

個體經濟學原理 與實習

國立臺灣大學經濟學系
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Demand, Supply, and Equilibrium



Is Facebook free? Is college worth it? How does location affect the rental cost of housing? How much more gasoline would people buy if its price were lower? Would a smoker quit the habit for \$100 a month? How would an ethanol subsidy affect ethanol producers? **Microeconomics** Can markets composed of only self-interested people maximize the overall well-being of society? Will free trade cause you to lose your job? How can the Queen of England lower her commute time to Wembley Stadium? What is the optimal size of government? Is there discrimination in the labor market? Can a monopoly ever be good for society? Is there value in putting yourself into someone else's shoes? How many firms are necessary to make a market competitive? Do people exhibit a preference for immediate gratification? Why do new cars lose considerable value the minute they are driven off the lot? How should you bid in an eBay auction? Do people care about fairness?

Acemoglu | Laibson | List

Chapter 4 Demand, Supply, and Equilibrium

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4 Demand, Supply, and Equilibrium

Chapter Outline

- 4.1 Markets(competitive market, identical good)
- 4.2 How Do Buyers Behave?(Demand)
- 4.3 How Do Sellers Behave?(Supply)
- 4.4 Supply and Demand in Equilibrium
- 4.5 What Would Happen if the Government Tried to Dictate the Price of Gasoline?

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4.1 Markets

A *market* is a group of buyers and sellers of a particular good or service. A market might be a physical place or a group of buyers and sellers spread around the world who never meet



Traders in Pit of Wall Street



Job market fair in China

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4.1 Markets

- The **market price** is the price at which buyers and sellers conduct transactions.
- Decision making is at the terms supply and demand refer to the behavior of people as they interact with one another **in markets**.
- Buyers determine *demand*. Sellers determine *supply*.
- In a **perfectly competitive market**(完全競爭市場) every buyer pays and every seller charges the same market price, no buyer or seller is big enough to influence that market **price(price taker,價格接受者)**, and all sellers sell an identical good or service.

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4.1 Markets Structure (市場結構)

Perfect Competition (完全競爭)

Products are the same, Numerous buyers and sellers so that each has no influence over price Buyers and Sellers are price takers

Ex: 農產品市場、NYSE

Monopoly (獨佔, Ch12)

One seller, and that seller controls price (No competition on the seller's side).

Ex: 台電、台水、Debeer、政府

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4.1 Markets Structure (市場結構)

Oligopoly(寡佔, Ch14)

Few sellers, Not always aggressive competition.
 Focus on the strategic interaction between two or three sellers (game theoretic approach).
 Ex: 中油 vs. 台塑 ; KMT vs. DPP

Monopolistic Competition (獨佔性競爭, Ch14)

Many sellers, Slightly differentiated products.
 Each seller may set price for its own product.
 Ex: 洗髮精, 公館餐館

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4.2 How Do Buyers Behave?

Quantity Demanded

The amount of a good that buyers are willing and able to purchase at a given price. (Notice: willing and able (林老師想要開BMW, 不列入需求量 –can not afford it))

Demand Schedule

A table that reports the quantity demanded at different prices, holding all else equal.

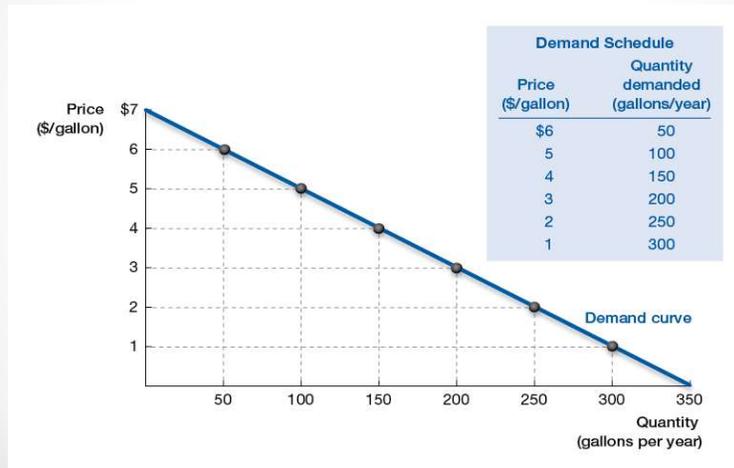
(i.e. 經濟學家問消費者：如果蘋果一個1元，妳願意買幾個？那一顆兩元呢？三？四？五....一路問下去，一直到消費者回答零個為止。)

Demand Curve

Plots the quantity demanded at different prices.

