Chapter 14

MODERN PRINCIPLES OF ECONOMICS
Third Edition

Price Discrimination and Pricing Strategy

Tyler Cowen • Alex Tabarrok

Outline

- Price Discrimination
- Price Discrimination is Common
- Is Price Discrimination Bad?
- Tying and Bundling

Introduction

- The anti-aids drug Combivir sells for \$0.50/pill in Africa and \$12.50/pill in Europe.
- Demand in Africa is lower and more elastic because people on average are poorer.
- GlaxoSmithKline can increase their profit by selling the same product at different prices to different customers.
- Price discrimination can take many different forms and occurs more frequently than most people realize

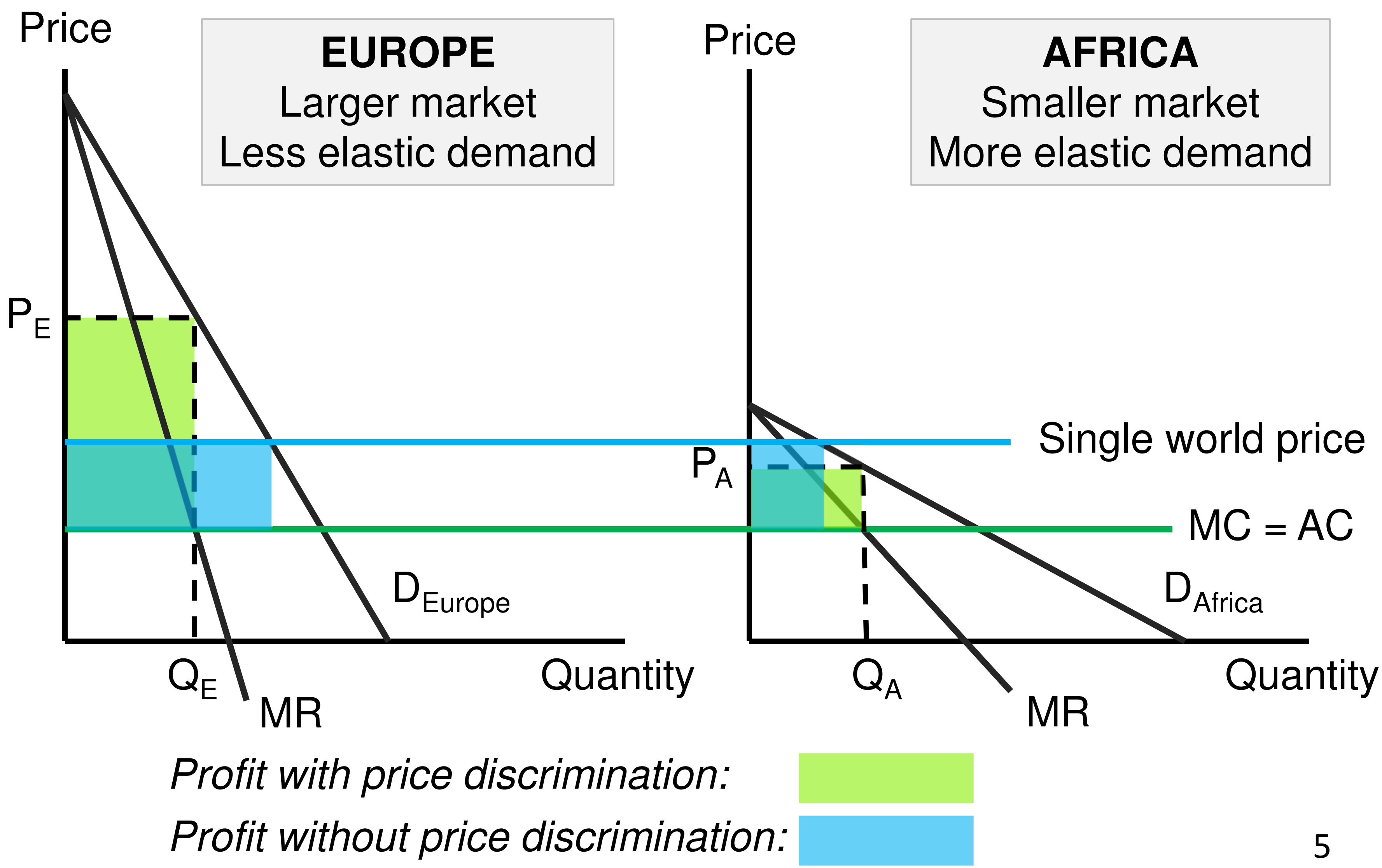
Definition

Price discrimination:

selling the same product at different prices to different customers.

