

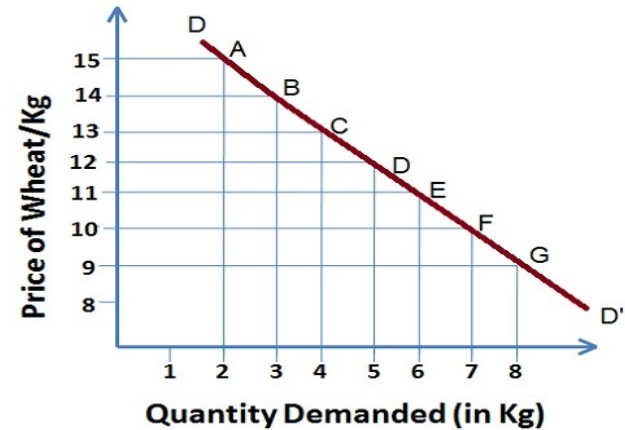
# **ECONOMICS Lecture 10**

## **The First Law of Demand**

Biwei Chen

# Topics

- Market Competition
- The Law of Demand
- Demand Curve Shifters
- Individual vs Market Demand



The law of demand can be considered as the #1 principle in economics because of its simplicity and explanatory power.

# Market Competition

- Recall that different forms of competition among society members. All serve to resolve conflict of interests.
- Economists focus on one specific type of competition—market competition through which buyers and sellers meet, compete and exchange.
- Thereafter, resource allocation and income distribution can be determined from the market exchange.
- In this process, what is the most significant factor that determines the buying and selling activities of the market participants? The competitive criterion question.

# The Law of Demand: $P \rightarrow Q_D$

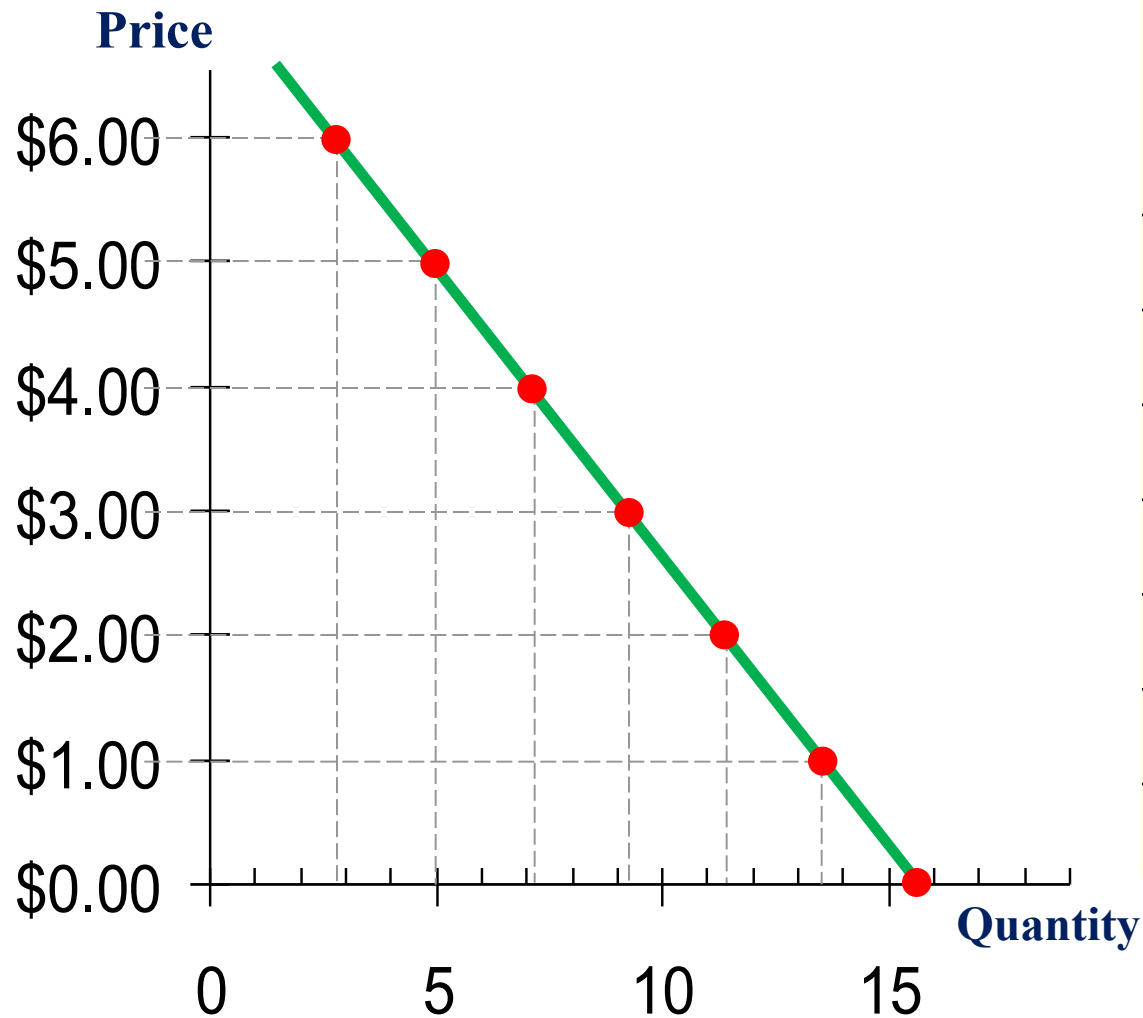
- **The law of demand (D):** the claim that the quantity demanded of a good will fall when the price of that good rises, other factors being equal (*ceteris paribus*).
- **Quantity demanded ( $Q_D$ ):** the maximum quantity of the good a buyer is willing and able to purchase at a specific price. Does this concept sound familiar?
- Duality (two sides of the same coin) between the use value and quantity demanded: 1) use value is the maximum value of a given quantity; 2) quantity demanded is the maximum quantity of a good affordable at a given price.
- Mathematical expression for the law:  $dQ/dP < 0$ , for any D.