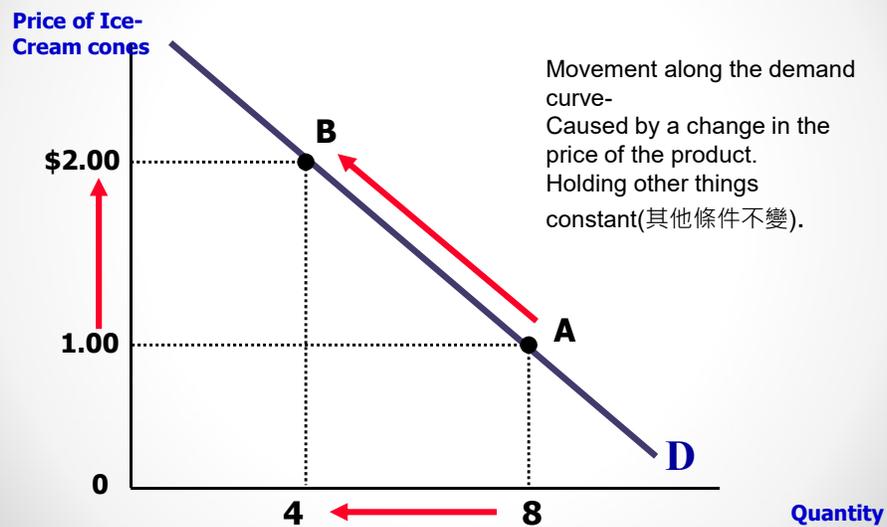
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Exhibit 4.1 Chloe's Demand Schedule and Demand Curve for Gasoline



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Changes in Quantity Demanded



4.2 How Do Buyers Behave?

- Demand curve can also be used to calculate how much one is willing and able to pay for an additional gallon of gas. (just reverse the thought experiment used to plot demand curve: how much are u willing to pay for this unit of good, condition on the amount you already have)
- The highest price that a buyer is willing and able to pay for an additional unit of a good is the **willingness to pay for that particular unit.**
- Ex: \$6 is the WTP for the 50th gallon of gas

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4.2 How Do Buyers Behave?

- The *law of demand* states that, other things being equal, the quantity demanded of a good falls when the price of the good rises.
- Why? Diminishing marginal benefit: as u consume more of a good, your marginal willingness to pay for an additional unit decline. (think about when you go home for summer vacation, the first several days u love ur parents so much.....XDD)
- 法則大致上是如此，但偶有例外-價格上漲，需求量反而上升：
 - (1) Conspicuous goods (炫耀性商品或消費)
Veblen: the Theory of the Leisure Class (有閒階級論)
He left U of Chicago Econ Dept because his eccentric life style
 - (2) Giffen's good (季芬財:蕃薯或馬鈴薯)

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4.2 How Do Buyers Behave?

From Individual Demand Curves to Aggregated Demand Curves

There are many buyers in the market.....

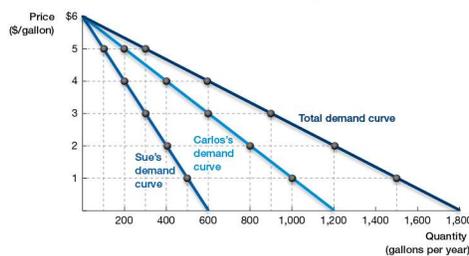
Market Demand Curve

The sum of the individual demand curves of all the potential buyers. The market demand curve plots the relationship between the total quantity demanded and the market price, holding all else equal.

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Exhibit 4.2 Aggregation of Demand Schedules and Demand Curves

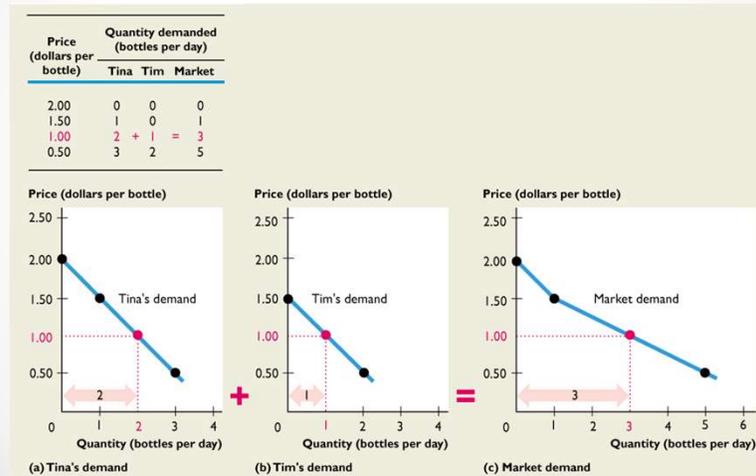
Sue's Demand Schedule		Carlos's Demand Schedule		Total Demand Schedule	
Price (\$/gallon)	Quantity demanded (gallons/year)	Price (\$/gallon)	Quantity demanded (gallons/year)	Price (\$/gallon)	Quantity demanded (gallons/year)
\$5	100	\$5	200	\$5	300
4	200	4	400	4	600
3	300	3	600	3	900
2	400	2	800	2	1,200
1	500	1	1,000	1	1,500



Graphically, individual demand curves are summed horizontally (水平加總) to obtain the market demand curve.

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Example in the text book is not very good because it does not express the possible kinked (拗折) nature of the market demand



4.2 How Do Buyers Behave?

From Individual Demand Curves to Aggregated Demand Curves

Shifts of the Demand Curve

- Occur when one of the following changes:
 1. tastes and preferences
 2. income and wealth
 3. availability and prices of related goods
 4. number and scale of buyers
 5. buyers' expectations about the future
- Caused by any change that alters the quantity demanded at every price.

