

# 衡量市場效率

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# 今天的主題

- 什麼是市場經濟？
- 為什麼經濟學家常常強調市場機制？市場有什麼了不起？
- 什麼是經濟學家常常在提的效率？
- 經濟模型怎麼設？以房屋市場為例
- 獨占市場與完全競爭市場有什麼不同？
- 哪個市場比較有效率？

# Market Economy

- We call our system a market economy because it's made up of huge numbers of markets like this one.
- Resources are allocated through the decisions of millions of firms and millions of households.
  - Firms decide what to make and who to hire.
  - Individuals decide who to work for and how to spend their income.
  - Everyone interacts in the market place.

# Market economics are decentralized

- After all, market economies are decentralized. There are thousands of buyers and thousands of sellers in many markets.
- Why doesn't this decentralized economy generate complete chaos?
- Is Market a good place to allocate resources?

# Adam smith (1723-1790)

- Adam Smith said that the markets in fact work very well.
- He said that they are guided as if by **an invisible hand** and leads to **desirable allocation of resources**.
- How does the invisible hand work its magic?
- How does it lead market to desirable outcome?

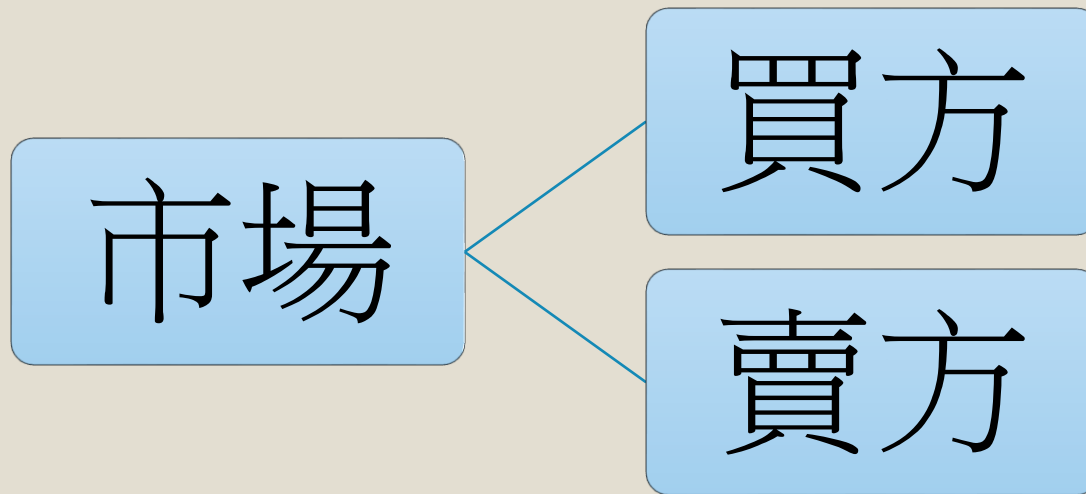
我們先從完全競爭市場開始談，

然後來談怎麼衡量資源分配的結果是不是有效率。

如果沒有市場...如果使用抽籤...資源分配的結果是不是比較沒有效率？

# Market and Market Structure

- 我們需要哪兩個元素形成市場？



# 買方(消費者)

- 買方的主要目的是
  - 獲得商品及服務
  - 以最好的價格

- 對於某一商品

ex: 灰色外套

心中會設定一個最高願意支付的金額。



# 賣方

- 出售商品/服務。
- 你有**最低願意出售**的金額。
- 而且，你會接受任何高於這個最低願售金額的價格。
- 當然，所有賣家都希望價格越高越好。



# 完全競爭市場 Perfectly Competitive Market

完全競爭市場的 3 個條件：

1. 沒有任何一個買家與賣家大到可以影響市場價格
2. 賣家賣的商品是一樣的
3. 可以自由進出

條件一: 沒有任何一個買家與賣家大到可以影響市場價格

There are many consumers and producers, and no one individual can change the market price with his/her behavior.

Example: If a farmer decides to rotate crops and grow corn this year rather than soybeans, this choice does not cause price fluctuations throughout the world.

條件二: Sellers in the market produce **identical goods**

An individual seller can't influence the market price by selling a unique product.

玉米田的玉米都長的一樣，沒有道理你的玉米可以賣得比較貴。

(商品都長的一樣，成本也都一樣嗎？不一定喔)

面對市場價格的波動，有些玉米農夫會建倉庫或使用期貨市場來減少價格變動造成的風險

條件3: There is free entry and exit in the market

Sellers can respond to potential profits in a market by entering, or by leaving markets that are no longer profitable—both of which have implications on market price.

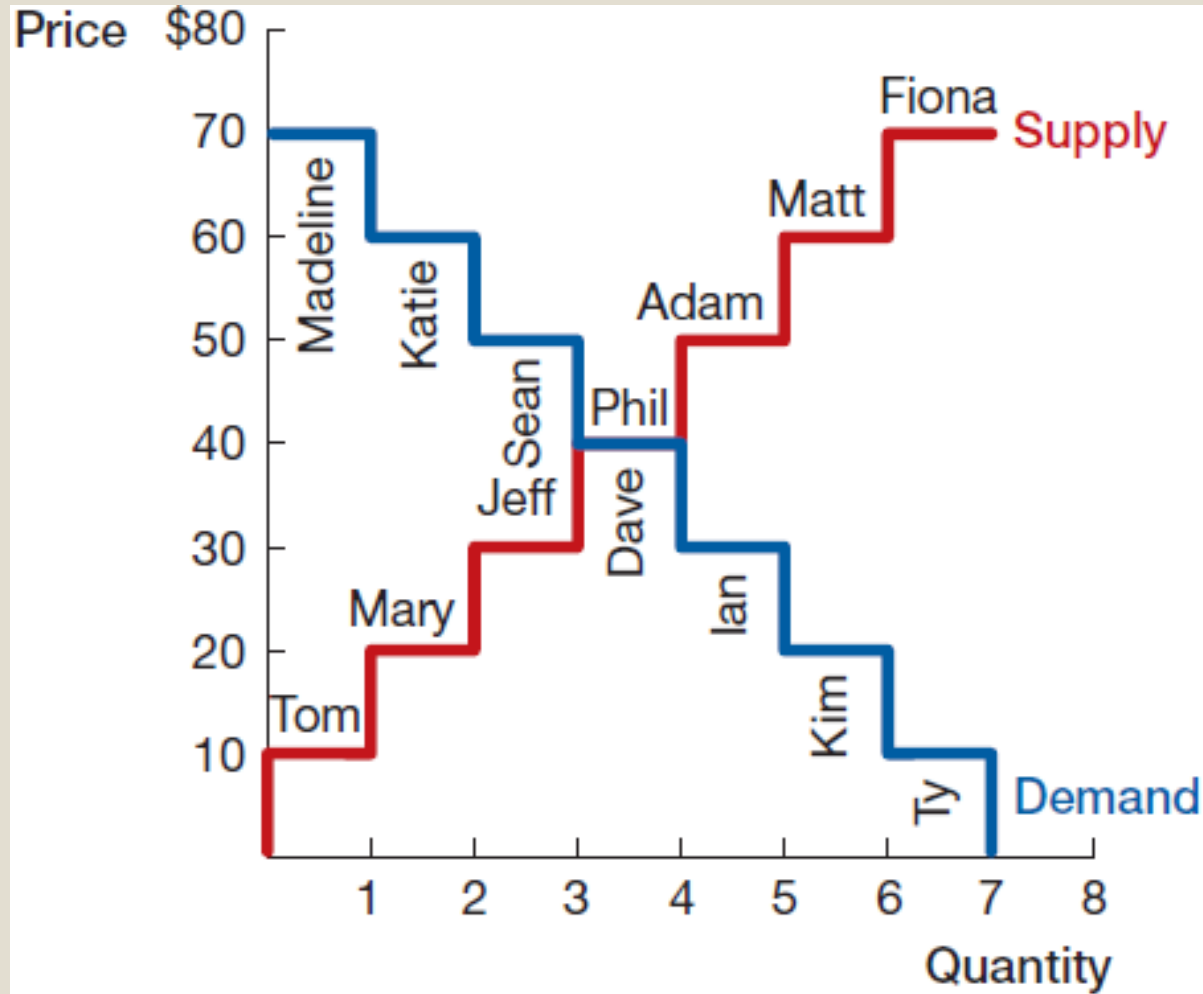
Example: If many firms leave a market, the supply curve will shift (that's one of the determinants) and market price will increase.

# 例子: 二手ipod

**Reservation value** is the price at which a trading partner is indifferent between making the trade and not doing so.

Buyer	Reservation Value (\$)	Seller	Reservation Value (\$)
Madeline	70	Tom	10
Katie	60	Mary	20
Sean	50	Jeff	30
Dave	40	Phil	40
Ian	30	Adam	50
Kim	20	Matt	60
Ty	10	Fiona	70

# 例子：二手ipod的需求與供給



# 市場結構與效率

- 完全競爭，獨佔，寡占...
- 完全競爭市場的均衡結果是不是最有效率？
- 如果沒有市場...如果使用抽籤...資源分配的結果是不是比較沒有效率？

-- Social Surplus

-- Pareto Efficient

## Social Surplus in the competitive equilibrium

**Social surplus** is the sum of consumer surplus (消費者剩餘) and producer surplus (生産者剩餘)

**Consumer surplus:** The difference between the price the consumer would be willing to pay and the market price

**Producer surplus:** The difference between the price the seller would be willing to accept and the market price.



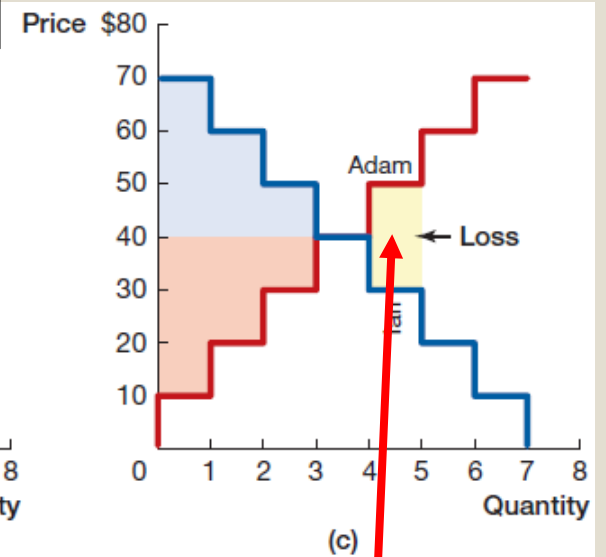
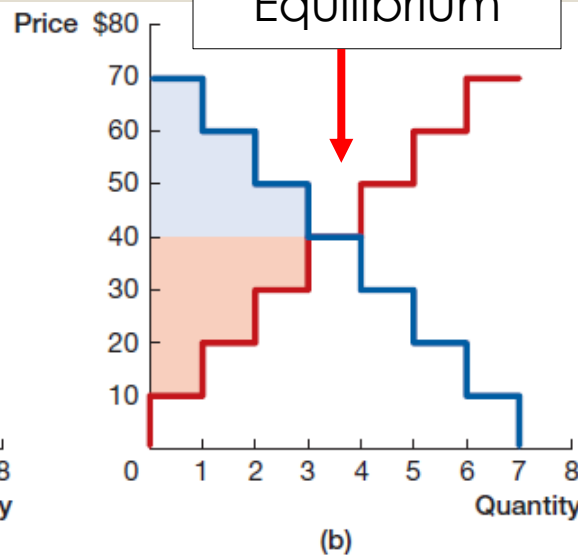
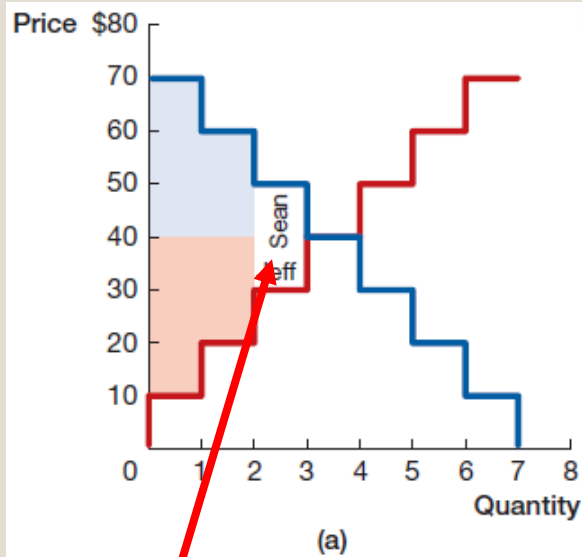
在這個例子裡：

$$CS = (70-40) + (60-40) + (50-40) = 60$$

$$PS = (40-10) + (40-20) + (40-30) = 60$$

$$\text{Social Surplus} = 120$$

Market in  
Equilibrium



Restrict Quantity  
Lose this area

We cannot improve the  
outcome by forcing the price  
or the quantity higher or lower.

