

Lecture 4: Supply and demand interactions, market failures

FOR 4684 Natural Resource
Economics and Management



School of Forest Resources

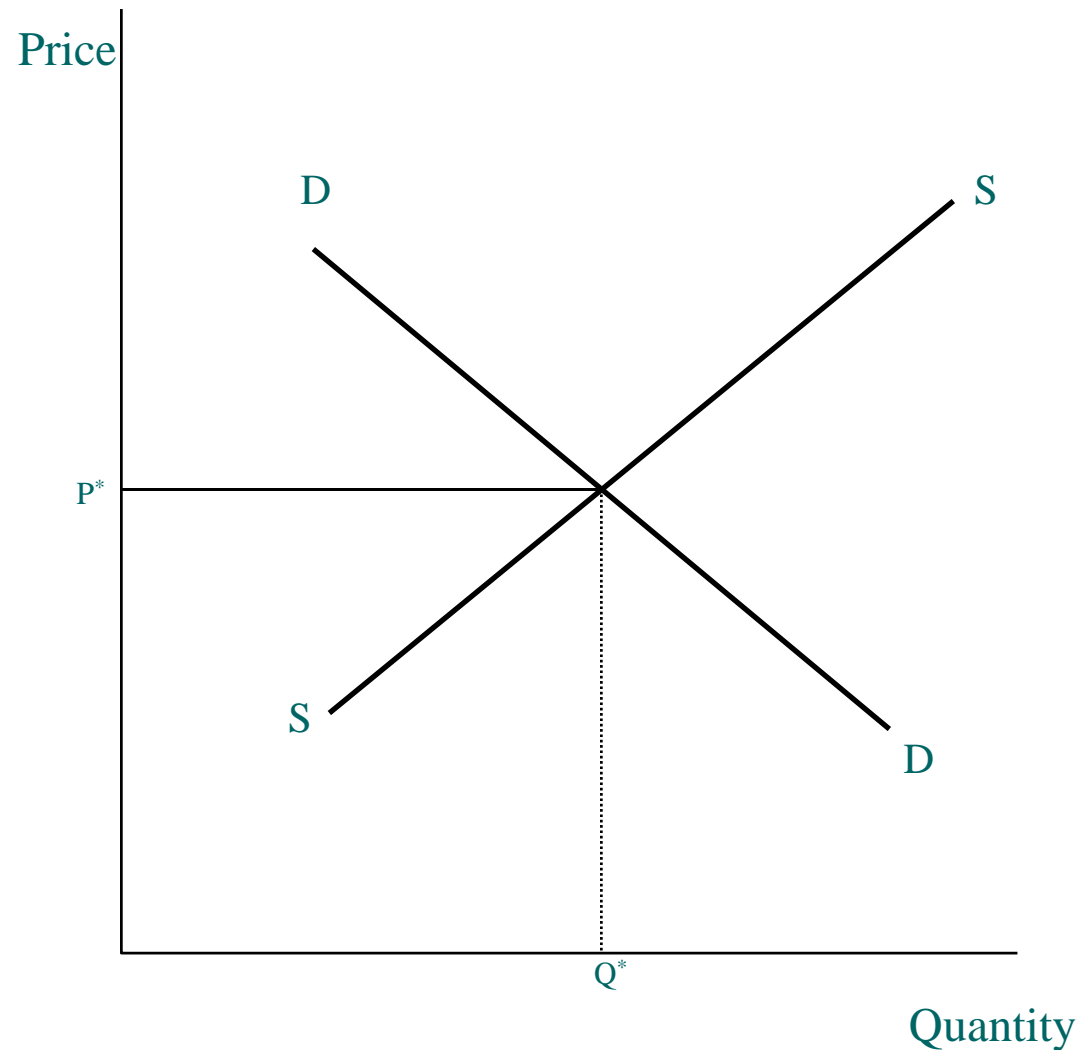


Conditions and assumptions for a free market

- Ownership of resources / property rights
- Firms and consumers are maximizers
- Perfect competition
- Free entry of firms into an industry
- Perfect information
- Mobility of labor and capital
- No unpriced side effects (externalities)
- Priced inputs and outputs