# How Do Consumers Respond to P↑

Baker, Scott R., Stephanie Johnson, and Lorenz Kueng. 2021. "Shopping for Lower Sales Tax Rates." *American Economic Journal: Macroeconomics*, 13 (3): 209-50. DOI: 10.1257/mac.20190026

- Baker, Johnson, and Kueng examined detailed spending data for more than 150,000 households across 40 states and 3,000 local municipalities to see whether spending changed in response to hikes in sales taxes.
- Evidence in the month before an increase, consumers stocked up on storable goods, like laundry detergent and alcohol, while they were less expensive. Households with a monthly grocery budget of \$500, for example, typically increased spending by up to \$20 before the tax increase, and then cut back spending the month after the higher tax rate went into effect. Consumers also responded to sales tax hikes on more expensive goods like cars.
- Consumers didn't just stockpile taxable goods; they also bought more tax-exempt items (as predicted by the income and substitution effects).

# Demand Schedule & Demand Curve



Price of lattes	Quantity of lattes demanded
\$0.00	16
\$1.00	14
\$2.00	12
\$3.00	10
\$4.00	8
\$5.00	6
\$6.00	4

# Demand: Marginal Use Value Curve

- Demand is a consumer's monetary vote showing their preference for the goods and services in the market. The price they pay is the cost sacrificed for immediate consumption.
- Indeed, the demand curve is individual marginal use value curve, and the consumer optimizes her consumption decision by equalizing MU and MC (market price) of the consumption unit.
- Every voluntary market exchange is mutually beneficial and generates **consumer surplus** in terms of the gain measured by the difference between the use value and exchange value.
- **Furthermore, a buyer can turn into a seller if  $P = EV \geq UV$ . Why?**
- Demand creates supply when exchange value is greater than the use value, because it is more beneficial to sell and gain the difference between the two values.

# Demand Creates Supply

- An economy consists of Alex and Biwei;
- Both demand apples;
- Alex has 6 apples;
- But Biwei has none;
- What is the exchange equilibrium?
- Can you derive Alex's supply curve of apple?