Force Adam to sell  
at price \$30 (his  
WTA \$50)  
Lose this area

# Efficiency

- The competitive market equilibrium is **efficient** in the sense that all **mutually advantageous** trades take place: **no more, no less**.
- The competitive market equilibrium **maximizes** social surplus.
- This is the best that society as a whole can do if it is simply interested in maximizing the **total size** of the economic pie.

# Pareto Efficiency

- Vilfredo Pareto; 1848-1923.
- A Pareto outcome allows no “wasted welfare”;
- i.e. the only way one person’s welfare can be improved is to lower another person’s welfare.
- A Pareto improvement is **an improvement to a system when a change in allocation of goods harms no one and benefits at least one person.**
- 沒有辦法再把資源重新配置達成 Pareto improvement : Pareto Efficient

# 從真實世界到經濟模型

- What causes what in economic systems?
- At what level of detail shall we model an economic phenomenon?
- Which variables are determined outside the model (外生給定) and which are to be determined by the model (內生)?

# Example: 天龍國內的小套房租屋市場

- 建一個模型討論小套房的房租
- Assumptions:
  - apartments are close or distant  
(想像天龍國被山包圍, 住在山的另一邊相對遙遠)
  - 所有小套房長的都一樣
  - 遠距離的小套房的房租是固定 已知的 (外生給定)
  - 有許多房東也有許多想租房的房客

# Modeling the Apartment Market

## ➤ Questions:

- Who will rent close apartments?
- At what price?
- Will the allocation of apartments be desirable in any sense?

How can we construct an insightful model to answer these questions?

# 分析方法上的假設

- Two basic principles:
  - **Rational Choice (The optimization principle)**: Each person tries to choose the best alternative available to him or her.
  - **Equilibrium**: Market price adjusts until quantity demanded equals quantity supplied.

# Modeling Apartment Demand

- Demand:

- 給定價格，市場上的消費者願意買多少單位？

- 每個人的願付價格是多少？



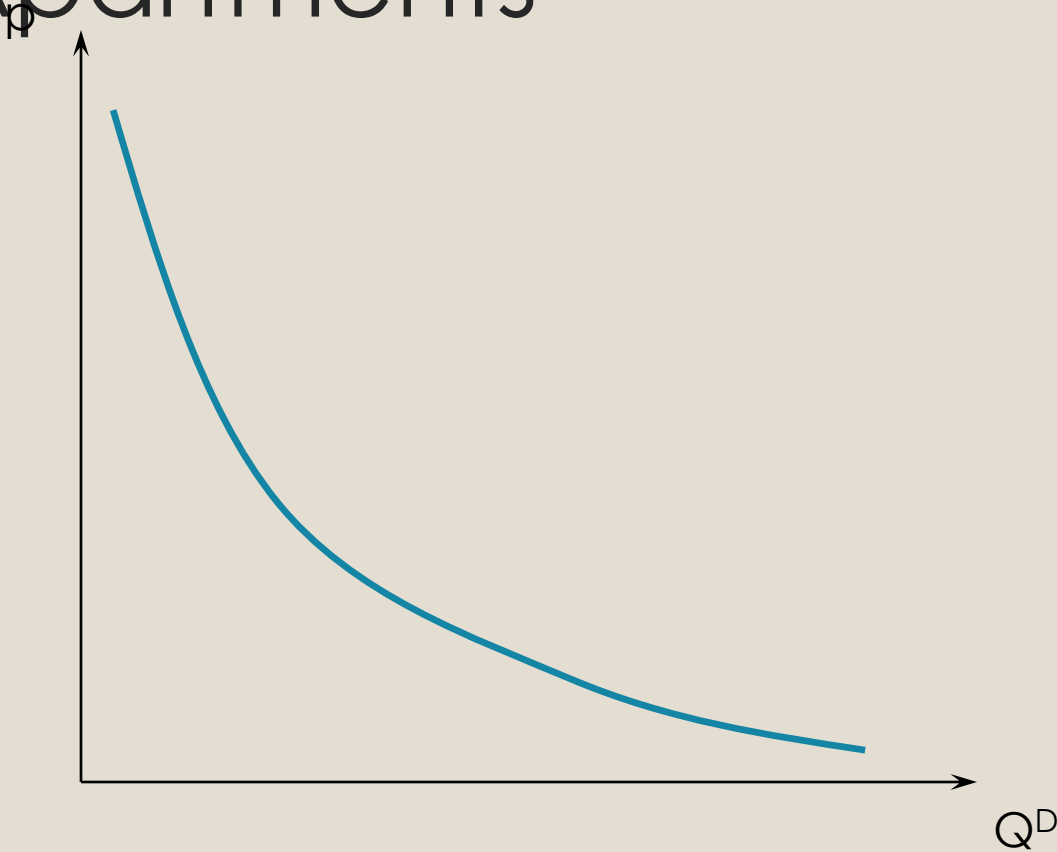
# Modeling Apartment Demand

- The lower is the rental rate  $p$ , the larger is the quantity of close apartments demanded

$$p \downarrow \Rightarrow Q^D \uparrow.$$

- The quantity demanded vs. price graph is the **market demand curve** for close apartments.

# Market Demand Curve for Apartments

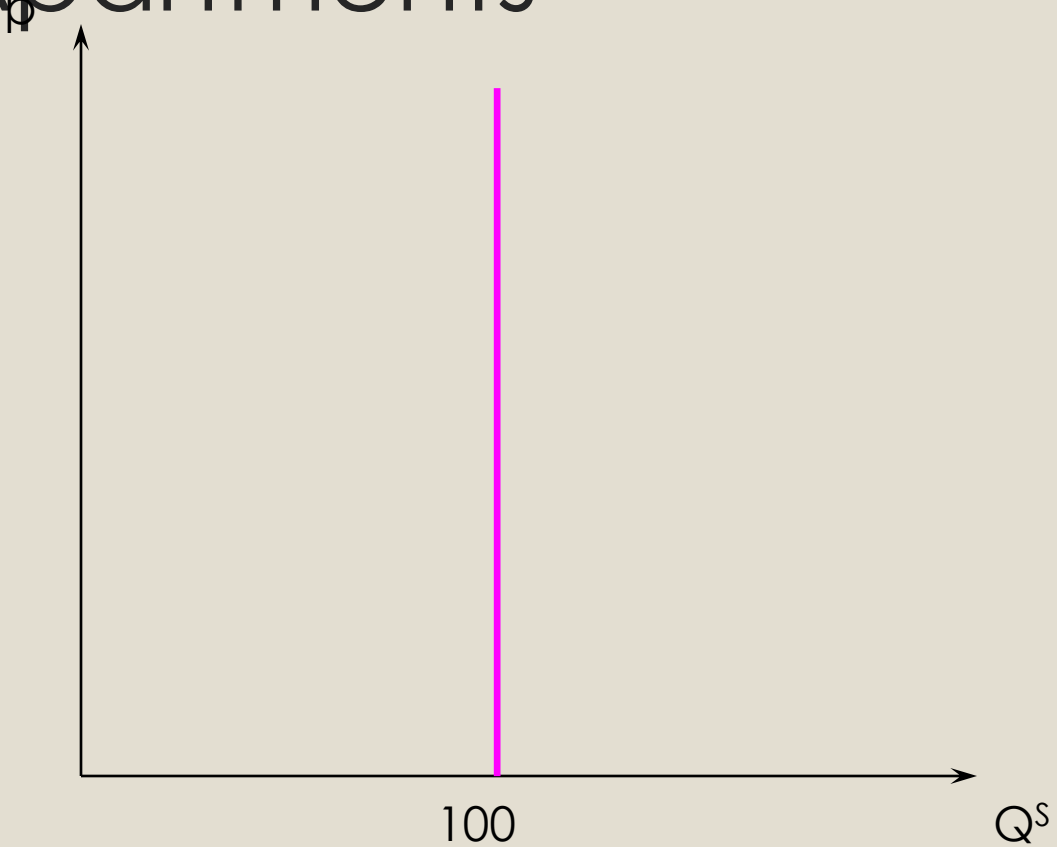


# Modeling Apartment Supply

- Supply:

It takes time to build more close apartments so in this short-run the quantity available is fixed (at say 100).

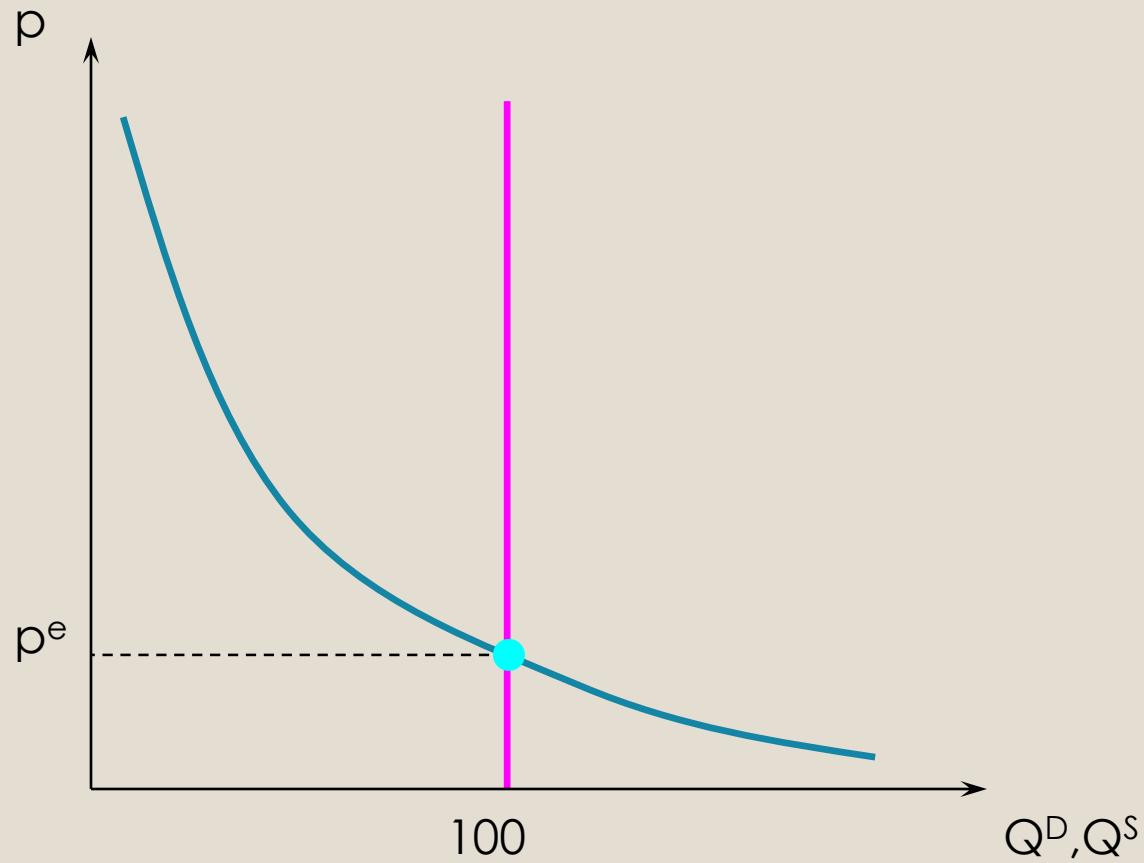
# Market Supply Curve for Apartments



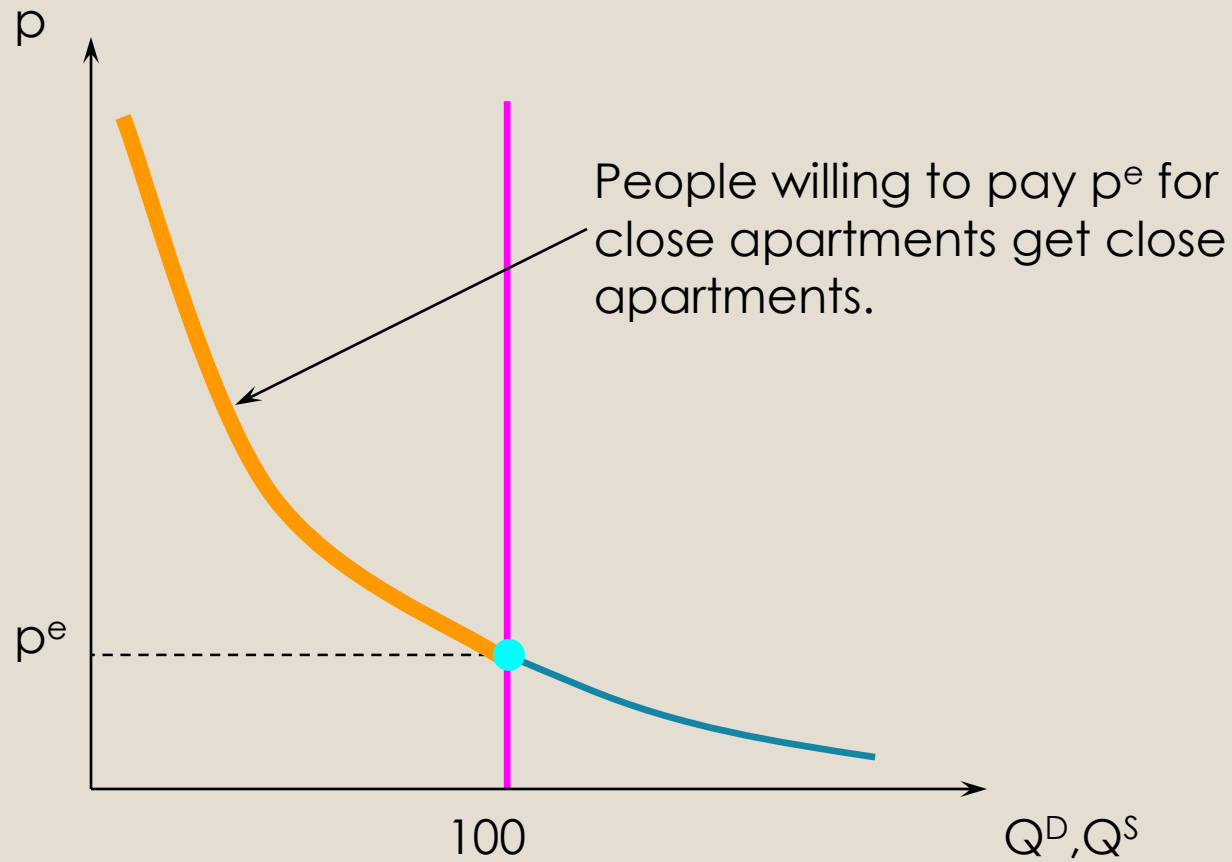
# 完全競爭市場下的均衡

- “low” rental price  $\Rightarrow$  quantity demanded of close apartments exceeds quantity available  $\Rightarrow$  price will rise.
- “high” rental price  $\Rightarrow$  quantity demanded less than quantity available  $\Rightarrow$  price will fall.
- Quantity demanded = quantity available  $\Rightarrow$  price will neither rise nor fall  
so the market is at a **competitive equilibrium**.

