7. MONOPOLY

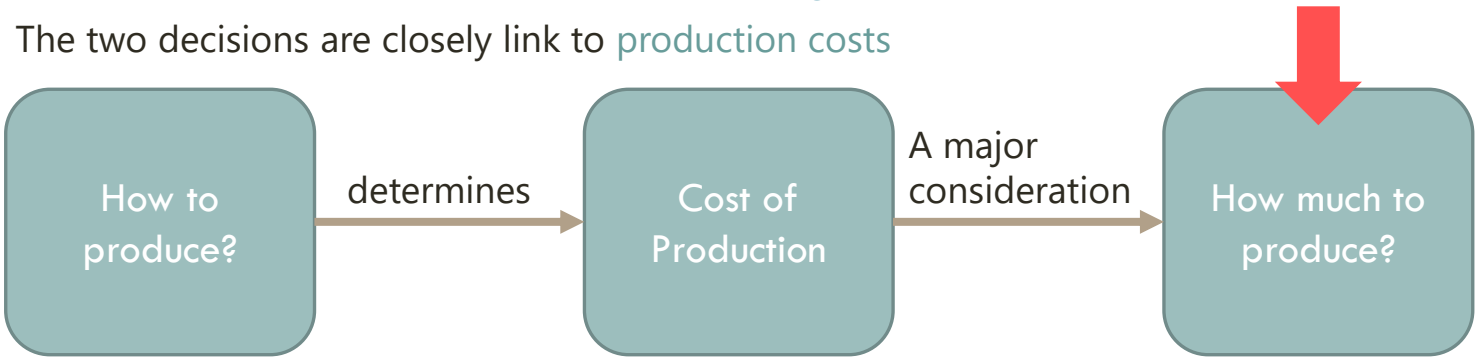
ECON1005 Principles of Economics I (Microeconomics)

1. MARKET STRUCTURE AND FIRMS' DECISIONS

- A firm is any business entity that turns inputs into outputs.
  - The major objective of the firm is assumed to be **profit maximization.**
  - Profit is the firm's total revenue minus total cost:

$$\text{Profit } (\pi) = \text{Total Revenue } (TR) - \text{Total Cost } (TC)$$

- *What decisions firms have to make?*
  - ***How to produce (which input combination to be used in production)?***
  - ***How much to produce (and what price to charge)?***
  - The two decisions are closely link to production costs



1. MARKET STRUCTURE AND FIRMS' DECISIONS

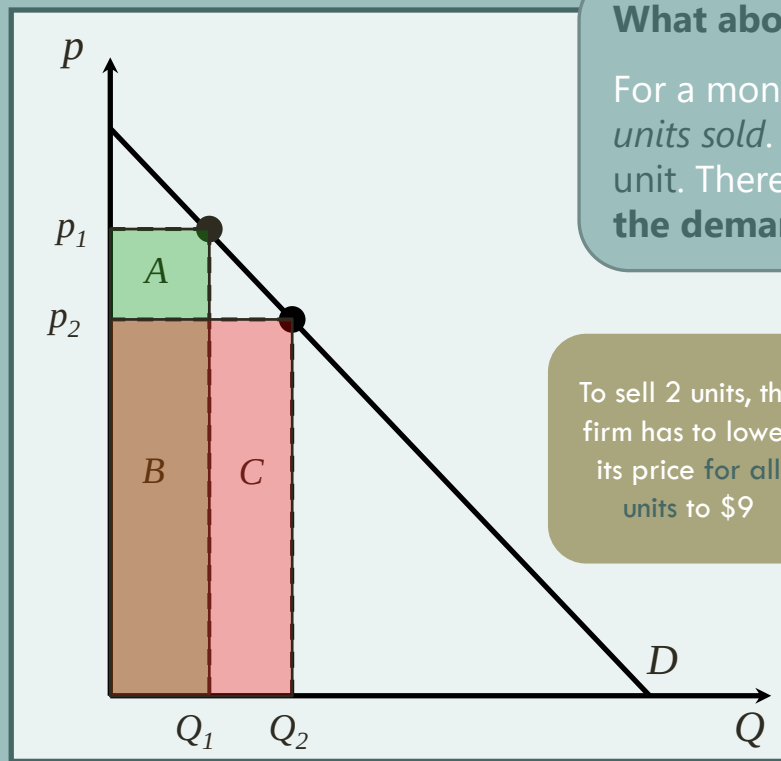
- When making output decisions, firms have two main considerations:
  - **Cost** Consideration: How much it costs to produce different output levels
    - The relationship between total cost and the amount produced is described by ***cost curves***, which apply to all firms in any market. (Discussed in Topic 4)
  - **Revenue** Consideration: How much revenue it can make to sell different output levels
    - The relationship between total revenue and the amount produced is determined by *the **demand facing the firm***.
      - Depends on the characteristics of the market the firm operates in, i.e. the **market structure**.

- Economists usually divide markets into four basic types:
  - Perfect competition (Competitive Market)
  - **Monopoly** (Topic 7)
  - Monopolistic competition (Topic 8)
  - Oligopoly (Topic 8)

The main difference is the demand curve facing the firm

1. MONOPOLY

- **Monopoly**: An industry where only one seller offers a good or service with no close substitutes.
  - There are high barriers to entry, so new firms cannot easily enter the market.
- The demand curve facing the monopoly is the **market demand curve**, which is **downward sloping**.



What about Marginal Revenue (*MR*)?

For a monopolist, selling more units means lowering the price for *all units sold*. This makes marginal revenue less than the price of that unit. Therefore, the **marginal revenue (*MR*) curve** always lies **below the demand curve**.

To sell 2 units, the firm has to lower its price for all units to $9

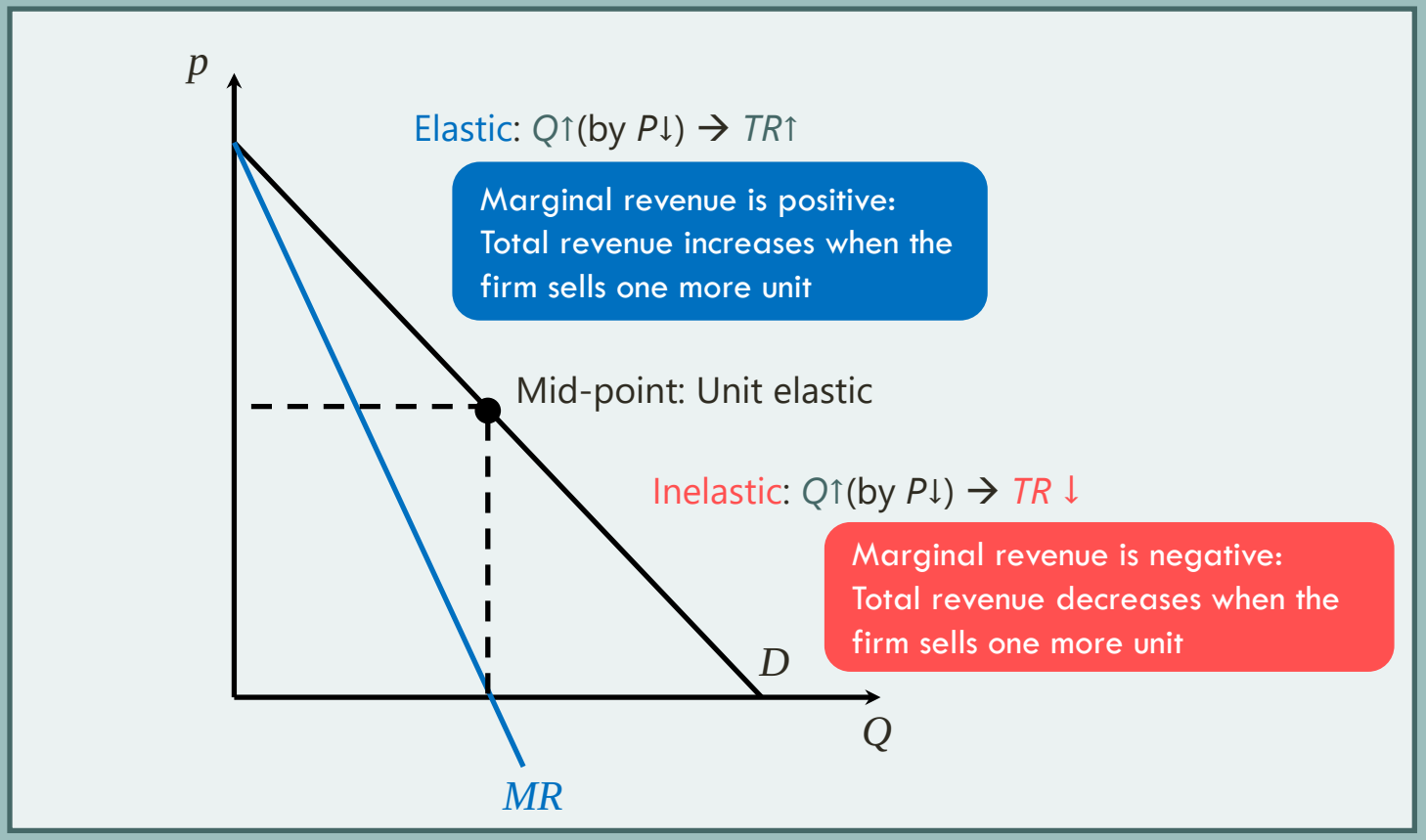
p	*q*	*TR*	*MR*
$10	1		
$9	2		
$8	3		
$7	4		
$6	5		

Demand curve facing the firm

The firm's MR < p

1. MONOPOLY

- For a **linear** (straight-line) **demand curve**, the **marginal revenue curve** has the **same vertical intercept** as the demand curve, and a **slope twice as steep**. (It can be shown mathematically)

