

Econ 101  
Fall 2000  
Answers to Thanksgiving Handout

1. Positive vs Normative

- a. P    b. N    c. P    d. P    e. N

2. Opportunity Cost and PPF

- a. For New Zealand y-intercept is (0,1200) and x-intercept is (400,0). For Australia, y-intercept is (0,400), x-intercept is (1200,0).
- b. New Zealand has the comparative advantage and absolute advantage in wheat production; Australia has comparative advantage and absolute advantage in cotton production.
- c. New Zealand could produce more wheat (giving up 1 unit of cotton production increases wheat production by 3 units) while Australia could produce more cotton (giving up 1 unit of wheat increases cotton production by 3 units), and then they could trade with each other. In the extreme, New Zealand could produce 1200 units of wheat, and Australia could produce 1200 units of cotton in contrast to their current level of total production of 720 bushels of wheat and 720 bales of cotton.

3. Excise Tax

- a. Equilibrium price is \$6, and equilibrium quantity is 4 million units. The demand curve has a vertical intercept at (0,10), and the supply curve has a vertical intercept at (0,2).
- b. New supply curve is  $P = Q_s + 4$ .  
Therefore, the new supply curve has a vertical intercept of (0,4).
- c. After-tax equilibrium price equals \$7, after-tax equilibrium quantity equals 3 million units, net price is \$5. Tax revenue equals \$6 million (tax is \$2 per unit, quantity sold in the market is 3 million units), consumer tax incidence is \$3 million, and producer tax incidence is \$3 million. Dead-weight loss is \$1 million.

4. Market Demand and Supply

- a. Individual demand curve intersects the y-axis at (0,0.8) and x-axis at (8,0). There are 10 officers in the market with identical demand curves. So, the market demand intersects the y-axis at (0,0.8) and x-axis at (80,0).
- b. The equation for market demand is:  $P = -0.01Q_D + 0.8$
- c. Equilibrium price is \$0.50, equilibrium quantity is 30 donuts and each officer buys 3 donuts.

5. Demand and Supply

- a. Supply shifts to the left and the equilibrium price increases while the equilibrium quantity decreases
- b. Demand for orange juice shifts to the right, both the equilibrium price and the equilibrium quantity increase.
- c. Demand for orange juice shifts to the right (orange juice is normal good), both the equilibrium price and the equilibrium quantity increase.
- d. Demand for orange juice shifts to the right, both the equilibrium price and the equilibrium quantity increase.
- e. Supply shifts to the left and demand shifts to the right. Equilibrium price increases, quantity is indeterminate.

6. Agricultural Programs

- a. Price will be  $P_3$  with the market supplying  $Q_3$ , consumers purchasing  $Q_1$ , and the government buying and storing  $Q_3 - Q_1$ . Cost of this program to the government is  $P_3(Q_3 - Q_1)$ . Disadvantage of the program is that the government must store its purchase.
- b. Price to consumers will be  $P_1$  with  $Q_3$  units supplied. Farmers will receive  $P_3$  with the government paying a subsidy of  $P_3 - P_1$  per unit, and the cost to the government is  $(P_3 - P_1)Q_3$ .

7. Elasticity

- 1. Price, 2. Quantity demanded, 3. Price, 4.  $(1/\text{slope})(P/Q_D)$ , 5. at a point,
- 6.  $\left( \frac{Q_1 - Q_0}{Q_1 + Q_0} \right) \left( \frac{P_1 + P_0}{P_1 - P_0} \right)$ , 7. between two points, 8. positive, 9. inelastic,
- 10. unit elastic, 11. elastic, 12. an elastic, 13. a unit elastic, 14. an inelastic,
- 15. unit elastic, 16. elastic, 17. down, 18. inelastic, 19. up, 20. unit elastic,
- 21. cross price, 22. quantity demanded of good X, 23. price of good Y,
- 24. complements, 25. substitutes, 26. income, 27. quantity demanded of good X,
- 28. income, 29. normal, 30. inferior, 31. price, 32. quantity of good X supplied,
- 33. price of good X, 34. negative

8. Budget Lines

- a. If pizza is on the y-axis, then y-intercept is (0,24) and x-intercept is (40,0). Budget line is linear.
- b. Budget line shifts toward the origin, but is parallel to the first budget line since prices have not changed. y-intercept is (0,18) and x-intercept is (30,0).
- c. Budget line has y-intercept of (0,24) and x-intercept of (30,0).
- d. Budget line has y-intercept of (0,40) and x-intercept of (40,0).