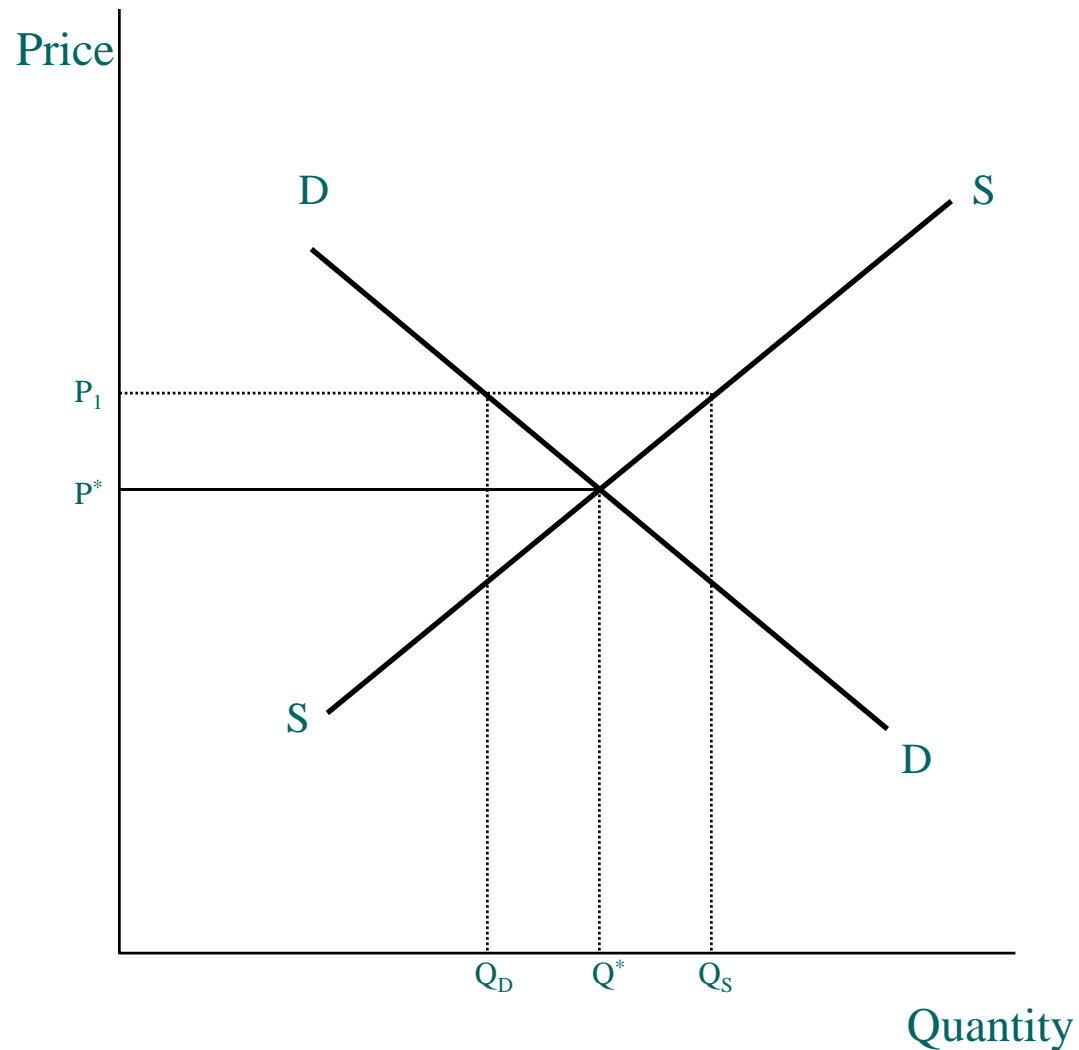
Basic supply and demand interaction

- At price = P^*
 - Producers are willing to supply Q^* units
 - Consumers are willing to buy Q^* units
- We say the market is at “equilibrium”



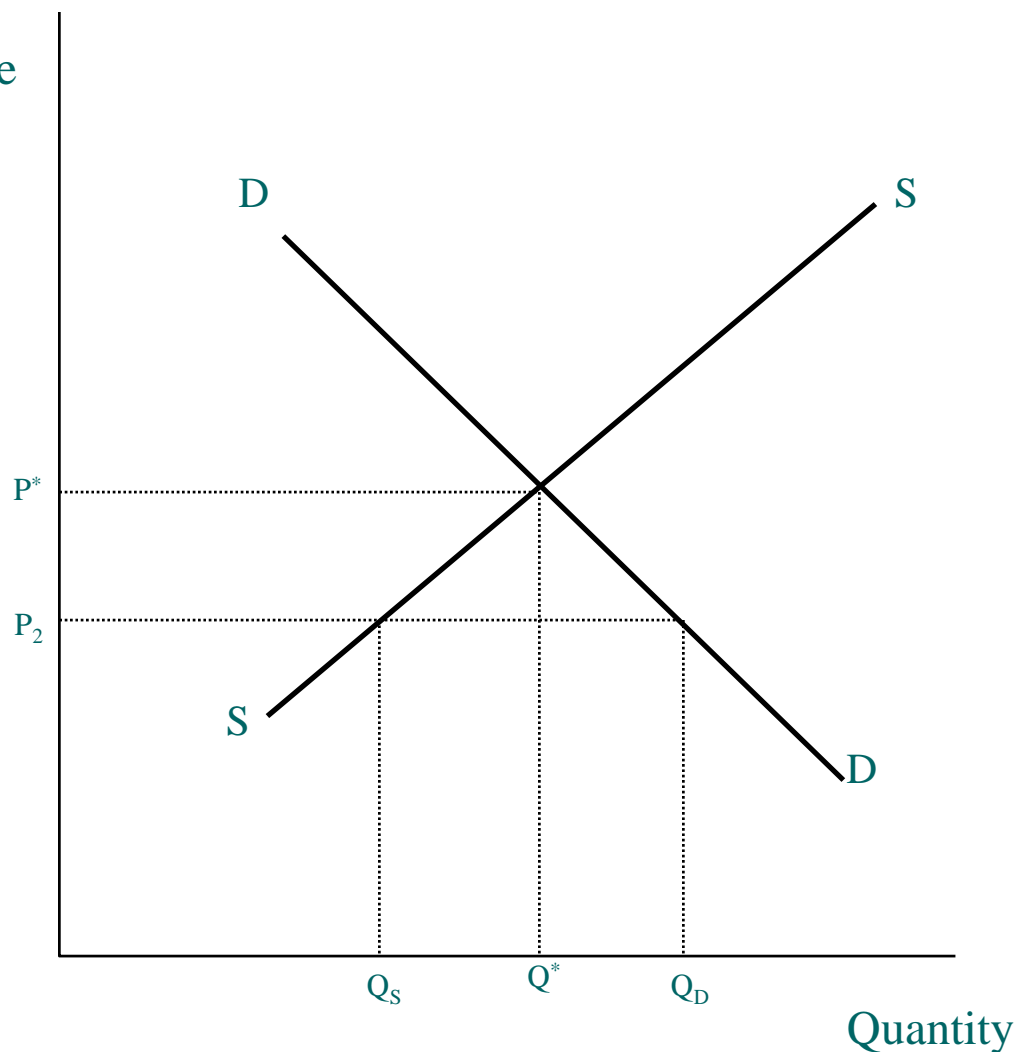
Basic supply and demand interactions: surplus