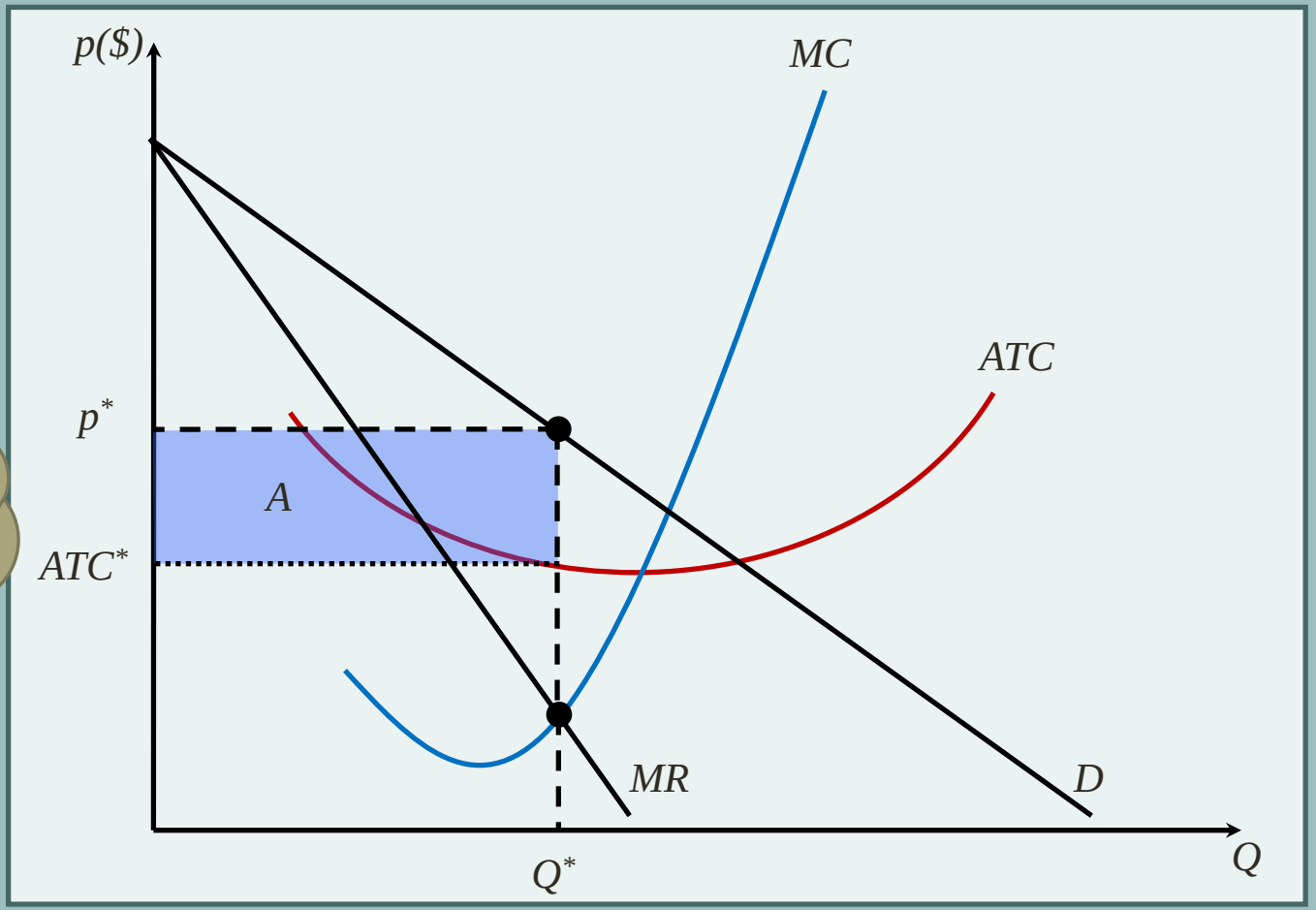


2. OUTPUT AND PRICING DECISIONS: HOW DO MONOPOLIES MAXIMIZE PROFITS?

Profit-maximizing output conditions:

- *MR = MC*

Is the monopoly making profits?



APPLICATION: MONOPOLY & FLOXURIDINE PRICES



Price in 2022:
$5 – 7 per vial

What is its price by early 2023?

- In late 2022, the price of floxuridine injection (a generic chemotherapy drug) suddenly rose by **over 5000%.**
  - The most dramatic increase occurred between October 2022 and January 2023.
  - By early 2023, the price reached **$250 – 350 per vial**.
- ***Why did this happen?***
- **Market exit**: Other manufacturers stopped producing the drug. This left just one exclusive supplier, creating a de facto **monopoly**.
- Data from Medicare and Medicaid confirmed the price surge, with no plausible justification like raw material shortages or regulatory changes.

(Source: Patel, P. H., Patel, B. B., & Desai, U. R. (2025). A Case of Excessive, Opportunistic Price Increase of a Generic Oncology Drug. medRxiv, 2025-07.)

2. OUTPUT AND PRICING DECISIONS: HOW DO MONOPOLIES MAXIMIZE PROFITS?

- In a monopoly market, no new firms can enter to compete.
  - The monopolist can keep earning positive economic profits even in the long run.
  - Economists call these long-run monopoly profits **monopoly rents**.

- Hence, the monopolist is often willing to pay the cost (e.g. in lobbying) to keep their monopoly status. These efforts are called **rent-seeking activities**.

- If $p < ATC$, the monopolist can only operate at a loss, what will the monopoly do?
  - *in the short run?*
  - *in the long run?*

- Note: **The concept of supply curve does not apply to monopolies**, since a monopolist sets both price and quantity to maximize profit (i.e. the firm is a **price setter**), rather than taking the market price as given and choosing how much to supply, as firms do in perfectly competitive markets (i.e. the firms are **price takers**)

APPLICATION: A RASH OF ORDERS

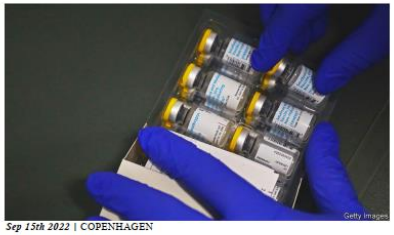
- Monkeypox made the headlines in the summer 2022:
  - 35,000 inflections across 92 countries between May and September.
- Unlike Covid-19, both vaccine and treatment already existed before the outbreak.
- The **patent** of **monkeypox vaccine** is held ***solely*** by **Bavarian Nordic**, a Danish firm founded in 1994 to commercialize a clever replacement to the old smallpox vaccine.
- Before the outbreak, only six countries, including America, had ordered the vaccine.
- ***How did the monkeypox outbreak affect Bavarian Nordic as the exclusive vaccine supplier?***

The Economist, Sept 15th, 2022

Business |

Makers of monkeypox drugs face a rash of orders

Defeating a worldwide outbreaks falls on two small drugmakers



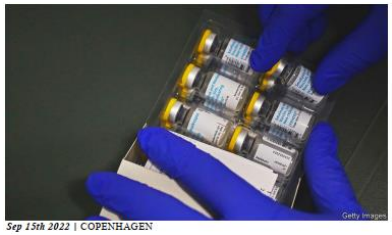
Sep 15th 2022 | COPENHAGEN

Monkeypox isn't covid-19. Since May the viral disease has infected 35,000 people in 92 countries, less than one-tenth as many as covid infects in a day. Though symptoms, including fever, headaches, muscle aches and a pus-filled rash, can be nasty, it seldom causes death. Critically, in contrast to covid, both a vaccine and a treatment predate the current epidemic. Their makers, two smallish drug companies, are struggling to keep up with demand.

The jab is made by Bavarian Nordic, a Danish firm founded in 1994 to commercialise a clever replacement, developed by a researcher in Bavaria, to the old smallpox vaccine (monkeypox and smallpox are related viruses). Before the latest outbreak, only six countries, including America, had ordered the drug. In the past four months that number has swelled to 70, and counting. "We were definitely not prepared for this," admits its finance chief, Henrik Juuel. The firm is working around the clock to add capacity and expand its 800-strong workforce. Annual revenue is forecast to more than double this year, to $380m.

Success has brought in resources to finance its other bets. Bavarian Nordic has just begun a phase-three clinical trial of a vaccine against rsv, a flu-like virus that kills as many elderly and infants as influenza. At a cost of up to $300m, it is a "heavy investment", says Mr Juuel; the firm expects to lose between $13m and $40m this year as a result. But the potential prize is large. No rsv jab exists and the global market for one could, analysts reckon, be as big as $5bn-10bn a year.

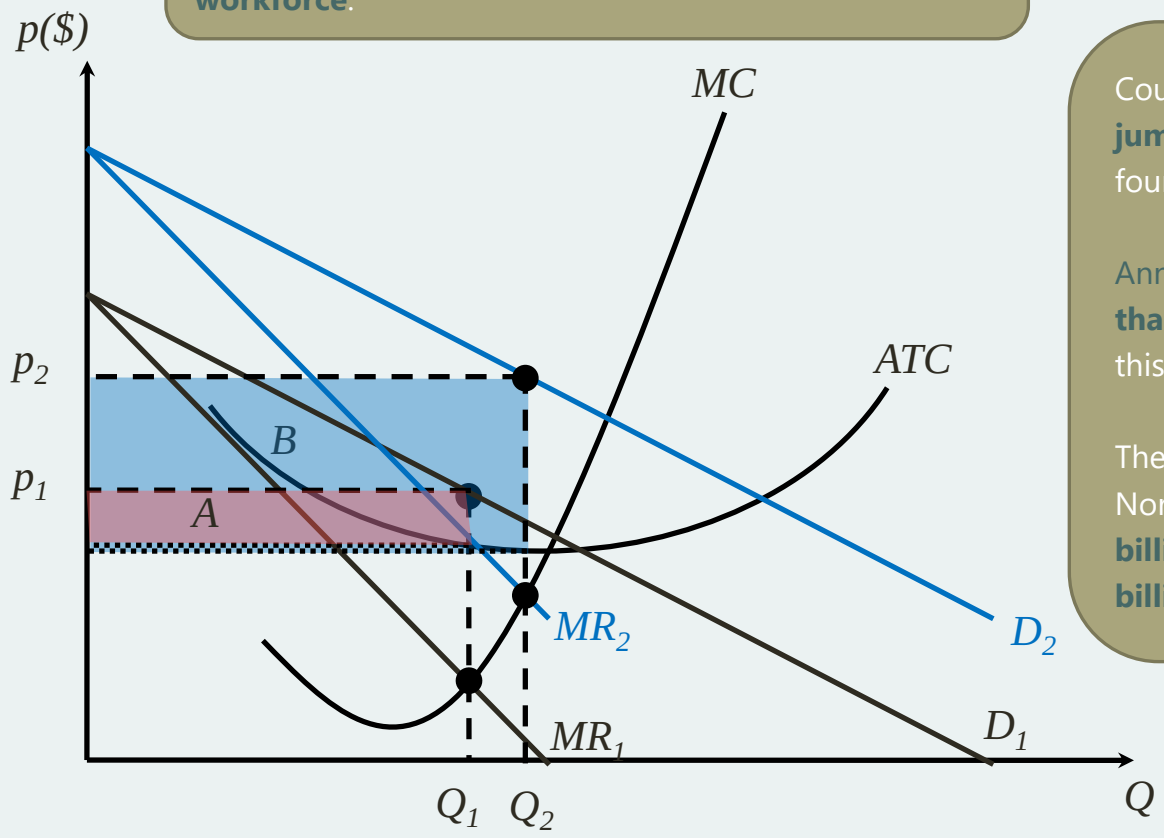
(Source: Rash of orders, *The Economist*, Sept 15th, 2022.)