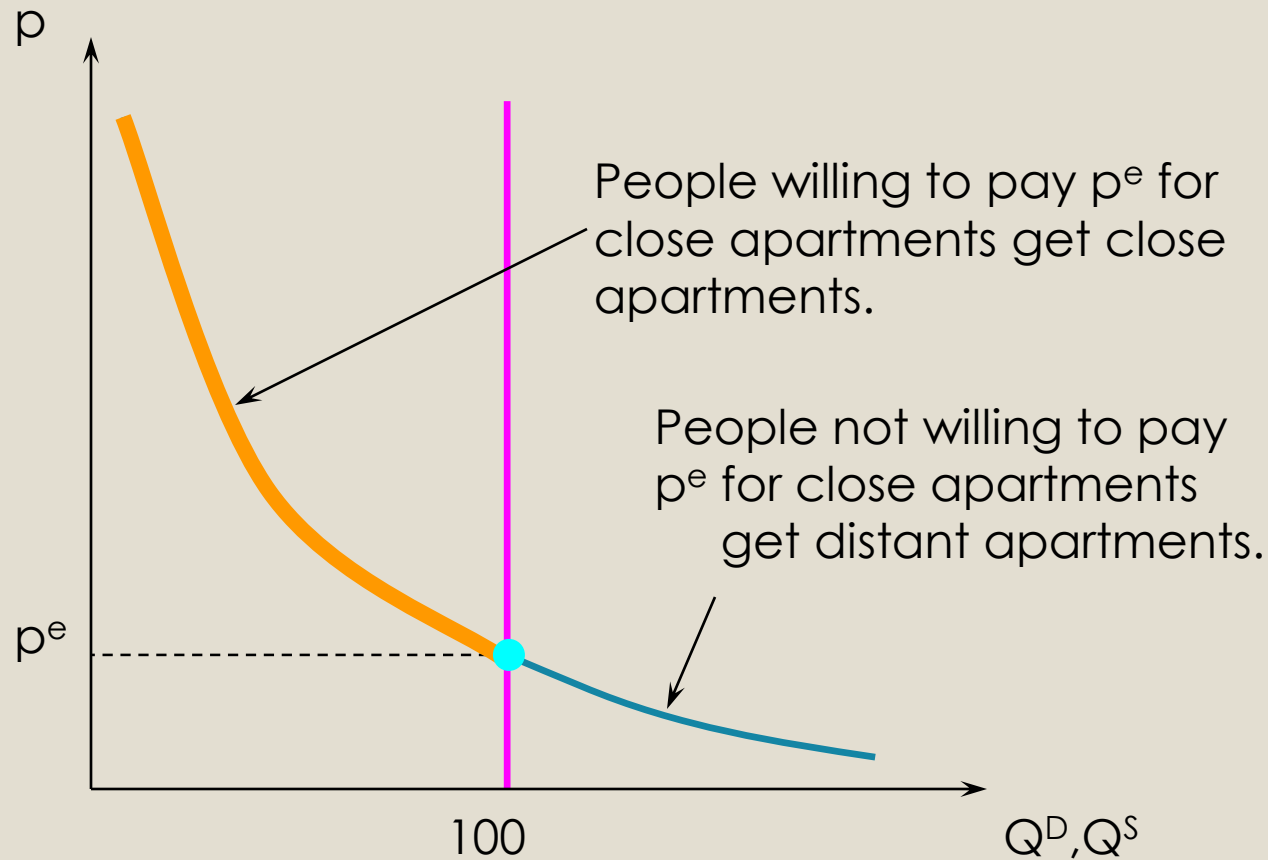
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# 完全競爭市場下的均衡

- Q: Who rents the close apartments?
- A: Those most willing to pay.
- Q: Who rents the distant apartments?
- A: Those least willing to pay.

So the competitive market allocation is allocated by “willingness-to-pay”.

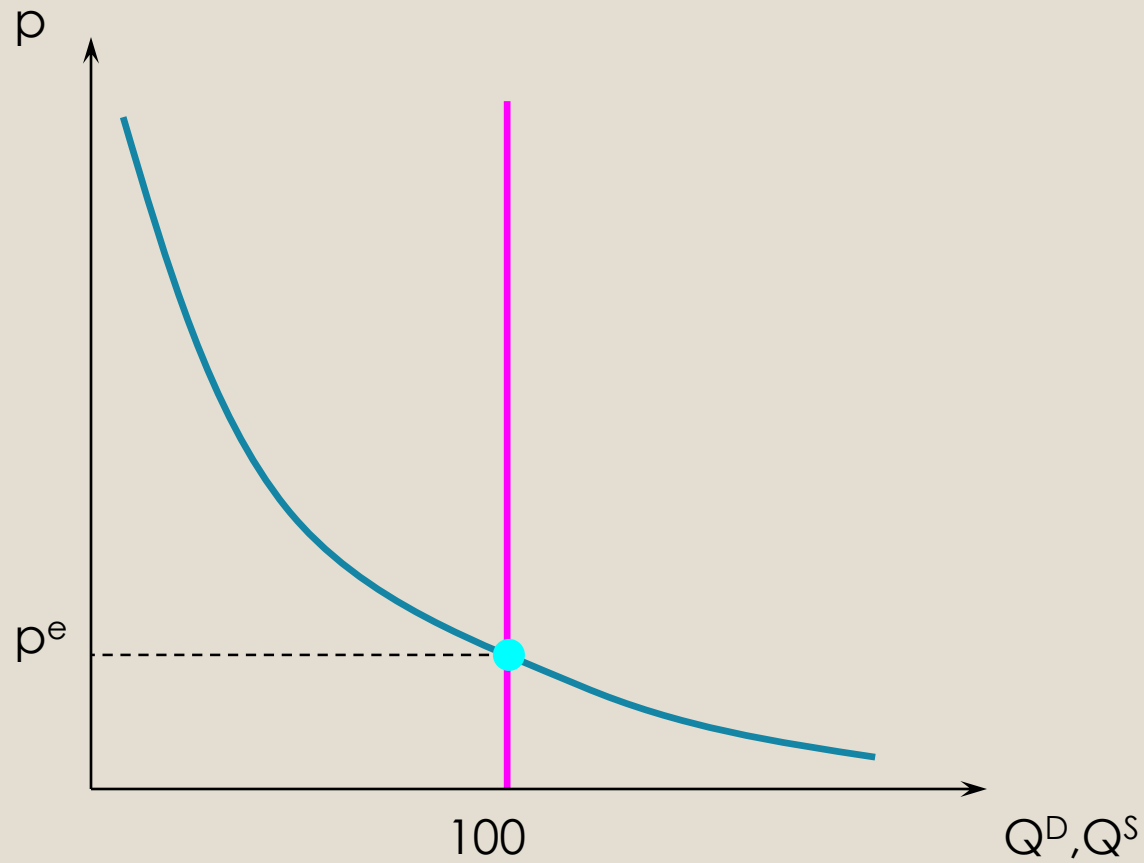
# 這個模型可以幫助我們做政策分析嗎？

- What is exogenous in the model?
  - price of distant apartments
  - quantity of close apartments
  - incomes of potential renters.
- What happens if these exogenous variables change?

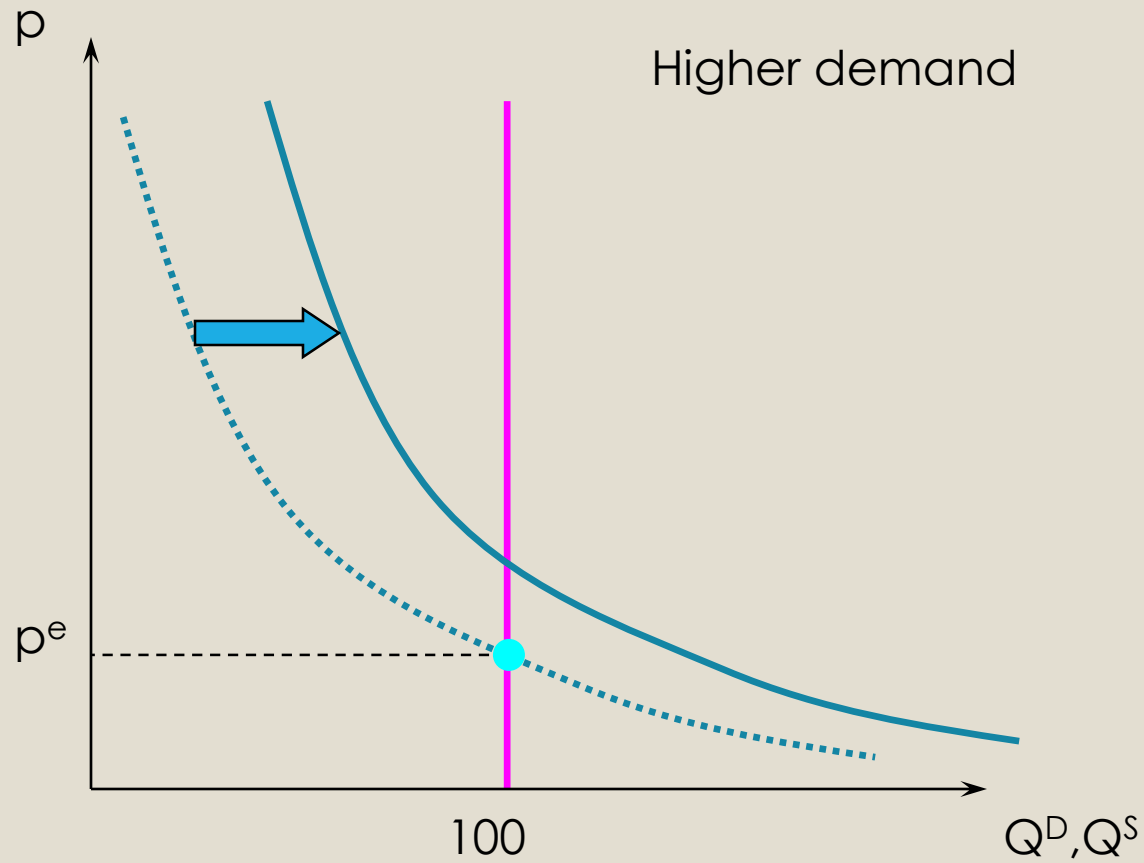
# 當環境/外在變數改變的時候...

- Suppose the price of distant apartment rises.
- Demand for close apartments increases (rightward shift), causing
- a higher price for close apartments.