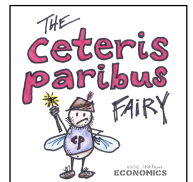
Quantity of Apples	Alex's Marginal Use Value	Biwei's Marginal Use Value
1	\$1.00	\$2.00
2	\$0.90	\$1.60
3	\$0.80	\$1.20
4	\$0.70	\$0.80
5	\$0.60	\$0.40
6	\$0.50	\$0.00



# Highlights on the Law of Demand

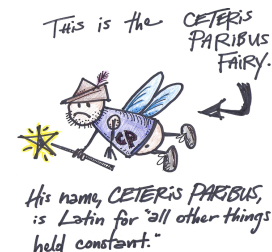
- It is a universal law governing all behavior.
- It only focus on two variables- price and quantity demanded!
- There is a causal relationship between price and quantity.
- Change in Price inversely causes change in quantity demanded.
- In reality, price can be observed but not quantity demanded.
- All else equal! Ceteris Paribus.

In order to correctly apply the law of demand into explanation, we shall always check the list above! More wisdom to you if you can think of the price as the opportunity cost!



# The “Ceteris Paribus” Assumption

- “All else equal” is the only assumption imposed before we can apply the law of demand.
- You might wonder what it means and why it is?
- What if “all else can change”? And they do!
- Answers: it means other factors than price shall remain unchanged. Because in reality, price is not the only factor that can change quantity demanded!
- If the assumption “all else equal” is violated, does the law of demand still hold? What would happen to the demand curve? Is it still downward sloping?



# “Ceteris Paribus” Assumption

- The answer is yes! Because it is a universal law!
- The relationship between price and quantity demanded is still inversely related.
- However, if other factor besides price also changes, say consumer's income, the demand curve will shift!
- To see how it works, let's use a graph in the next slide.

And what exactly are the magical powers of the CETERIS PARIBUS FAIRY?

Well, no matter what the situation,

he keeps **ALL OTHER THINGS HELD CONSTANT!**  
*~~~~~*



The point is that his magical powers allow for the foundation to be laid for BASIC ECONOMIC THOUGHT.

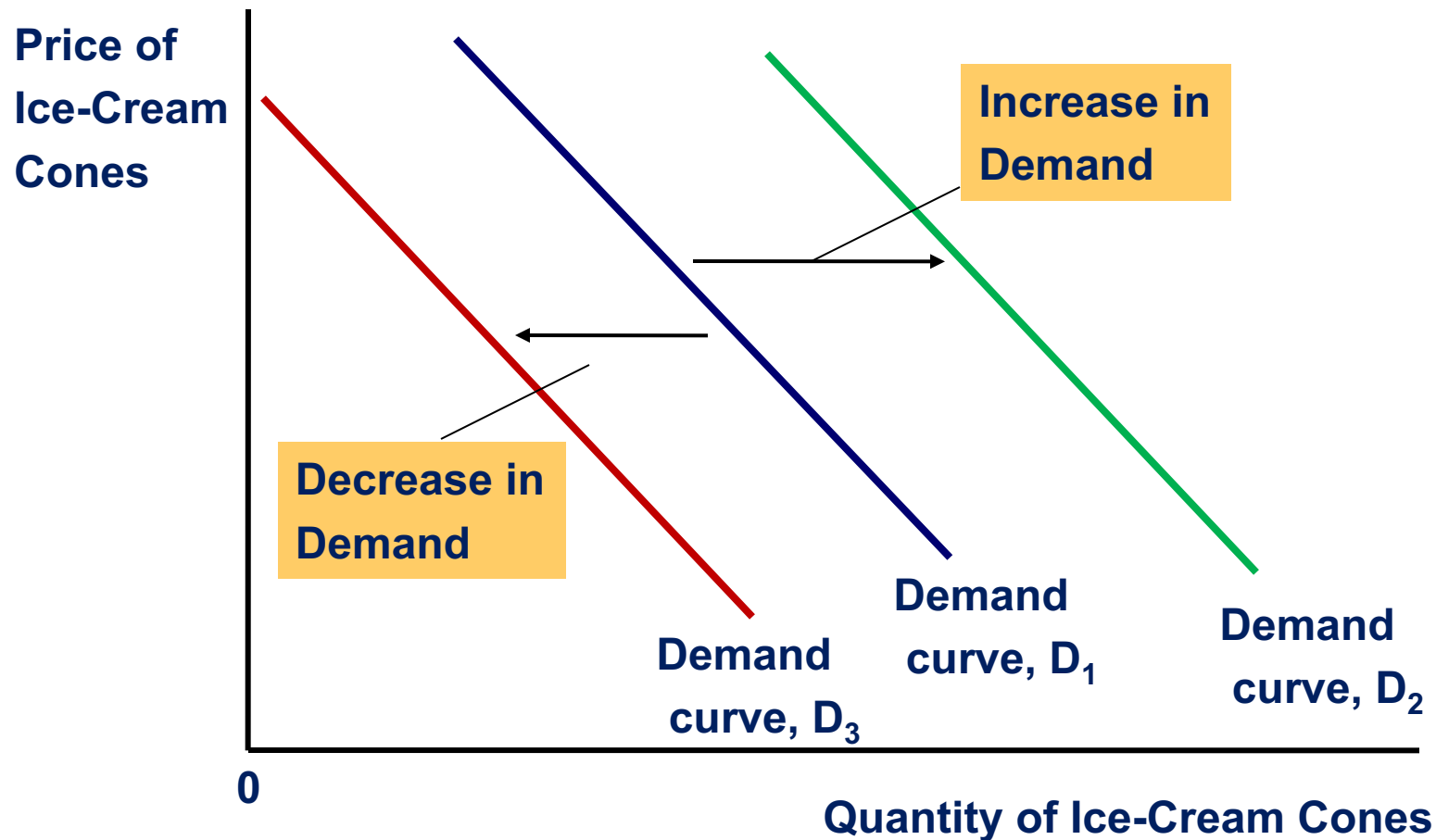
Yes.