9. Indifference Curves

- a. True, b. True, c. True, d. True

10. Consumer Choice

- a. The y-intercept is (0,10) and the x-intercept is (40,0).
- b. The budget line should be just tangent to the indifference curve at (4,24).
- c. 80 utils
- d. Nothing about absolute amount of total utility; we do know he is maximizing his total utility

11. Utility

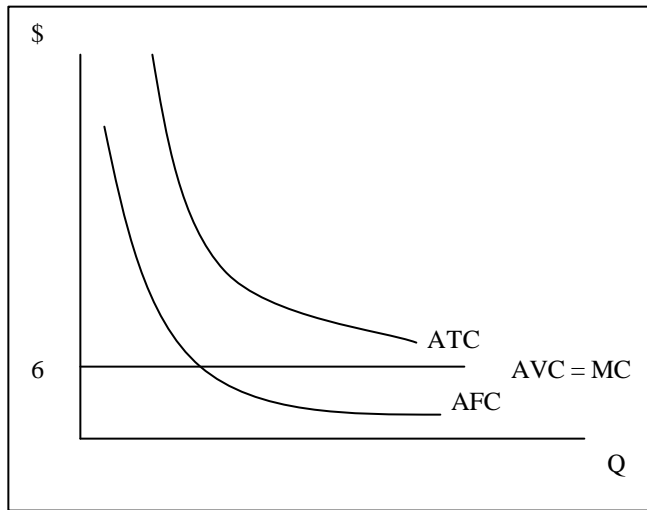
See textbook for definitions.

12. Income and Substitution Effects

- a.  $\text{Cake} = 10 - \text{Coffee}$ .  
This is the line that shows all the combinations of coffee and cake that Mary can afford and that exhaust her income.
- b.  $\text{Cake} = 10 - 2 \text{ Coffee}$ .  
Mary can no longer afford as much coffee as initially since the price of coffee has increased.
- c. Coffee consumption has decreased from 5 units to 3 units.
- d. \$15
- e.  $\text{Cake} = 15 - 2 \text{ Coffee}$
- f. Income effect is 1 cup of coffee; substitution effect is 1 cup of coffee.

13. Cost Functions

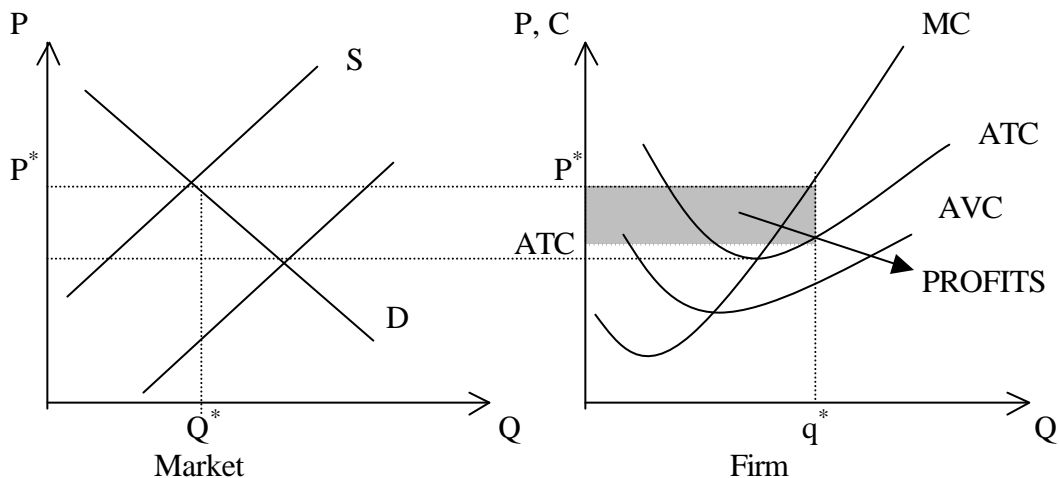
- a.  $\text{TFC} = 100$ ,  $\text{TVC} = 6Q$
- b. Fixed costs: plant and equipment, e.g. tractors, silos, barns, etc.  
Variable costs: labor expenditures, fertilizers, pesticides
- c.  $\text{ATC} = (100 + 6Q) / Q$   
 $\text{AVC} = 6Q / Q = 6$   
 $\text{AFC} = 100 / Q$
- d. Sketch graph based on table of values using the equations you derived in part (c).
- e. Find MC by looking at the change in total cost divided by the change in output.  $\text{MC} = 6$  for all output levels.
- f. The graph of part (d) should look like:



