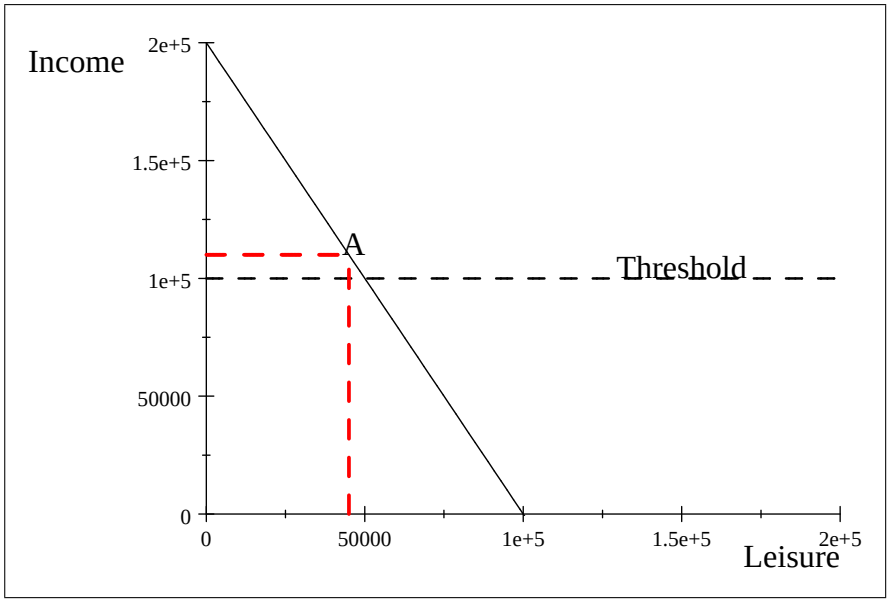
Assignment 3

Due: November 15^{th} at 6pm

October 25, 2022

1. (25 points) A proposal to establish a minimum corporate income tax on corporations earning over a particular amount is a key component of the Inflation Reduction Act. Assume this 15% tax is implemented and the corporation is modeled as an individual. The graph below shows an income-leisure decision for the firm if it pays 0% tax, where one can think of the hours worked being the hours worked by all employees to generate that amount of income. The dashed line that cuts across the entire graph shows the income threshold at which the tax takes effect. Point A is the firm's optimal decision under a 0% tax rate.

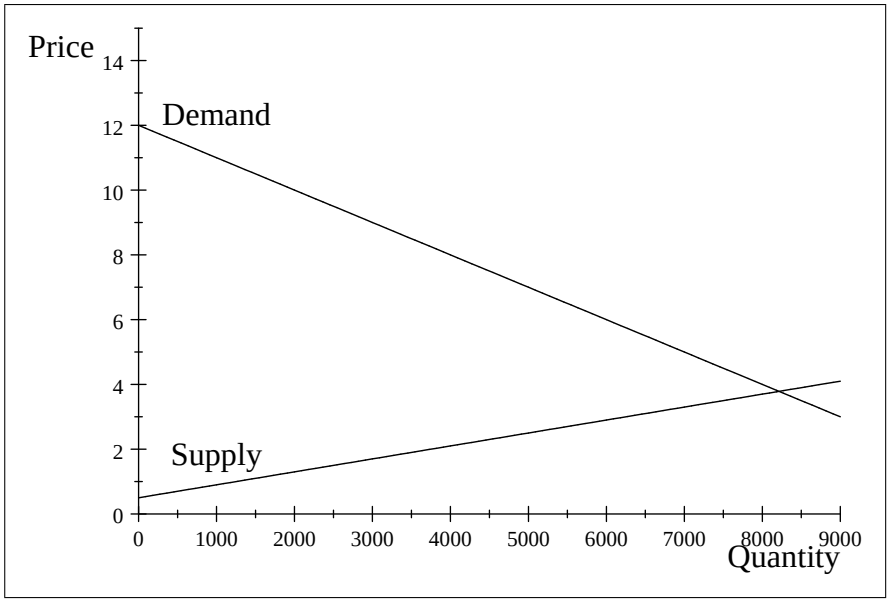


a Assume that the 15% tax is implemented on incomes over the threshold. Illustrate the new budget constraint on the graph.

b Assuming the firm has standard indifference curves, given the budget constraint you have drawn, explain why the corporation might cut worker hours (i.e. increase their leisure time).

c Assume now that there are many firms that face an identical income-leisure tradeoff budget constraint. Firms have different preferences, so prior to the imposition of the tax, firms make income-leisure decisions that lead to incomes that look like they are uniformly distributed over the income range to an observer. Using your post-tax budget constraint from part **a**, after the implementation of the tax, would we still expect to see a uniform distribution of firm incomes? Explain why or why not, and if you do not expect to see a uniform distribution of firm incomes explain how the empirical distribution of incomes might change.

