

ECO100: Introductory Economics

Supply, Demand & Equilibrium

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(perfectly) competitive market: the assumptions

- Each seller's good is exactly the same as any other seller's
- Each buyer is small relative to the entire market
 - Any 1 buyer can buy as much as he wants at the market price without affecting the market price
 - **Implication for buyer:**

- Each seller is small relative to the entire market
 - Any 1 seller can sell as much as she wants at the market price without affecting the market price
 - **Implication for seller:**

So, how much coffee gets demanded?

in a particular “market”, over a particular time frame . . .

- 1 Current price of coffee
- 2 Prices of related goods
- 3 Expected prices in future time frames
- 4 Income
- 5 Number of consumers in “market”
- 6 Tastes and preferences

Let's hold 2-6 constant (for now) and look only at the relationship between price and quantity . . .

insight from Observo, master of the bleeding obvious

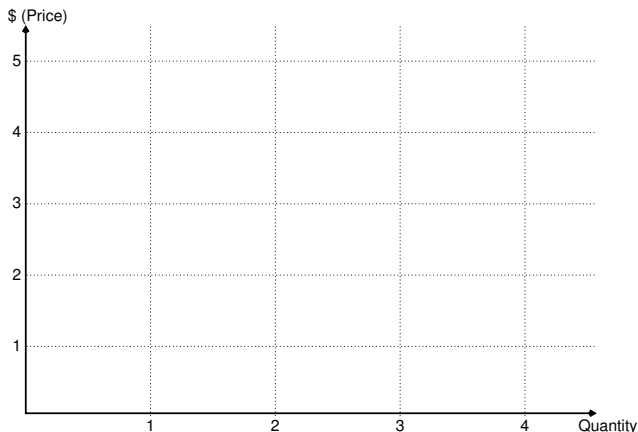
the unobjectionable(?) insight

As the price of something decreases, the quantity demanded of that something increases

Why?

demand: a graph & its interpretation

from previous notes: **Marginal Willingness to Pay = MWTP = Item Value - Implicit Cost**

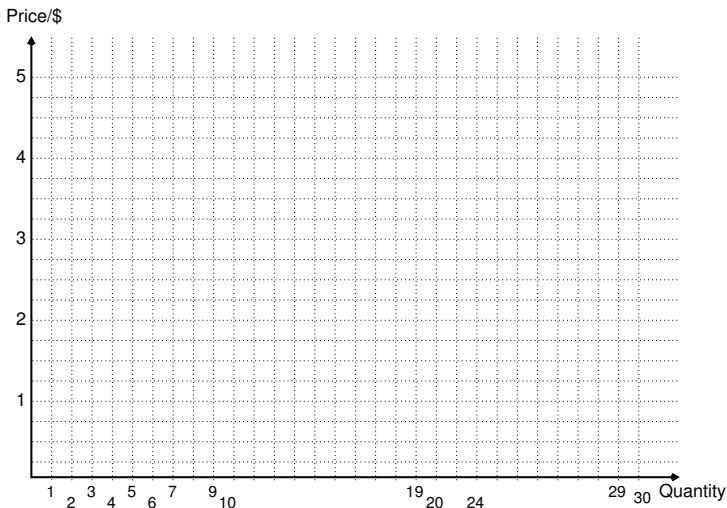


two ways of characterizing the P, Q^d relationship

First way: Q^d as a function of P . Example: $Q^d(P) = 22 - 4P$

Graphically characterizing the P, Q^d relationship

$$Q^d(P) = 22 - 4P$$



market demand curve: summary

- Relationship between market price (P) and market quantity demanded (Q^d), **everything else constant**
 - We are not saying any particular (P) is going to happen . . .
- Reasonably assumed to be a negative relationship: “Law of Demand”
- 2 interpretations for (\hat{Q}, \hat{P}) , a point on the curve
 - 1 If a price (\hat{P}) does happen, what is quantity demanded? \hat{Q}
 - 2 At what price are exactly \hat{Q} units demanded? \hat{P}
- 2 caveats:

So, how much coffee gets demanded?

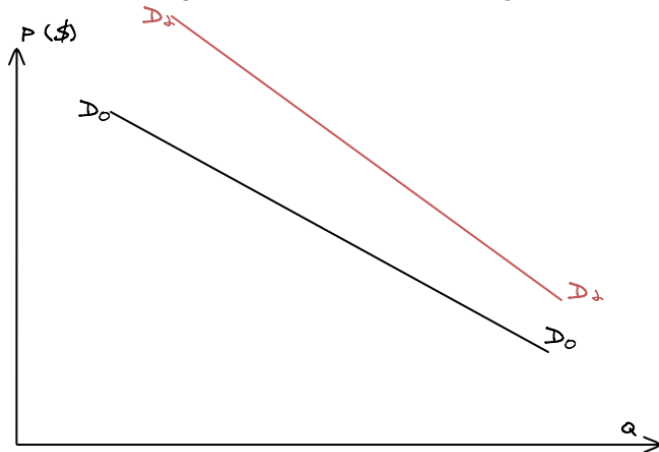
in a particular “market”, over a particular time frame . . .