AFC has its usual shape. It is declining as output increases. By definition, ATC is AFC plus AVC. AVC is constant in this question. Therefore, the vertical distance between ATC and AFC is constant and equals 6. AVC and MC are both constants. Note also that ATC is decreasing as output increases. Thus this is an example of increasing returns to scale. You can reduce the unit cost of production as you produce more and more.

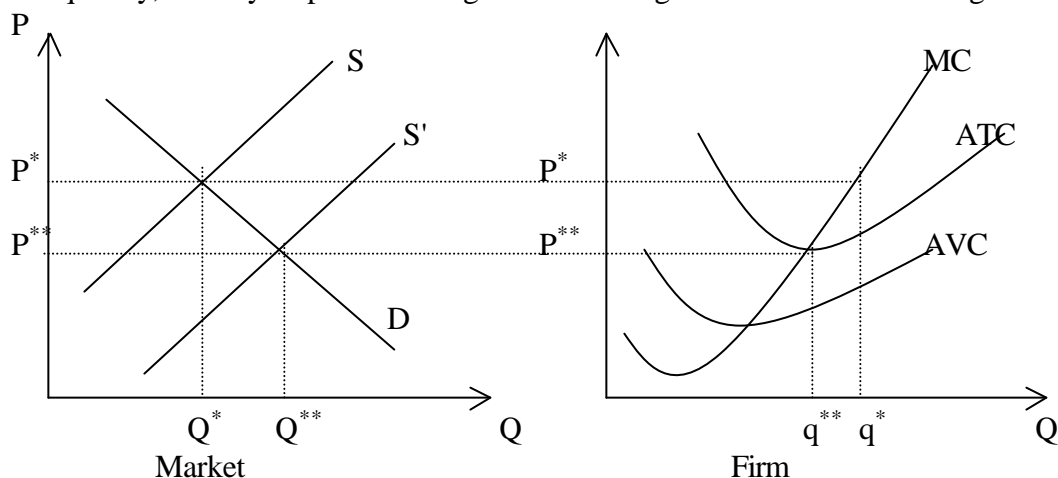
#### 14. Perfect Competition

- a. Short-run equilibrium in a perfectly competitive industry in which individual firms make short-run economic profits:



