Equilibrium Slides

Econ 331

Summer 2025

BINGHAMTON UNIVERSITY
STATE UNIVERSITY OF NEW YORK

Learning Outcomes/Goals

1. Find market equilibrium with supply and demand graphically and algebraically.

2. Predict the impacts on equilibrium price and quantity of government taxes, subsidies, and quotas.

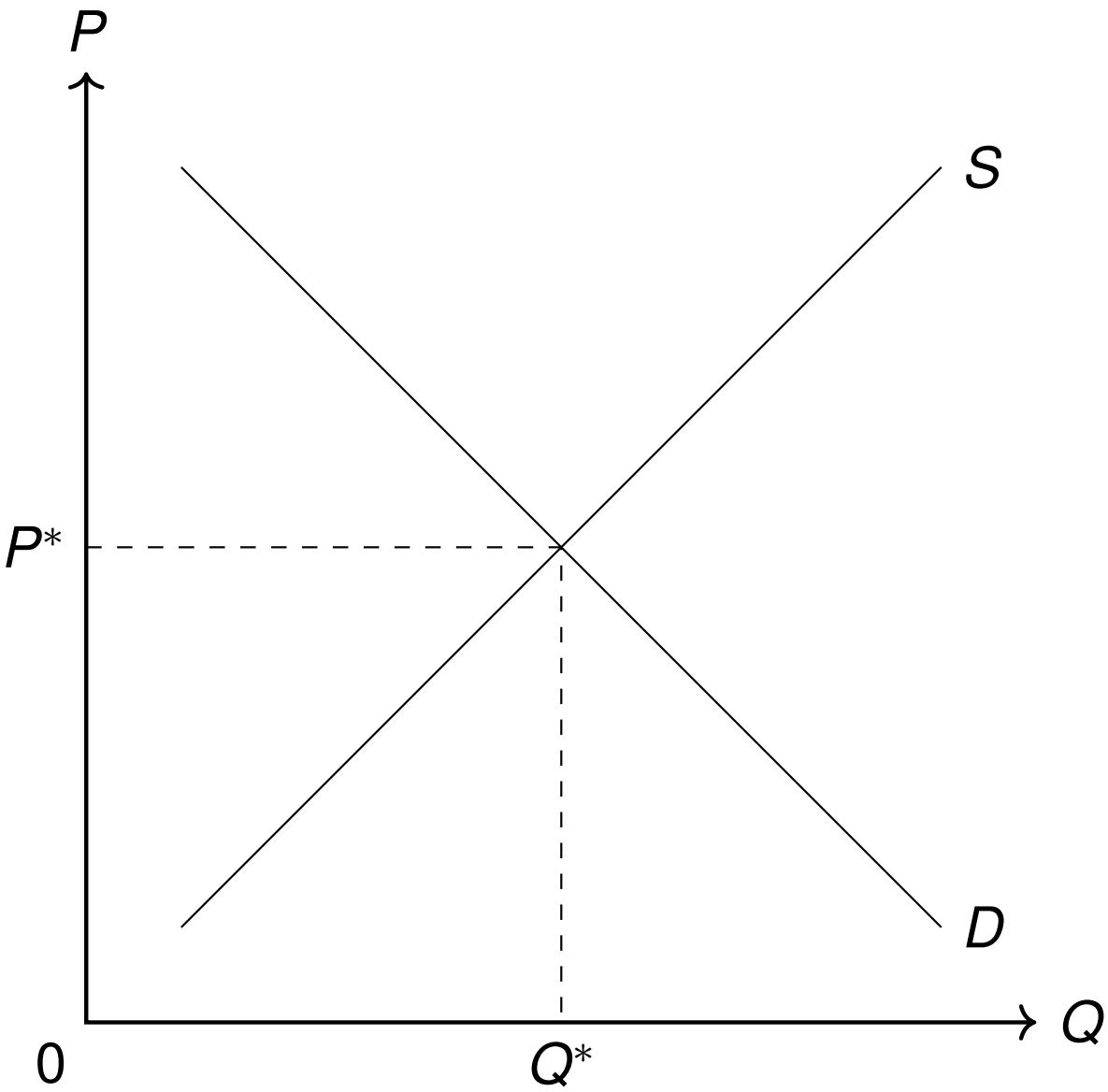
3. Quantify the impacts of government policies on consumer, producer, and total surplus and illustrate these impacts through identifying deadweight loss on a demand and supply diagram.