Sep 15th 2022 | COPENHAGEN

APPLICATION: A RASH OF ORDERS

"We were definitely not prepared for this," admits its finance chief, Henrik Juuel. The firm is working around the clock to **add capacity** and **expand its 800-strong workforce**.



Countries ordering the vaccine **jumped from 6 to 70** in just four months.

Annual revenue forecast: **more than double to $380 million** this year.

The market value of Bavarian Nordic soared **from $1.4 billion (May) to nearly $4 billion (August).**

APPLICATION: BEEF WHOLESALING IN HONG KONG

- **Ng Fung Hong** is the **SOLE** distributor of fresh beef in HK, endorsed by China's Ministry of Commerce.
- Wholesale price of marbled beef **up by 4.5%** (from HK$4,490 to HK$4,690 a picul).
- Company statement:
  - "The price adjustment are in response to the prevailing market situations, including supply."
  - **Decrease in supply of live cows from mainland**.

How does the decrease in the supply of live cows affect Ng Fung Hong's output and price decision?

SCMP.COM

South China Morning Post

Hong Kong

Wholesale price for marbled beef rises 4.5pc

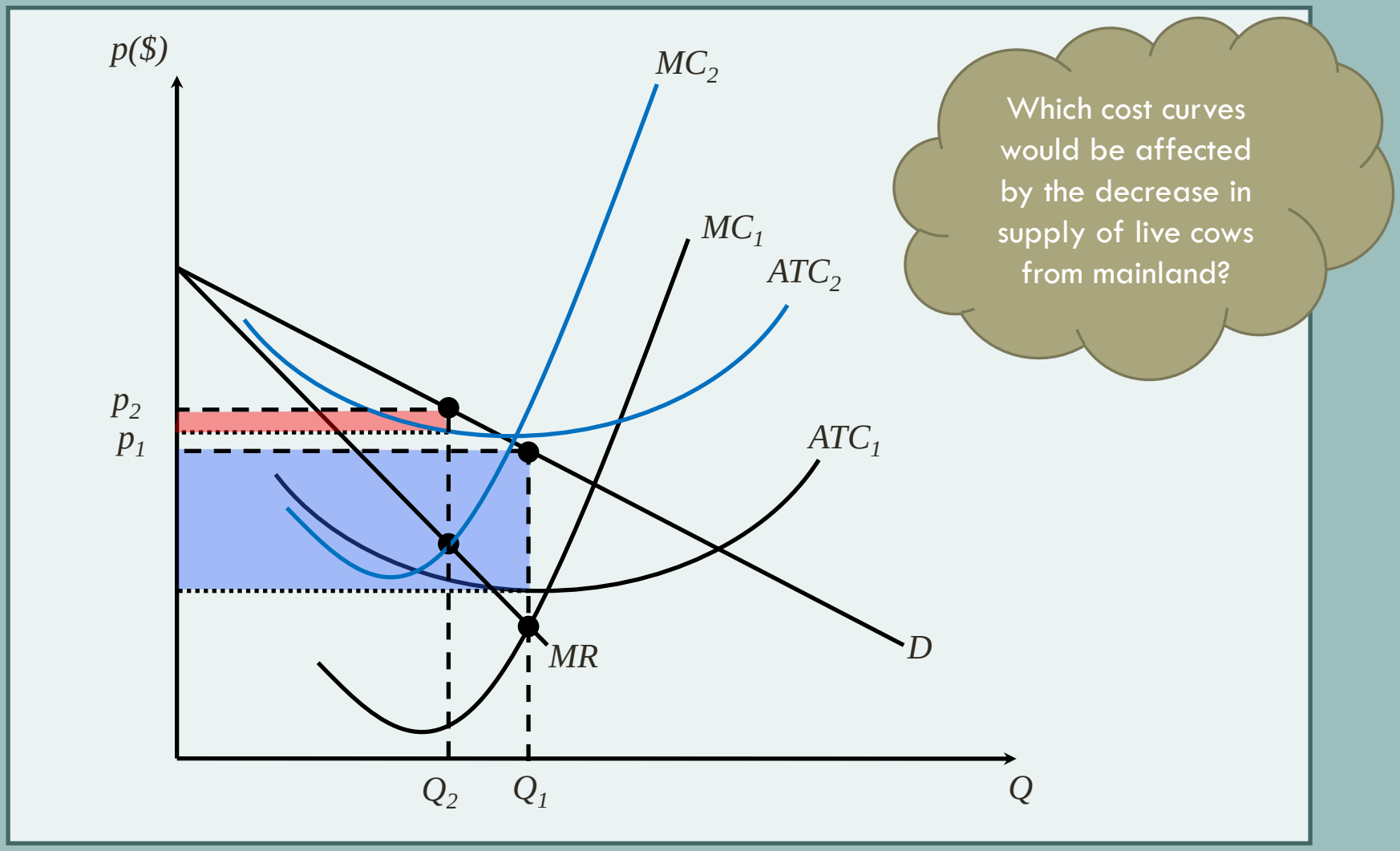
Government to question latest increase, but some traders still blame importer's monopoly

Stuart Lau
Ng Kang-chung
Published: 12:00am, 6 May, 2013



(Source: Wholesale price for marbled beef rises 4.5pc, *SCMP*, May 6, 2013; Beef monopoly chewed over, *The Standard*, Nov 5, 2012; Beijing vows to break beef monopoly, *SCMP*, June 8, 2013)

APPLICATION: BEEF WHOLESALING IN HONG KONG



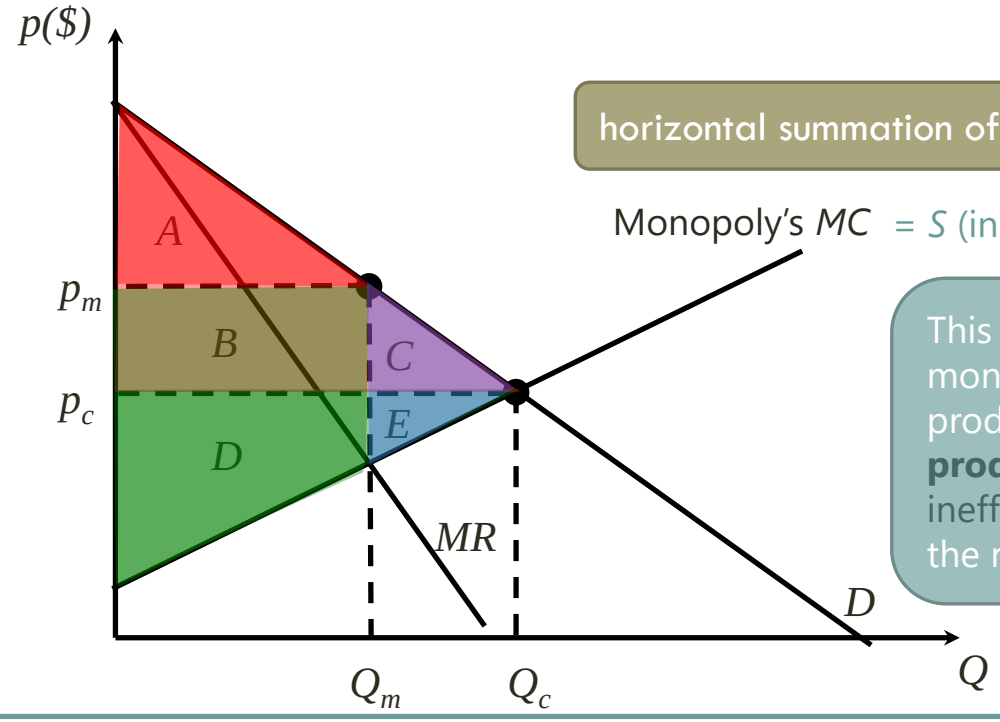
3. MARKET EFFICIENCY: WHAT ARE THE PROBLEMS WITH MONOPOLY?

- In a perfectly competitive market, resources are allocated efficiently and **total surplus** (consumer + producer surplus) is maximized

- To compare, imagine a monopoly that replaces a competitive industry but keeps the same production methods.
  - So, the **monopoly's MC curve** is the horizontal summation of all competitive firms' MC curves (i.e. the same as **the market supply curve** in the competitive market).

- It can be easily shown that total surplus and welfare are lower under monopoly.

3. MONOPOLY AND MARKET EFFICIENCY

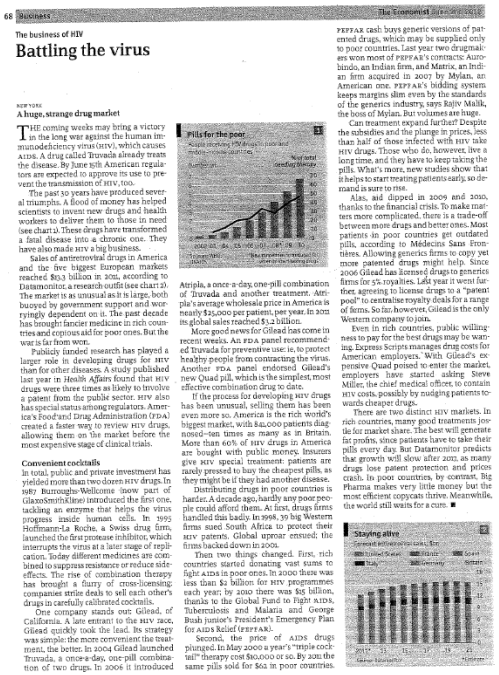


horizontal summation of all competitive firms' MC curves

Monopoly's *MC* = *S* (in perfect competition)

This comparison assumes that the monopoly does **not** change how it produces. If the monopoly **improves the production methods** (e.g. by closing some inefficient plants), it could reduce costs and the results might be different.