Thus firms engaging in price discrimination must have market power and can not happen in competitive industries

Price Discrimination



Self-Check

A firm with market power can use price discrimination to:

a. Decrease costs.
b. Decrease output.
c. Increase profits.

Answer: c – *a firm with market power can use price discrimination to increase profits.*

Price Discrimination

- Recall the profit-maximizing rule for firms with Monopoly power:
  - *produce the Quantity where MR = MC*
  - *based on that Quantity, charge as much as the market will bear (found by the position of the demand curve)*
- But what if you sell to more than one market, each with its own demand curve?
  - E.g. senior citizens and young people, business travelers and leisure travelers.

Price Discrimination

The principles of price discrimination:

1a. If the demand curves are different, it is more profitable to set different prices in different markets than a single price that covers all markets.

1b. To maximize profit, the firm should set a higher price in markets with more inelastic demand.

2. Arbitrage makes it difficult for a firm to set different prices in different markets.

Definition

Arbitrage:

taking advantage of price differences for the same good in different markets by buying low in one market and selling high in another market.

For example, these markets can have geographic differences or time period differences (futures)

Preventing Arbitrage

- Rohm and Haas produced a plastic (MM) used in industry and in dentistry.
- MM for industrial uses sold at 85 cents per pound; a slightly different version for dentures sold at $22 per pound.
- To reduce arbitrage, Rohm and Haas spread a rumor that industrial MM was laced with arsenic.
- The rumor proved to be sufficiently effective

Preventing Arbitrage

- Smuggling cheap AIDs drugs out of Africa ($.50/pill) for resale in Europe ($12.50/pill)
- Different colored pills in Africa
- Easily identified in Europe
- Pharma companies assisted by Euro police enforcement
- Fairly effective anti-arbitrage process

Preventing Arbitrage

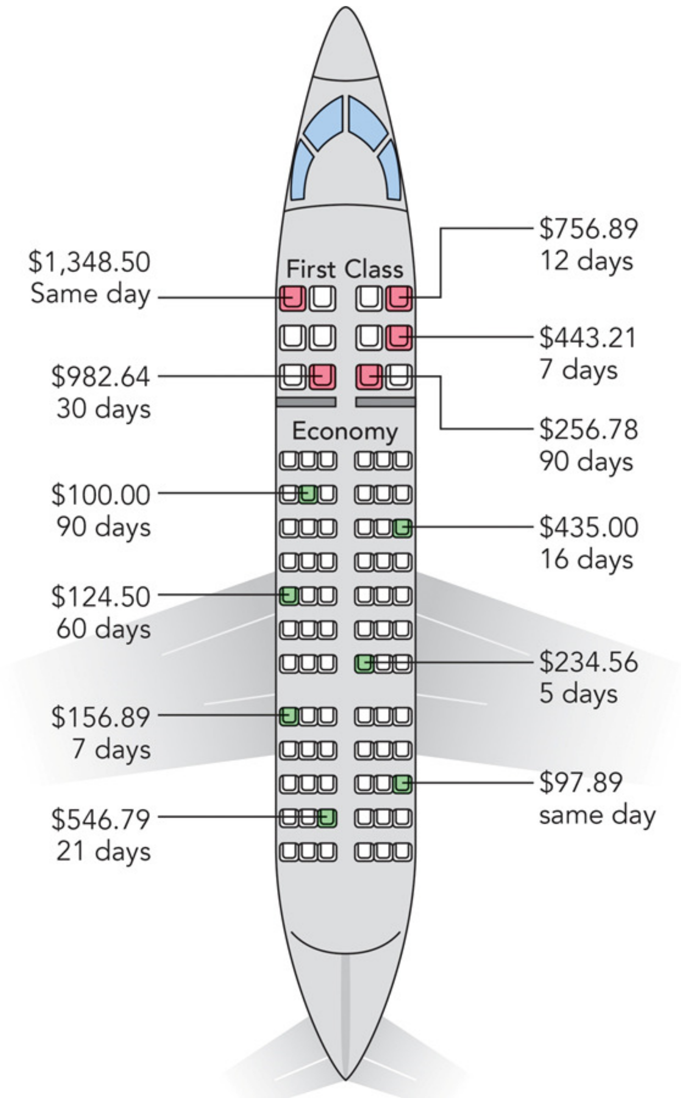
- Corn or fuel ethanol as per the US ethanol program
- AKA “White Lightning”
- Could be used as drinking alcohol, but would be subject to substantial “sin” taxes
- Therefore, corn ethanol is “poisoned” to prevent arbitrage/consumption
- “