CETERIS PARIBUS FAIRY is that powerful.

No matter what the situation, he holds all other variables constant.



# Shifts in the Demand Curve



Any change that raises the quantity that buyers wish to purchase **at any given price** shifts the demand curve to the right. Any change that lowers the quantity that buyers wish to purchase **at any given price** shifts the demand curve to the left.

# Demand Factors and Curve Shifters

- The factors that can shift the entire demand curve are called the demand curve shifters. They include all possible other-than-price variables that play certain roles in determining market prices.
- We shall study several common factors in detail.
- Variables that can shift the demand curve: Income, Weather, Fashion, Prices of related goods, Tastes, Expectations, New information, Government Policies.
- However, some demand curve shifters such as taste and expectations are not directly observable, which makes it difficult to test any explanations based on these factors.

# Demand Equation and Factors

- The demand equation is the mathematical expression for the demand curve, which follows the law of demand.
- For simplicity, we can model it in a linear equation:  $P=D(Q)$  or  $P=aQ+b$ , where  $a<0$  is the slope coefficient and  $b>0$  is the intercept on the P axis. And this intercept “variable”  $b$  is the all possible factors other than price that can shift the demand curve.
- For example, Biwei’s demand curve for apply can be written as  $P=-0.5Q+1.5$ . Can you draw this equation in a graph?
- Can you infer Biwei’s quantity  $Q_D$  when  $P_1=\$0.5$  and  $P_2=\$1$ ?
- If Biwei’s income budget for apple consumption increases from \$1.5 per day to \$3, how would it change the demand?

# Demand Factor - Income

- Recall from consumer budget constraint that income determines purchasing power and consumption.
- **Normal good:** Other things constant, an increase in income leads to an increase in demand. ( $I+ \rightarrow D+$ )
- **Inferior good:** Other things constant, an increase in income leads to a decrease in demand. ( $I+ \rightarrow D-$ )

Luxury chocolates



Exclusive resorts



Own label discounters



Urban bus transport



Business class travel



Fine wines and dining



Cigarettes



Economy class travel



# Demand Curve Shifters

## Price of Closely Related Goods

- Price of related goods consists of two categories.
- **Substitutes**: two goods whereby an increase in the price of one leads to an increase in the demand for the other.
- **Complements**: two goods whereby an increase in the price of one leads to a decrease in the demand for the other.