	Competition	Monopoly	Change
CS			
PS			
Welfare			



68 Business

The business of HIV

Battling the virus

NEW YORK

A huge, strange drug market

THE coming weeks may bring a victory in the long war against the human immunodeficiency virus (HIV), which causes AIDS. A drug called Truvada already treats the disease. By June 15th American regulators are expected to approve its use to prevent the transmission of HIV, too.

The past 30 years have produced several triumphs. A flood of money has helped scientists to invent new drugs and health workers to deliver them to those in need (see chart 1). These drugs have transformed a fatal disease into a chronic one. They have also made HIV a big business.

Sales of antiretroviral drugs in America and the five biggest European markets reached $10.3 billion in 2011, according to Datamonitor, a research outfit (see chart 2). The market is as unusual as it is large, both buoyed by government support and worryingly dependent on it. The past decade has brought fancier medicine in rich countries and copious aid for poor ones. But the war is far from won.

Publicly funded research has played a larger role in developing drugs for HIV than for other diseases. A study published last year in Health Affairs found that HIV drugs were three times as likely to involve a patient from the public sector. HIV also has special status among regulators. America's Food and Drug Administration (FDA) created a faster way to review HIV drugs, allowing them on the market before the most expensive stage of clinical trials.

Convenient cocktails

In total, public and private investment has yielded more than two dozen HIV drugs. In 1987 Burroughs-Wellcome (now part of GlaxoSmithKline) introduced the first one, tackling an enzyme that helps the virus progress inside human cells. In 1995 Hoffmann-La Roche, a Swiss drug firm, launched the first protease inhibitor, which interrupts the virus at a later stage of replication. Today different medicines are combined to suppress resistance or reduce side-effects. The rise of combination therapy has brought a flurry of cross-licensing: companies strike deals to sell each other's drugs in carefully calibrated cocktails.

One company stands out: Gilead, of California. A late entrant to the HIV race, Gilead quickly took the lead. Its strategy was simple: the more convenient the treatment, the better. In 2004 Gilead launched Truvada, a once-a-day, one-pill combination of two drugs. In 2006 it introduced

Pills for the poor

1

People receiving HIV drugs in poor and middle-income countries

Number, m

% of total needing therapy

Atripla, a once-a-day, one-pill combination of Truvada and another treatment. Atripla's average wholesale price in America is nearly $25,000 per patient, per year. In 2011 its global sales reached $1.2 billion.

More good news for Gilead has come in recent weeks. An FDA panel recommended Truvada for preventive use: ie, to protect healthy people from contracting the virus. Another FDA panel endorsed Gilead's new Quad pill, which is the simplest, most effective combination drug to date.

If the process for developing HIV drugs has been unusual, selling them has been even more so. America is the rich world's biggest market, with 841,000 patients diagnosed—ten times as many as in Britain. More than 60% of HIV drugs in America are bought with public money. Insurers give HIV special treatment: patients are rarely pressed to buy the cheapest pills, as they might be if they had another disease.

Distributing drugs in poor countries is harder. A decade ago, hardly any poor people could afford them. At first, drugs firms handled this badly. In 1998, 39 big Western firms sued South Africa to protect their HIV patents. Global uproar ensued; the firms backed down in 2001.

Then two things changed. First, rich countries started donating vast sums to fight AIDS in poor ones. In 2000 there was less than $2 billion for HIV programmes each year; by 2010 there was $15 billion, thanks to the Global Fund to Fight AIDS, Tuberculosis and Malaria and George Bush junior's President's Emergency Plan for AIDS Relief (PEPFAR).

Second, the price of AIDS drugs plunged. In May 2000 a year's "triple cocktail" therapy cost $10,000 or so. By 2011 the same pills sold for $62 in poor countries. PEPFAR cash buys generic versions of patented drugs, which may be supplied only to poor countries. Last year two drugmakers won most of PEPFAR's contracts: Aurobindo, an Indian firm, and Matrix, an Indian firm acquired in 2007 by Mylan, an American one. PEPFAR's bidding system keeps margins slim even by the standards of the generics industry, says Rajiv Malik, the boss of Mylan. But volumes are huge.

Can treatment expand further? Despite the subsidies and the plunge in prices, less than half of those infected with HIV take HIV drugs. Those who do, however, live a long time, and they have to keep taking the pills. What's more, new studies show that it helps to start treating patients early, so demand is sure to rise.

Alas, aid dipped in 2009 and 2010, thanks to the financial crisis. To make matters more complicated, there is a trade-off between more drugs and better ones. Most patients in poor countries get outdated pills, according to Médecins Sans Frontières. Allowing generics firms to copy yet more patented drugs might help. Since 2006 Gilead has licensed drugs to generics firms for 5% royalties. Last year it went further, agreeing to license drugs to a "patent pool" to centralise royalty deals for a range of firms. So far, however, Gilead is the only Western company to join.

Even in rich countries, public willingness to pay for the best drugs may be waning. Express Scripts manages drug costs for American employers. With Gilead's expensive Quad poised to enter the market, employers have started asking Steve Miller, the chief medical officer, to contain HIV costs, possibly by nudging patients towards cheaper drugs.

There are two distinct HIV markets. In rich countries, many good treatments jostle for market share. The best will generate fat profits, since patients have to take their pills every day. But Datamonitor predicts that growth will slow after 2012, as many drugs lose patent protection and prices crash. In poor countries, by contrast, Big Pharma makes very little money but the most efficient copycats thrive. Meanwhile, the world still waits for a cure. ■

2 Staying alive

Sources: WHO; UNAIDS

*New guidelines introduced for when to start taking drugs

(Source: Battling the virus, *The Economist*, June 2, 2012.)

In **1996**, a new and effective HIV/AIDS treatment called **HAART** became available.

Dr. David Ho, an American HIV/AIDS researcher, is associated with the early breakthroughs that led to HAART.

Within 4 years, death rates dropped 84% - but only in wealthy countries.

What was the cost of these antiretroviral treatments (ARVs) per person per year?

US$10,000 – 15,000!

Why so expensive?

Strict **patent protection** meant no competition!

In poor countries, almost no one could afford these drugs. Five years after HAART was introduced, **fewer than 8,000 people in sub-Saharan Africa were receiving the life-saving drugs**.

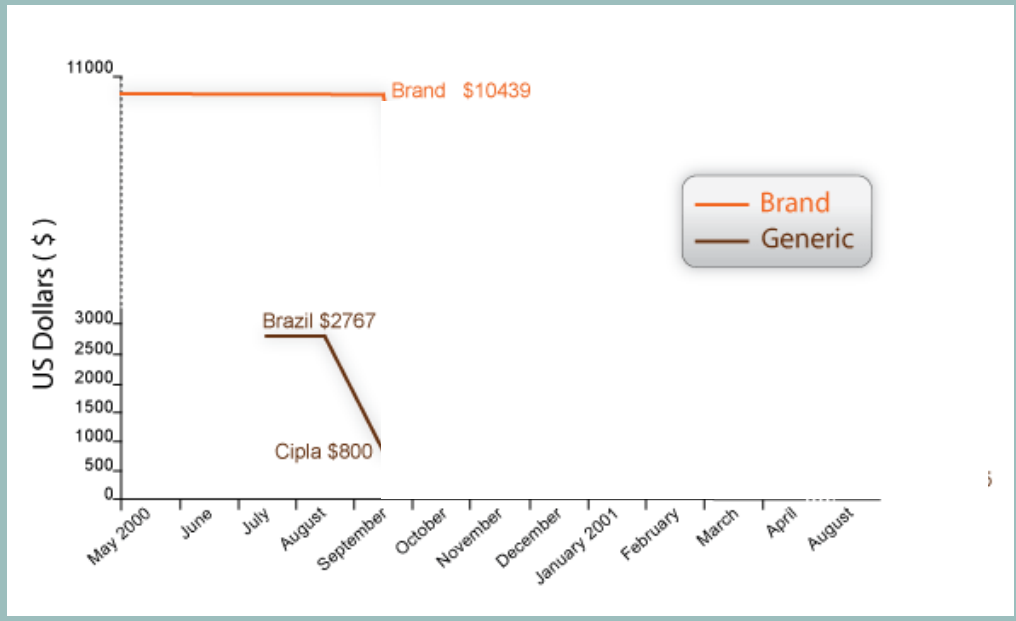
APPLICATION: BATTLING THE (HIV) VIRUS

THE BREAKTHROUGH: GENERIC DRUGS

- In 2000, companies in Brazil and India started making **generic ARVs** – identical copies of brand-name drugs.
  - Generic drugs work exactly the same, but **cost much less**.

- The prices of AIDS drugs plunged after 2000:
  - In May 2000, a year's "triple cocktail" therapy cost $10,000.
  - By 2011, the same treatment was just $62 in poor countries!

- Thanks to generics, millions now receive affordable HIV treatment worldwide. Most people with HIV, even in low-income countries, can access basic ARVs for less than $100/year.



Deadweight loss from high monopoly pricing has fallen as generic entry and international initiatives improved access.

However, newer HIV drugs and treatments may still be expensive at first, due to patent rules and delayed generic entry, i.e., brand-name drug companies take actions that prevent generic drugs from entering the market after the original patent expires, which are **rent-seeking activities**.

4. WHY MONOPOLY ARISES? BARRIERS TO ENTRY

- **Barriers to entry** are the sources of monopoly power. Main types of barriers to entry include:

- **Natural Barriers:** exist naturally within the market:

  - **Control of Unique Resources**, such as mineral deposits or land locations
    - E.g. China controls 60 – 70% of the global supply of **rare earth minerals** (plus 90% of **global refining capacity**), which are crucial for almost all electronic products.