- 1 Current price of coffee
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For each item in 2-6, how does a particular change affect the relationship between P and Q ?

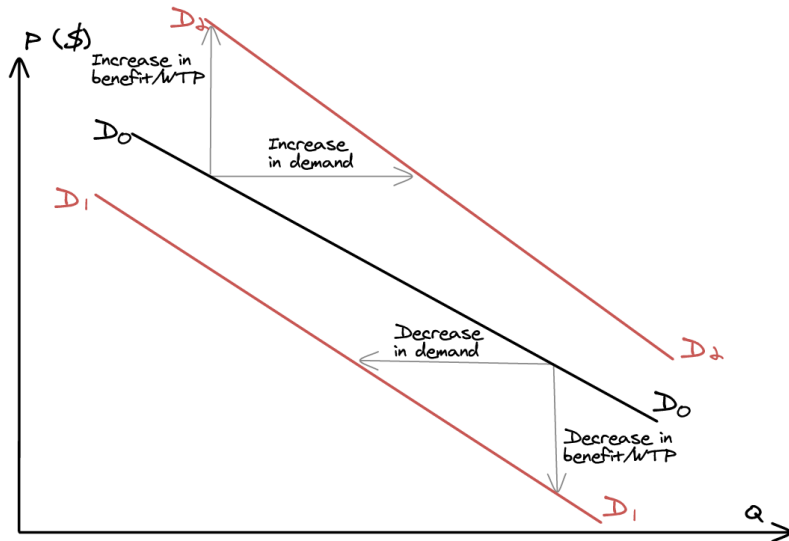
a trick question

Is D_2 a shift up of D_0 or a shift out (right) of D_0 ?



shifts in demand

up/out versus in/down



changes in the price of related goods

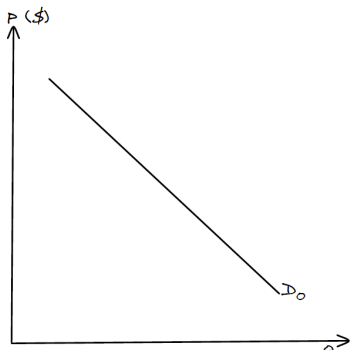
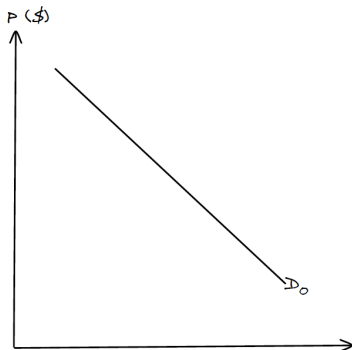
consider $\uparrow P_{related}$

Complements

If more value from A if B consumed as well, then A and B are **complements**

Substitutes

If A and C are substitutes, then A and C are **substitutes**



expected future prices

consider $\uparrow P_{\text{tomorrow}}$

- For those items where “buying today” and “buying tomorrow” are **substitutes** ...
 - Difference between a pound of coffee beans and a cup of coffee.

changes in income (or wealth)

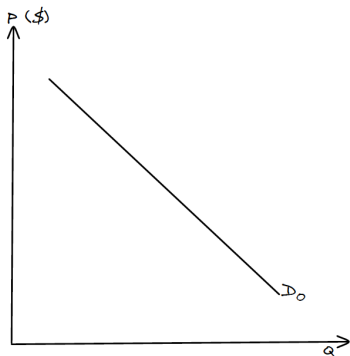
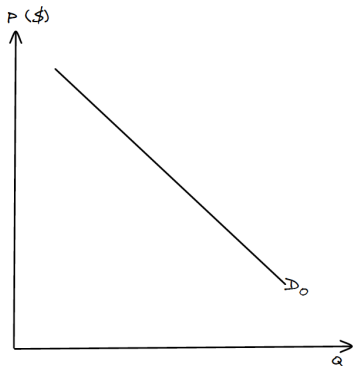
consider \uparrow *income*

Normal Good

Income and demand move in same direction (positively related)