- If price = P_1
 - Producers make Q_s
 - Consumers are willing to buy Q_D
- Sellers will cut prices and production levels
- As prices fall, buyers will consume more until demand is met
- Prices and quantity will settle at P^* and Q^*



Basic supply and demand interactions: shortage

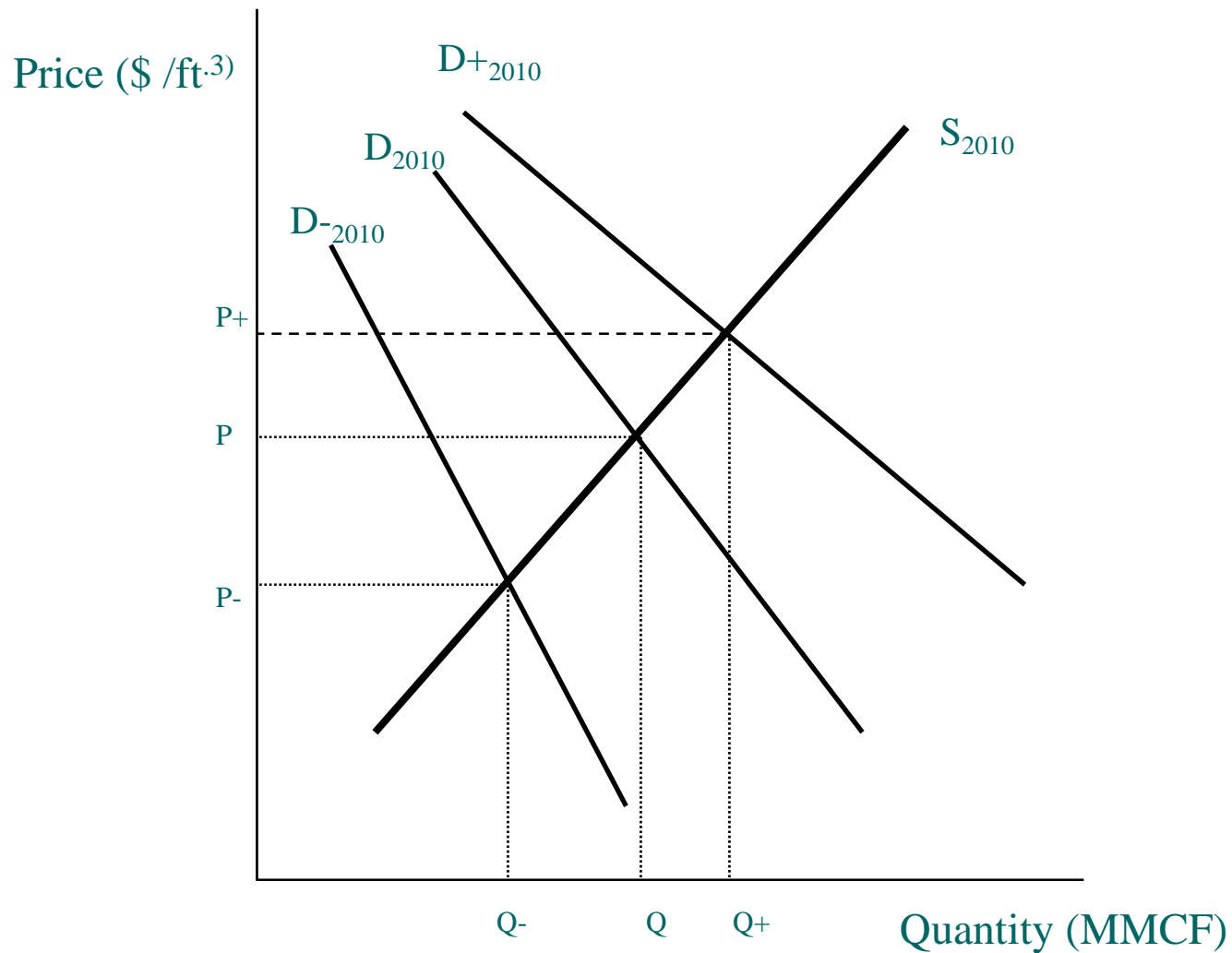
- If price = P_2
 - Producers make Q_s
 - Consumers are willing to buy Q_D
- Consumers demand more than is available, will “bid up” the price.
- Producers will expand production or more producers will enter the market, increasing the quantity available.
- Prices and quantity will settle around P^* and Q^*