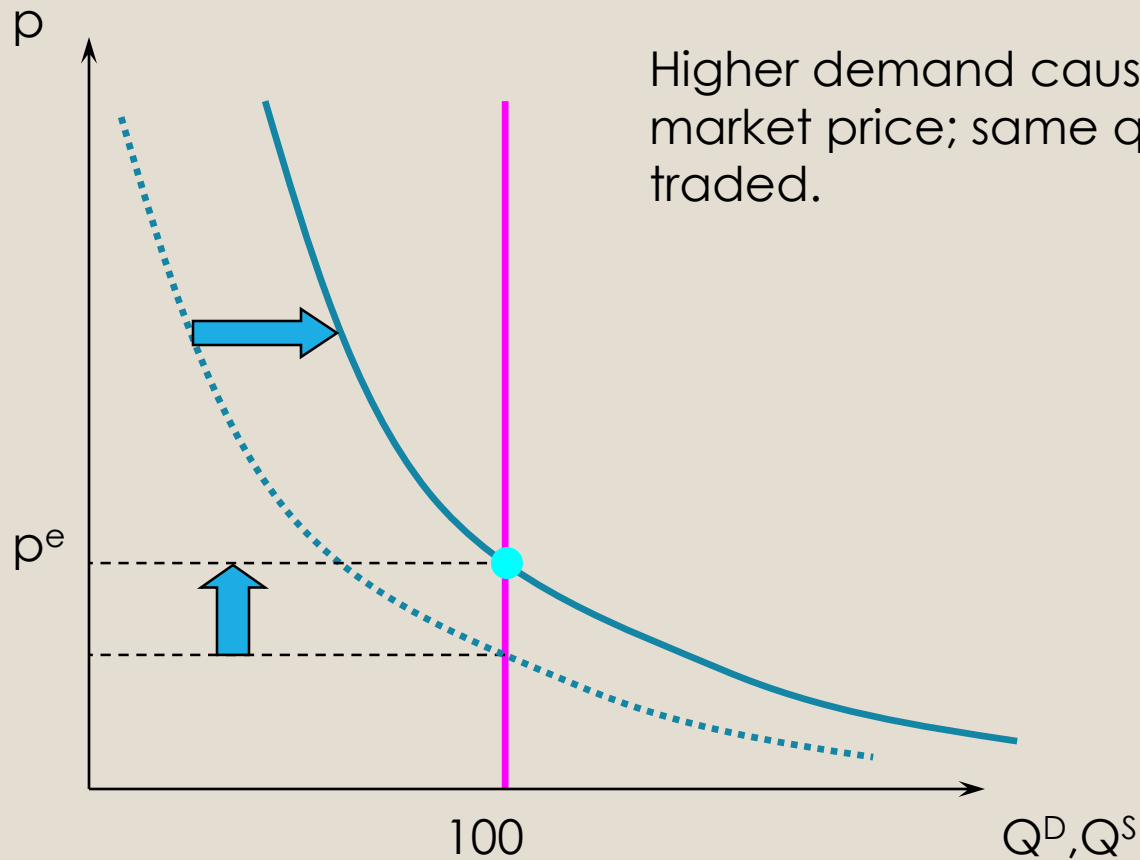
# Market Equilibrium



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# Market Equilibrium

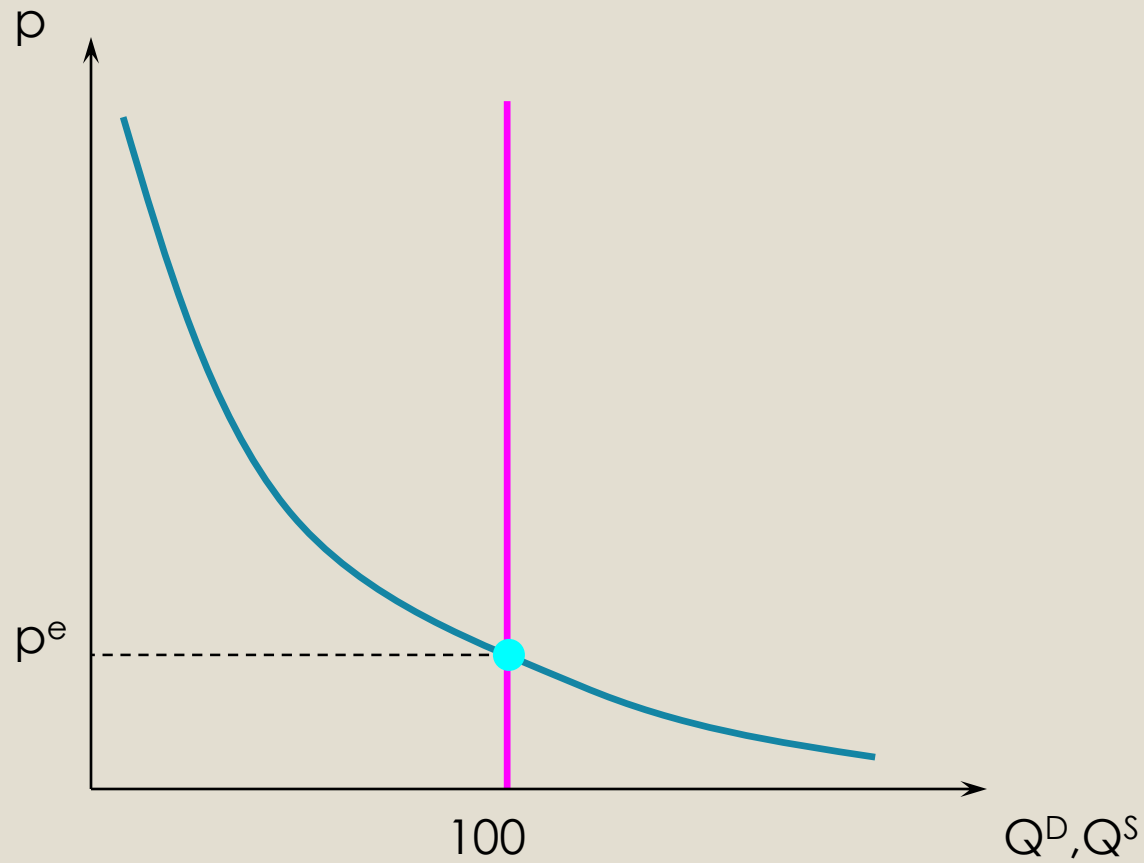


Higher demand causes higher market price; same quantity traded.

# 當供給改變...

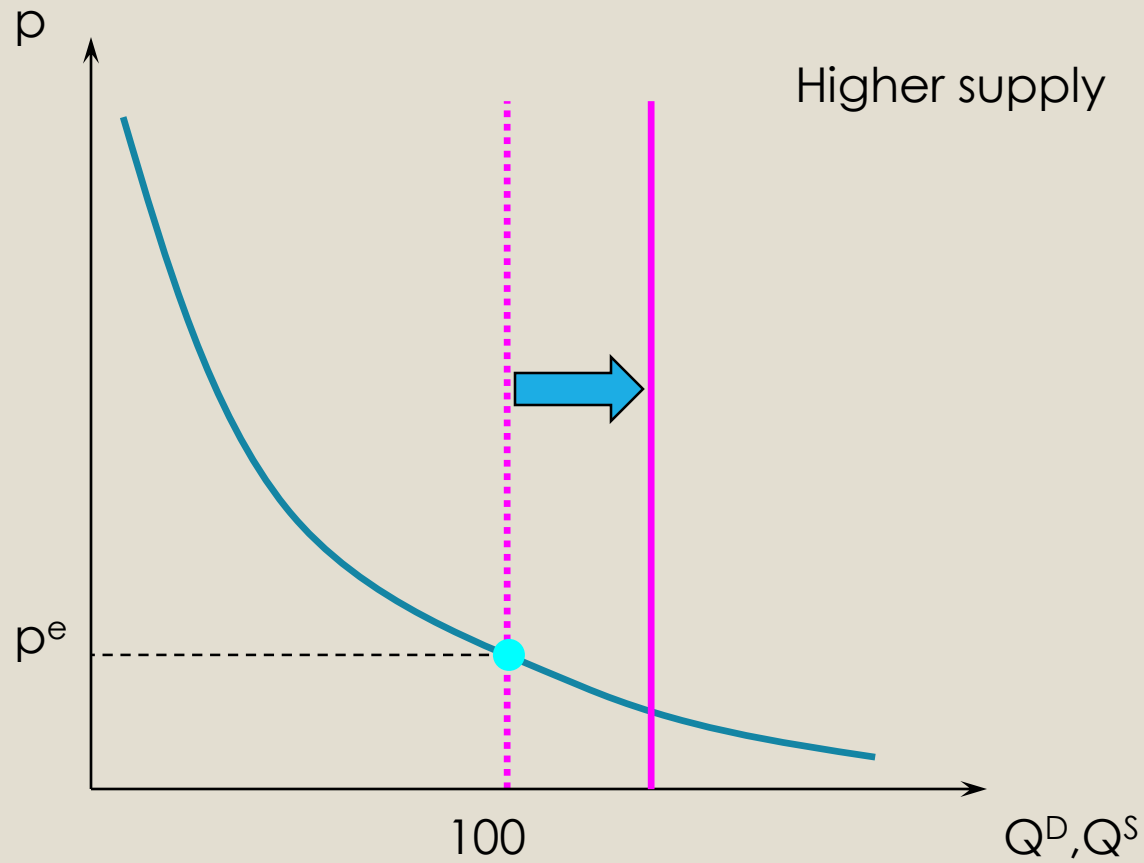
- Suppose there were more close apartments.
- Supply is greater, so
- the price for close apartments falls.