### Substitute Goods





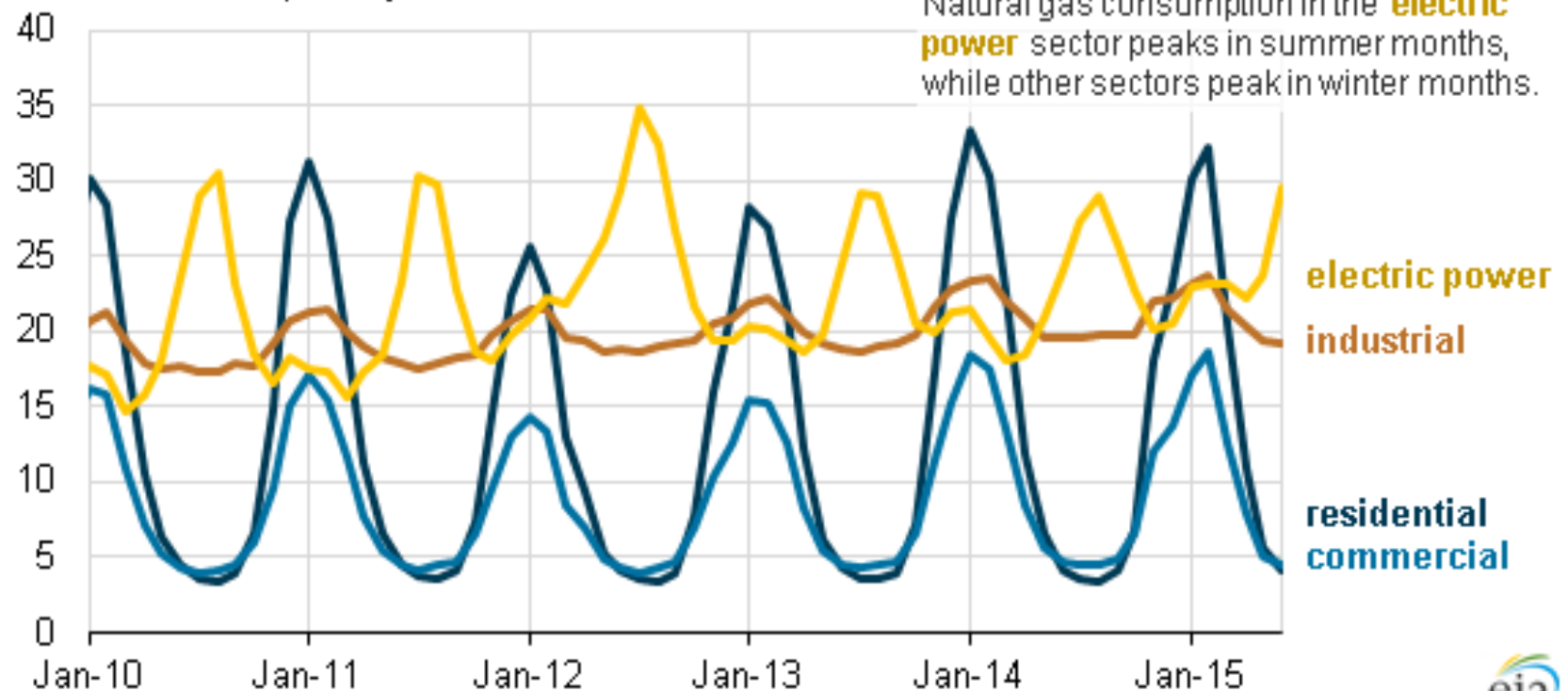
# Demand Factors

- Weather and climate: Consumer will increase demand for ice-cream and cold drinks in summer, for example.
- Tastes and fashion: change in tastes changes the demand.  
What exactly is taste? How do we explain a change in taste?
- Expectations about the future:
  - Expected rising income leads to an increase in current demand;
  - Expected higher prices leads to an increase in current demand.
  - Expectation plays a vital role in financial market asset pricing.
  - Expectation play a central role in public policy decisions.
- Government policies: tax, subsidies, price control, quantity restriction, regulation, standards, ...