Preventing Arbitrage

- Regional DVD coding
- DVD prices set at different levels for different parts of the world
- Without it, could buy very low-priced DVDs in India and sell them in the US
- Encoding prevents arbitrage

Price Discrimination is Common

- Movie theaters often charge seniors less.
- Businesses often pay more for software than students do.
- Airlines set different prices according to characteristics that are correlated with willingness to pay.



Price Discrimination is Common

- Airline Price discrimination
- Need to determine elasticity/willingness to pay of the customer segments
- Leisure vs business travelers
- Making flights that extend over a weekend identifies flyers as leisure travel
- So do advanced reservations (more elastic)
- Airline tickets are non-transferrable (to prevent arbitrage)
- Not to be confused with standby fares

Price Discrimination is Common

- Movie theatres (senior & matinee discounts)
- Hardcover vs softcover books
- Discount coupons
- Volume discounts
- Computer printer example (pages per minute)

Definition

Perfect price discrimination:

each customer is charged his or her maximum willingness to pay.

Perfect Price Discrimination

TABLE 14.1 Price Discrimination at Williams College, 2001–2002

Income Quintile	Family Income Range	Net Price After Financial Aid
Low	$0–$23,593	$1,683
Lower Middle	$23,594–$40,931	$5,186
Middle	$40,932–$61,397	$7,199
Upper Middle	$61,398–$91,043	$13,764
High	$91,044+	$22,013