# Market Equilibrium

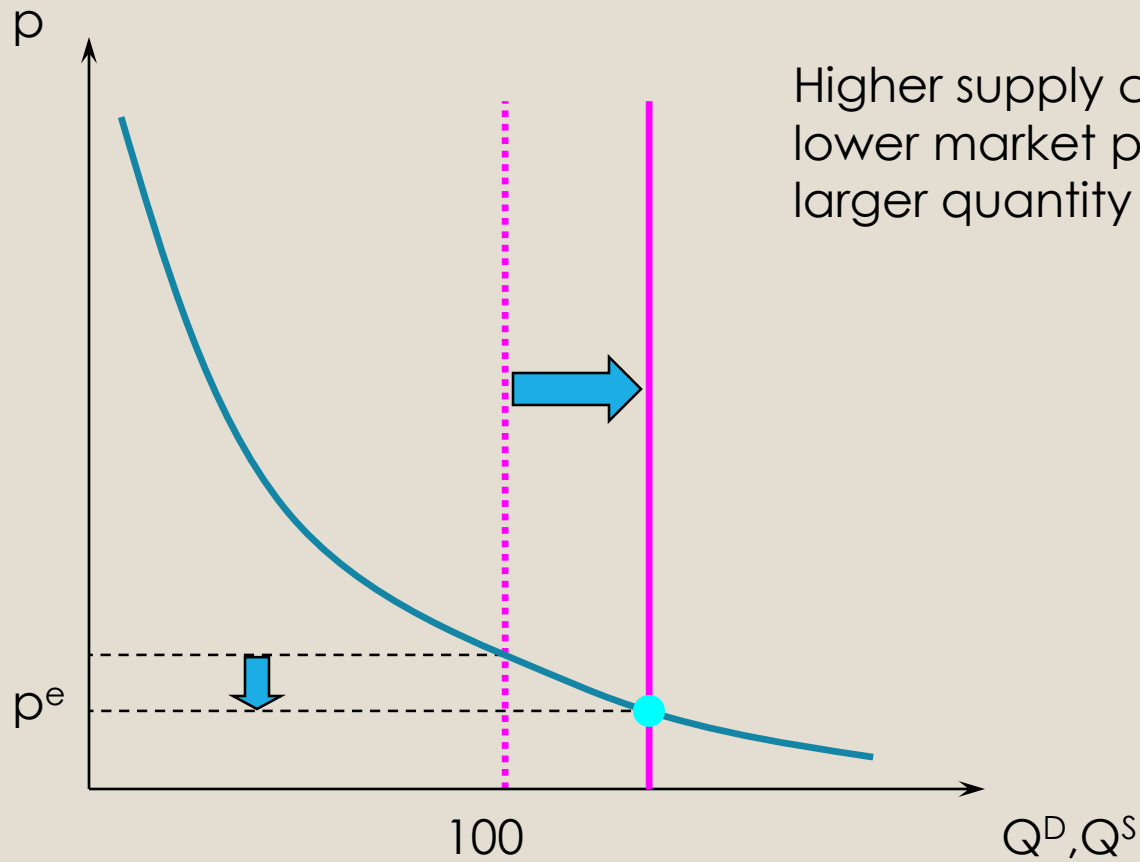




# Market Equilibrium



# Market Equilibrium

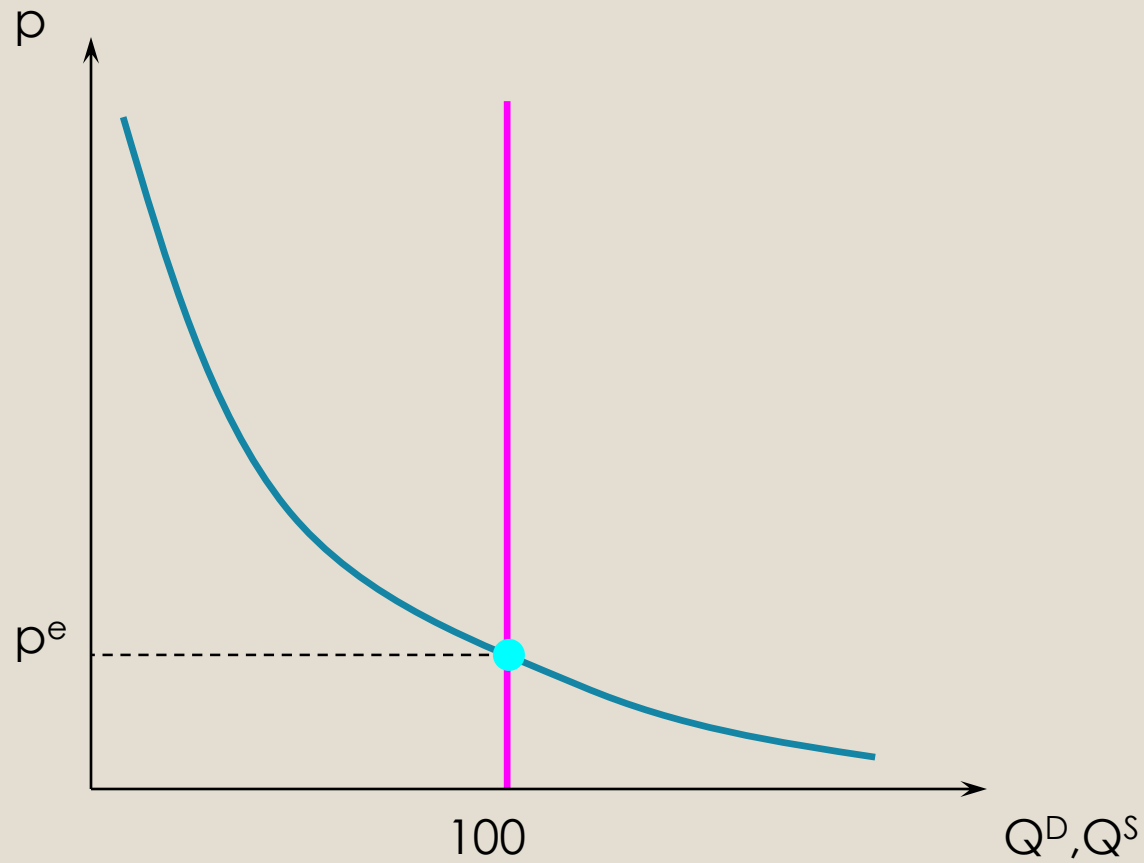


Higher supply causes a lower market price and a larger quantity traded.

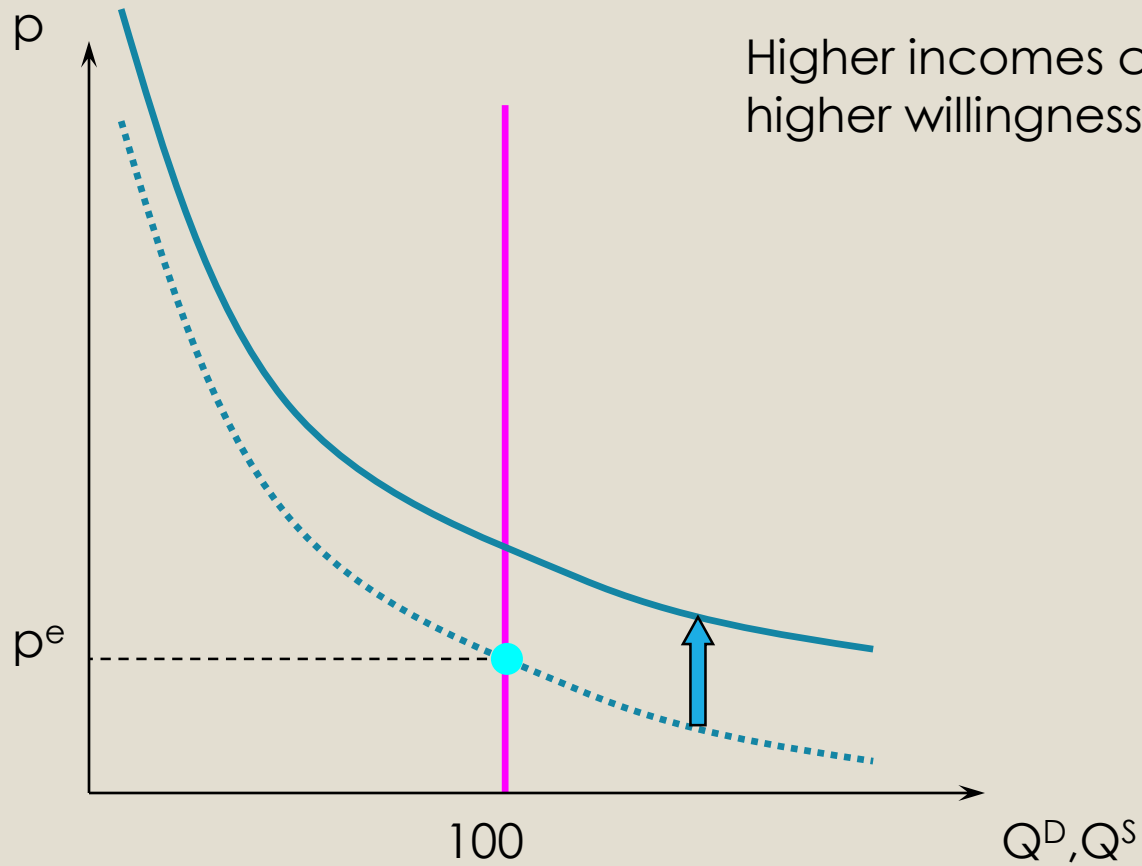
# 當所得增加...

- Suppose potential renters' incomes rise, increasing their willingness-to-pay for close apartments.
- Demand rises (upward shift), causing
- higher price for close apartments.

# Market Equilibrium

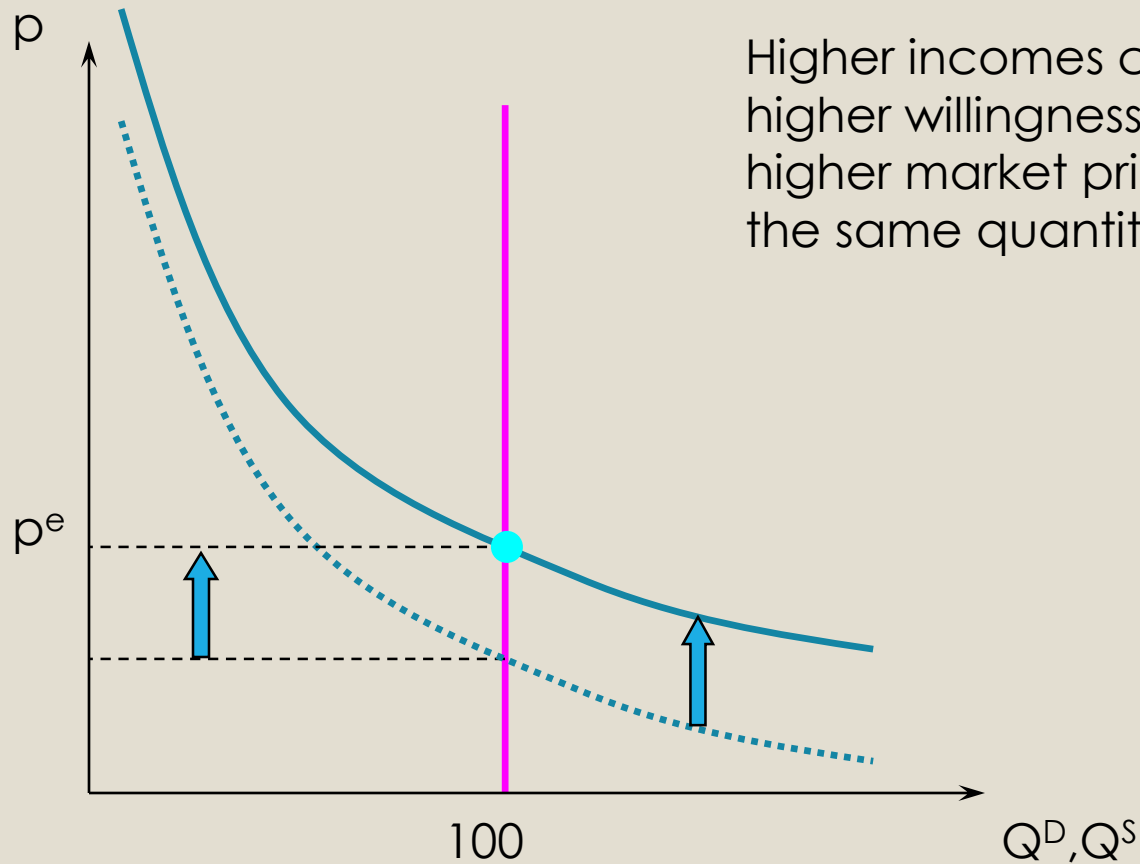


# Market Equilibrium



Higher incomes cause  
higher willingness-to-pay

# Market Equilibrium



Higher incomes cause higher willingness-to-pay, higher market price, and the same quantity traded.

# 課稅政策的分析

- Local government taxes apartment owners.
- What happens to
  - price
  - quantity of close apartments rented?
- Is any of the tax “passed” to renters?

對房東課稅會不會使得房租上升？

# Taxation Policy Analysis

- Market supply curve is almost the same.
- Market demand curve is unaffected.
- So the competitive market equilibrium is unaffected by the tax.
- Price and the quantity of close apartments rented are not changed.
- Landlords pay all of the tax.



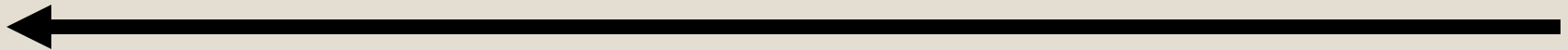
# 市場結構

- Market structure – identifies how a market is made up in terms of:
  - The number of firms in the industry
  - The nature of the product produced
  - The degree of monopoly power each firm has
  - The extent of barriers to entry

# Market Structure

Perfect  
Competition

Pure  
Monopoly



More competitive (fewer imperfections)

# Market Structure

Perfect  
Competition

Pure  
Monopoly

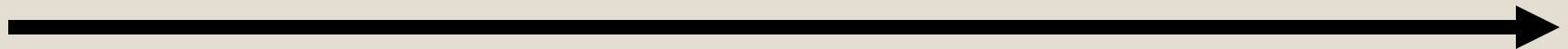
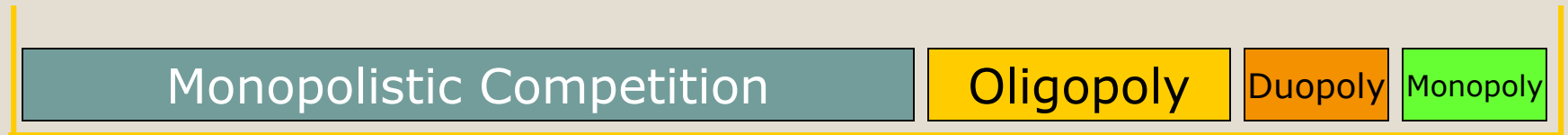


Less competitive (greater degree  
of imperfection)

# Market Structure

Perfect  
Competition

Pure  
Monopoly



The further right on the scale, the greater the degree of monopoly power exercised by the firm.

# 完全獨佔 (Pure Monopoly)

- 獨佔市場中只有一個賣家
- 市場上無相似的商品(替代品)
- 甚麼原因導致獨佔呢？
  - 市場有進入障礙
  - 專利
  - 政府授權許可
  - 獨家的生產要素、技術
  - 大規模經濟

# 自然獨佔 (Natural Monopoly)

- 由於地理環境的自然因素或最適規模的關係而發生的市場獨佔狀況，稱為自然獨佔。
  - 1. 地理環境的自然因素：擁有其他地區沒有的天然資源，而形成獨佔現象。例如智利產的硝石或是南洋產的橡膠。
  - 2. 產業具規模經濟特性：若由一家廠商生產便足以供應整個市場所需，且生產成本較低；但如果有兩家或數家廠商同時供應市場，其成本反而提高。例如電力、瓦斯、水力、鐵路等。

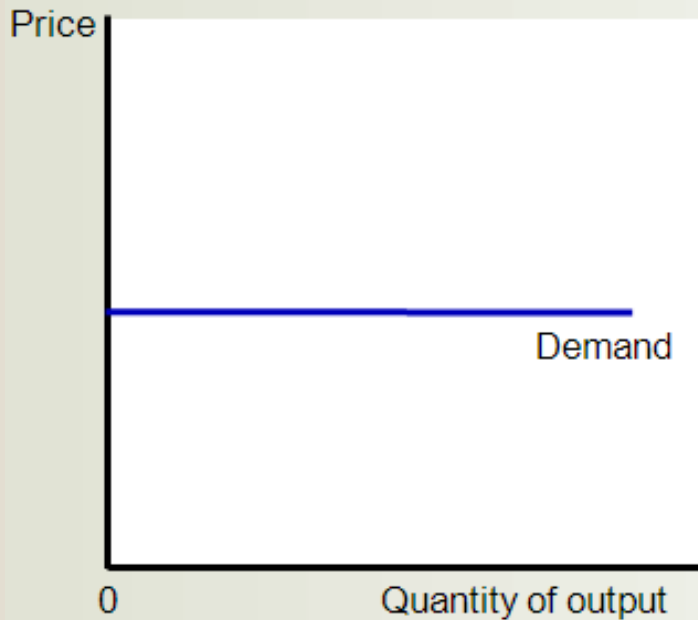
# 獨佔 V.S 完全競爭市場

- 獨佔市場
  - 價格制定者
  - 唯一賣家
  - 市場需求線為負斜率的曲線
- 完全競爭市場
  - 價格接受者
  - 市場上有很多賣家
  - 面臨水平的市場需求曲線