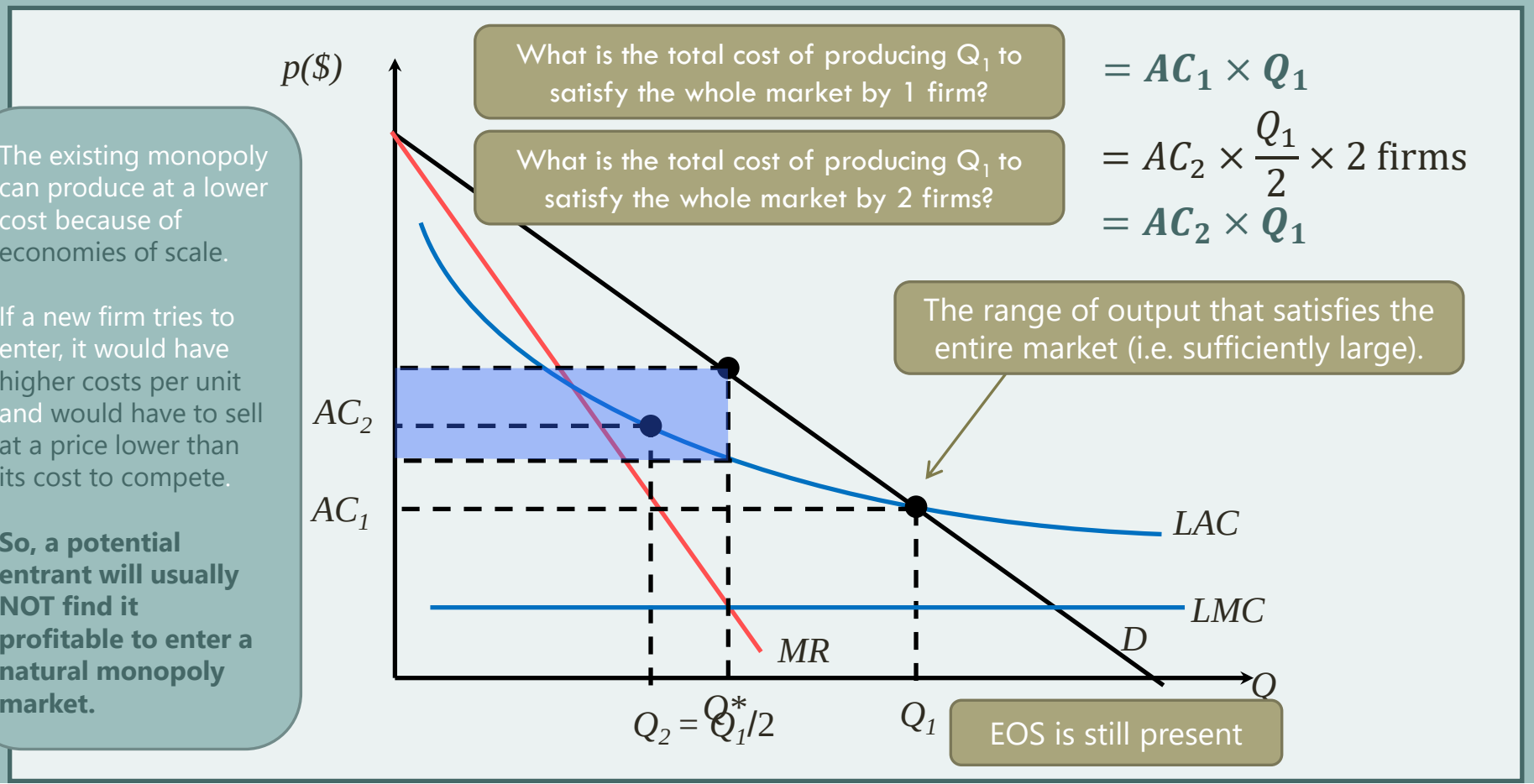
  - **Natural Monopoly**
    - It happens when one firm can produce the whole market's output at a lower cost than if there were several firms.
    - This occurs when **economies of scale** are present *over a sufficiently large range of output*.





4. WHY MONOPOLY ARISES? BARRIERS TO ENTRY

- *Suppose there are several firms initially in the market, what would they do?*
- *Once monopolized, will potential entrant find it profitable to enter the market?*



The existing monopoly can produce at a lower cost because of economies of scale.

If a new firm tries to enter, it would have higher costs per unit and would have to sell at a price lower than its cost to compete.

So, a potential entrant will usually NOT find it profitable to enter a natural monopoly market.

APPLICATION: DOGFIGHT



Business | Dogfight

Can China smash the Airbus-Boeing duopoly?

It hopes to succeed where others have failed

Scheduled for take-off Photograph: Getty Images
Jul 25th 2024|Farnborough

Each year Airbus and Boeing, the two halves of the global aircraft duopoly, face off at the world's most prestigious airshow, which alternates between Paris and Farnborough, in the countryside close to London. This year's event in Farnborough, which opened on July 22nd, was a more subdued clash than

Source: Dogfight, *The Economist,* Jun 25th, **2024**.



The Economist

Commercial aircraft

Duelling the duopolies

New entrants to the world jetliner market struggle to take off

May 15th 2012 | from the print edition

IT MAY well turn out that pilot error, or

The troubled Sunjet

Source: Duelling the duopolies, *The Economist,* May 19th, **2012**.

- Can China break the Airbus-Boeing global aircraft duopoly?
  - Some people believe that it is only a matter of time, but becoming a maker of large passenger planes remain very difficult
- Boeing and Airbus spend $20 – 30 billion to develop a new plane. New competitors would have to spend even more. They also need to match the price and performance of the duopoly's planes.
- One of the biggest barriers is that new entrants rarely know if they will get enough buyers.
  - Example: Japan's Mitsubishi had to cancel its MRJ jet after failing to get a critical mass of orders.
- The Chinese government gave COMAC about $70 billion in subsidies to develop the C919.
  - COMAC has delivered 6 planes and has over 1000 orders – mostly from Chinese airlines.
  - Outside China, only one company (a startup in Brunei with Chinese support) has ordered C919.

4. WHY MONOPOLY ARISES? BARRIERS TO ENTRY

- **Legal barriers to entry**
  - Protection of **Intellectual Property** by **patents** (for new product or scientific innovation) or **copyrights** (for literary, musical or other artistic work).
    - Reason: Encourages innovation by letting investors/producers earn more profits (as incentives).
  - **Government Franchise or License**: Some industries need a government license to operate (like utilities, TV, gambling)
    - Reason: These industries are sometimes "natural monopolies" (most efficient with just one supplier).
    - Other political rationales



香港賽馬會
The Hong Kong Jockey Club

CLP 中 中電
港燈
HK Electric



The small plastic stool, called the 'pizza saver', isn't for decoration or to keep the slices together, but actually separates the pizza box's lid from touching the pizza so the toppings don't stick to the top.

Carmela Vitale's invented it and got a patent for her idea in 1985.

APPLICATION: WISHING UPON A DEATH STAR

- Since 2005, Disney has been actively acquiring major intellectual property (IP). These legal rights act as **barriers to entry**.
  - **2006**: It bought Pixar for **$7.4 billion** (Toy Story, Monster University)
  - **2009**: It bought Marvel Entertainment for **$4.2 billion** (The Avergers, etc.)
  - **2012**: It bought Lucasfilm for **$4 billion** (Star Wars franchise)
  - **2019**: It bought 21st Century Fox for **$71 billion** (X-Men, Simpsons, Avatar, etc.)











SPIDER-MAN AND THE MARVEL CINEMATIC UNIVERSE (M.C.U.)

- **Sony Pictures** bought the movie rights to Spider-Man before Disney's Marvel purchase.
- Spider-Man could not appear in Disney's Marvel movies at first; only Sony could make Spider-Man films.
- Disney and Sony later made a deal to let Spider-Man (played by Tom Holland) join the Marvel Cinematic Universe (M.C.U.).

(Source: *The New York Times,* Sept 27, 2019.)

4. WHY MONOPOLY ARISES? BARRIERS TO ENTRY

- **Network Effect**
  - A product has a **network externality** if its value depends on the number of people using it.
  - Positive network externality is usually referred to as **network effect** - the product or service becomes more valuable as more people use it.
    - **Size Effect**: A consumer gets a direct benefit from a larger user base. It is commonly found in digital platforms connecting different groups (platform economy):
      - Messaging & Communication Apps: WhatsApp, WeChat, LINE, Telegram
      - Social Media: Instagram, TikTok, X (Twitter), Xiaohongshu (Little Red Book), Weibo
      - Online Marketplaces: eBay, Taobou,
      - Sharing Economy & Platforms: Uber, Airbnb
    - **Complementary network goods**: More users leads to more related complements.
      - Examples: Video game consoles & games, Electric cars & Charging networks, VR headsets & apps/movies …

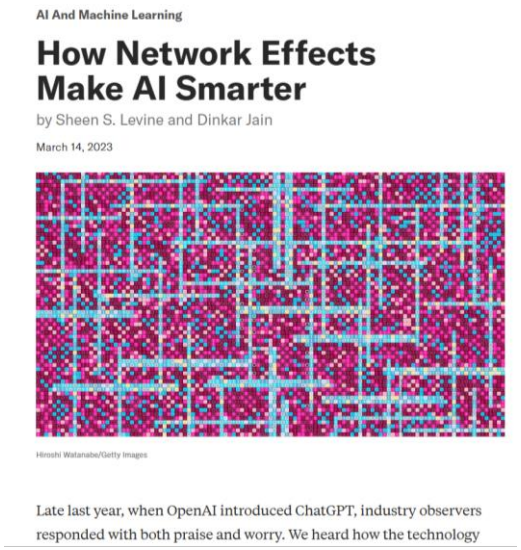
4. WHY MONOPOLY ARISES? BARRIERS TO ENTRY

- *Why is network effect important?*
  - Once the company reaches **critical mass** (lots of users), it becomes hard for rivals to compete - creating barriers to entry.
  - It explains why firms often sell its product or service at a low **introductory price** or **penetration price** to achieving a critical mass quickly.
    - Examples: WhatsApp or WeChat for free, Uber's or KeeTa's early discount,
- After building up a big network, a company may dominate the market, obtaining monopoly power.









AI And Machine Learning

How Network Effects Make AI Smarter

by Sheen S. Levine and Dinkar Jain

March 14, 2023

Hiroshi Watanabe/Getty Images

Late last year, when OpenAI introduced ChatGPT, industry observers responded with both praise and worry. We heard how the technology

(Source: Levine, S. S., & Jain, D. How network effects make AI smarter. Harvard Business Review, 14th March, 2023.

