AAE 343 Discussion Section 1
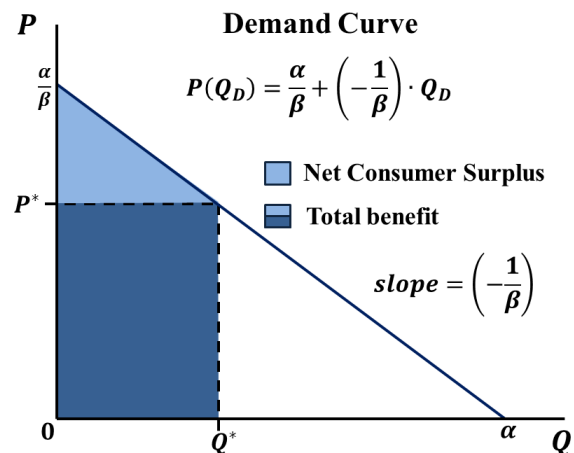
January 25, 2019

I. Some Housekeeping

- Weekly discussion sessions: participation is graded. Please attend your registered session!
- Discussion materials available on my website: https://adamtheising.wixsite.com/home/aae343
- Discussion sections should be inclusive and respectful of all viewpoints, and I expect all participants to treat each other with professional courtesy.
  - Save yourself some studying time! Work through problems in discussion and participate by sharing your thoughts and calculations. Even if your work has mistakes – and it's okay to be wrong in discussion – you learn more through active participation than mechanically copying down answers off the board.
- Contact Adam via:
  - Office hours: 320 Taylor Hall
    - Mondays, 2:30-4:30, or by appt
  - Email: theising@wisc.edu (Please include AAE343 in the subject line)
    - Response policy: I will respond to all **professionally written** emails within 24 hours. But I reserve the right to take all 24 hours. Implication: please do not assume that I will be able to respond to your last-minute email the night before an exam or assignment.
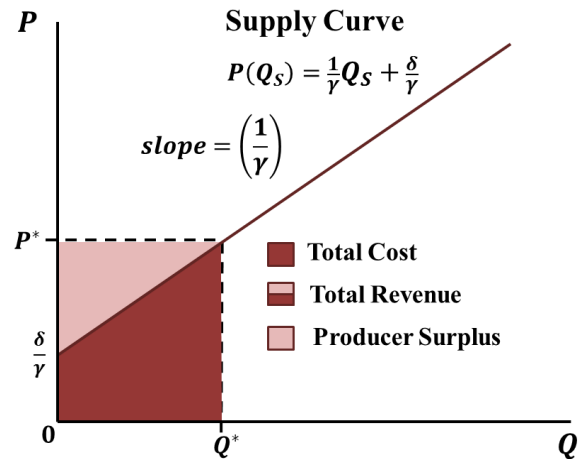- Reminder on grading (from Sarah's syllabus): *"Homework assignments are not regraded except for an arithmetic error."*

II. The Demand Curve

- The **demand function** expresses the relationship between the price of a good (P) and the quantity of this good consumers are willing to purchase for any given price ($Q_D(P) = f(P)$). This function is often expressed in the linear form, $Q_D(P) = \alpha - \beta P$.
- When graphing the demand function, economists often express it as the **inverse demand function** ($P(Q_D) = f^{-1}(Q_D) = \frac{\alpha}{\beta} - \frac{1}{\beta}Q_D$). This mathematical formulation displays the quantity demanded as the independent variable, along the horizontal axis, and the price as the dependent variable, along the vertical axis.
- Factors that can cause shifts in the demand curve include tastes and preferences, income, price of related goods, expectations and number of buyers. In general, from the consumer's perspective, negative factors would cause the demand curve to shift to the left and positive to the right.
- The demand curve represents the **Marginal Willingness to Pay** or the **Marginal Benefit** of consumption.
- **Consumer Surplus** is the difference between the Marginal Willingness to Pay and the price up to the amount consumed.
- The **Total Benefit** is the area under the demand curve up to the point of consumption.