# 獨佔 V.S 完全競爭市場

- 獨佔者所面臨的需求曲線為負斜率的曲線，而非水平的需求曲線。

(a) A Competitive Firm's Demand Curve



(b) A Monopolist's Demand Curve





# How Should a Monopoly Price?

- 獨佔者如何訂價？
- 獨佔者主要目的是極大化銷售利潤：
  - 利潤=銷售收入-生產成本。
- 獨占廠商是價格的制定者而非價格的接受者，所以獨佔者可藉由調整銷售(生產)數量進而改變售價。
- 若獨佔廠商增產
  - 數量效果：產量增加→銷售收入增加
  - 價格效果：產量增加，商品價格下跌→銷售收入減少

- 1. 單一訂價：獨佔者對每個消費者皆收取同一價格。
- 2. 價格歧視(差別訂價)：指販賣同一個商品，但因為消費者不同、或因為消費者購買數量不同而有不同的售價。
- 為何要差別訂價？
  - 銷售策略：唯有當廠商具備決定價格的市場力量才会有價格策略的產生。
  - 增加利潤

# examples

- 電影票價有全票、優待票(學生、軍警、孩童)、早場票

## 票價說明

PRICE

放映廳	全票	優待票	早場票
2D數位電影	NT\$240	NT\$210	NT\$190
3D數位電影	NT\$290	NT\$260	NT\$240

# examples

- 餐廳不同用餐時間價格不同(午餐、晚餐、例假日)

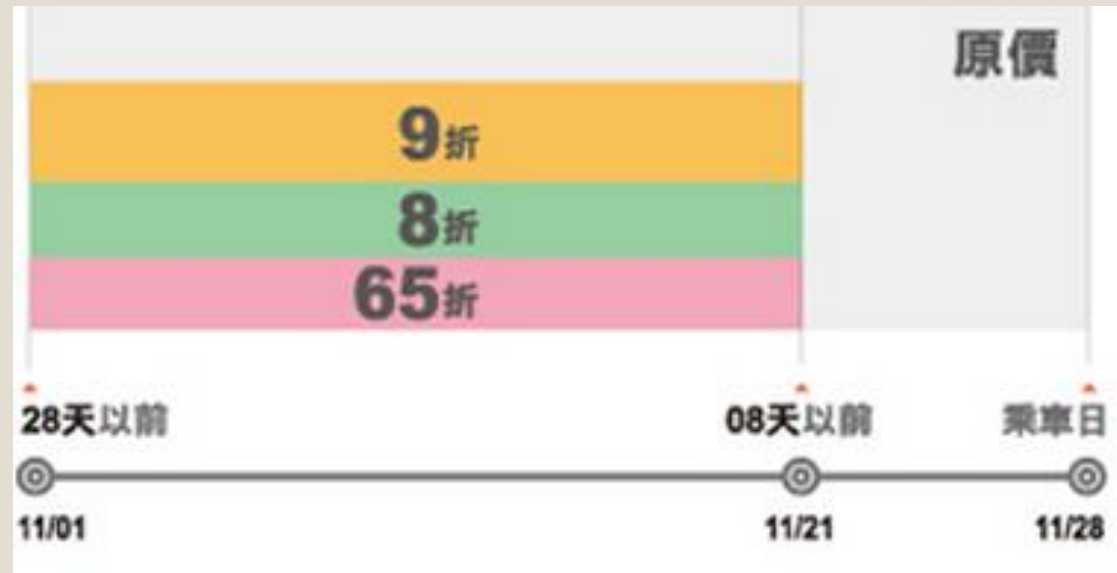
<b>大人</b>	午餐時段 12:00~14:30 (週一~週五)		<b>329</b> 元/人
	晚餐時段 17:00~24:00 (週一~週五)		<b>399</b> 元/人
	週六、週日 國定例假日 11:30~24:00		<b>399</b> 元/人
	<b>小孩</b>		
	週一~週日 不分時段 12:00~24:00	90-110cm	<b>100</b> 元/人
		111-130cm	<b>200</b> 元/人
<b>注意事項</b>			
★小孩90公分以下不收費，130公分以上以大人計算。			
★歡迎使用預約訂位，若逾時10分鐘，視同取消。			
★用餐時間以開單第一人入場的時間為主。			
★本店用餐時間為2小時，最後點餐時間為入場後90分鐘內。			
★以上消費酌收10%服務費。			

<b>歡迎光臨</b>	
週一~週五	
午餐	晚餐
大人 /	<b>318</b> 元
小孩 /	<b>158</b> 元
週六、日、例假日	
大人 /	<b>348</b> 元
小孩 /	<b>168</b> 元

# examples

## ◦ 高鐵的早鳥優惠(65折、8折、9折)

- 愈早訂位者，愈有機會訂得65折優惠車票。早鳥65折銷售完畢即改發售早鳥8折，早鳥8折銷售完畢即改發售早鳥9折，早鳥9折銷售完畢即提前截止並改發售原價車票。



# examples

- 報章雜誌上的商品折價券、網路上的優惠券

2014-04-30



GOMAJI

3.7折

團購特價

**\$499**

**馬上購買**

不滿意退費保證

原價 \$1320  
節省 \$821  
26 份已販售  
團購已成功，可繼續購買

1 2 3 4 5

# examples

## ○貴賓卡



### VIP 會員權益通知



#### 原權益

結帳時須出示貴賓卡享9折優惠

#### 權益更動

結帳時未攜帶貴賓卡

1. 貴賓卡會員請提供相關證件經查詢享9折優惠
2. 無相關證件者請提供會員姓名經查詢享95折優惠

# 其他訂價策略

- 成套式定價(bundle pricing)：指兩種以上商品合併在一款產品販售。
  - 以較低的整體價格刺激購買，或促銷消費者本來不太可能購買的商品。(E.g. 速食套餐)
  - 促使消費者購買成套產品，以製造套牢效果。(E.g. Microsoft Office)

紐奧良焗烤雞腿堡+可樂(小)+蜂蜜百斯吉 1-3

優惠價  
**\$99**  
原價\$132

★使用期限 2013/1/16 ~2013/2/20



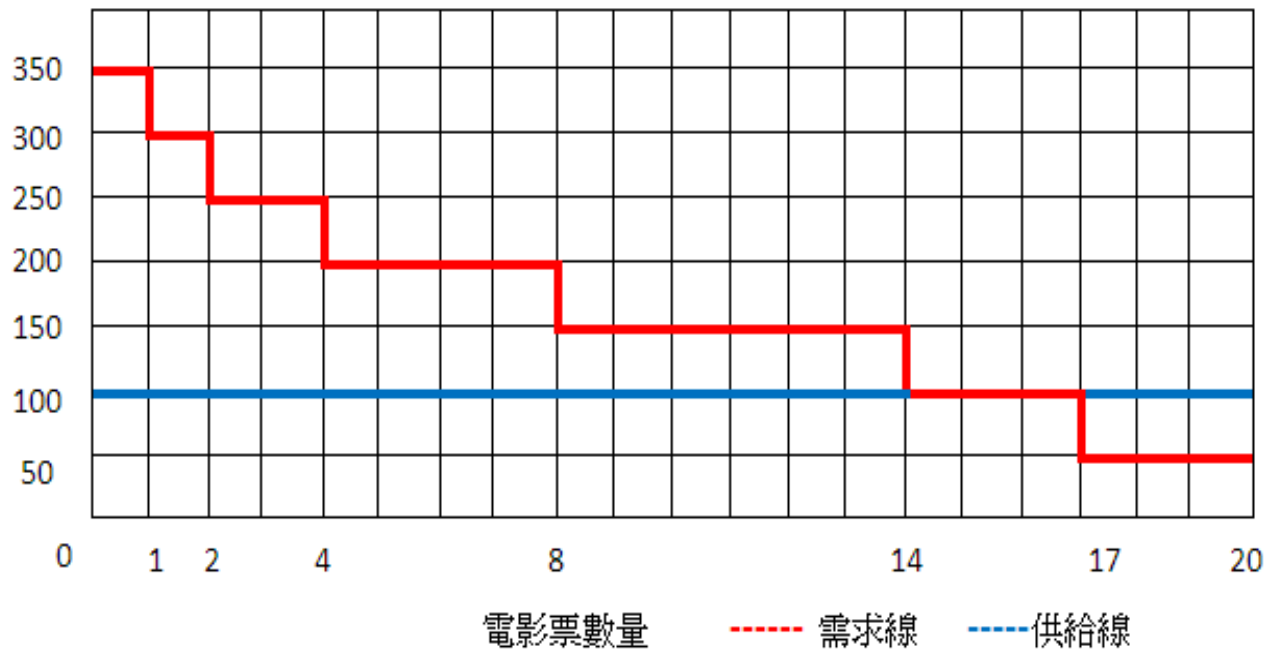
# 獨佔的電影院市場(一)

- 假設電影院有獨佔市場的力量，電影院將會把票價訂在可獲得最大利潤的價格。
- 狀況一：
  - 市場共20個消費者，每個消費者對電影票的最高願付價格：\$350, \$300, \$250, \$200, \$150, \$100, \$50。
  - 電影票的成本為\$100。

# 電影的需求與供給

- 問題：假若電影票只能單一訂價，電影院應將票價訂在...才可獲得最多利潤(收入-成本)？

電影票價格 (元)



# 利潤極大化(單一訂價)

◦ 電影票價訂在\$200，電影院能獲得最大利潤\$800。

價格(P)	成本	數量(Q)	利潤
350	100	1	250
300	100	2	400
250	100	4	600
<b>200</b>	<b>100</b>	<b>8</b>	<b>800</b>
150	100	14	700
100	100	17	0
50	100	20	-1000

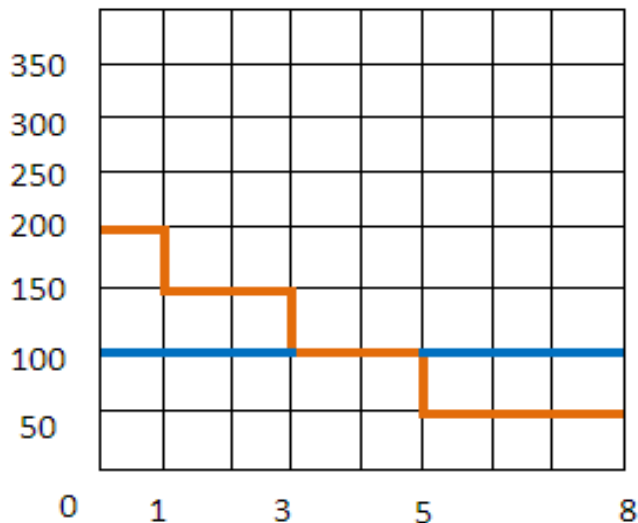
# 獨佔的電影院市場(二)

- 同上一個電影院的例子：電影院有獨佔市場的力量，電影院將會把票價訂在可獲得最大利潤的價格。
- 狀況二：
  - 假設電影院可區別消費者為學生或上班族，並且可以針對不同群消費者訂不同的票價。(學生票、全票)
  - 電影市場的20個消費者其中有8個學生及12個上班族，每個消費者對電影票的最高願付價格：\$350, \$300, \$250, \$200, \$150, \$100, \$50。
  - 電影票的成本為\$100。

# 學生、上班族對電影的需求

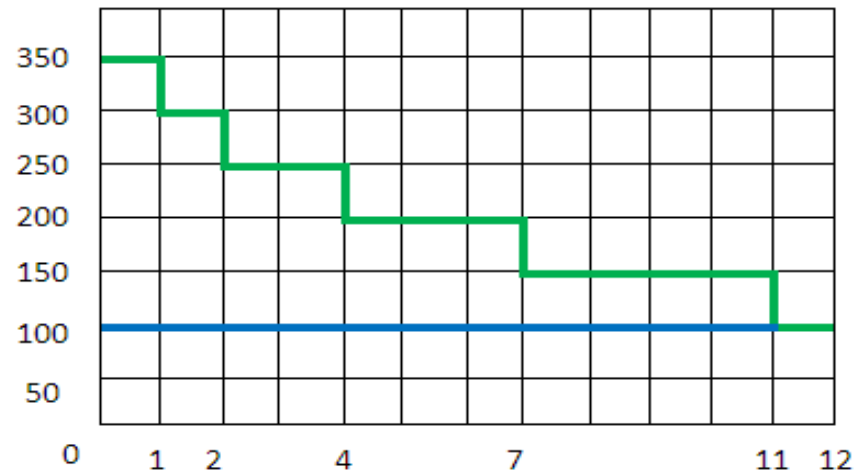
- 問題：電影院若能對兩群消費者分別訂不同的票價，則電影院應將學生票、全票的價格訂在...才可獲得最大利潤？