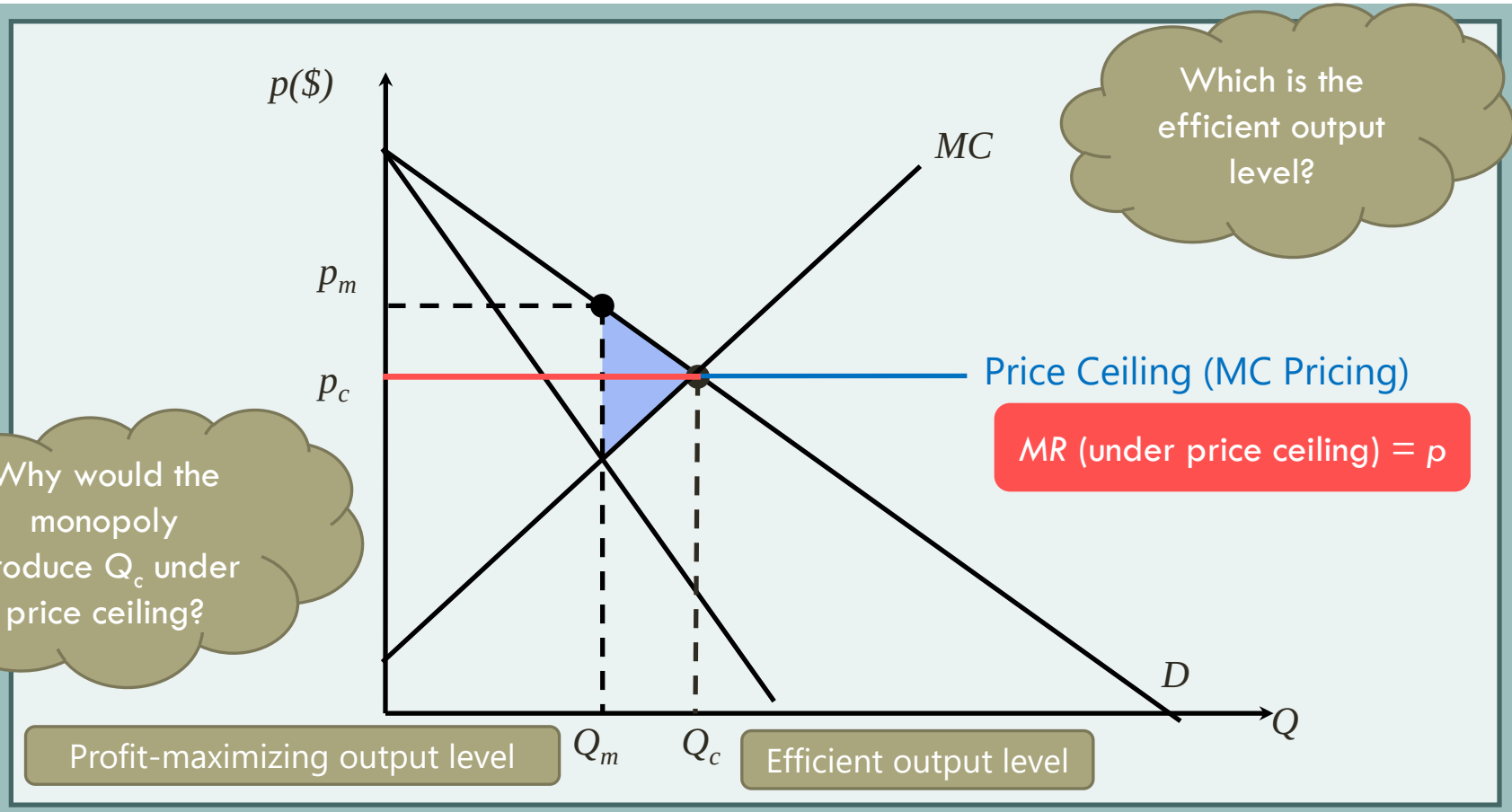
- **How Gen AI Exhibits Network Effects?**
- Data network effect: More users generate more data, which can be used to improve models.
  - Millions of prompts help ChatGPT learn to write more efficiently for everyone.
- Platform adoption: As more developers and users adopt a generative AI platform (e.g., OpenAI), it attracts more third-party tools, integrations, and community contributions.
  - Businesses build integrations with OpenAI APIs (like adding GPT-powered chatbots to Slack, Discord.
- Prompt engineering & sharing: Communities sharing effective prompts and workflows improve collective performance, making the platform more valuable.
  - Midjourney or DALL-E users share millions of images, inspiring others to join and create.



APPLICATION: NETWORK EFFECTS MAKE AI SMARTER

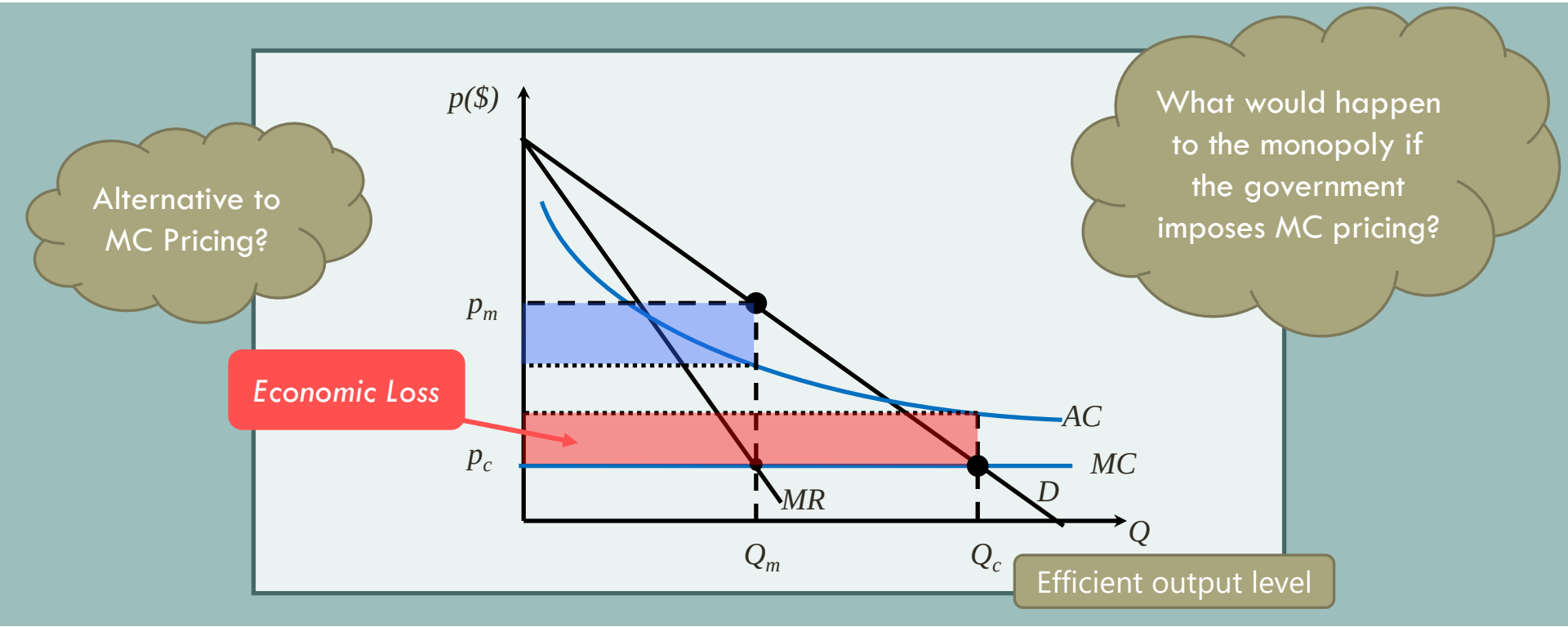
5. REGULATING MONOPOLY

- **Marginal Cost (*MC*) Pricing (price ceiling)**



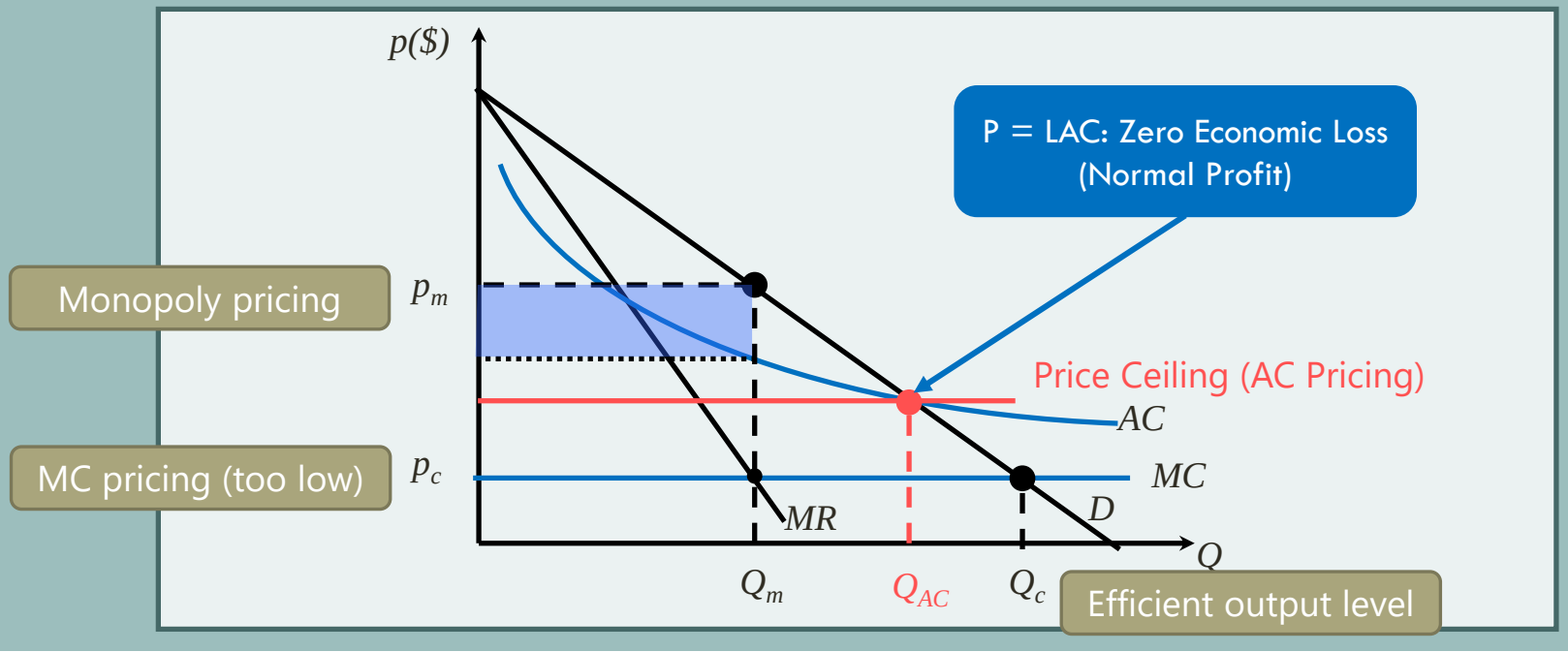
5. REGULATING MONOPOLY

- Problems of MC Pricing:
  - How to determine the optimal price (price ceiling)?
    - It is hard for regulators to determine true MC (firms may have incentives to inflate reported costs)
  - MC pricing to regulate a natural monopoly?