# Demand Factor: Weather & Seasons

## Natural gas deliveries to customers by end use, Jan 2010 - Jun 2015

billion cubic feet per day



# ACTIVE LEARNING 1 Demand Curve

**Draw a demand curve for music downloads. What happens to it in each of the following scenarios?**

A. The price of iPods falls



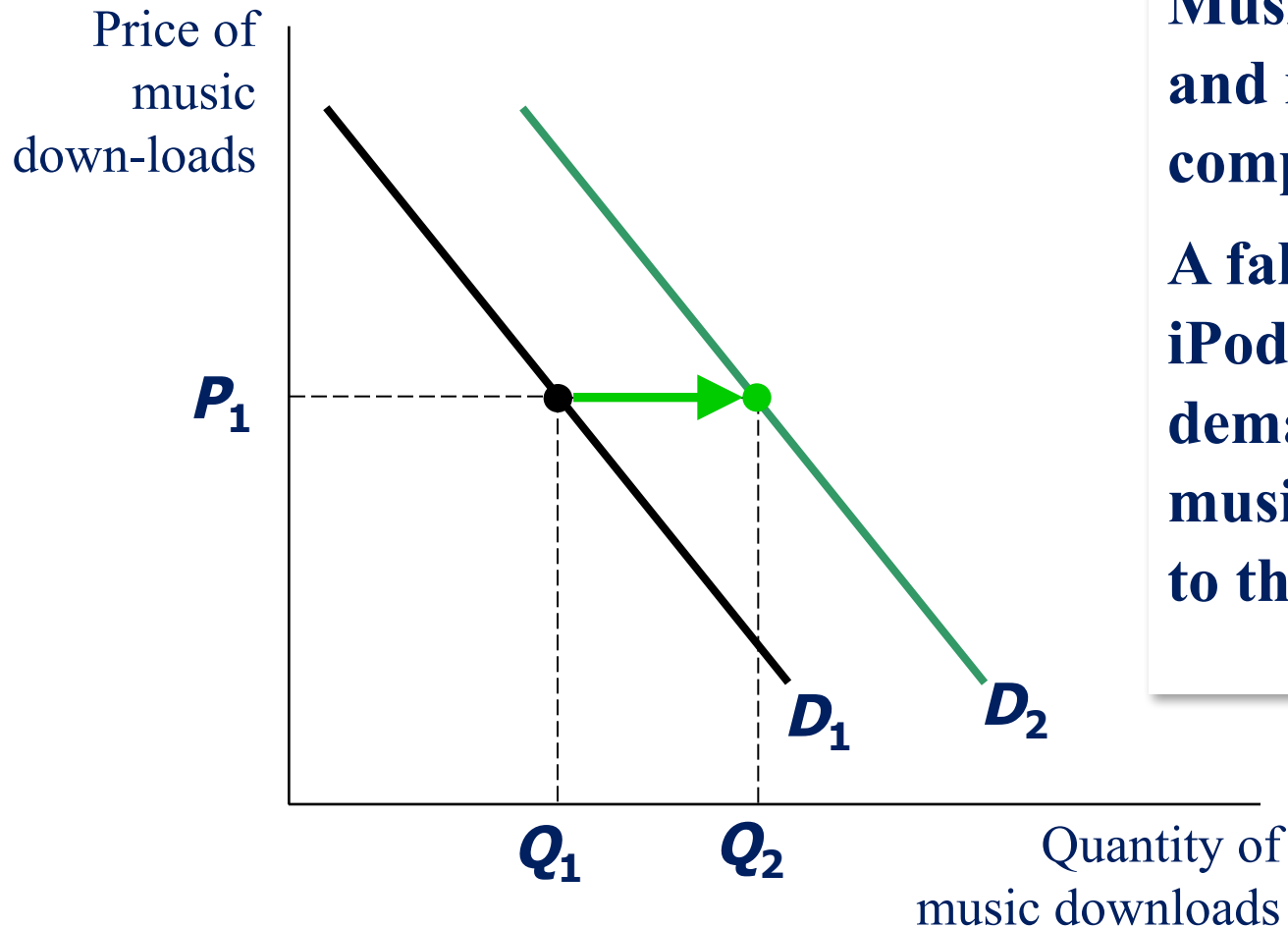
B. The price of music downloads falls



C. The price of CDs falls



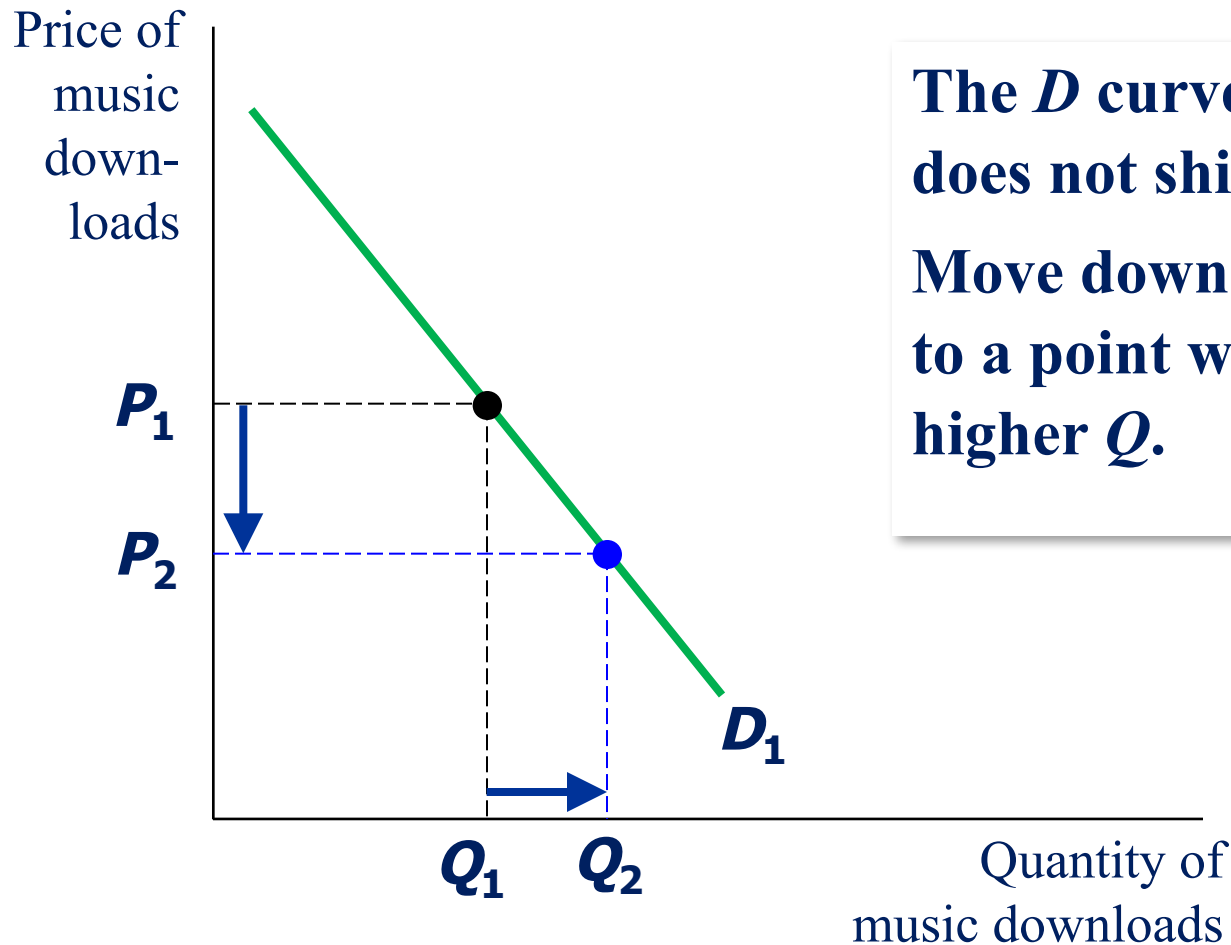
# ACTIVE LEARNING 1 A. Price of iPods falls



**Music downloads and iPods are complements.**

**A fall in price of iPods shifts the demand curve for music downloads to the right.**

# ACTIVE LEARNING 1 B. Price of music falls



**The  $D$  curve  
does not shift.**

**Move down along curve  
to a point with lower  $P$ ,  
higher  $Q$ .**

# Demand Factor: Psychological Tricks

- **Visual Pricing Tricks:** These tricks aim to intentionally minimize the appearance of the price, so it's more palatable to consumers. For instance, a store will price something at \$9.99 instead of \$10.00, or label a product as "buy-one-get-one" rather than 50% off.
- **Intentional Language Tricks:** It's not what you say, but how you say it. Making products seem costly to manufacture, offering exclusivity, and using words associated with small amounts fall under this category. These tricks use semantics to position a product in an appealing way.
- **Brick-and-Mortar Tricks:** A store's layout is less arbitrary than you may realize. Having a bright and colorful entrance, playing calm and slow music, and putting the essential items at the back of the store are a few tactics that fall into this section. These tricks use displays and product placement to influence consumer behavior.
- **Urgency Tricks:** A false sense of urgency and phase-out discounts are included in this category. If a consumer believes they might miss out on a deal, they're more likely to buy.