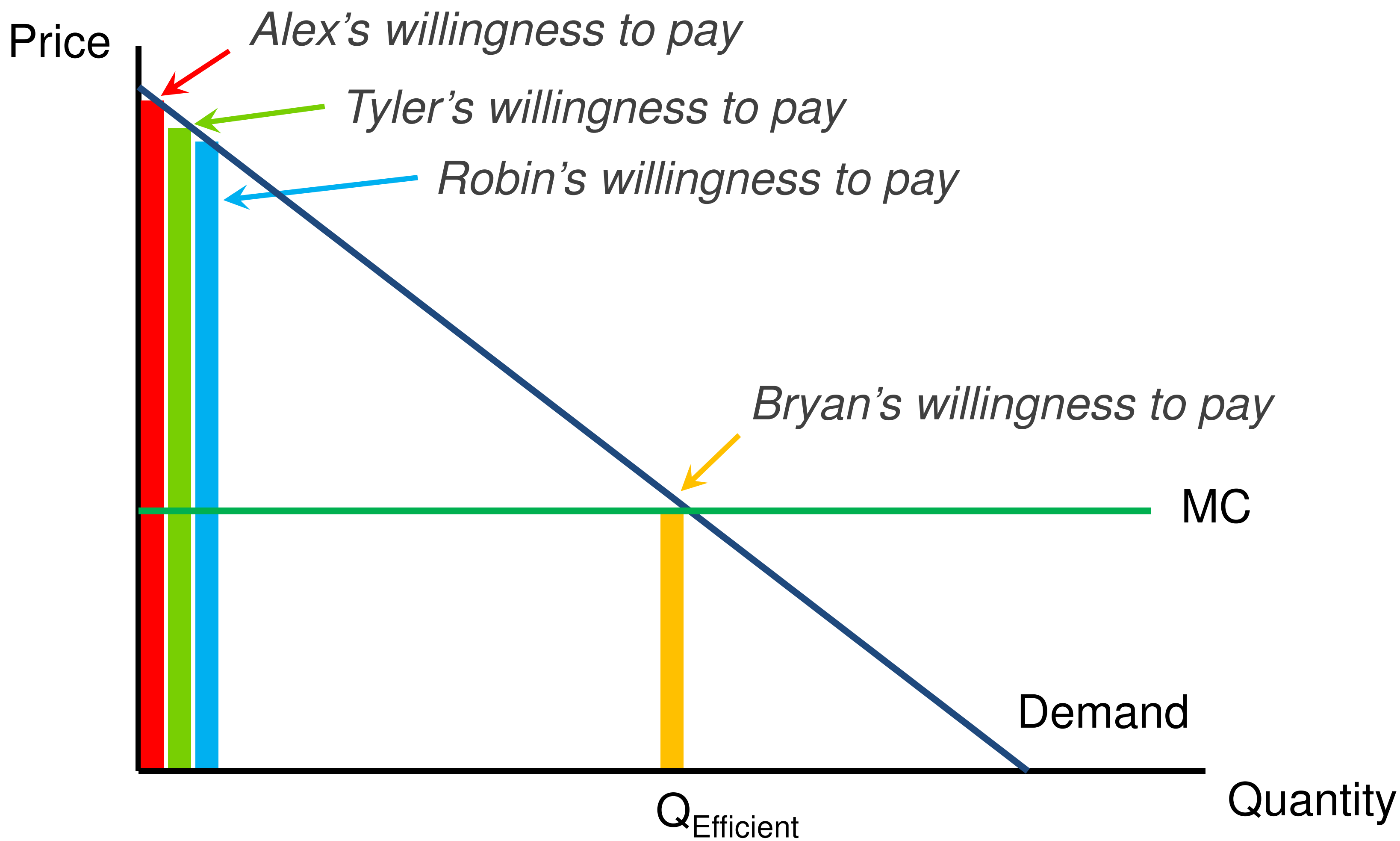
Note: Students who did not apply for financial aid paid $32,470.
Source: Hill, Catharine B., and Gordon C. Winston. 2001. *Access: Net Prices, Affordability, and Equity at a Highly Selective College*. Williams College, DP-62.

Williams College uses detailed information about its customers to set many different prices.

Perfect Price Discrimination

- A perfectly price-discriminating (PPD) monopolist charges each consumer his or her maximum willingness to pay.
- Consumers end up with zero consumer surplus.
- All of the gains from trade go to the monopolist.
- The PPD monopolist has an incentive to maximize the gains from trade, which means no deadweight loss.

Perfect Price Discrimination



A perfect price discriminator produces the efficient quantity.