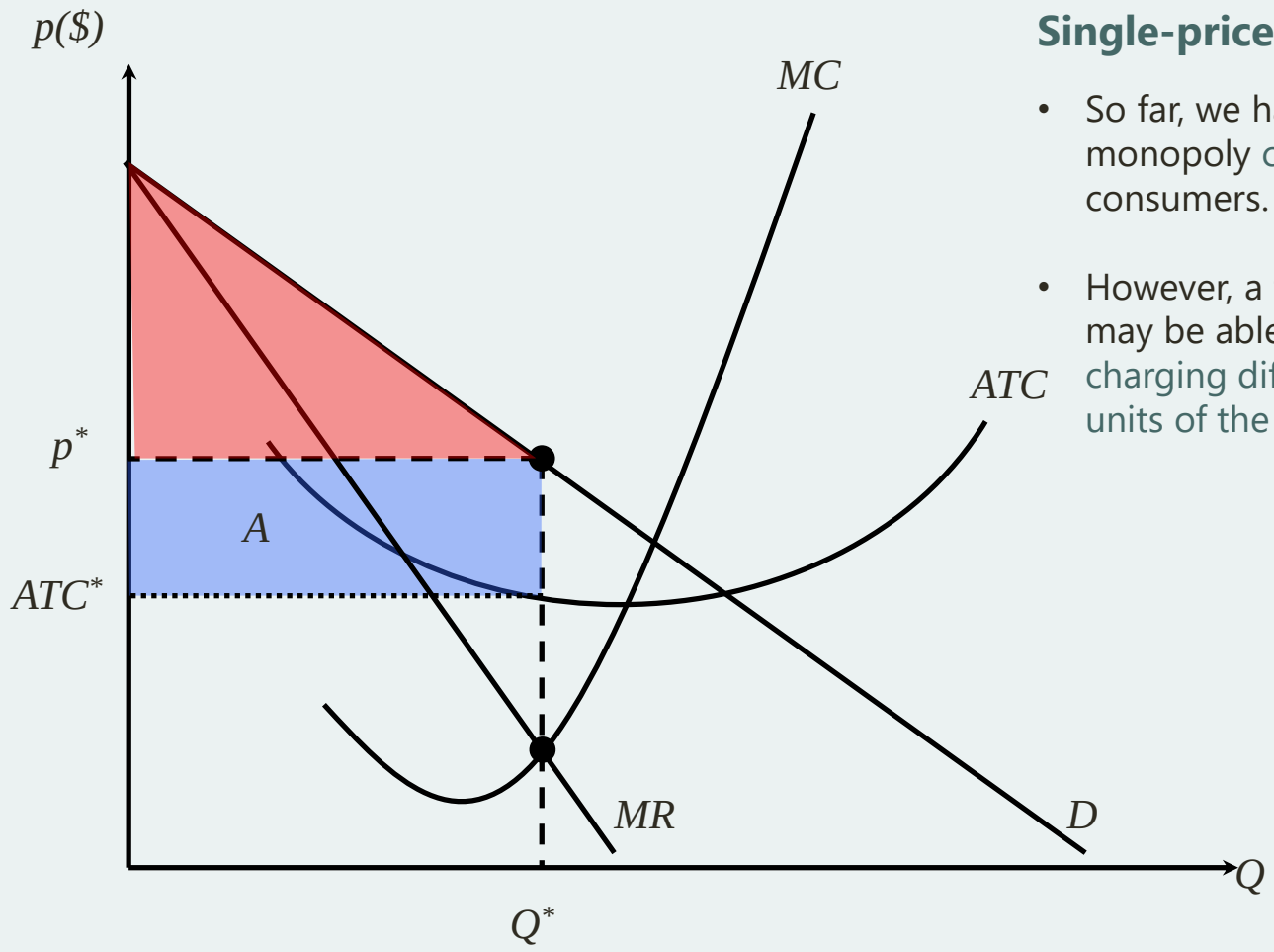


5. REGULATING MONOPOLY

- **Average Cost (*AC*) Pricing** (or **Fair Rate of Return** Regulation)
  - Set the price ceiling to permit the monopoly to charge a price equal to its average cost: ***p = LAC***.
  - This lets the firm cover all its costs and earn a **normal profit**, i.e. a fair rate of return on its investment.
  - **Potential problem?**
    - The monopoly has little incentive to reduce costs; incentive to overinvest.



6. PRICE DISCRIMINATION



Single-price monopoly

- So far, we have assumed the monopoly charges one price to all consumers.
- However, a firm with monopoly power may be able to increase profits by charging different prices for different units of the same product.

6. PRICE DISCRIMINATION

- **Price Discrimination**: Selling different units of the same product at different prices, where the price differences do not reflect differences in cost.

- When is price discrimination possible?
  - The firm must be **price setters** (*monopoly or market power*).
  - The firm have some **information** about the consumers' willingness to pay
  - The firm must be able to **prevent resale**:
    - Unable to resell
    - Transaction costs are prohibitively high



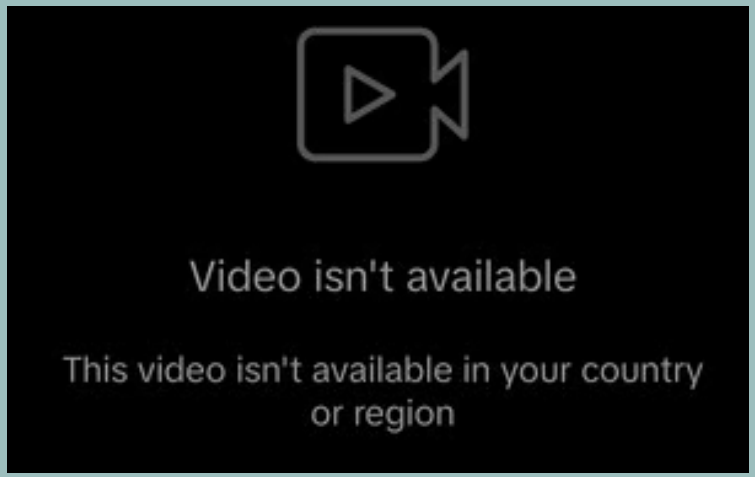


APPLICATION: GEO-BLOCKING

- Geo-blocking is a technology that restricts access to online content based on the user's geographic location (using geolocation tools like IP address checks).

- ***Why do firms use geo-blocking for selling online?***
  - To avoid regulatory and administrative complications of selling in other countries
    - Copyright and licensing reasons (e.g. Netflix, Spotify, Disney+, Hulu …)
    - Regional differences in gambling laws (e.g. Bet365, PokerStars,…) or laws about adult content (e.g. Pornhub, OnlyFans…)
  - **To enforce price discrimination**
    - Example: NBA League Pass, Steam (PC gaming store), Mobile Games





Source: Disconnected continent, *The Economist,* May 9th, 2015; Levesque and Al-Rawi (2021), "Geo-blocking and the Globalization of Pornography, Porn Studies Journal.

6.1 FIRST-DEGREE (PERFECT) PRICE DISCRIMINATION

- The firm charges each consumer exactly their *maximum* willingness to pay for every unit purchased.
  - Each unit is sold at a different price, derived from the demand curve.
- Marginal revenue (MR) for each unit equals its price, so the firm's *MR* curve is the same as its demand curve.
- **A perfectly price discriminating firm maximizes profit by producing an output level where its demand curve meets its marginal cost curve.**

		Single-price monopoly		Perfect Price Discrimination	
p	q	TR	MR	TR	MR
$10	1	$10	$10		
$9	2	$18	$8		
$8	3	$24	$6		
$7	4	$28	$4		
$6	5	$30	$2		

Demand curve facing the firm

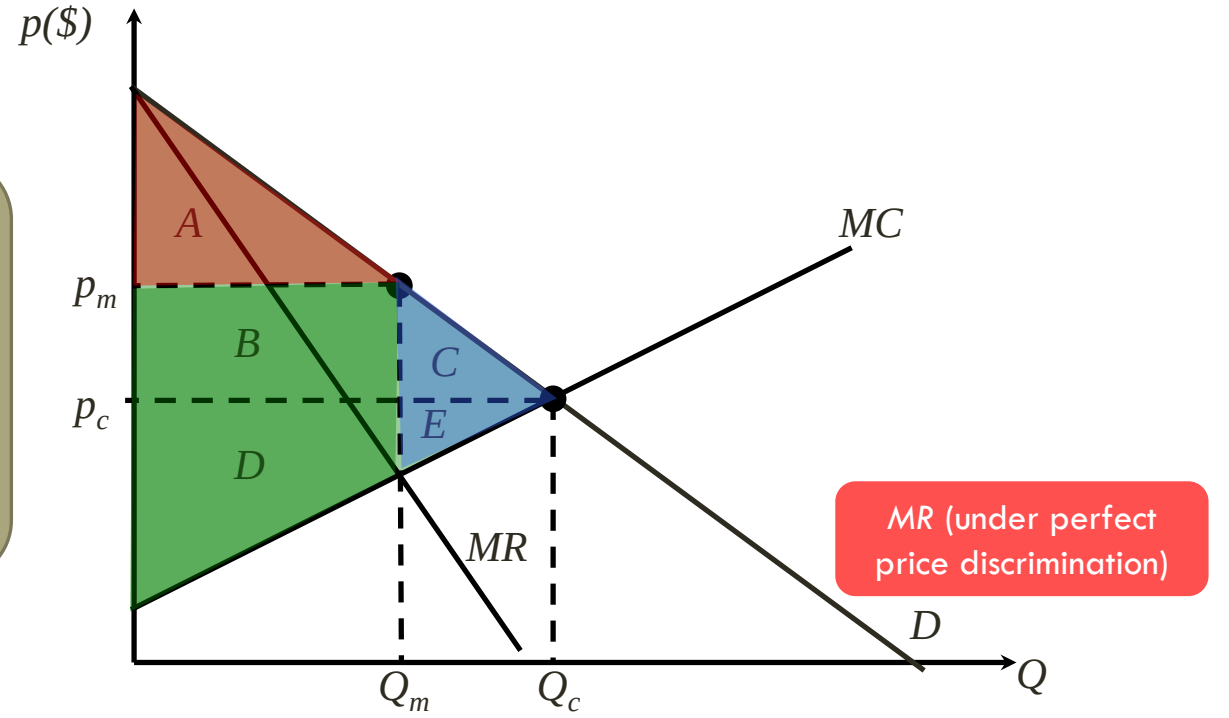
The firm's MR < p

The firm's MR = p

6.1 FIRST-DEGREE (PERFECT) PRICE DISCRIMINATION

Is the market efficient under perfect price discrimination?