4.2 How Do Buyers Behave? Shifting the Demand Curve

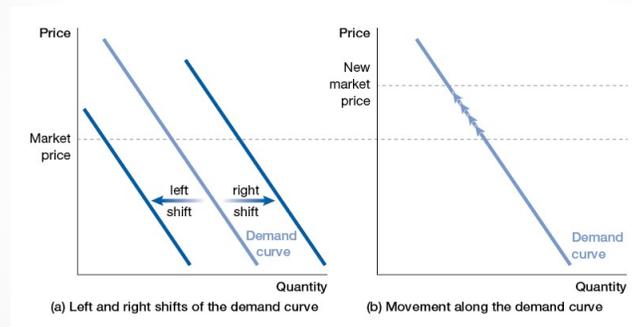


Exhibit 4.4 Shifts of the Demand Curve vs. Movement Along the Demand Curve

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4.2 How Do Buyers Behave? From Individual Demand Curves to Aggregated Demand Curves

Income:

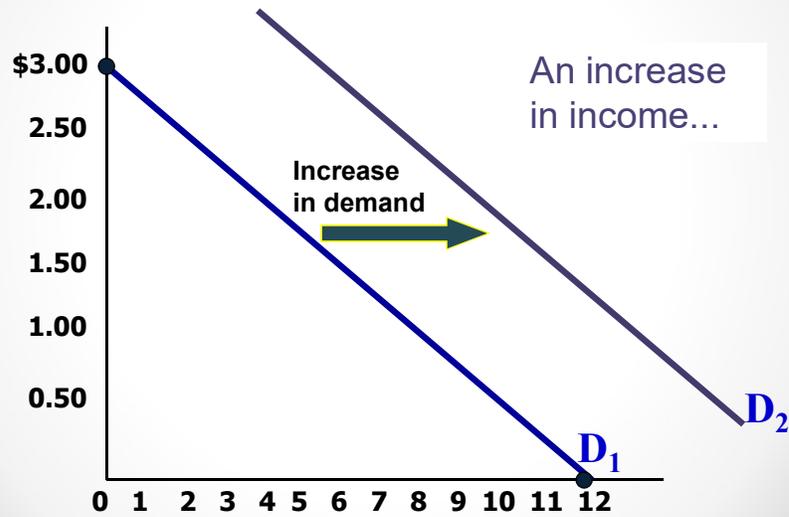
- As income increases the demand for a *normal good* (正常財) will increase. Ex: house, car, leisure...
- As income increases the demand for an *inferior good* (劣等財) will decrease. Ex: Yam in the 1950's Taiwan
- Notice that a good can be both normal or inferior, depend on at which income or consumption range we are talking about...also how we define its scope matters.

Ex: motorcycle-Mini Copper-Camry-Lexus, vs. safe and comfort transportation

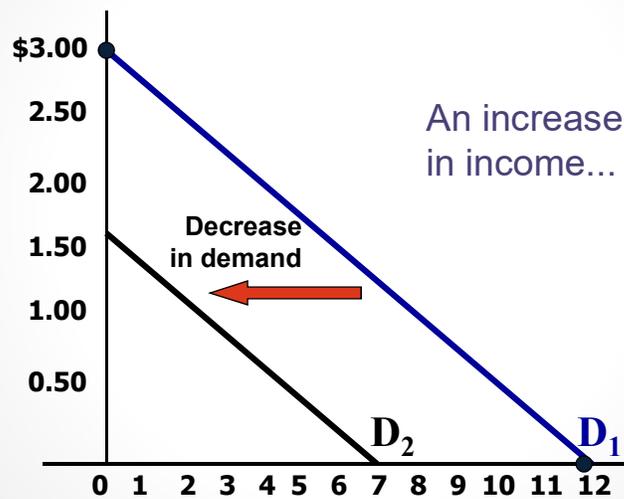
Ex: 醃糠妻(桌?)

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Consumer Income Normal Good



Consumer Income Inferior Good



4.2 How Do Buyers Behave? Shifting the Demand Curve

Prices of Related Goods:

Substitutes(替代品)

When a fall in the price of one good reduces the demand for another good, the two goods are called *substitutes*

Ex: 麥當當炸雞 vs 肯GG炸雞, Coke vs Pepsi, 正版軟體 vs. 下載軟體, marijuana vs. cocaine, DPP vs. KMT, 林明仁經原 vs. 王道一經原 (this is why we have so many classes)

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Substitutes in consumption



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4.2 How Do Buyers Behave? Shifting the Demand Curve

Complements (互補品)

When a fall (increase) in the price of one good increases (decrease) the demand for another good, the two goods are called *complements*.

Complements are usually pairs of goods that are used together.

Ex: coffee and cream, ice cream and fudge, X-box and its video CD, gas and car...

Ex: : a couple years ago, car market of Taiwan dropped 15%, some blame the slow economy, but gasoline price played an important role, too.

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4.2 How Do Buyers Behave? Shifting the Demand Curve: A functional form expression

If Demand function for X is

$$Q_x = 100 - 3P_x - 0.01I + 0.5P_y$$

Then X is inferior goods, X and Y are substitutes

If $I = 4500$, $P_y = 70$, then $Q_x = 90 - 3P_x$

If $I = 5000$, $P_y = 70$, then $Q_x = 85 - 3P_x$

Demand curve shifts to the left.

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4.2 How Do Buyers Behave? Shifting the Demand Curve

- **Taste**
Taste change when people become better informed, or when new goods become available.
- **Number of Buyers**
The greater the number of buyers in a market, the larger is the demand for any good.