2. (25 points) Consider the following graph, which shows the market for gasoline. The original equilibrium price is \$3.80 and equilibrium quantity is 8200. The inverse demand function is $P = -0.001Q + 12$; the demand function is $Q = 12,000 - 1000P$.



a Calculate the price elasticity of demand at the equilibrium price and quantity. Is demand elastic or inelastic at the equilibrium price and quantity?

b Suppose that a major international event occurs and the supply of gasoline is restricted. Show a general supply shift on the graph that reflects this restriction and identify the new equilibrium price and quantity on the graph.

c The federal tax on gasoline is 18.3 cents per gallon. Suppose there is a policy proposal to eliminate the federal tax on gasoline (a gas tax holiday) for a period of three months (suppose it begins on October 1^{st} and ends on December 31^{st}). Assume the announcement of the gas tax holiday is made on September 1^{st} so that there is a month between announcement and implementation.

i In words, describe the effect that this proposal would have on the supply and/or demand curves for gasoline.

ii Looking week by week, and including the month before and the month after the gas tax holiday, how would we expect behavior of consumers to change over that time period and at what points in time might we expect behavior of consumers to change the most? Explain, assuming that there are no other unexpected shocks that affect the gasoline market during this time period.

d An alternative policy proposal calls for a price ceiling to be imposed. Using the equilibrium price and quantity from the supply curve you drew in part **a** as a reference, illustrate a binding price ceiling on the graph. What short run and long run effects could occur due to the imposition of the price ceiling? Consider the effects on both the seller and the buyer.

3. (25 points) Consider three individuals who would benefit from a public good. If the public good is supplied, each individual would receive the equivalent of $\$1,500$ of utility from the public good. It costs $\$1,995$ to supply the public good, but each individual only has $\$1,000$ that could be contributed towards the supply of the public good.

   a Can any individual supply the public good on their own? Explain.

   b Is it possible that the public good can be provided by only two individuals contributing? Explain.

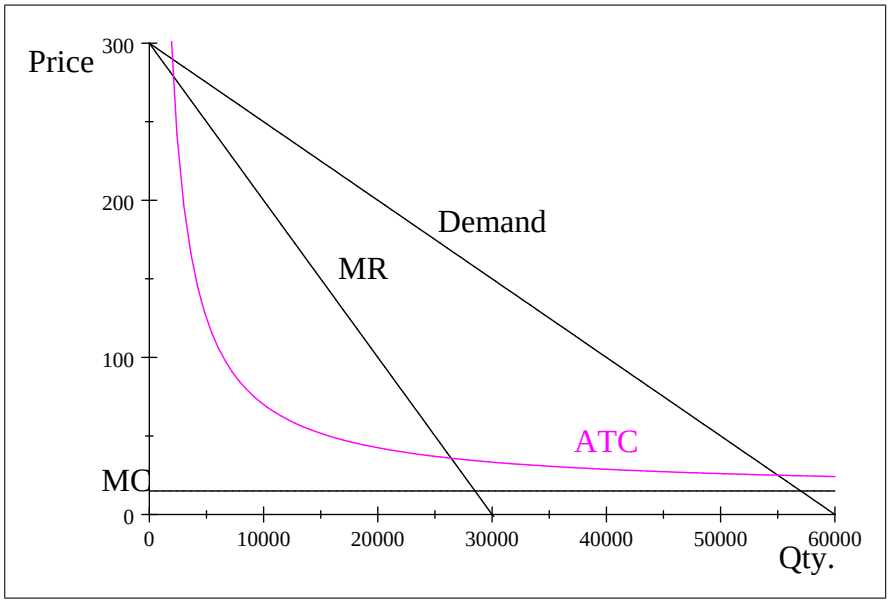
   c Describe the free-rider problem in public goods and whether it is present in this problem. If it is present, how can an individual benefit by free-riding in this scenario?

   d Rather than relying on private contributions, a tax system could be enacted to provide the public good. If each individual was taxed \$665 with the funds being used to supply the public good, would the individuals vote in favor of the tax proposal? Assume the individuals are only concerned with whether the benefits they receive from the public good outweigh the cost in taxes.

   e Does this tax system seem equitable given what you know about the individuals' benefit from their public good and their ability to pay?

   f In this example there is a very small society (three people) who all have similar abilities to pay and receive the same benefit from the good. Suppose there are now 30,000 individuals. With 30,000 people, it is less likely that every individual values the public good the same and that every individual has the same ability to pay. Explain why a taxation plan that charges everyone $\frac{1}{30,000}$ of the total cost of the public good might not be supported by the individuals in this society and whether or not the plan is equitable.

4. (25 points) One component of the Inflation Reduction Act is to allow Medicare to negotiate some drug prices. The picture below shows the demand, marginal revenue, marginal cost, and average total cost for a particular drug. Note that the marginal cost (MC) is constant at \$15. Average total cost is downward sloping and intersects the demand curve at \$25; because MC is flat, average total cost will never be below MC but at very high quantities ATC gets closer to \$15 and eventually the difference between MC and ATC is indistinguishable.



   a Identify the profit-maximizing price and quantity on the graph.

   b The negotiation process is more like a price ceiling being imposed with the firm facing severe financial penalties if their price exceeds the price cap. Effectively, the negotiation process imposes a price ceiling. Assume that the price cap is set at \$35. In the short run, would we expect quantity to

expand or contract and would there be shortages in the market? Explain, making reference to this firm's profit-maximizing behavior once the price ceiling is imposed. (It may be helpful to draw the price ceiling on the graph).

c Now suppose that the price cap is set at \$10. Does the analysis in part **b** change? Explain.