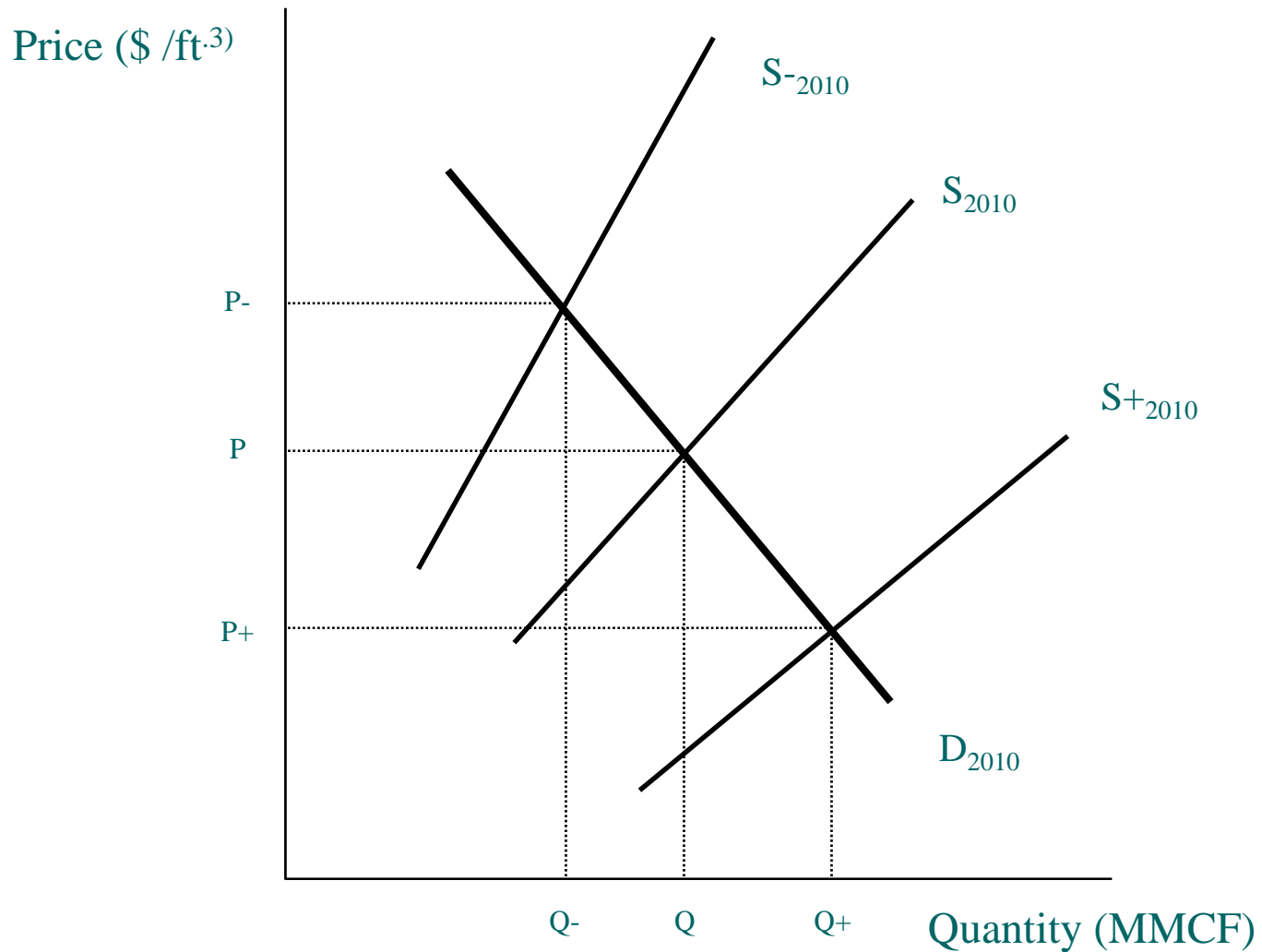
Pricing a good in a competitive market

- Assume we start with supply and demand in equilibrium
- Now, tastes change and a particular good has greater demand, buyers want this good at its current price in quantities greater than producers can supply.
- Prices for this good rise, as people are willing to pay more for this good.
- Rates of return to the producers of this good improve
 - More capital is invested in the production of this good
 - Firms may enter into this market
- As more production is realized, prices start to fall, and rates of return fall or stabilize, production stabilizes also.
- New price and quantity permit producers to pay costs of production and make a reasonable rate of return.