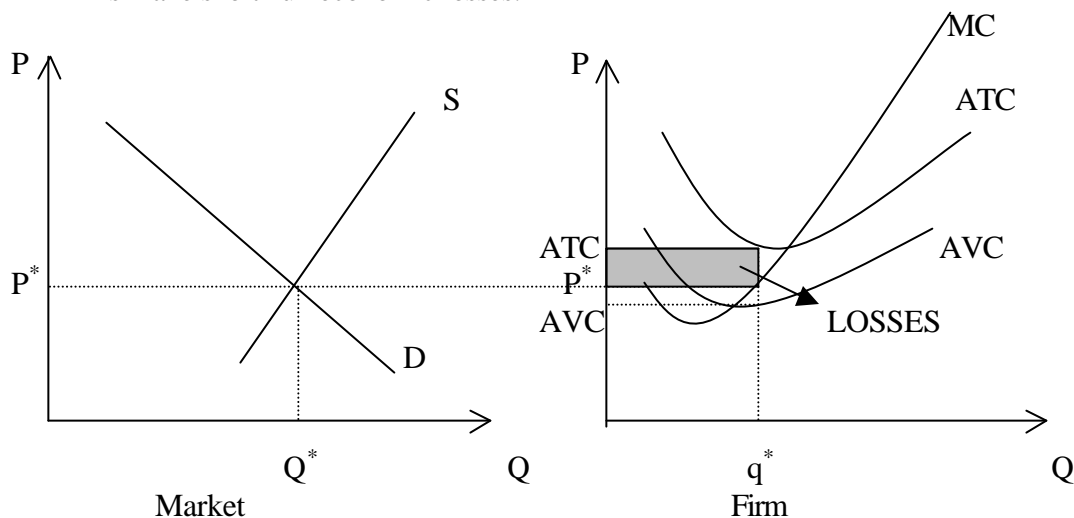
- b. Since there are opportunities of positive economic profits in this industry, and since there are no barriers to exit or entry, new firms will enter in this market to exploit the positive profits. Entry continues until profits are zero in the long-run.

As more firms enter in this market, supply will increase and market supply curve will shift to right (shown by  $S'$  in the diagram below). Given the market demand curve, this will pull the price down (shown by  $P^{**}$  in the diagram), and equilibrium quantity will increase (shown by  $Q^{**}$ ). Each firm in the industry will produce  $q^{**}$  instead which is lower than  $q^*$ . Although the new equilibrium quantity produced by an individual firm is lower than the old equilibrium quantity, industry output will be higher due to a large number of firms entering.



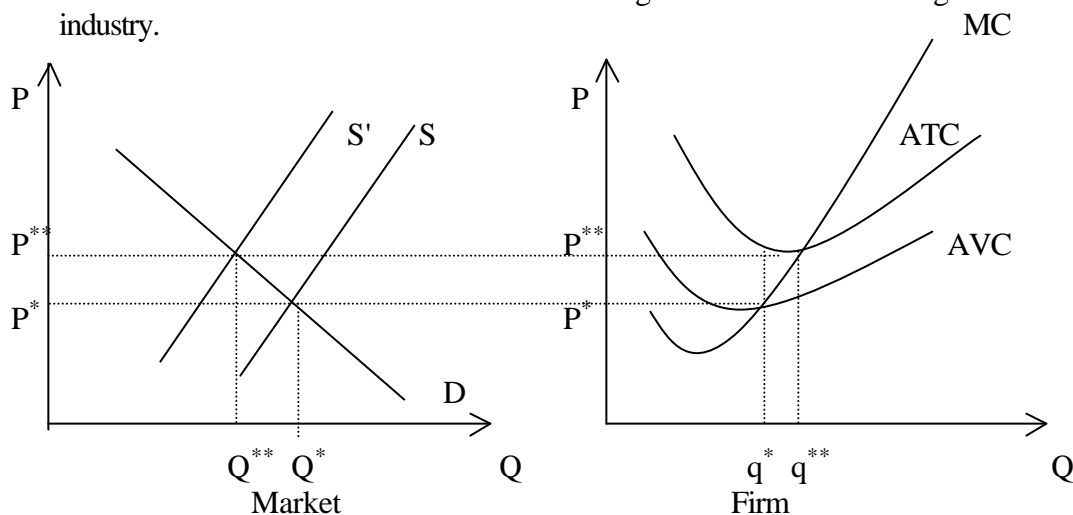
The supply curve shifts to right until profits become zero, that is, until price is equal to ATC.