Where We Are

- This will be a slight extension of what you have seen (and may or may not remember) from your 160 class!

- But now we also want to be able to push our discussion of taxes and the theory beyond what we did in 160.

The Supply-Demand Diagram



Review of Equilibrium

- Equilibrium $\implies$ supply=demand.
- Slope of demand curve represents sensitivity of quantity demanded to price.
- Slope of supply curve represents sensitivity of quantity supplied to price.
  - We call these sensitivities **elasticities**, or ϵ.

Taxes

- Suppose we place a tax on this market.
  - For now we will be agnostic as to whether we tax consumers or producers.
- The tax will increase the price of the good, and therefore reduce the quantity sold.

- This will cause a loss in total welfare, which we call deadweight loss.

Types of Quantity Taxes We Will Cover

1. Quantity taxes-tax paid per unit bought and sold.
    1. Excise tax–tax placed on the sellers.
    2. Sales tax–tax placed on the buyers.

Questions about Taxes

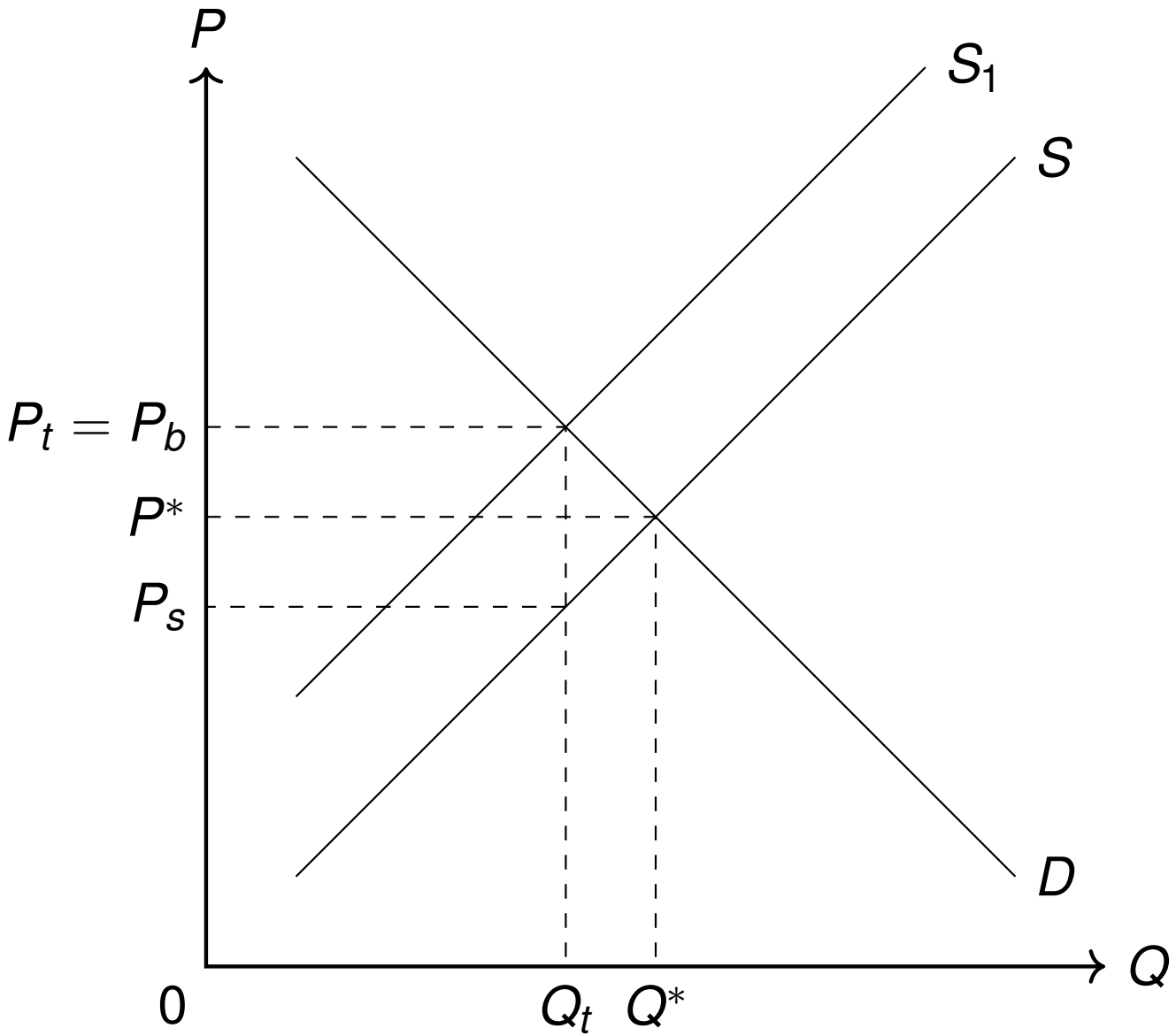
- For any tax, we want to know the following:
  1. What percentage of the tax will producers and consumers pay?
  2. How much in monetary terms will producers and consumers pay?
  3. How can we predict which side of the market will pay more of the tax?
  4. How can we mathematically predict which percentage of the tax each side of the market will pay?