Demand shifting



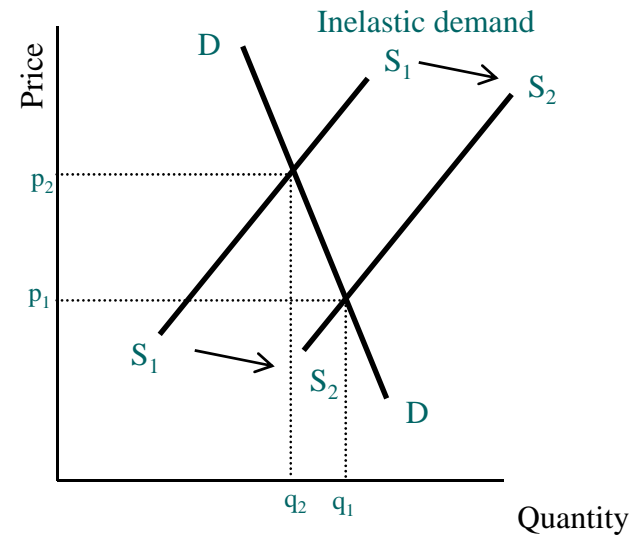
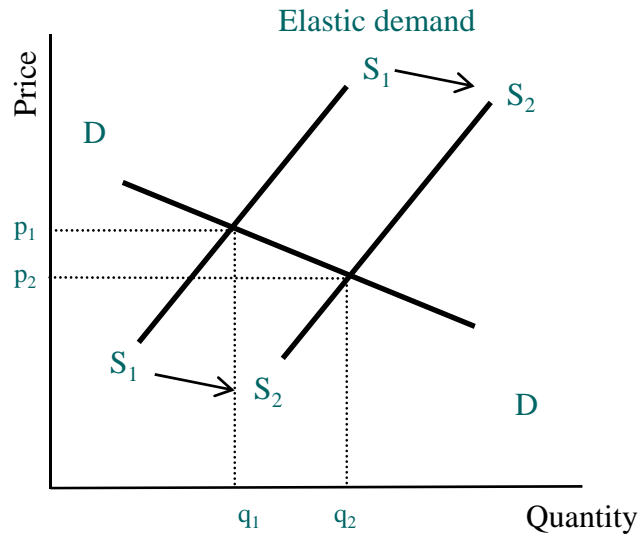
Supply shifting



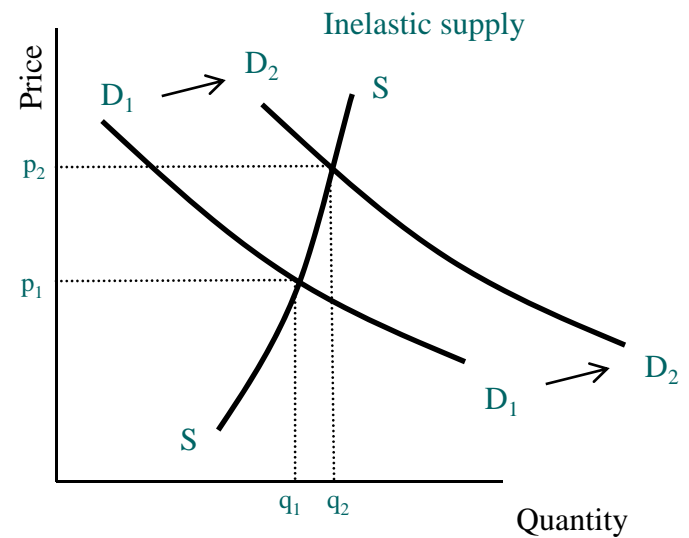
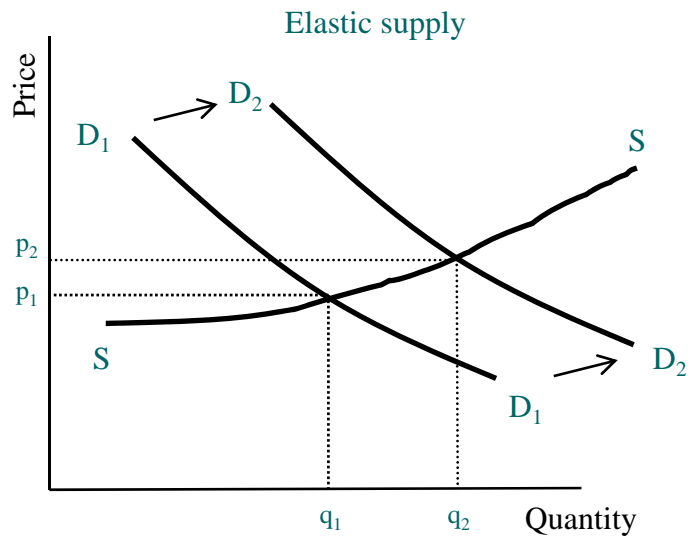
Mathematically solving simple supply and demand interactions

- Demand equation $P = \$500 - 0.0002Q$
- Supply equation $P = \$50 + 0.0001Q$
- Where does market “clear?”