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4.2 How Do Buyers Behave? Shifting the Demand Curve

- **Expectations**
Expected future prices influence demand today if inter-temporal substitution (跨期替代) is allowed.

Ex:

- (1) if the price of a computer is expected to fall next month, the demand for computers today decreases.
- (2) Typhoon arrives tomorrow, but the demand for vegetables increase today.

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4.2 How Do Buyers Behave? Shifting the Demand Curve

Table 1 Variables That Influence Buyers

Variable	A Change in This Variable. . .
Price	Represents a movement along the demand curve
Income	Shifts the demand curve
Prices of related goods	Shifts the demand curve
Tastes	Shifts the demand curve
Expectations	Shifts the demand curve
Number of buyers	Shifts the demand curve

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4 What Would Happen If the Government Tried to Dictate the Price of Gasoline

Evidenced-Based Economics Example:

How much more gasoline would people buy if its price were lower?



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4 What Would Happen If the Government Tried to Dictate the Price of Gasoline

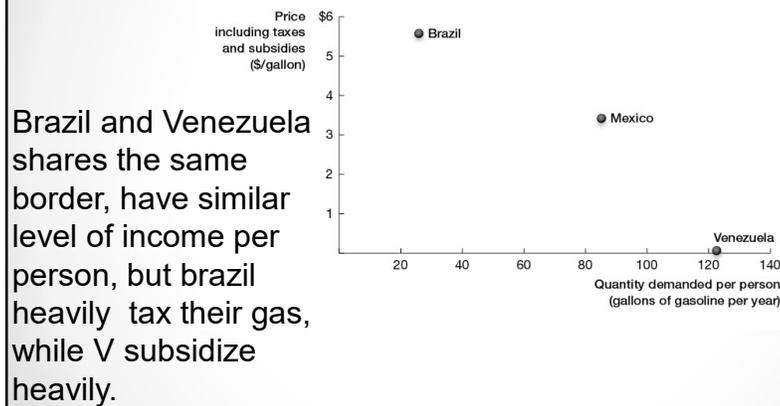


Exhibit 4.5 The Quantity of Gasoline Demanded (per person) and the Price of Gasoline in Brazil, Mexico, and Venezuela
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4.3 How Do Sellers Behave?

Quantity Supplied

The amount of a good that sellers are willing and able to sell at a given price. (willingness to sell)

Supply Schedule

A table that reports the quantity supplied at different prices.

Supply Curve

Plots the quantity supplied at different prices.

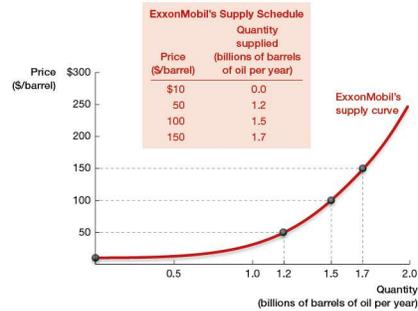
4.3 How Do Sellers Behave?

Law of Supply (供給法則)

The *law of supply* states that, other things equal, the quantity supplied of a good rises when the price of the good rises.

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Exhibit 4.6 ExxonMobil's Supply Schedule for Oil and Supply Curve for Oil



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4.3 How Do Sellers Behave? Shifting Supply Curve

Chevron's Supply Schedule		ExxonMobil's Supply Schedule		Total Supply Schedule	
Price (\$/barrel)	Quantity supplied (billions of barrels of oil per year)	Price (\$/barrel)	Quantity supplied (billions of barrels of oil per year)	Price (\$/barrel)	Quantity supplied (billions of barrels of oil per year)
\$10	0.0	\$10	0.0	\$10	0.0
50	0.8	50	1.2	50	2.0
100	1.0	100	1.5	100	2.5
150	1.1	150	1.7	150	2.8

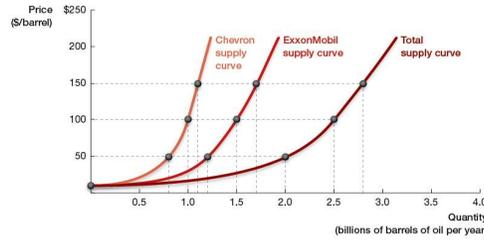


Exhibit 4.7 Aggregation of Supply Schedules and Supply Curves

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4.3 How Do Sellers Behave? Shifting Supply Curve

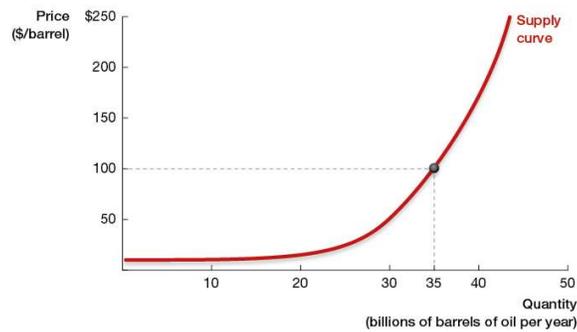
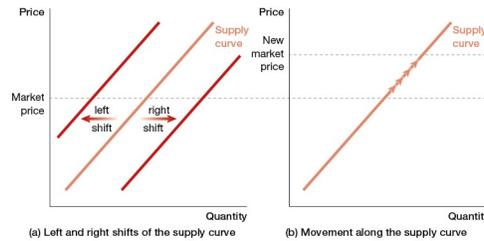