- c. Short-run equilibrium in a perfectly competitive industry in which individual firms make short-run economic losses:



- d. In the short-run, there are economic losses. Notice that in the diagram above, when the firm produces  $q^*$ , it can cover its variable costs since  $P^* > AVC$ . In the long-run a firm will shutdown if it makes losses, therefore, some firms will exit the industry in the long-run. This will lead to a decrease in supply and the market supply curve will shift to left (shown as  $S'$ ). Given the market demand curve,

price will increase as a result, making firms be able to cover their total costs. The increase in price continues until total revenues are enough to cover all the total costs, that is, until profits are zero. In the diagram below,  $P^{**}$  is the new equilibrium price and  $Q^{**}$  is the new equilibrium quantity in the market. Although each firm produces more than it used to be, i.e.,  $q^{**} > q^*$ , the industry output is lower than the initial situation. This is due to a large number of firms exiting the industry.



#### 15. Monopoly and Price Discrimination

- Airline monopoly will sell 100 tickets for \$150 per ticket.
- Profits equal \$5000; consumer surplus equals \$5000.
- It would sell 200 from a price of \$50 to a price of \$250.
- $ATC = \$75$ . The firm should consider the marginal cost, not the average total cost in deciding whether to produce the last unit: the MC is \$50 and the MR is \$50 for the 200<sup>th</sup> unit, thus the 200<sup>th</sup> unit would be the profit maximizing level of output for the perfect price discriminator. Even though the ATC is higher than price for some output levels, the perfectly price discriminating monopolist makes positive economic profits and is able to capture the whole surplus in the market.

#### 16. Monopoly and Natural Monopoly

- This is a natural monopoly because ATC is downward sloping throughout the relevant range of production. This is not surprising since the provision of electricity requires substantial investments in capital in order to provide the service at all. Additional customers do not significantly add to cost.
- The firm would be willing to pay at most \$8 since a price of more than \$8 would reduce its profits to less than zero. Since any firm that acquires the license will face the cost structure and market demand as given in the question, we can say that all firms participating in the auction are identical,

and there are a lot of firms participating in the auction. Therefore, competition will induce firms to bid exactly \$8 for the license.

- c. If the city provides the service they will provide 5 units at a price of \$6 per unit; consumer surplus equals \$25 and profits equal 0. Monopolist would sell 3 units at a price of \$10 per unit; profits would equal \$8 and consumer surplus would be \$9. Monopolist who acquires the business through license auction will produce 3 units at a price of \$10 per unit; profits will be zero since it pays \$8 for the license, and consumer surplus is \$17 which equals the consumer surplus in the usual monopoly case plus the proceeds of the auction.

17. Oligopoly and Game Theory

- a. Both Al and Betty will choose the moderate strategy.
- b. Both players' dominant strategies are the M strategy.

18. Monopolistic Competition

- a. True, b. False, c. True, d. True, e. True, f. False

Note: For part (d), output produced by a monopolistically competitive firm is productively efficient although it is allocatively inefficient.

19. Resource Markets

- a. 5 workers
- b. \$5 per hour
- c. 40 workers

20. Externalities

- a. Demand curve has y-intercept of (0,300) and x-intercept of (1200,0); the marginal private cost curve has a y-intercept of (0,200) and a slope of 1.
- b. Price is \$280 and quantity is 80 units.
- c. The socially efficient price is \$290 and quantity is 40 units.

21. Public Goods

- a. The demand curve for Mary has y-intercept of (0,12) and x-intercept of (12,0). The demand curve for Joe has y-intercept of (0,8) and x-intercept of (4,0). The aggregate demand curve has a kink at (4,8). At quantities less than 4 units the aggregate demand is  $P = 20 - 3Q$  and at quantities greater than or equal to 4 units, the aggregate demand is  $P = 12 - Q$ . The efficient level of production is  $3 \frac{1}{3}$  units at a price of \$10 where the marginal social cost intersects the aggregate demand curve.
- b. See (a).
- c. Mary will pay \$8  $\frac{2}{3}$  per unit and Joe will pay \$1  $\frac{1}{3}$  per unit.