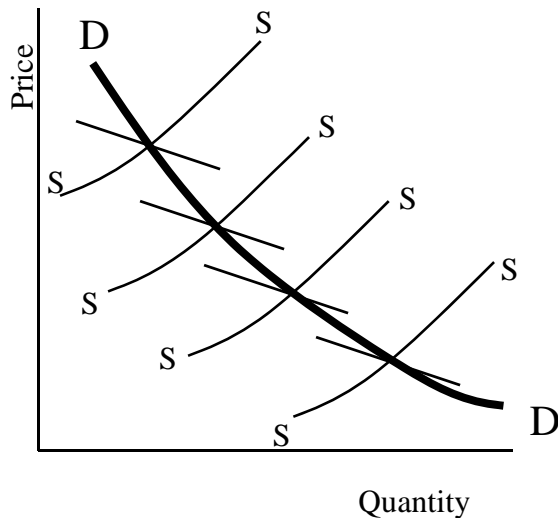
Supply shifts with elastic or inelastic demand



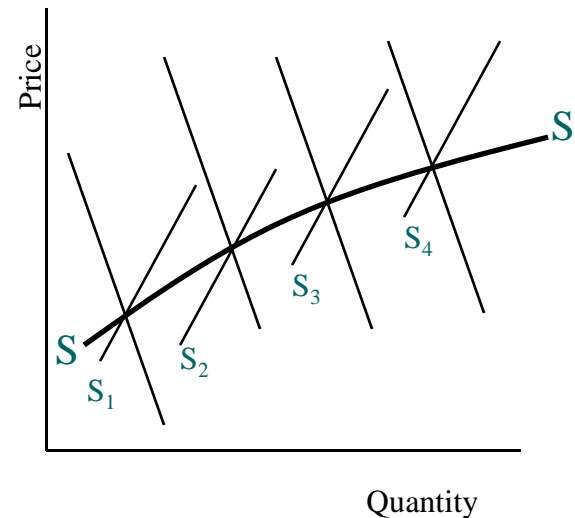
Demand shifts with elastic or inelastic supply



Long-run supply and demand



Long run demand curve



Long run supply curve


- Both are mapped by intersections of short-run supply and demand curves
- Identity problem – identifying true changes or shifts in supply and demand require adjustments for inflation and other long-term factors.

Imperfect competition: monopoly

- Single firm produces all output
- Firm has market power, faces a downward sloping demand curve
- Marginal revenue curve will lie below the demand curve and will be downward sloping.
 - In perfect competition, marginal revenue curve is horizontal ($MR = PRICE$).
- Monopolies produce fewer goods than competitive markets and charge higher prices.

An example of a monopoly

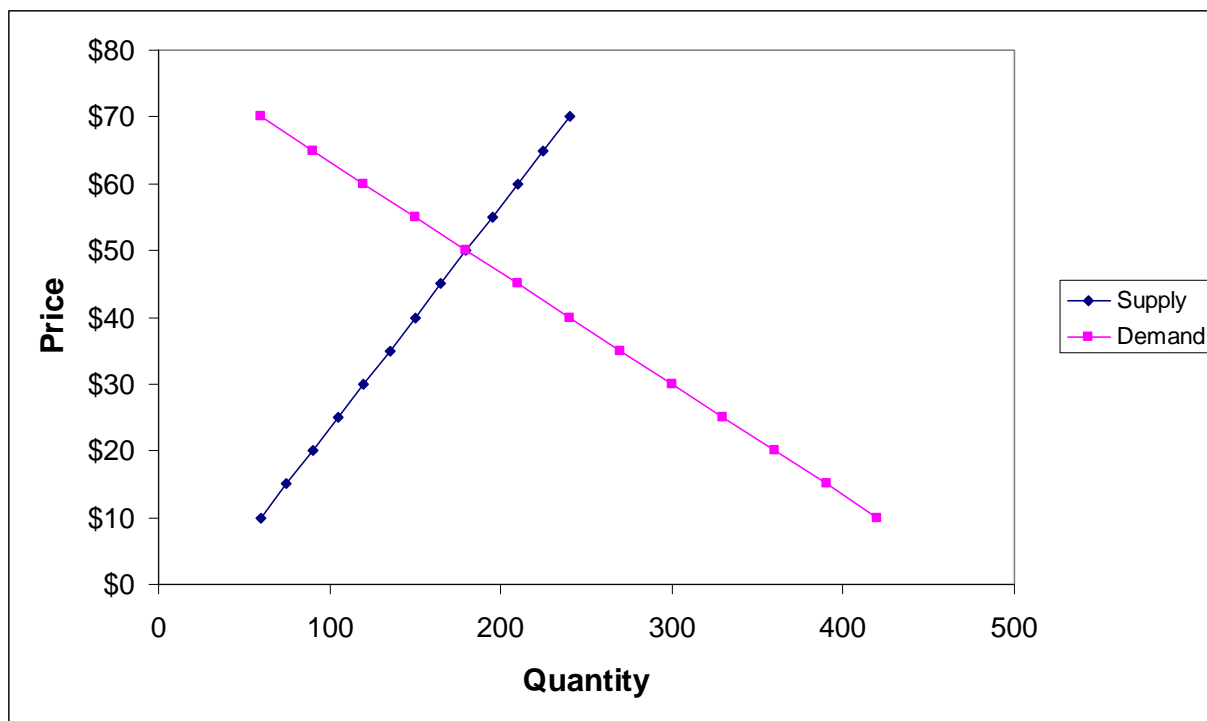
- Let's say a firm is a monopoly and faces the demand curve:
 - $Q = 480 - 6P$ - or - $P = 80 - 0.167Q$
 - Let's say the firm's supply curve, (which is also its marginal cost curve) is:
 - $Q = 30 + 3P$ - or - $P = -10 + 0.333Q$
- **Which form is appropriate to use for determining a monopolies production?**
 - Use form for $P=f(Q)$ since marginal revenue should be this form
 - So, use these equations:
 - Demand: $P = 80 - 0.167Q$
 - Supply: $P = -10 + 0.333Q$
- Total revenue will be:
 - $TR = P \times Q$
 - $TR = (80 - 0.167Q)Q$
 - $TR = 80Q - 0.167Q^2$
- Marginal revenue the first derivative of TR:
 - $MR = 80 - 0.333Q$