Perfect Price Discrimination

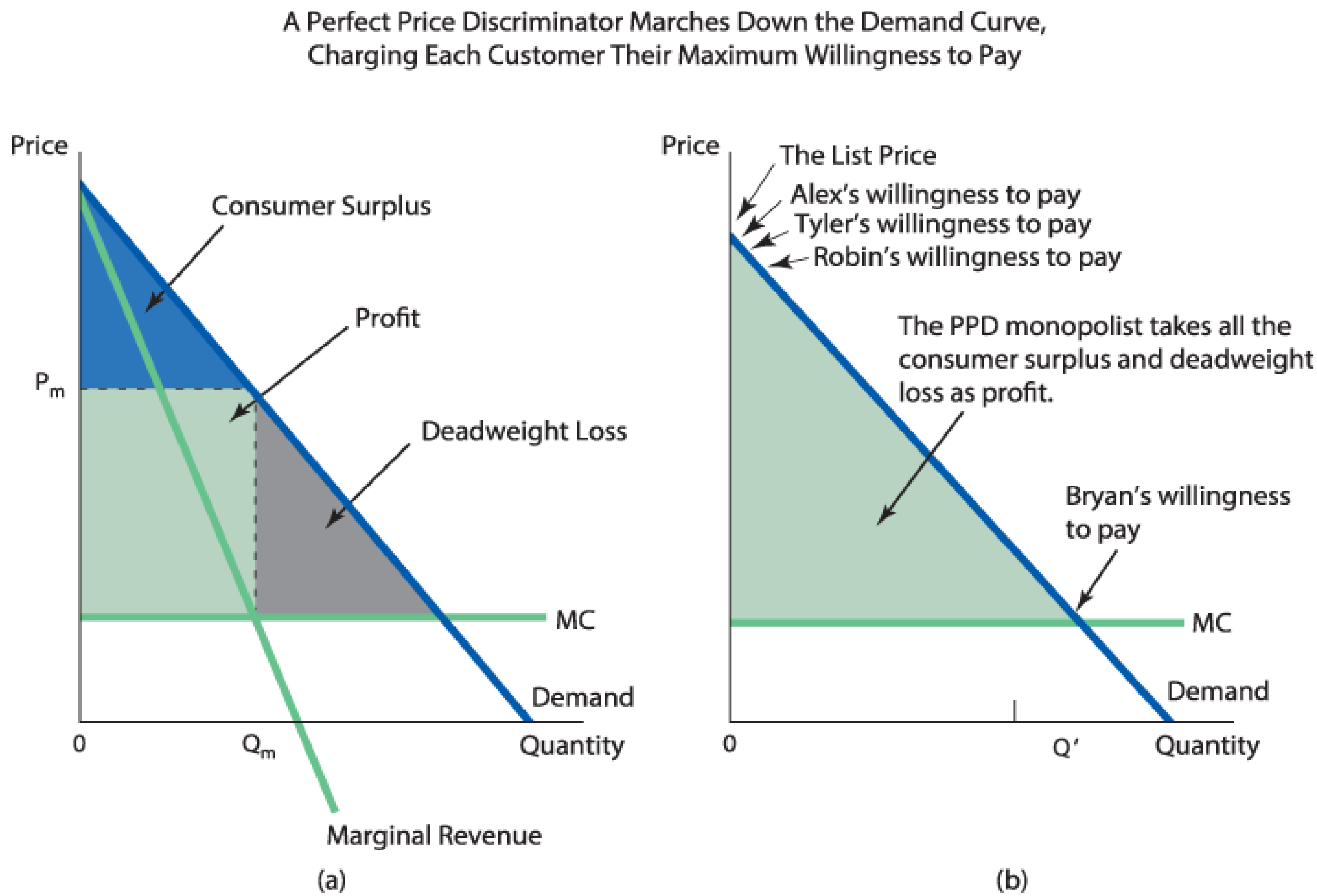


Figure 14.4
Cowen, *Modern Principles of Economics*, 4e, © 2018 Worth Publishers

Perfect Price Discrimination

- In practice, PPD is difficult to implement since it requires very detailed information on consumers' maximum willingness to pay
- Producers/sellers will go to great lengths to gather information on their customers to achieve the goals of PPD
  - Why do you suppose car salesmen are so friendly when you approach them?
  - Why do they insist on doing a credit check as a "necessary" first step?

Self-Check

Perfect price discrimination means charging each customer:

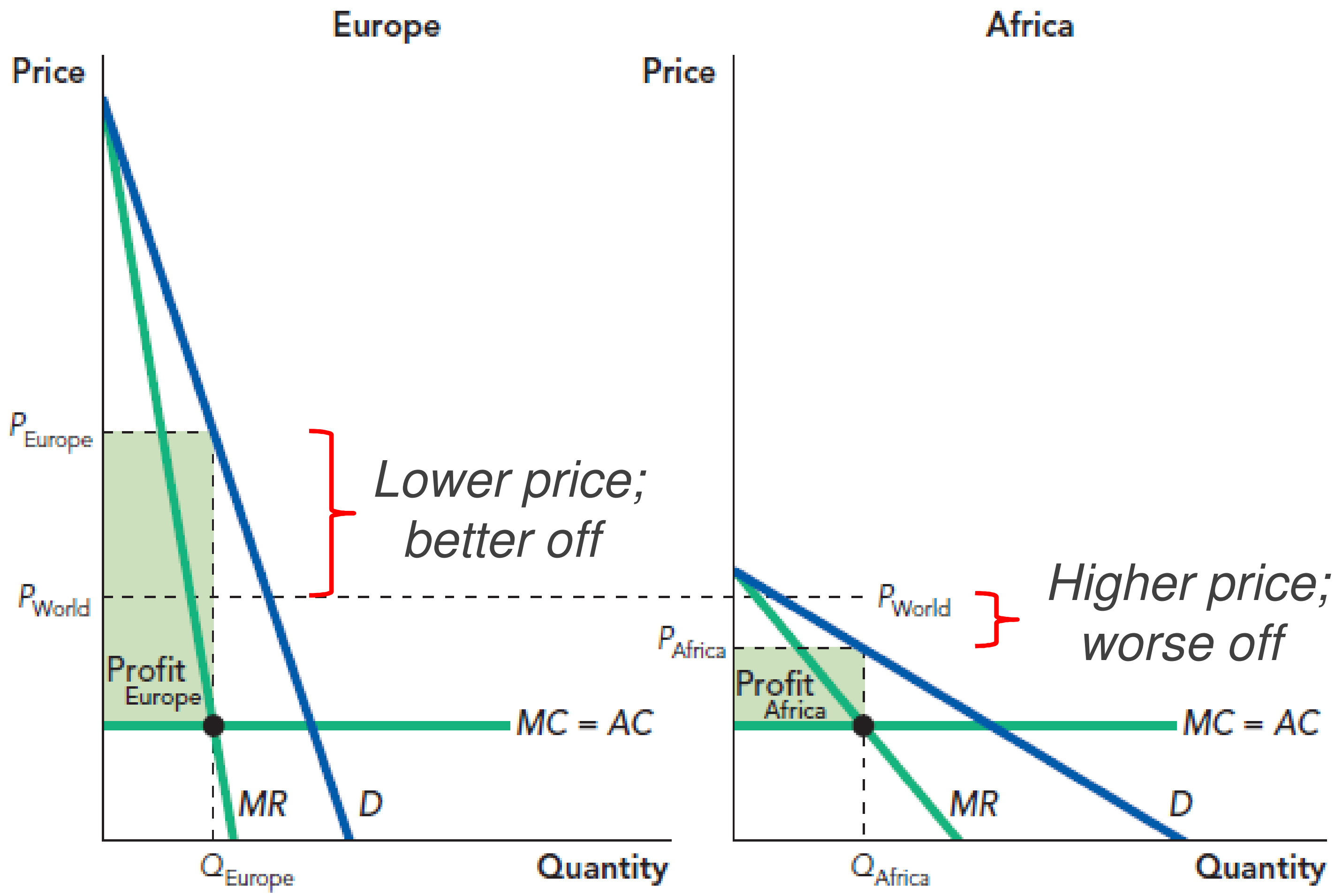
a. The same amount.
b. Their maximum willingness to pay.
c. Their maximum ability to pay.

Answer: b – *perfect price discrimination means charging each customer their maximum willingness to pay.*

Is Price Discrimination Bad?

- Price discrimination could be better or worse than single pricing.
- It is bad if the total output with price discrimination falls or stays the same.
- If output increases under price discrimination, then total surplus will usually increase.
- Firms need to be careful, must try to control consumer resentment by not allowing widespread knowledge of pricing differences
- "Marketing"

Is Price Discrimination Bad?



Total surplus can increase OR decrease under one price.

Is Price Discrimination Bad?

- Price discrimination helps cover fixed costs.
- Fixed costs remain the same, while profits increase with market size.
- More profit encourages more research and development.
- Creates incentives to increase output.

Self-Check

Price discrimination is better than single pricing if:

a. Total surplus increases.
b. Total surplus decreases.
c. Output remains the same.

Answer: a – *price discrimination is better if it increases total surplus.*

Tying and Bundling

Tying:

to use one good, a consumer must use a second good that is sold only by the same firm.

Bundling:

Requiring that products be bought together in a bundle or package.