# Demand Factor: Market Expectation



“Once you get spooked by something, you start being very sensitive to other bumps in the night.”

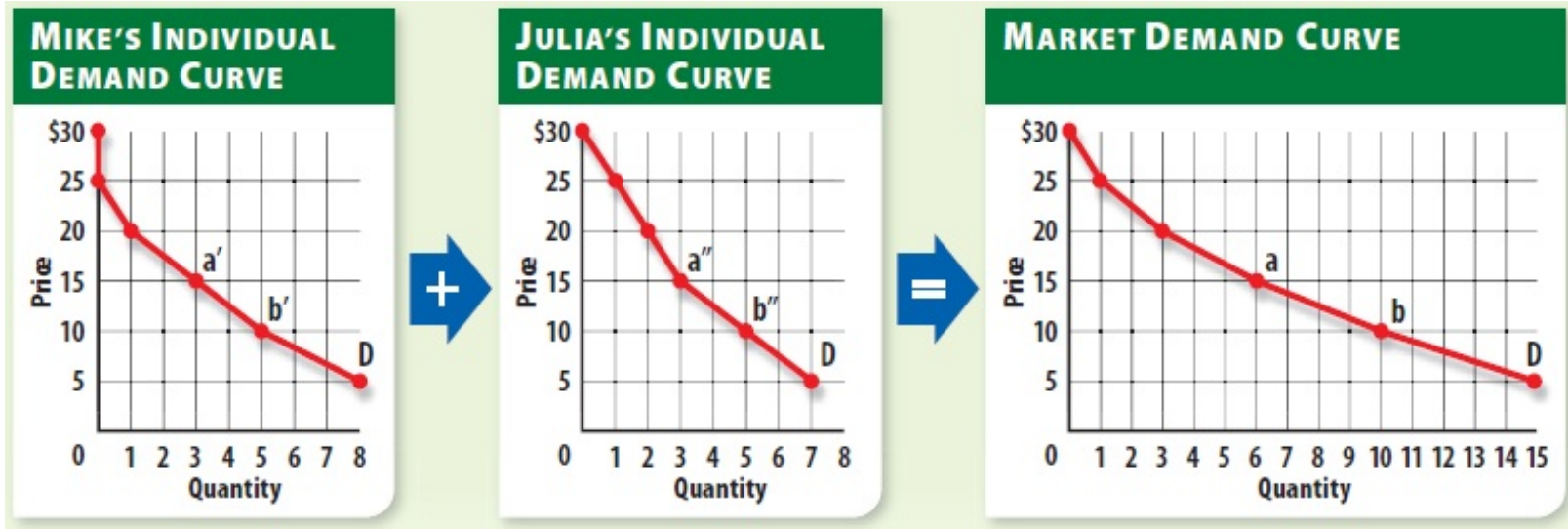
# From Individual to Market Demand

- Individual is the basic unit in all economic analysis.
- Society consists of individuals. Market demand therefore consists of individual demands.
- How do we derive the market demand curve from the individual demand curve?
- Recall the demand schedules for individuals.

Price of ice cream cones	John		Smith		Market
0	10		11		21
1	8		9		17
2	6	+	7	=	13
3	4		5		9
4	2		3		5
5	0		1		1



# Market Demand: Aggregate Individuals



To get the market demand curve, all we do is add together the number of quantity that Mike and Julia would purchase at every possible price. Then, we simply plot the prices and quantities on a separate graph. The market demand curve above is very similar to the individual demand curve in we looked at earlier. Both show a range of possible prices that might prevail in the market at a given time, and both curves are downward sloping. The main difference between the two is that the market demand curve shows the demand for everyone in the market.

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