Exhibit 4.8 Market Supply Curve for Oil

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Exhibit 4.9 Shifts of the Supply Curve vs. Movement Along the Supply Curve



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4.3 How Do Sellers Behave?
Shifting Supply Curve**Shifts of the Supply Curve**

Occur when one of the following changes:

- Prices of related goods (相關物品價格)
- Input price (生產要素價格)
- Technology (生產技術)
- Expectations (預期)
- Number of sellers (賣方人數)

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4.3 How Do Sellers Behave?
Shifting Supply Curve

**Prices of related goods (相關物品價格):
Substitute in production (生產上的替代品)**

A good that can be produced in place of another good.
For example, for an auto factory, its production line can be used to produce truck or SUV.. (or you are good at Teaching both Econ and Calculus)

- The supply of a good *increases* if the price of one of its substitutes in production *falls*.
- The supply a good *decreases* if the price of one of its substitutes in production *rises*.

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4.3 How Do Sellers Behave?
Shifting Supply Curve

Complement in production (生產上的互補品)

A good that is produced along with another good. For example, cream is a complement in production of skim milk in a dairy. (Or 豬腦與豬肉)

- The supply of a good *increases* if the price of one of its complements in production *rises*.
- The supply a good *decreases* if the price of one of its complements in production *falls*.

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4.3 How Do Sellers Behave? Shifting Supply Curve

- Technology, Input price, Expectations(預期), Number of sellers(賣方人數)
- Increase of number of sellers, decrease of input price, and the advance of new technology will shift the supply to the right, and vice versa.
- **Ex:** 鐵的價格下降(油管價格下降) or fracking(頁岩油裂解), shift the supply of oil to the right.
- Expect the price will increase next month- decrease supply this year, shift supply to the left. (囤積居奇)

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4.3 How Do Sellers Behave? Shifting Supply Curve

Variable	A Change in This Variable. . .
Price	Represents a movement along the supply curve
Input prices	Shifts the supply curve
Technology	Shifts the supply curve
Expectations	Shifts the supply curve
Number of sellers	Shifts the supply curve

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4.4 Supply and Demand in Equilibrium

Competitive Equilibrium

The point at which the market comes to an agreement about what the price will be (**competitive equilibrium price**) and how much will be exchanged (**competitive equilibrium quantity**) at that price.

quantity supplied=quantity demanded.

除非有外力介入 (i.e. other things not being equal)
不然 P and Q 不會變動

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4.4 Supply and Demand in Equilibrium

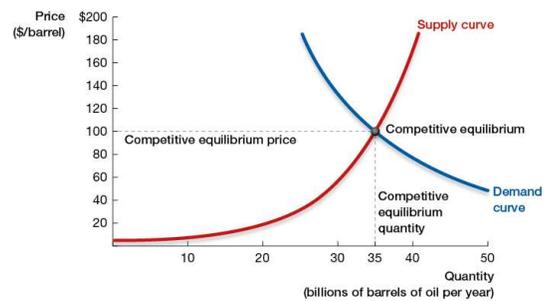


Exhibit 4.10 Demand Curve and Supply Curve for Oil

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4.4 Supply and Demand in Equilibrium

Equilibrium Price

The price that balances quantity supplied and quantity demanded.

Equilibrium Quantity

The quantity supplied and the quantity demanded at the equilibrium price.

On a graph, both can be represented by the point at which the supply and demand curves intersect.

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4.4 Supply and Demand in Equilibrium

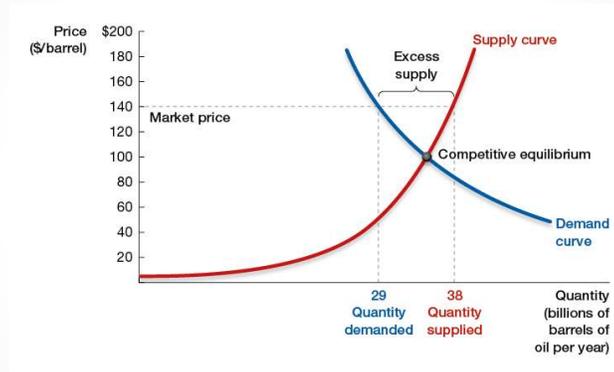


Exhibit 4.11 Excess Supply

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4.4 Supply and Demand in Equilibrium

- Excess supply(or surplus)
- When price $>$ equilibrium price, then quantity supplied $>$ quantity demanded. There is excess supply (超額供給) or a surplus.
- Market will force the price to go down, thereby moving toward equilibrium.

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4.4 Supply and Demand in Equilibrium

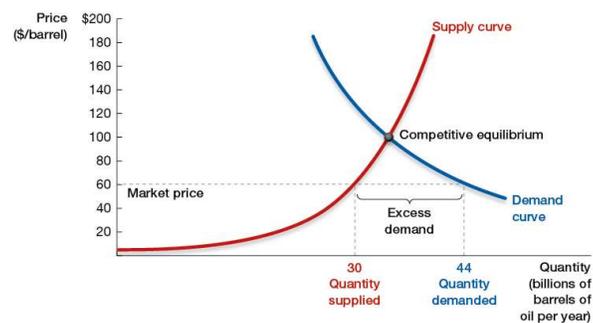


Exhibit 4.12 Excess Demand

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4.4 Supply and Demand in Equilibrium

Shortage

When price < equilibrium price, then quantity demanded > the quantity supplied.