電影票價格 (元)



電影票數量    --- 學生需求線    --- 供給線

電影票價格 (元)



電影票數量    --- 上班族需求線    --- 供給線

# 利潤極大化(價格歧視)

◦ 學生票訂在\$150、全票訂在\$200，則電影院能獲得最大利潤

$$\$150 + \$700 = \$850$$

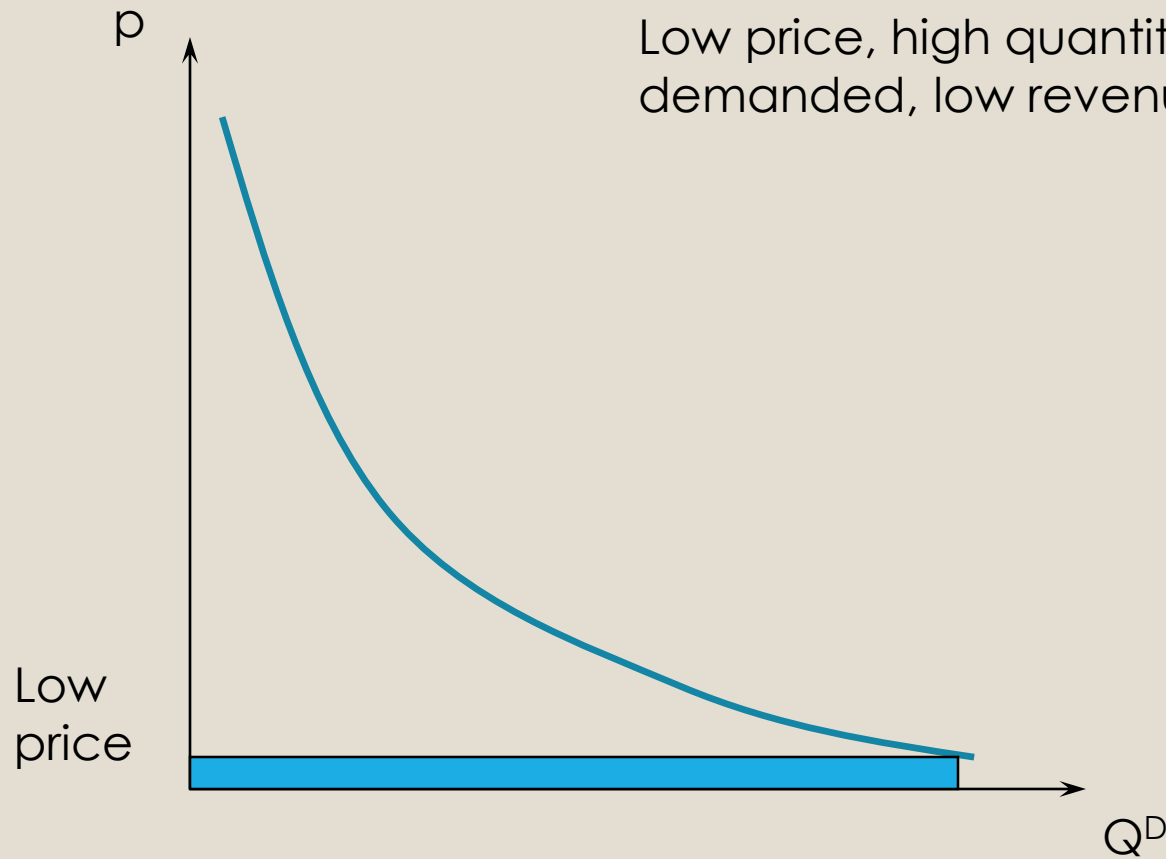
學生票價(P)	成本	數量(Q)	利潤	上班族票價(P)	成本	數量(Q)	利潤
350	100	0	0	350	100	1	250
300	100	0	0	300	100	2	400
250	100	0	0	250	100	4	600
200	100	1	100	<b>200</b>	<b>100</b>	<b>7</b>	<b>700</b>
<b>150</b>	<b>100</b>	<b>3</b>	<b>150</b>	150	100	11	550
100	100	5	0	100	100	12	0
50	100	8	-400	50	100	0	0

# 其他策略

- 商務艙與經濟艙
- 完全差別取價

# 回到房屋市場 -- Monopoly

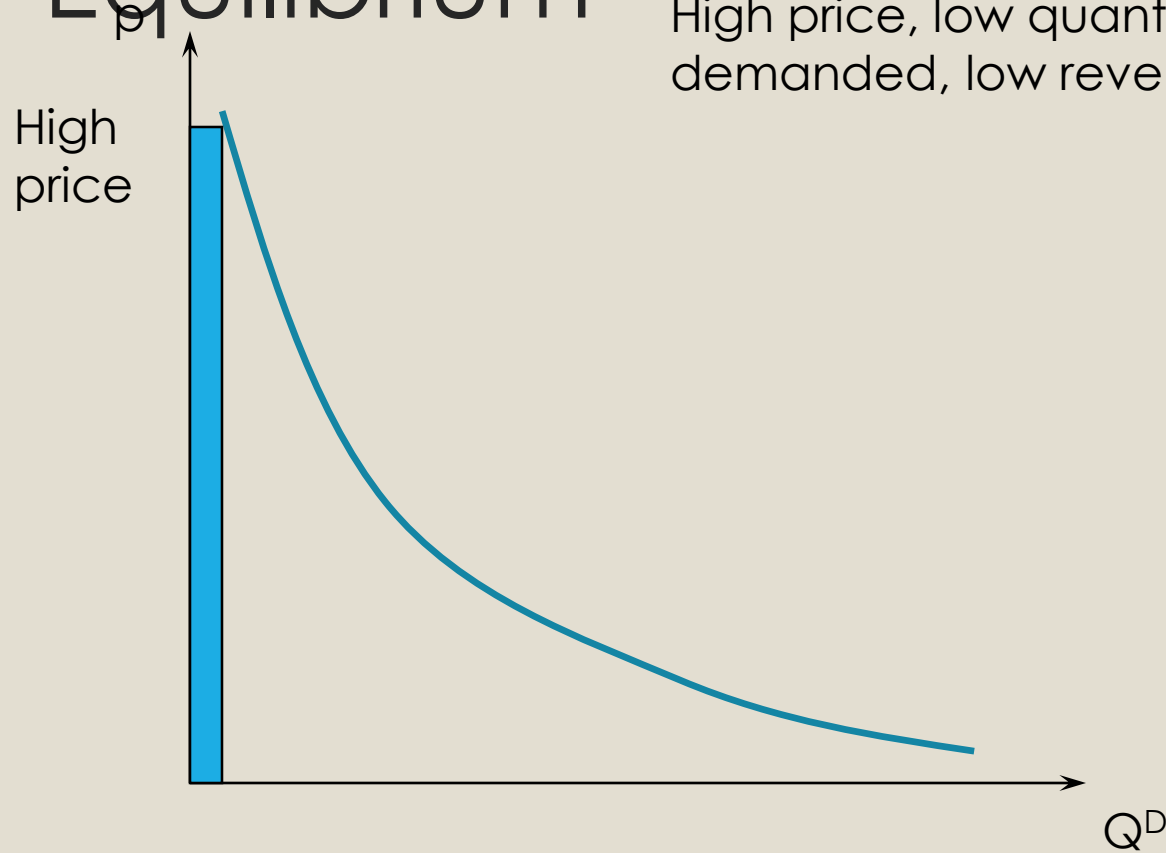
Low price, high quantity demanded, low revenue.





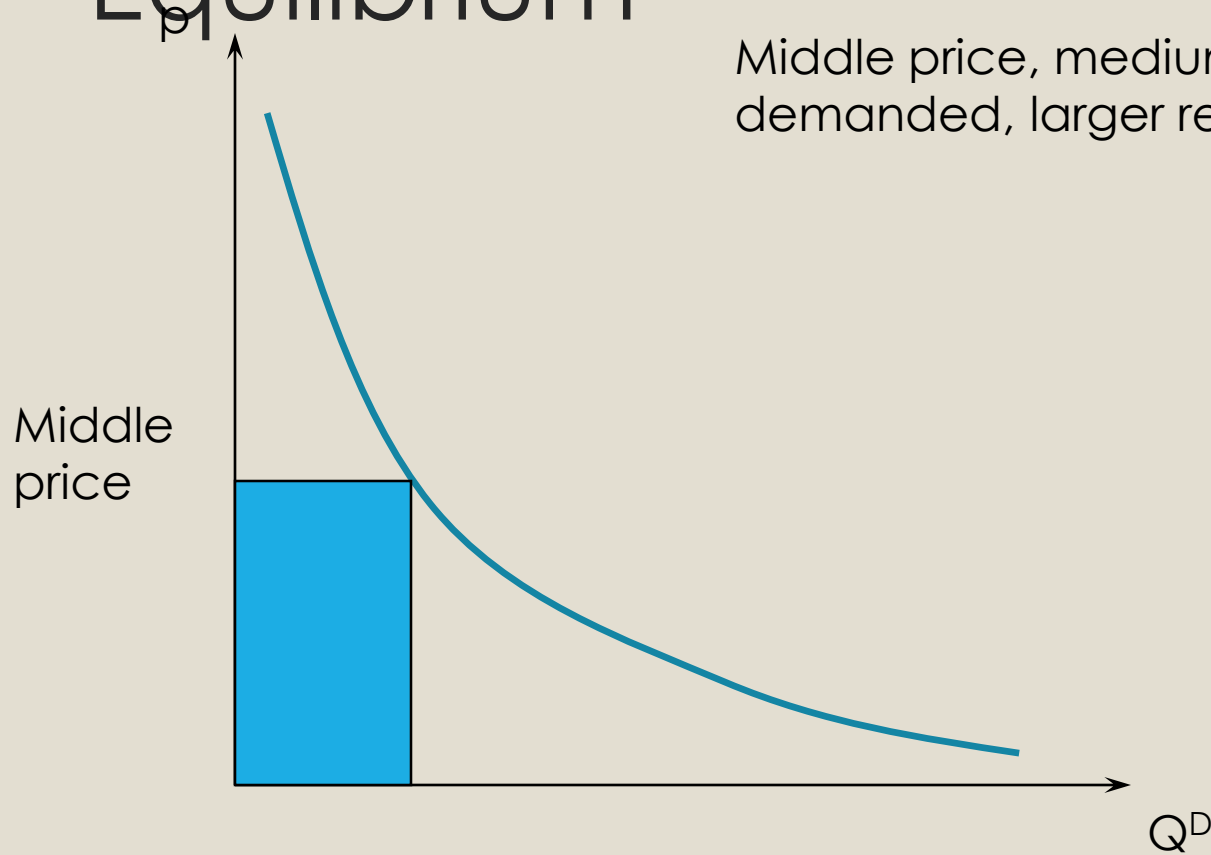
# Monopolistic Market Equilibrium

High price, low quantity  
demanded, low revenue.

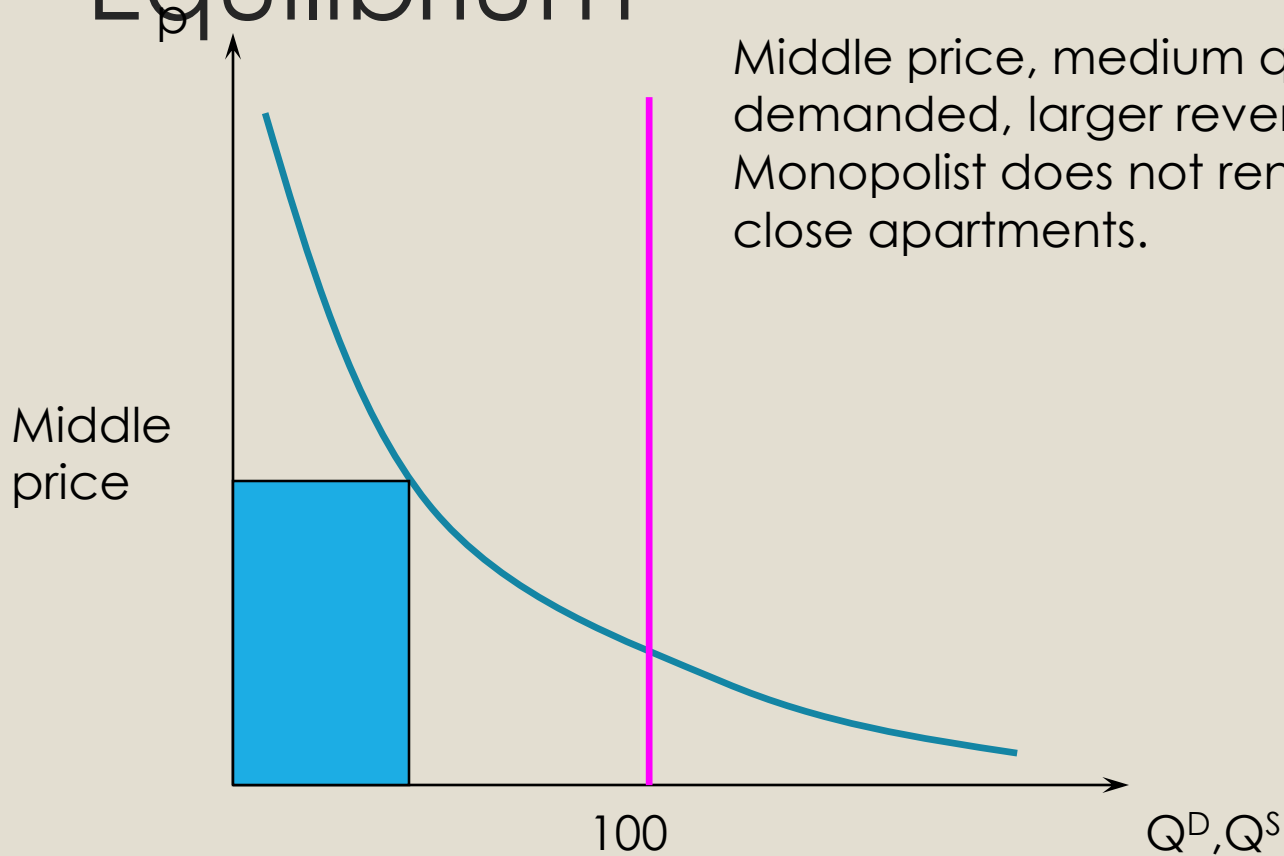


# Monopolistic Market Equilibrium

Middle price, medium quantity  
demanded, larger revenue.