Is it fair?



	Competition	Monopoly	Perfect Price Discrimination
CS	*A + B + C*	*A*	
PS	*D + E*	*B + D*	
W = CS + PS	*A + B + C + D + E*	*A + B + D*	
DWL	0	*C + E*	

APPLICATION: PAY WHAT YOU WANT (PWYW)

- **Pay what you want** (or PWYW) Pricing
  - Buyers choose the price they pay, sometimes even zero.
  - Sometimes a minimum price or a suggested price is provided.

- In October 2007, **Radiohead** (British rock band) invited fans to download the album, *In Rainbows*, from the band's website for whatever price they chose to pay!
  - Results? More than 1.2 million downloads in the first week; average price paid: about £4 per album

- In October, 2016, a restaurant owner in Guiyang (China) used the PWYW to attract customers.
  - Results? **Lost 100,000 RMB in just 7 DAYS!!**



Guiyang restaurant tries out 'pay what you want' policy, loses 100,000 RMB in a week

BY ALEX LINDER IN NEWS ON OCT 19, 2016 12:45 AM

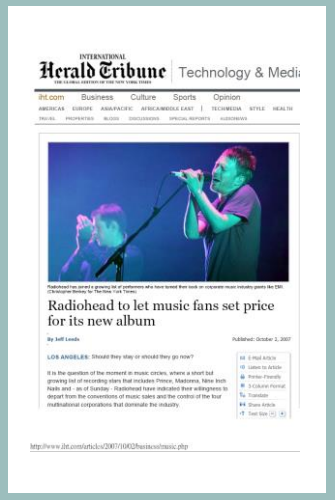
In order to attract customers to her new restaurant, a restaurant owner in Guiyang came up with a noble if naive promotional policy, allowing diners to order however many dishes that they desired and then simply pay whatever they wanted when the bill came.

Turns out, this is a really, *really* bad idea.

While the tactic did manage to attract many diners to the new karst-themed restaurant on its opening day, on October 2nd, it didn't manage to manage to attract much moolah. Some customers paid only 10% of the cost of their meal, while others dared to leave just 1 RMB on the table. After seven days, the restaurant had lost 100,000 RMB, The Paper reports.

"If our food or service was the problem, then that would be one thing," owner Liu Xiaojun sighed. "But according to customer feedback, our dishes are both filling and tasty. It's just that the payments don't match up with the evaluations."

After just a week, the promotion fell apart. Liu and her two partners got into an argument and one of the partners fled back to his hometown, vowing not to return.



INTERNATIONAL Herald Tribune | Technology & Media

iht.com Business Culture Sports Opinion

Radiohead has joined a growing list of performers who have turned their back on corporate music industry giants like EMI.

Radiohead to let music fans set price for its new album

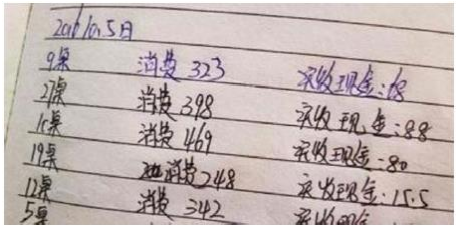
By Jeff Leeds

Published: October 2, 2007

LOS ANGELES: Should they stay or should they go now?

It is the question of the moment in music circles, where a short but growing list of recording stars that includes Prince, Madonna, Nine Inch Nails and - as of Sunday - Radiohead have indicated their willingness to depart from the conventions of music sales and the control of the four multinational corporations that dominate the industry.

http://www.iht.com/articles/2007/10/02/business/music.php



2016.10.5日

9桌 消费 323 实收现金:0

3桌 消费 398 实收现金:88

1桌 消费 469 实收现金:80

19桌 应消费 348 实收现金:15.5

12桌 消费 342

5桌

APPLICATION: PERSONALIZED (DYNAMIC) PRICING?

- Uber relies extensively on machine learning (ML) to establish a robust and reliable Dynamic Pricing (or Personalized Pricing) system.
  - The data is collected, and the algorithm predicts the top price that you are most likely to pay.
  - Using large quantities of data, AI can also pull from different sources to add to the algorithm such as events, time of day, amount of people requesting rides and more.
  - It also pull in personal customer data and historical activity to determine how to price the ride.
- "One of the strongest predictors of whether or not you are going to be sensitive to surge is how much battery you have left on your cell phone," Keith Chen, Uber's head of economic research said.
- Dynamic pricing has been used for years. American Airlines was the first to utilized the method and Amazon does it online.

Forbes

Uber Charges More If They Think You're Willing To Pay More

Nicole Martin Former Contributor

AI & Big Data

I write about digital marketing, data and privacy concerns.



uber
GETTY

Ever try and get an Uber at rush hour and find that prices have surged? Or see the price of an Uber change within minutes? Well, thanks to AI and data it's because the app assumes you'll pay the surged price. And you know what? We usually do.

(Source: How deep are your pockets?, *The Economist,* Jun 30th, 2012; Uber Charges More If They Think You're Willing To Pay More, *Forbes*, Mar 30, 2019.)

6.2 THIRD-DEGREE (MULTIMARKET) PRICE DISCRIMINATION

- First-degree price discrimination is usually hard to implement (why?).

- A firm exercising **third-degree price discrimination** divides consumers into groups and charges a different price to each group.
  - Example: Student discounts, Senior discounts, different prices in different countries, …

Hong Kong resident offer: Hong Kong residents can enjoy special ticket offers on 1-day ticket and 2-day ticket *until November 15, 2023*.



香港迪士尼樂園加價｜最新票價

香港迪士尼樂園由9月20日起加價，迪士尼一日門票將分為4個級別，由現有3類再增加一級。迪士尼門票最新第全新設計的「第4級別」，適用於年內最繁忙日子，標準票價為879元。

而原有最高級別的「特定高峰日子」（現為第3級別），票價則由759元增至799元；「高峰日子日子」（現為第二級別）票價由699元；至於最票價最平的「普通日子」（現為第 1級別門票領錢維持不變。

迪士尼樂園新票價由9月20日起生效，香港居民於2023年11月15日或之前以原有票價購買1日門票。想用優惠價購買迪士尼樂園門票？即刻碌上Klook!

迪士尼樂園一日門價最新正價票價：

Third-degree price discrimination

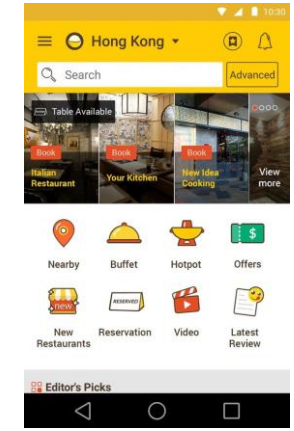
		第2級別	第3級別	第4級別
成人	$639	$719	$799	$879
小童	$475	$539	$599	$659
長者	$100	$100	$100	$100

Application: Hong Kong Disneyland visitors face increased ticket prices starting from September 20, 2023.

6.2 THIRD-DEGREE (MULTIMARKET) PRICE DISCRIMINATION

- Two ways firms divide consumers into groups:
  - Observable Characteristics (Direct Segmentation)
    - Age, gender, student status, location/country, …
  - Self-Selection: Allows consumers to *choose* the group to which they belong (usually based on their willingness to spend time to obtain a lower price)
    - Coupons, rebates, redemption code, Groupons, time-consuming shopping methods









APPLICATION: MCDONALD'S DESSERT PRICE

- 在同一間麥當勞分店，不同櫃枱購買食品，價錢最多可貴56%
  - 將軍澳新都城麥當勞外甜品站（圖）的雪糕新地離奇「加價」，在甜品站購買一杯要9元，返回店內只需6元，貴50% (At the McDonald's in TKO, ice-cream at the dessert counter is $9. Inside the store, it is only $6 - a 50% difference!)
  - 記者問甜品站店員為何定價偏高，她苦笑說：「我都想知點解。問過經理，佢話冇得解。(When asked why the desert counter price is higher, the staff replied with a wry smile: "I wish I knew, too. The manager said there is no explanation.")
  - 中文大學市場學系教授認為，同一店舖不同櫃枱定價不一，甚為罕見 (The professor of Marketing, CUHK, commented that having different prices at separate counters within the same shop is very uncommon.)

(Source: *Appledaily,* Sept 5th, 2012.)

6.3 SECOND-DEGREE (QUANTITY) DISCRIMINATION

- In many markets, customers buy more than one unit over time. Because each consumer's demand curve slopes downward, their willingness to pay decreases as they buy more units.

- **Quantity Discounts**: Customers pay one price for the first block of units (up to a certain quantity), then a different (usually lower) price for additional units.
  - Example: Price for the first three units: $100 each; Price for the fourth unit and beyond: $70 each

- ***How about the membership program?***
  - Any customer who made an accumulate purchase of over certain amount is eligible to become a VIP member.
  - A VIP member enjoys a 10% discount for further purchases.