$$MR = \frac{\partial TR}{\partial Q}$$

If the monopolist behaved as though the market were perfectly competitive...

- The market would “clear” at a price of \$50 and a quantity of 180 units.

Price	Quantity Supply	Quantity Demand
10	60	420
15	75	390
20	90	360
25	105	330
30	120	300
35	135	270
40	150	240
45	165	210
50	180	180
55	195	150
60	210	120
65	225	90
70	240	60

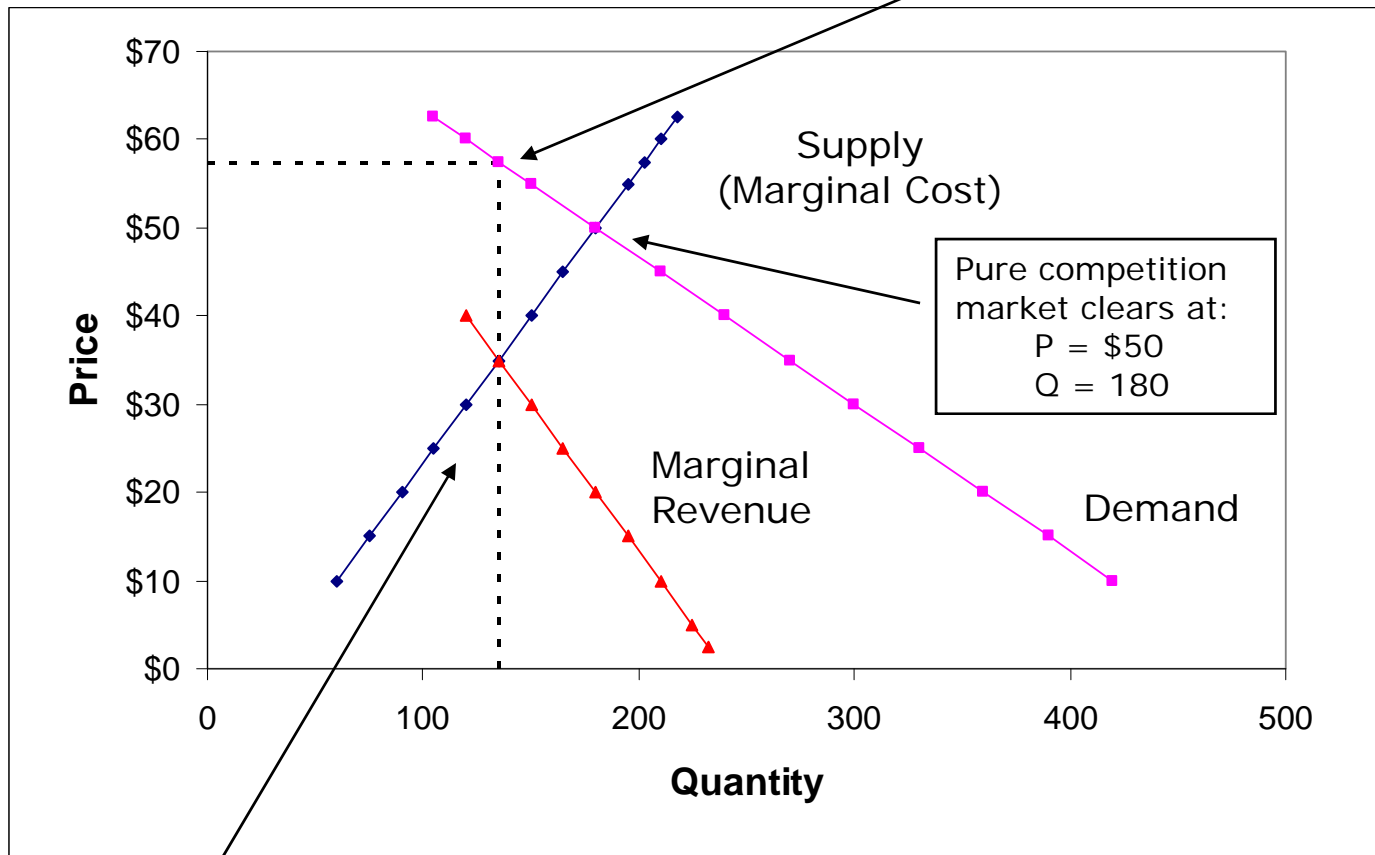


But the monopolist will behave as a profit maximizer

- Monopolist will produce where $MR = MC$.
 - Remember that MC is the same as the monopolists supply curve
 - Marginal cost = $-10 + 0.333Q$
 - Marginal revenue = $80 - 0.333Q$
 - Set $MC = MR$ and solve for P
 - $-10 + 0.333Q = 80 - 0.333Q$
 - $0.667Q = 90$
 - $Q = 135$
- The monopolist will produce only 135 units.
- Following this logic, if only 135 units are available in the market, the company can charge \$57.5 per unit.
- So the results of the monopoly are to decrease production (135 units from 180) and increase price (\$57.5 instead of \$50).