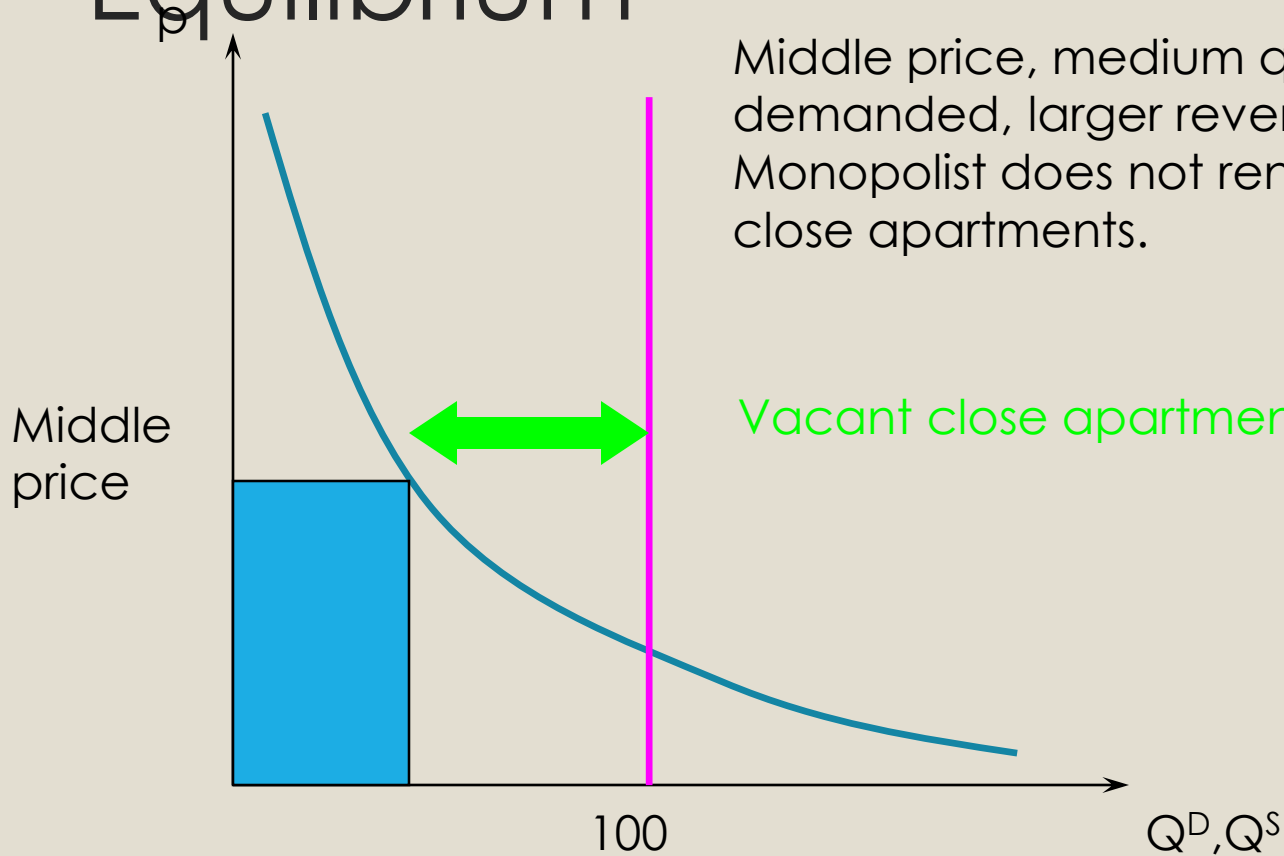


# Monopolistic Market Equilibrium



Middle price, medium quantity demanded, larger revenue. Monopolist does not rent all the close apartments.

# Monopolistic Market Equilibrium



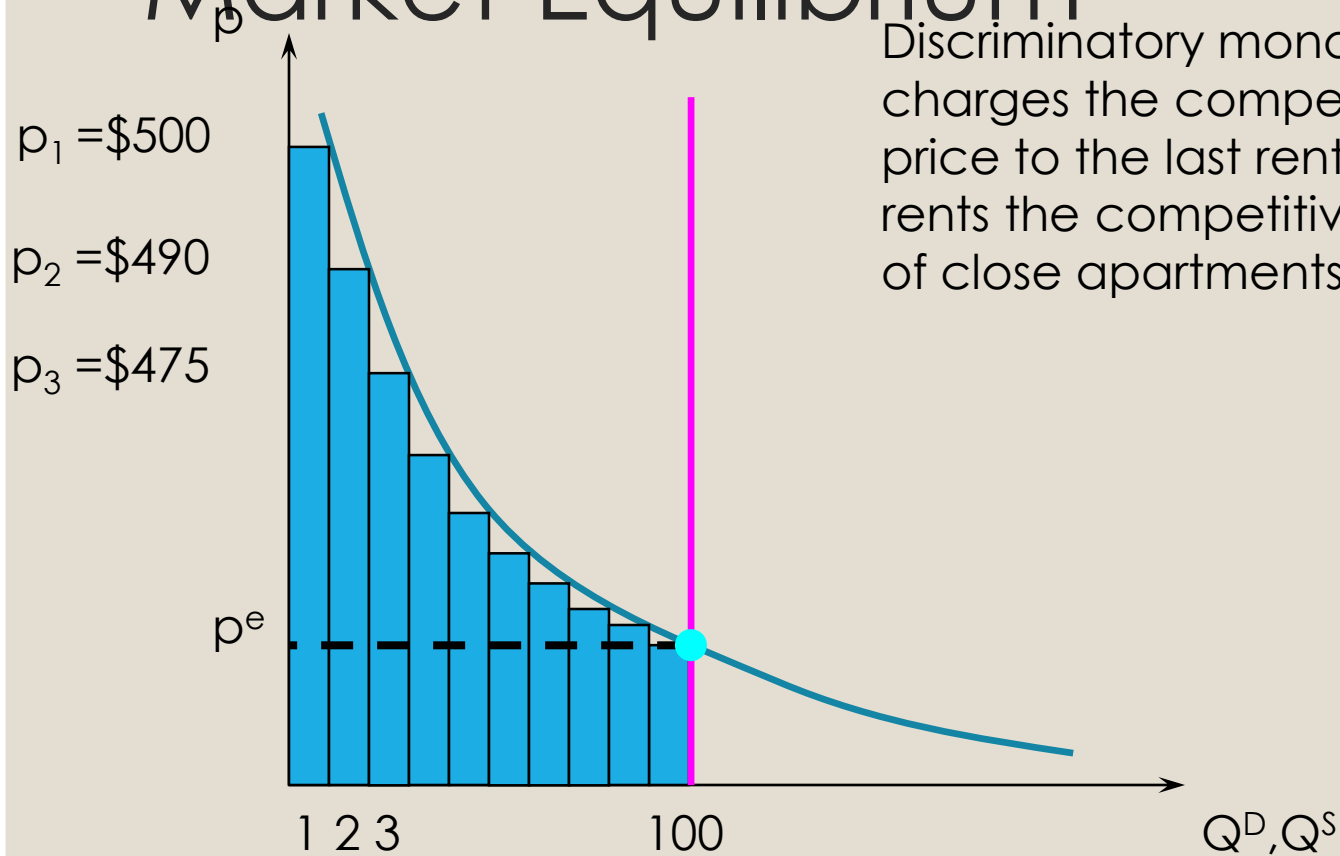
Middle price, medium quantity demanded, larger revenue. Monopolist does not rent all the close apartments.

Vacant close apartments.

# Perfectly Discriminatory Monopolistic Landlord

- Imagine the monopolist knew everyone's willingness-to-pay.
- Charge \$500 to the most willing-to-pay,
- charge \$490 to the 2nd most willing-to-pay, etc.

# Discriminatory Monopolistic Market Equilibrium



Discriminatory monopolist charges the competitive market price to the last renter, and rents the competitive quantity of close apartments.

# Which Market Outcomes Are Desirable?

- Which is better?
  - Perfect competition
  - Monopoly
  - Discriminatory monopoly

# Pareto Efficiency

- Vilfredo Pareto; 1848-1923.
- A Pareto outcome allows no “wasted welfare”;
- i.e. the only way one person’s welfare can be improved is to lower another person’s welfare.
- A Pareto improvement is **an improvement to a system when a change in allocation of goods harms no one and benefits at least one person.**
- 沒有辦法再把資源重新配置達成 Pareto improvement : Pareto Efficient



# Pareto Efficiency

- Jill has an apartment; Jack does not.
- Jill values the apartment at \$200; Jack would pay \$400 for it.
- Jill could sublet the apartment to Jack for \$300.
- Both gain, so it was Pareto inefficient for Jill to have the apartment.

# Pareto Efficiency

- A Pareto inefficient outcome means there remain unrealized mutual gains-to-trade.
- Any market outcome that achieves all possible gains-to-trade must be Pareto efficient.

# Pareto Efficiency

- Competitive equilibrium:
  - all close apartment renters value them at the market price  $p^e$  or more
  - all others value close apartments at less than  $p^e$
  - so no mutually beneficial trades remain
  - so the outcome is Pareto efficient.

# Pareto Efficiency

- Discriminatory Monopoly:
  - assignment of apartments is the same as with the perfectly competitive market
  - so the discriminatory monopoly outcome is also Pareto efficient.

# Pareto Efficiency

- Monopoly:
  - not all apartments are occupied
  - so a distant apartment renter could be assigned a close apartment and have higher welfare without lowering anybody else's welfare.
  - so the monopoly outcome is Pareto inefficient.

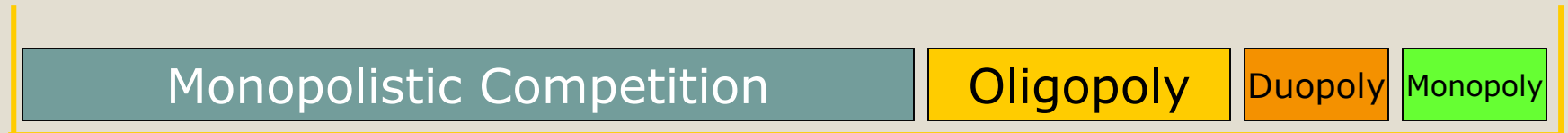
# Pareto Efficiency

- Rent Control:
  - some close apartments are assigned to renters valuing them at below the competitive price  $p^e$
  - some renters valuing a close apartment above  $p^e$  don't get close apartments
  - Pareto inefficient outcome.

# Market Structure

Perfect  
Competition

Pure  
Monopoly



The further right on the scale, the greater the degree of monopoly power exercised by the firm.

# Market Structure

Characteristics: Look at these everyday products – what type of market structure are the producers of these products operating in?



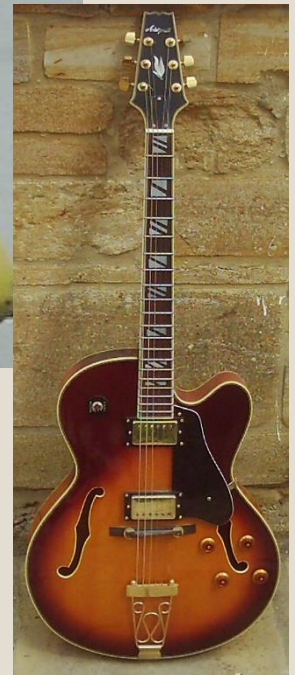
Vodka



Cano



Mercedes CLK Coupe





# 世界之巔急先鋒：雪巴人