Inferior Good

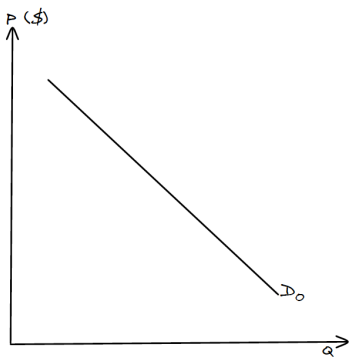
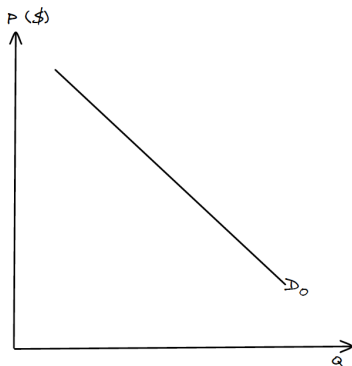
Income and demand move in opposite direction



changes in number of consumers in market

consider \uparrow number of consumers

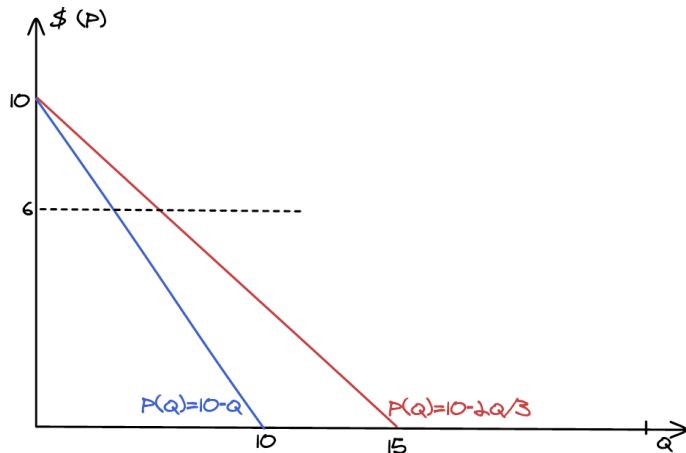
■ Straightforward ...



- ...but be careful: number in market versus number who purchase
because of price change

individual demands into market demand

$$Q(P) = 10 - P \text{ and } Q(P) = 15 - 3P/2$$



a note on demand semantics

- **Change in quantity demanded:** movement along the curve
 - Only changes in price move us along demand curve
- **Change in demand:** shift of the curve
 - A (relevant) change in anything but price shifts the curve

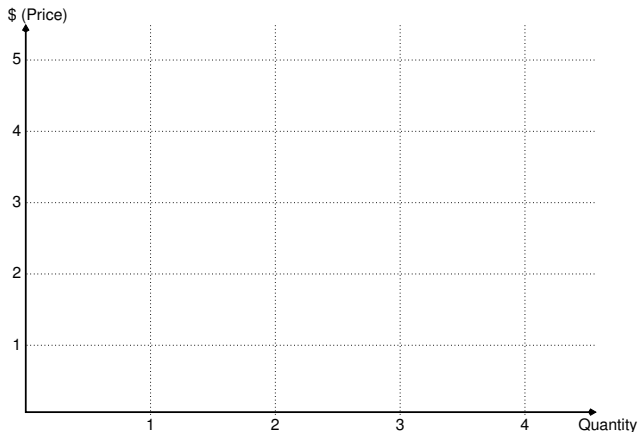
insight from Observo, master of the bleeding obvious

another unobjectionable(?) insight

As the price of something increases, the quantity supplied (i.e., offered for sale) of that something increases

Why?