Questions about Taxes with Vocab

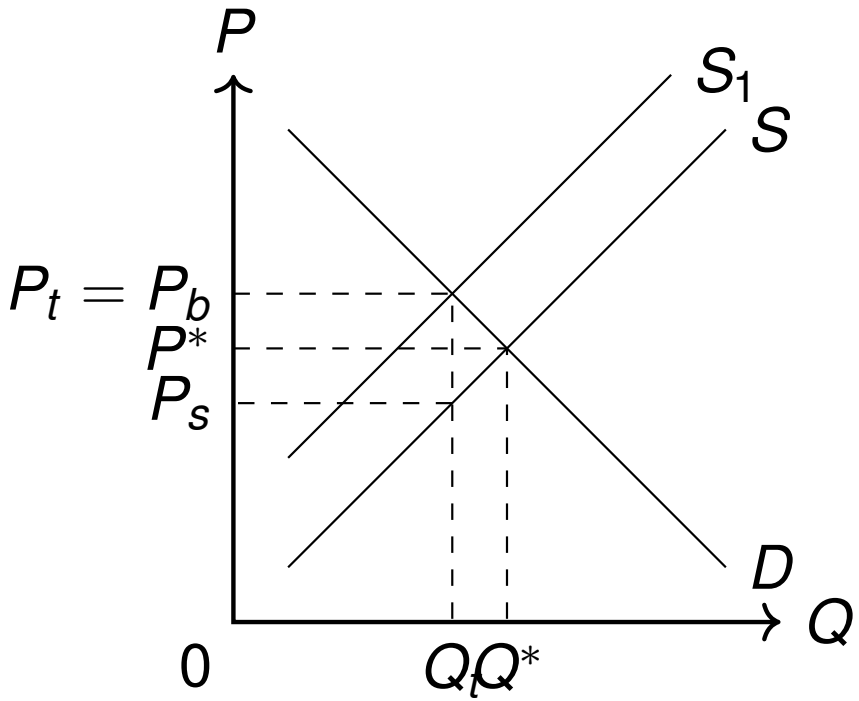
- For any tax, we want to know the following:
  1. What percentage of the tax will producers and consumers pay?
     - This is called **Tax Incidence**.
  2. How much in monetary terms will producers and consumers pay?
     - This is called **Tax Burden**.
  3. How can we predict which side of the market will pay more of the tax?

  4. How can we mathematically predict which percentage of the tax each side of the market will pay?
     - Both of these will depend on the relative elasticities of supply and demand.

Producer Tax Example



Producer Tax Example



- Q falls from Q^* to Q_t.
- P increases from P^* to P_t.
- P_t=price the buyers pay,P_s= price the seller receives.
- $P_t - P_s$ is equal to the size of the tax.
- $P_b - P^*$ is the tax burden of the buyers.
- $P^* - P_s$ is the tax burden of the sellers.