- There is excess demand (超額需求) or a shortage.
- Suppliers will raise the price due to too many buyers chasing too few goods, thereby moving toward equilibrium.

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4.4 Supply and Demand in Equilibrium

Law of supply and demand

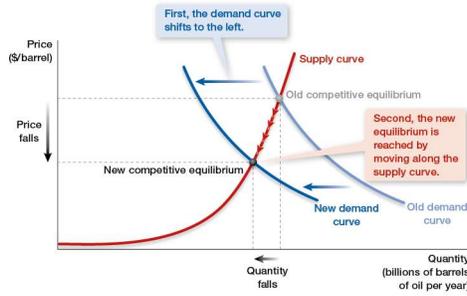
The claim that the price of any good adjusts to bring the quantity supplied and the quantity demanded for that good into balance.

Market force would do it.

Walras auctionner.

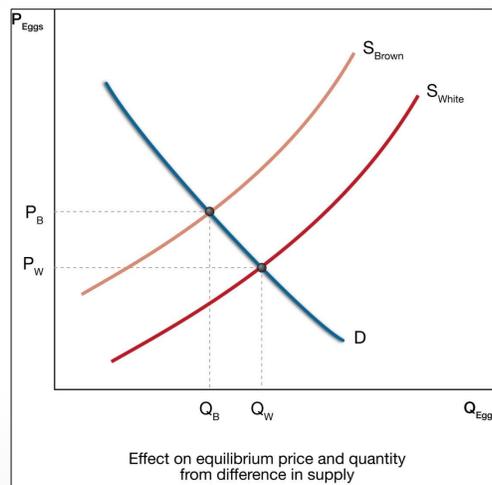
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Analyzing Equilibrium change using Supply and Demand



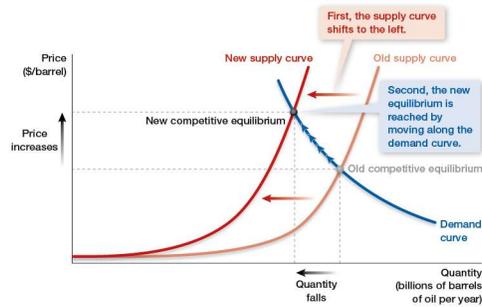
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4.4 Supply and Demand in Equilibrium Curve Shifting in Competitive Equilibrium



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Exhibit 4.13 A Left Shift of the Supply Curve



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4.4 Supply and Demand in Equilibrium Curve Shifting in Competitive Equilibrium



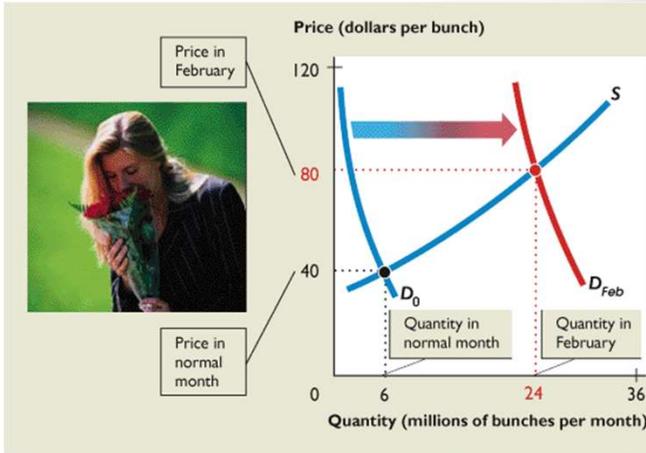
**Why do the price of roses
increase right before
Valentine's Day?**

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A Change in the Demand for Roses

In a normal month, the price of roses is \$40 a bunch and 6 million bunches are sold.

Valentine's Day in February increases the demand for roses and shifts the demand curve rightward.

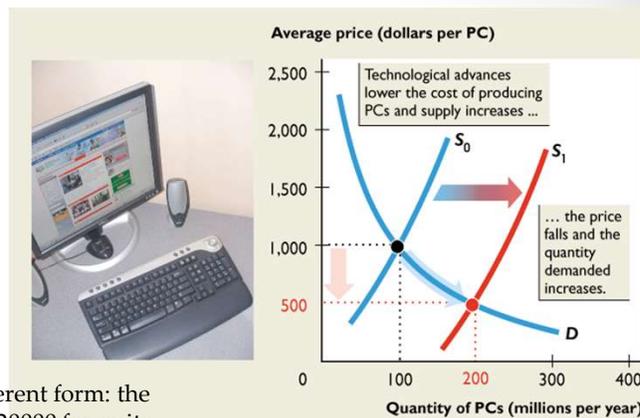


In February, the equilibrium price rises and the equilibrium quantity increases.

A Change in the Supply of PCs

Advances in technology have lowered the cost of computer chips, hard drives, and monitors, and the supply of PCs increased.

