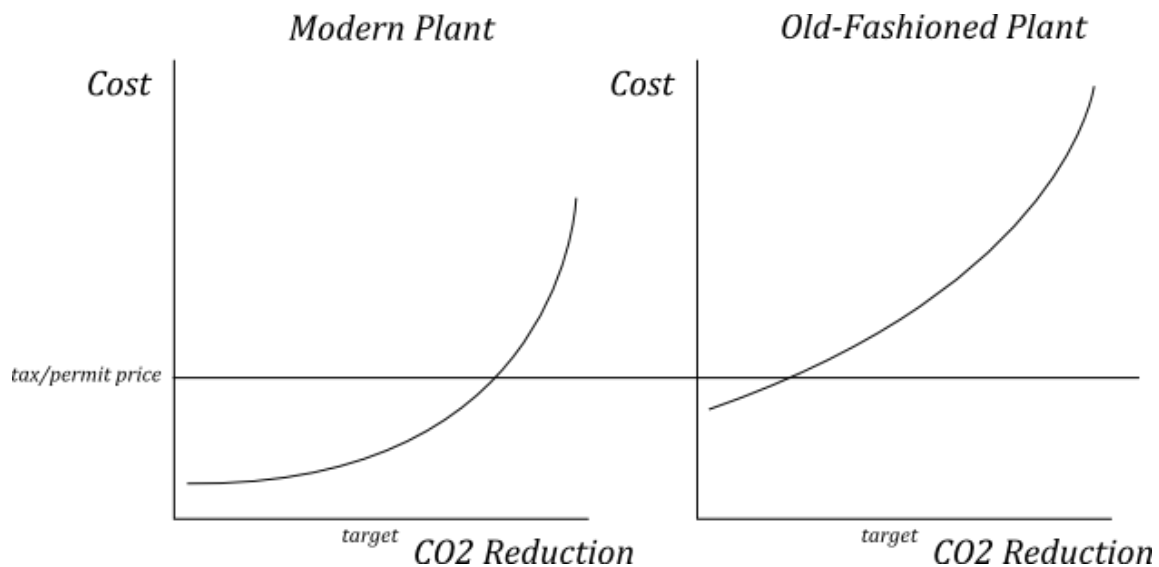
- c. Eventually, the price of permits will reach an equilibrium, such that:

permit price = marginal cost of reducing CO<sub>2</sub> at modern plant = marginal cost of reducing CO<sub>2</sub> at old-fashioned plant

When this equilibrium is reached, what happens to the total cost of reducing CO<sub>2</sub>, and which firm does more of the reducing?

*The total cost falls, with the modern firm doing more of the reducing.*

- d. Suppose that instead of issuing permits, the government sets a carbon tax with a price equal to the equilibrium permit price, as illustrated below. Is the total cost of reducing CO<sub>2</sub>, and the amount reduced by each firm, different from part (c)? If yes, how?



*No, it should be identical.*