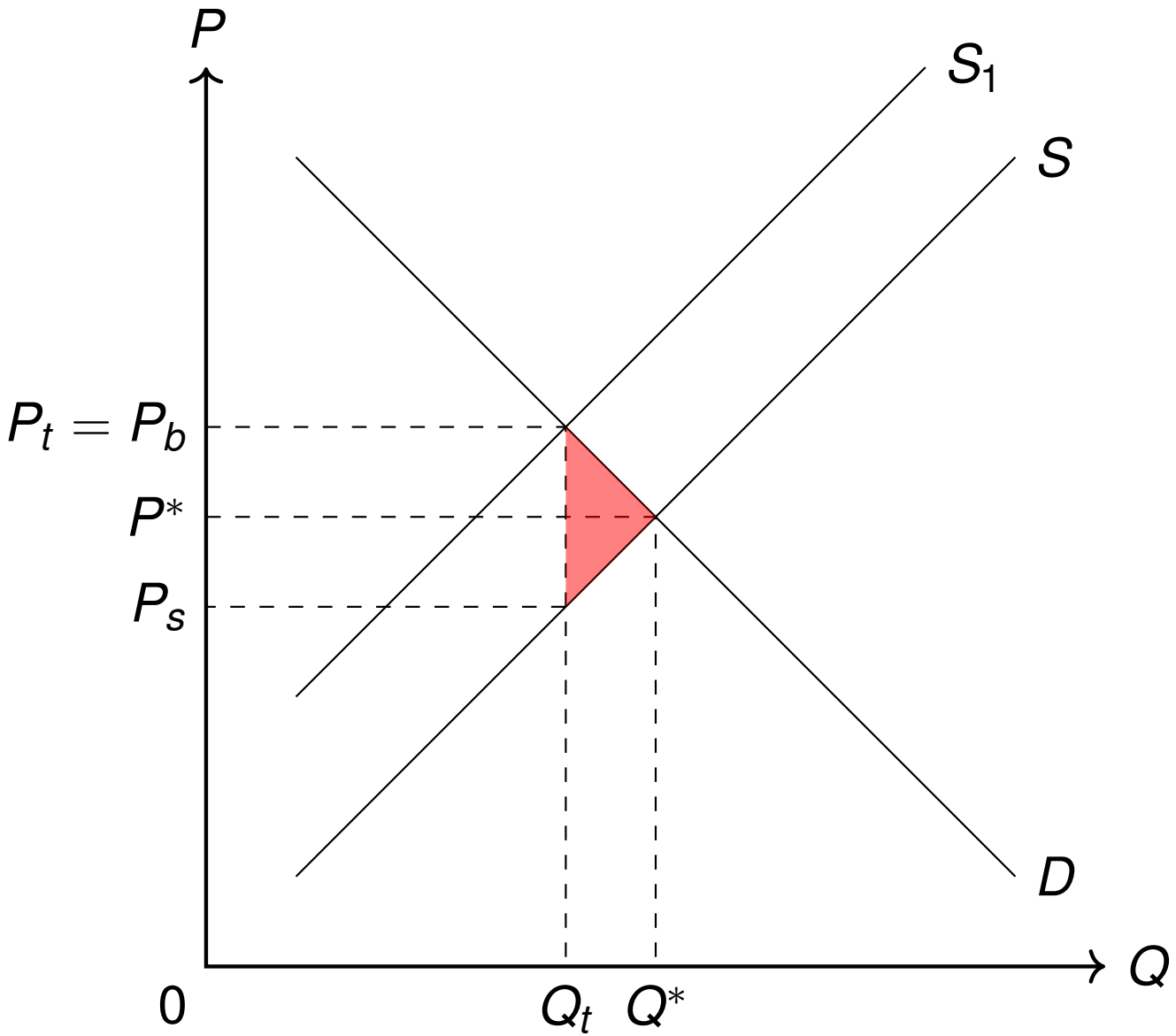
Taxes and Elasticities–Questions for Class

- **Claim** Whichever side of the market is less sensitive to changes in price will pay more of the tax.
- **Question**: How can we show this graphically?
- **Question**: Suppose demand and supply are linear. How can we show this algebraically?

Taxes–Surplus and Deadweight Loss

- Let's revisit the producer tax example and think about deadweight loss due to the tax.
- We know the tax made quantity decrease from Q^* to Q_t.
- If we find the total surplus from those trades in between Q^* and Q_t, we can figure out how much total surplus we lost, or the deadweight loss due to the tax.
- We will use that Total Surplus=Consumer Surplus + Producer Surplus.
- Consumer Surplus=WTP-P.
- Producer Surplus=P-WTA.
- I will show the DWL in red.

Producer Tax Example–DWL



Taxes–Government Revenue

- How much tax revenue does a tax generate?
- We know the tax is the difference between $P_t = P_b$ and P_s.
- We know the quantity sold with the tax is Q_t.
- Since this is a tax per unit sold, revenue=$Q_t \cdot (P_b - P_s)$.
- I show government revenue for this tax in purple.

Producer Tax Example–Government Revenue