supply: a graph & its interpretation

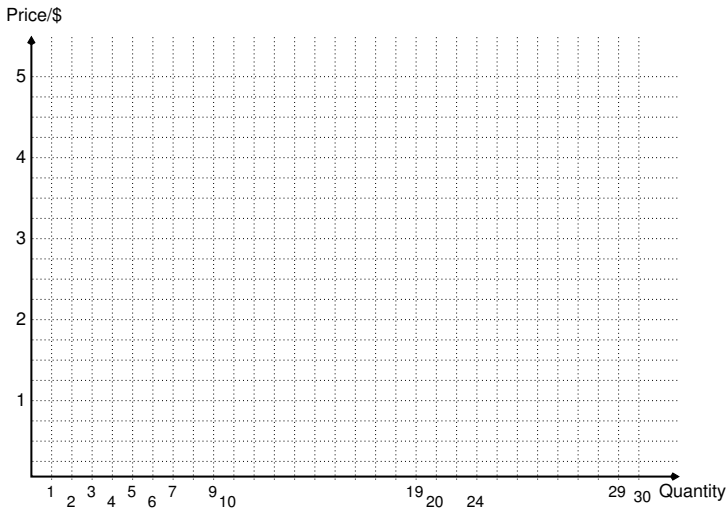


two ways of characterizing the P, Q^s relationship

First way: Q^s as a function of P . Example: $Q^s(P) = 24P - 48$

graphically characterizing the P, Q^S relationship

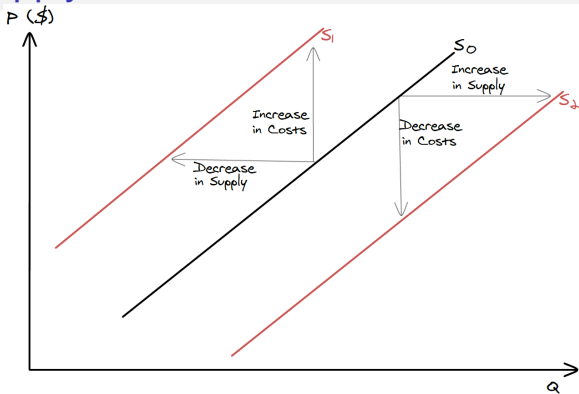
$$Q^S(P) = 24P - 48$$



market supply curve: summary

- Relationship between market price (P) and market quantity supplied (Q^S), **everything else constant**
 - We are not saying any particular (P) is going to happen . . .
- Reasonably assumed to be positive relationship: “Law of Supply”
- 2 interpretations for (\hat{Q}, \hat{P}) , a point on the curve
 - 1 If a price (\hat{P}) does happen, what is quantity supplied? \hat{Q}
 - 2 At what price are exactly \hat{Q} units supplied? \hat{P}

shifts in supply



- 1 Input Prices: $\uparrow P_{inputs} \Rightarrow S_0 \rightarrow$
- 2 Technology: $\uparrow \text{Technology} \Rightarrow S_0 \rightarrow$
 - The curious case of weather
- 3 Expectations: $\uparrow P_{\text{next period}} \Rightarrow S_0 \rightarrow$
- 4 # of sellers: $\uparrow \# \text{ Sellers} \Rightarrow S_0 \rightarrow$

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what we want our model to provide: a prediction

given assumptions about market, what is expected outcome

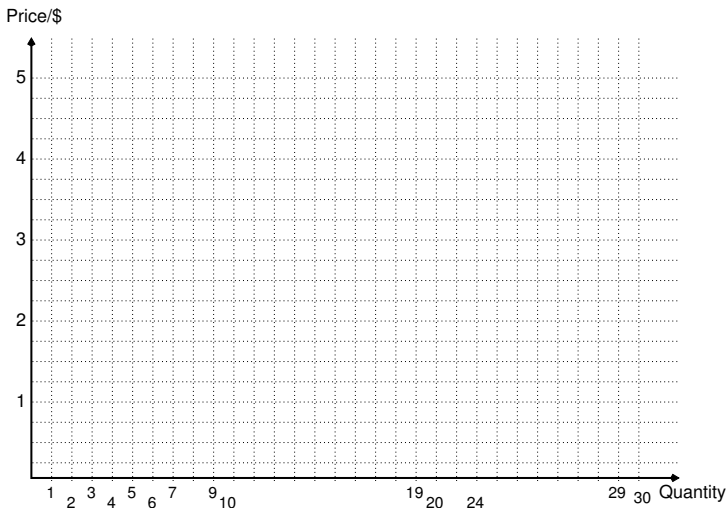
- **Equilibrium, loosely:** Stability.
- Ideally there is some force moving from disequilibrium to equilibrium.
- **Market clearing condition:** when the quantity supplied equals the quantity demanded
 - Intersection of Supply and Demand Curves
- Algebraically: 2 unknowns, need 2 equations

$$\text{Solve for price } (P^*) : Q^S(P^*) = Q^D(P^*) \quad (1)$$

$$\text{Find quantity } (Q^*) : Q^* = Q^D(P^*) (= Q^S(P^*)) \quad (2)$$

equilibrium in (perfectly) competitive markets: example

$$Q^d(P) = 22 - 4P; \quad Q^s(P) = 24P - 48$$



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equilibrium in perfectly competitive markets: example