Tying

- Tying is a form of price discrimination
- Hewlett Packard sells printers below cost and ink far above cost.
- The printer will only work with HP ink cartridges.
  - Cartridge design is patented via print head
- Those with a high willingness to pay probably want to print a lot of photos.
- Tying causes high users to pay more per photo than low users.
- “Base” vs “variable” goods are tied

Tying

- Firms generally price the base good below cost and the variable good above cost.
- Customers reveal their WTP through the variable good
- Tying illustrates the benefits and costs of price discrimination.
  - May increase output by lowering price for low volume users.
  - Spreads the fixed cost of R&D over more users, encouraging innovation.
  - Extra money is often spent to keep competitors out of the ink business.

Tying

- Tying examples:
  - Ink cartridges and printers
  - Razors and razor blades
  - Xbox consoles and game cartridges
  - Many others

- Many firms often spend resources to construct a strict compatibility between the “base” and “variable” goods

Bundling

- Bundling is also a form of price discrimination
- Bundling requires products to be purchased together in a bundle or package
  - Firms use bundling when they have more information on the demand for the bundle than for the individual parts
  - Bundling may help prevent arbitrage

Bundling

- Many goods <u>must</u> be bought as a package.
  - Toyota doesn't sell engines, steering columns, and wheels it sells a bundle called a car.
  - It would be difficult for most consumers to assemble the parts themselves.
- Microsoft bundles Word, Excel, Outlook, Access, and PowerPoint in a bundle called Microsoft Office.
  - It would not be difficult for consumers to buy the products individually and assemble them.
  - Microsoft can spread its fixed costs over greater Q

Bundling

TABLE 14.2 Maximum Willingness to Pay for Word and Excel

	Amanda	Yvonne
Word	\$100	\$40
Excel	\$20	\$90

- Consumers have very different values for the separates but similar values for the package.
- This enables price discrimination.

Bundling

- If the products in the previous table were sold separately, what would be Microsoft's best pricing strategy to maximize revenues?
- Selling Word at $40 yields: Q = 2 and TR = $80
- Selling Word at $100 yields: Q = 1 and TR = $100
- Selling Excel at $20 yields: Q = 2 and TR = $40
- Selling Excel at $90 yields: Q = 1 and TR = $90

- This pricing method results in TR for both products at:
  - $100 + $90 = TR = $190
- Is there a way to increase revenues?

Bundling

TABLE 14.3 Maximum Willingness to Pay for Office

	Amanda	Yvonne
Word	$100	$40
Excel	$20	$90
Office = Word + Excel	$120	$130

- Suppose Microsoft charges $120 for Office.
- Amanda pays $100 for Word and $20 for Excel.
- Yvonne pays $40 for Word and $80 for Excel.

Bundling

- What if the two products are bundled?
- What should the price be to maximize revenues (and therefore profits)?
- If the bundle price = $130? TR = $130
- If the bundle price = $120? TR = $240
  - Both customers have a WTP of at least $120
  - Both customers buy bundle, TR = 2 * $120 = $240
  - Very close to perfect price discrimination
- Bundling increases gains from trade, profitability
- More examples of bundling:
  - Cable TV
  - Econ textbooks

Bundling

- Cable TV example:
  - Channels sold in group packages
  - Politicians have recently attacked the practice of bundling and have argued for “a la carte” pricing
  - Bundling makes sense for Cable TV since customers have a high WTP for some channels and a low WTP for others
  - The demand for the “bundle” of channels across consumers is fairly similar
  - The MC of additional channels is low
  - Hence bundling is beneficial to high fixed cost, low marginal cost industries like CTV

Self-Check

Requiring goods to be bought together in a single package is called:

a. Tying.
b. Bundling.
c. Single package pricing.

Answer: b – *requiring goods to be bought together is called bundling.*

Takeaway

- Price discrimination is common.
- Firms often price goods based on characteristics correlated with willingness to pay.
  - Student and senior discounts.
  - Setting prices depending on how far in advance a flight is booked.
- Must prevent arbitrage to successfully price discriminate.

Takeaway

- The more a firm knows about its customers the better it can price-discriminate.
- Perfect price discrimination means charging each customer their maximum willingness to pay.
- Tying and bundling are different forms of price discrimination.
- By increasing profits, price discrimination increases the incentive to engage in R&D.