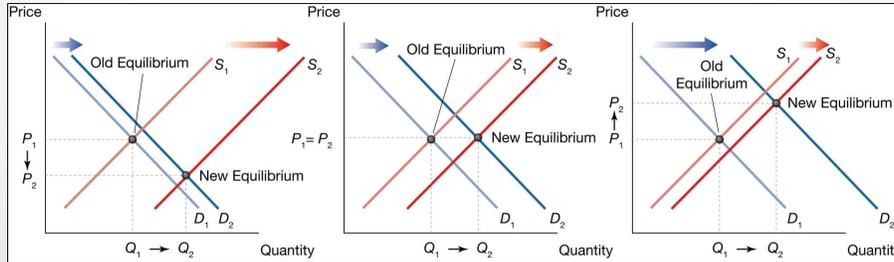
But this shift takes a different form: the price of PC is about NT\$20000 for quite sometime, why?
Quality increase instead



The equilibrium price decreased and the equilibrium quantity increased.

4.4 Supply and Demand in Equilibrium
Curve Shifting in Competitive Equilibrium

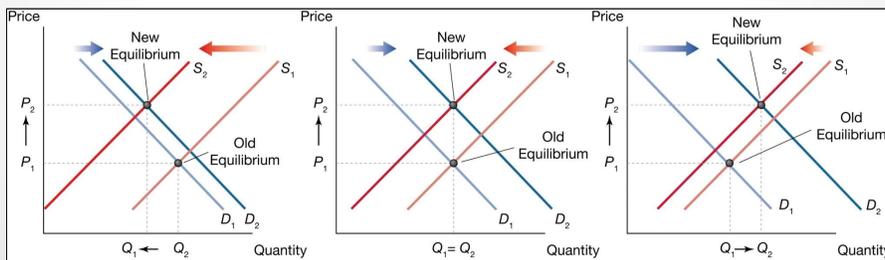
Both the Demand Curve and Supply Curve Shift Right



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4.4 Supply and Demand in Equilibrium
Curve Shifting in Competitive Equilibrium

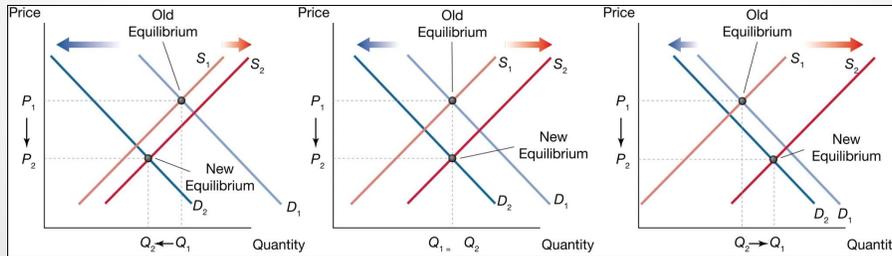
The Demand Curve Shifts Right and the Supply Curve Shifts Left



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4.4 Supply and Demand in Equilibrium
Curve Shifting in Competitive Equilibrium

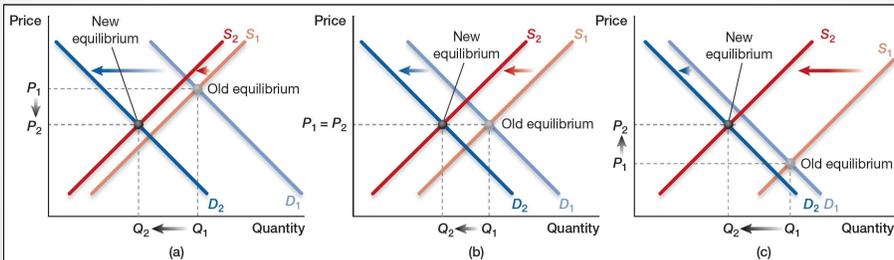
The Demand Curve Shifts Left and the Supply Curve Shifts Right



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4.4 Supply and Demand in Equilibrium
Curve Shifting in Competitive Equilibrium

Both the Demand Curve and Supply Curve Shift Left



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4.4 Supply and Demand in Equilibrium
Curve Shifting in Competitive Equilibrium

Effects of Shifts of Demand and Supply

		Change in Demand	
		Incr. Demand	Decr. Demand
Change in Supply	Incr. Supply	Equil. P ?	Equil. P ↓
		Equil. Q ↑	Equil. Q ?
	Decr. Supply	Equil. P ↑	Equil. P ?
		Equil. Q ?	Equil. Q ↓

A Change in Both:
Sep 2021中國大限電 電價市場

自由財經 財經政策 影音學區 國際財經 證券消息 市場資訊 財經簡報 基金點

中國專家稱大限電與煤價有關 發電廠愈發愈虧本

2021/09/29 08:04



中國的燃煤電廠。(路透社)

【即時新聞/綜合報導】中國多省份份份限電，近日討論最廣的，是在電力過剩的東北卻也限電，業地人稱未得到通知就停電，而且持續數、煤車高，嚴重影響生活，中國專家指出原因與煤炭供應量有關，外標則提出中國之所以限電的三大原因。

《中國新聞周刊》報導，從本月26日開始，東北限電就成了中國社群網站上的熱門議題，當地人說他們連到無計畫、未通知、不定時的停電，國家電網工作人員透露，目前中國多個地區都出現能源供應不平衡的狀況，中國能源總局官員曾稱小平則說，煤價長期高位運行，近期煤價迅速飆升，使得一些電力企業虧損嚴重，並呼籲政府採取措施。

webto Latm.pdf

- 用電需求增加(疫情下少數開工國家，訂單高峰)
- 用電 D 右移
- 煤價大漲，9月16至23日煤價比同期上揚一倍，光是今年就漲了56%
- 從2017年大力壓縮一些煤炭生產產能，直接關停了許多中小煤礦，並對大煤礦實施減產、限產措施。去年這一時期，中國從澳大利亞進口煤炭占比超過30%，總量差不多就是3500萬噸。
- 用電S左移
- 電價P大漲
- 用電量Q看起來是減少

對市場的干預: 限電與電價管制

殺死那個東三省人？中國東北拉開限電的「硬停電風暴」



東西朝鮮的夜晚，終於無縫接軌...