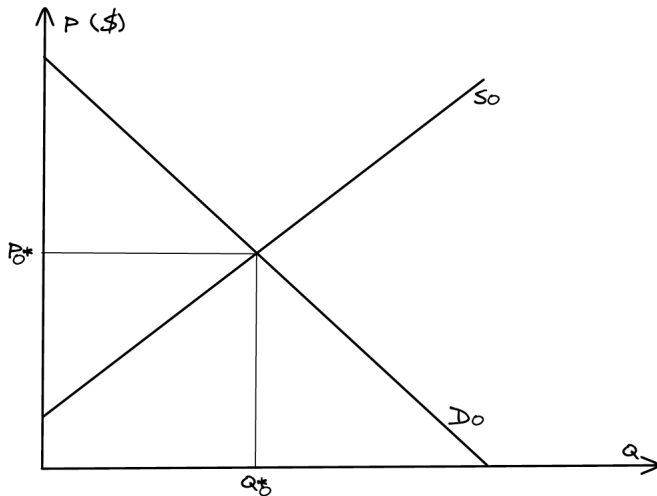
$$Q^d(P) = 22 - 4P; \quad Q^s(P) = 24P - 48$$

effects of shifts in supply and demand

- After a shift in one or both curves, need to find new equilibrium
- Let's do some examples . . .

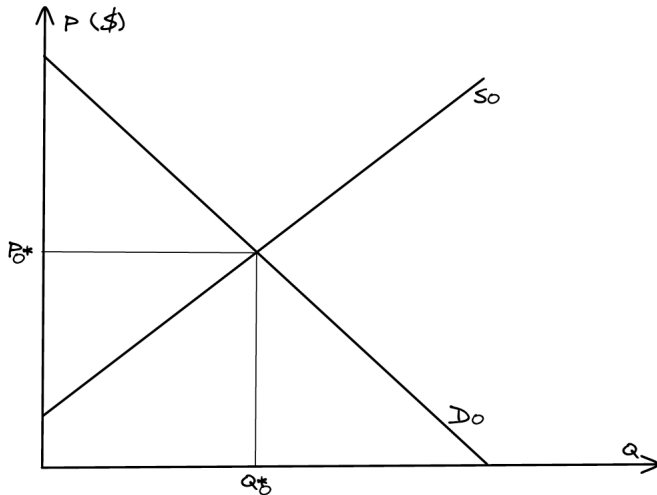
example: shift up/out of demand curve

e.g., increase in the price of a substitute



example: shift down/out of supply curve

e.g., improvement in technology

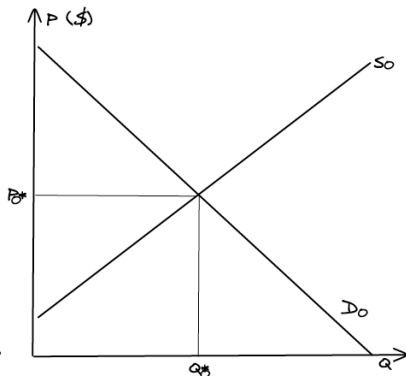
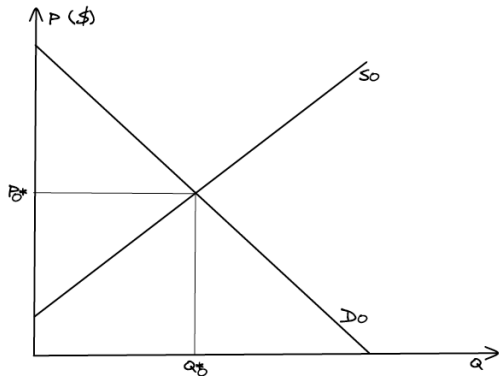


shifting both curves

- If both curves shift
 - 1 We know the direction of change of **either P or Q**
 - 2 The direction of change in the other outcome is ambiguous
- Proof by example:
 - Shift Up/Out of Demand Curve
 - Shift Down/Out of Supply Curve

shifting both curves: an example

shift up/out of demand curve; shift down/out of supply curve



Which is consistent with evolution of personal computer market (at least before tablets)?

summary

- The 2 interpretations of supply and demand curves
- Scarce resources are often allocated by markets
- We started with one type of market: perfectly competitive
 - Made some very strong assumption
- Equilibrium as a prediction of what is going to happen
 - **Positive Claim:** The decentralized, perfectly competitive market finds the price P^* that equilibrates supply and demand
- Price as a signal of value and scarcity

a real-world example

empirical facts (U.S. Office of National Drug Control Policy)

- 1990 U.S. Marijuana Purchases: \$15 billion
- 2000 U.S. Marijuana Purchases: \$10.5 billion (inflation adjusted)
- Increased consumption from 1990 to 2000
- Implication: Price decreased: Price decrease relatively larger than quantity increase

The Questions

- 1 If we limit ourselves to shifting one curve, what shift is consistent with $\uparrow Q, \downarrow P$?
- 2 What does $\downarrow\downarrow P, \uparrow Q$ tell us about steepness of curves?

the U.S. marijuana market, graphically