Demand Curve

$$P(Q_D) = \frac{\alpha}{\beta} + \left(-\frac{1}{\beta}\right) \cdot Q_D$$

☐ Net Consumer Surplus
☐ Total benefit

$$slope = \left(-\frac{1}{\beta}\right)$$
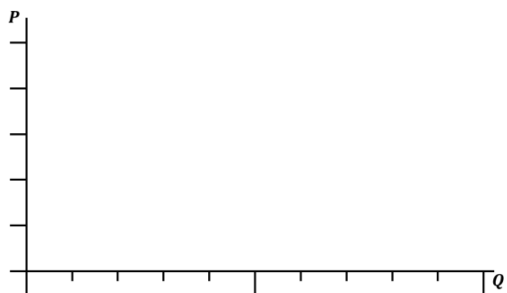
III.   **The Supply Curve**
- The **supply function** expresses the relationship between the price of the good (P) and the quantity suppliers (e.g. firms, laborers, other economic agents) are willing to provide to the market for any given price ($Q_S(P) = g(P)$). This function is often expressed in the linear form $Q_S(P) = \gamma P - \delta$.
- When graphing the supply function, economists often express it as the **inverse supply function** ($P(Q_S) = g^{-1}(Q_S) = \frac{1}{\gamma}Q_S + \frac{\delta}{\gamma}$). This mathematical formulation displays the quantity supplied as the independent variable, along the horizontal axis, and the price as the dependent variable, along the vertical axis.
- Factors that can cause shifts in the supply curve include changes in input prices, technology, expectations about the future, and the number of sellers.
- The supply curve represents the **Marginal Cost**.
- **Producer Surplus** is the difference between the price and the marginal cost up to the amount produced.
- **Total Cost** is the area under the supply curve up to the quantity produced.

Supply Curve

$P(Q_S) = \frac{1}{\gamma}Q_S + \frac{\delta}{\gamma}$

$slope = \left(\frac{1}{\gamma}\right)$

■ Total Cost
■ Total Revenue
☐ Producer Surplus

Problem 1   *Umbrella-venture* – While visiting the bustling metropolis of Central City, you notice that when it starts raining, individuals begin to sell umbrellas outside the exits of the subway stops. You wonder if this lucrative enterprise could be applied to the UW campus here in Madison. You do a little research to determine what the cost of supplying different quantities of umbrellas would be and run a survey among friends to determine a demand for umbrellas on rainy days. From this research, you are able to determine the market demand and supply schedules.

1. Given the market demand and supply schedule to the right, express both demand and supply functions algebraically as well as the inverse of these functions. Sketch these (inverse) functions on the provided graph below.

P	Q_D	Q_S
0	100	-22.5
1	80	-7.5
2	60	7.5
3	40	22.5
4	20	37.5
5	0	52.5

2. At what price should you sell the umbrellas and how many should you sell? That is, what is the equilibrium price (P^*) and the equilibrium quantity (Q^*)? Indicate these on the graph above.

3. What is your total cost (TC) and total revenue (TR)? What is the total benefit (TB)? Identify (shade) these regions in the graph above.

4. What is your producer surplus (PS)? What is the consumer surplus (CS)? What is the total net benefit your umbrella venture would provide to the campus community? Identify these regions in your graph above.

IV.   Aggregate Demand

- When thinking about the market demand for a private good, we sum the individual demands horizontally. That is, for a given price (P^*), each individual in the market has a level of quantity demanded ($Q_{D_1}^*$ and $Q_{D_2}^*$ below). Adding, or aggregating, the quantities demanded gives us the **aggregate demand** for the market ($Q_{D_{Agg}}^*$).
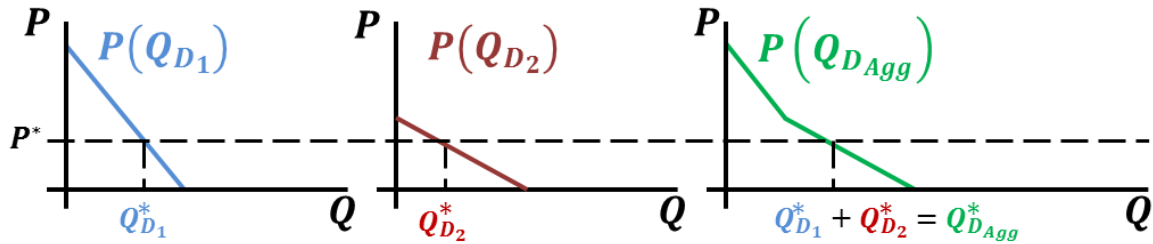
Question 1   When aggregating the demands for private goods, how are the individual demands summed (answer not graded)?