翻譯推文

直接附

21年9月30日 18:03 · Twitter for iPhone
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- 電價是管制的，不能隨市場浮動。
- 現在廠標煤價每噸約1400合為成本的話，燃至少每千瓦時0.448加上財務成本等其，「已經是虧損運當地的燃煤標桿電千瓦時0.463元。成本就吃掉電價！有「雙控政策」是能源消耗總量和強

4.5 What Would Happen If the Government Tried to Dictate the Price of Gasoline?



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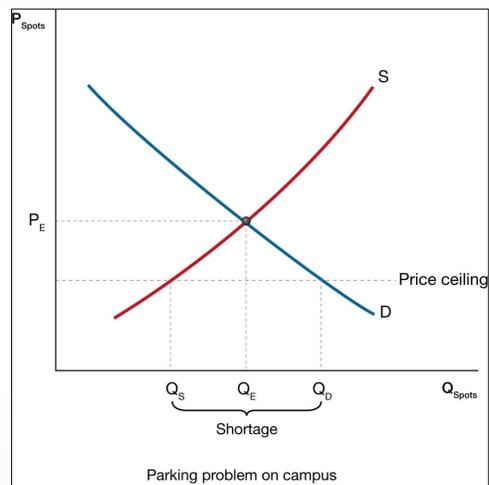
4.5 What Would Happen If the University Campus Tried to Dictate the Price of Parking Space?

Alternative Example:
“One more question: Why is there a parking problem on campus?”



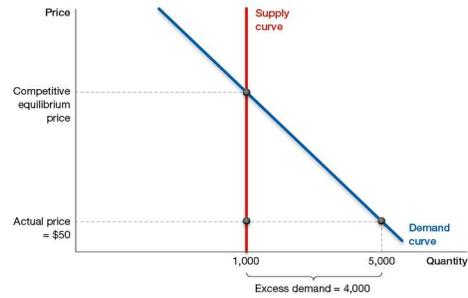
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4.5 What Would Happen If the University Campus Tried to Dictate the Price of Parking Space?



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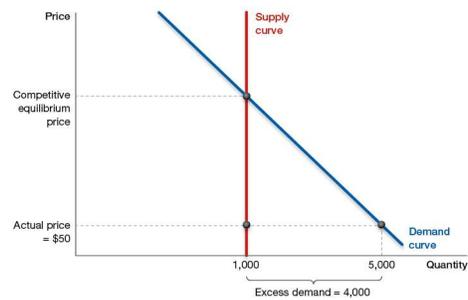
Exhibit 4.16 Excess Demand for Henrico County's Laptops



1000 apple laptop, \$50 each.
 People started to line up at 1:30am,
 by 8am, 5000 were there!(第1000號以後在想啥?)

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Example: Veuzuela again!



1000 apple laptop, \$50 each.
 People started to line up at 1:30am,
 by 8am, 5000 were there!(第1500號以後在想啥?)

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Some reminders

(1) **P**=price paid (代價，不一定是錢) **Q**=stuff you get from paying the price (say friendship, love) : U can do anything!

EX 你們兩成為一對因為你跟他在一起好自在，對許多事情的看法都一樣! 翻譯成經濟學的语言就是:

(2) 均衡分析不一定是實際的交易點

CHAPTER 4 THE MARKET FORCES OF SUPPLY AND DEMAND

- (3) 供需獨立存在
(性交易：有需求才有供給？)
- (4) 買賣不成供需在
- (5) 均衡價格為負

Ex: Heckman's
econometrics class
(2001 Nobel Prize Winner)



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Price Mechanism: Invisible hand revisit

- We mentioned that market is usually a good way to organize economic activity.
- In any economy system, scarce resources have to be allocated among competing uses.
- Three types of economic system: Command (communist), Traditional (法老王), and Market. The first two did not work well because you just can not know everything, especially when the world is advancing so fast!
- Hayek(1945) AER “[The Use of Knowledge in Society](#)”
- Price is a signal that helps economic coordination.

CHAPTER 4 THE MARKET FORCES OF SUPPLY AND DEMAND

- Supply and demand together determine the price of the economy’s million different goods and service, and prices are the signals that guide the allocation of resources. Invisible baton and the economy orchestra?
- Similarly, price determines who produce each good and how much is produced?

- Ex:**
- 18分能不能上大學？
 - P82: 大地震過後 你可以賣一瓶五百元的礦泉水嗎？
 - (Price Gouging:價格詐欺)
 - 記得SARS時的口罩?Covid 19 口罩
 - 南北戰爭的小蜜蜂.....

CHAPTER 4 THE MARKET FORCES OF SUPPLY AND DEMAND