Monopolistic production

If $Q = 135$ units available in market, demand curve indicates price of \$57.5

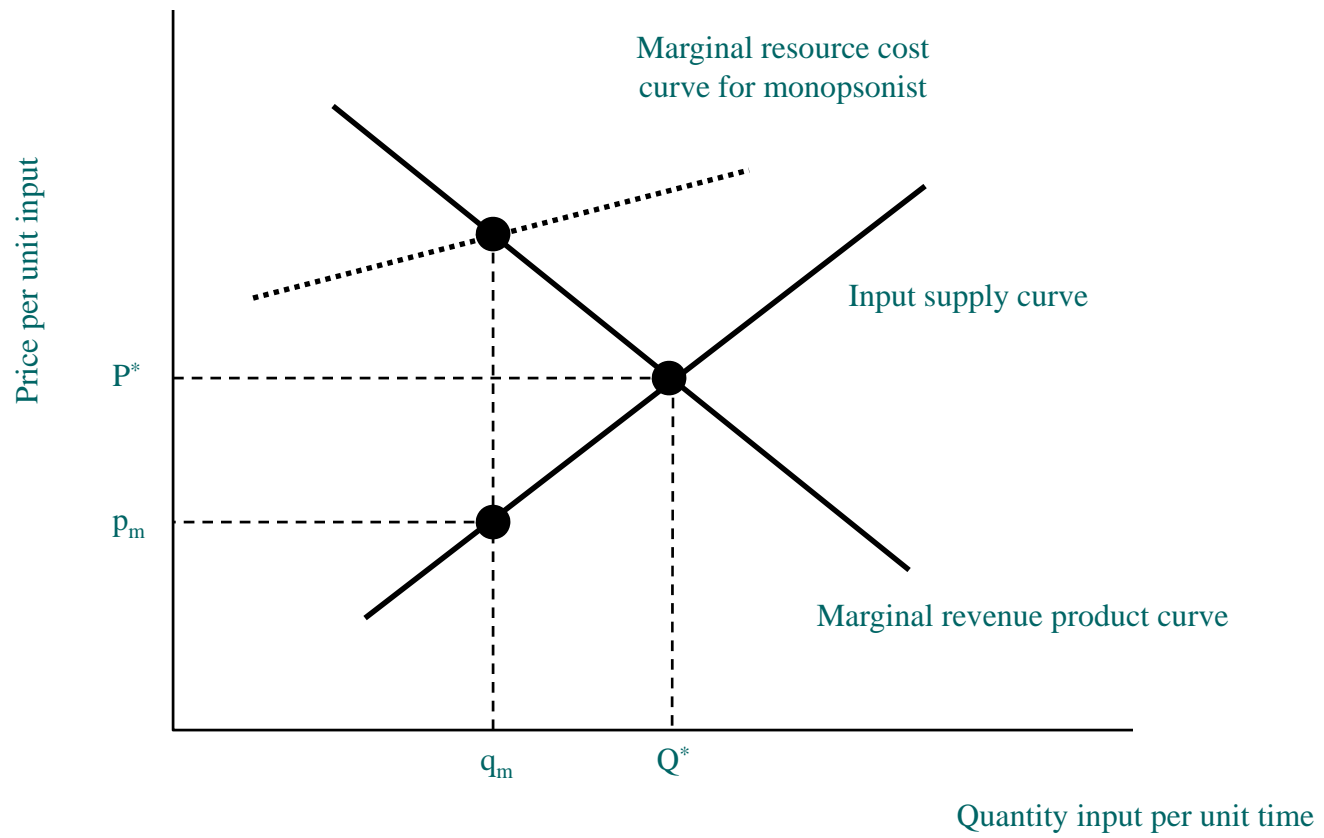


Point where $MC = MR$ for monopoly, firm will produce $Q = 120$ units

Monopsony

- A good or service is bought by only one firm
- Supply curve faced by monopsonist is upward sloping
- Marginal resource curve will lie above the supply curve.
- Result: monopsonist will consume less at a lower price than is optimal to society under a purely competitive market.

Supply and marginal resource cost curve for a monopsonist...





Reducing competition

- Collusion between firms
 - to raise product prices
 - to lower input prices (why forest industries won't talk about stumpage prices)
- Price discrimination
- Predatory pricing

Other market failures...

- Imperfect information
 - Stumpage prices for NIPF landowners
 - Who are buyers?
 - What are product possibilities?
- Immobility of labor and capital
 - Not much of a problem in USA, across states or international borders



Next lecture...

Externalities and optimal levels of environmental impact (and more on market interventions).