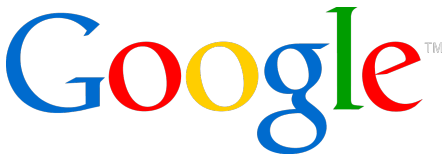

Differential pricing and welfare

A short tutorial

Hal Varian
Chief economist, Google

Types of differential pricing

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First degree (personalized pricing) – price depends on identity

In extreme case everyone pays different price

Second degree (versioning) – prices differ depending on consumer choice, but same *price menu* for everyone

Quantity discounts, product line with various (price, quality) combos, bundling

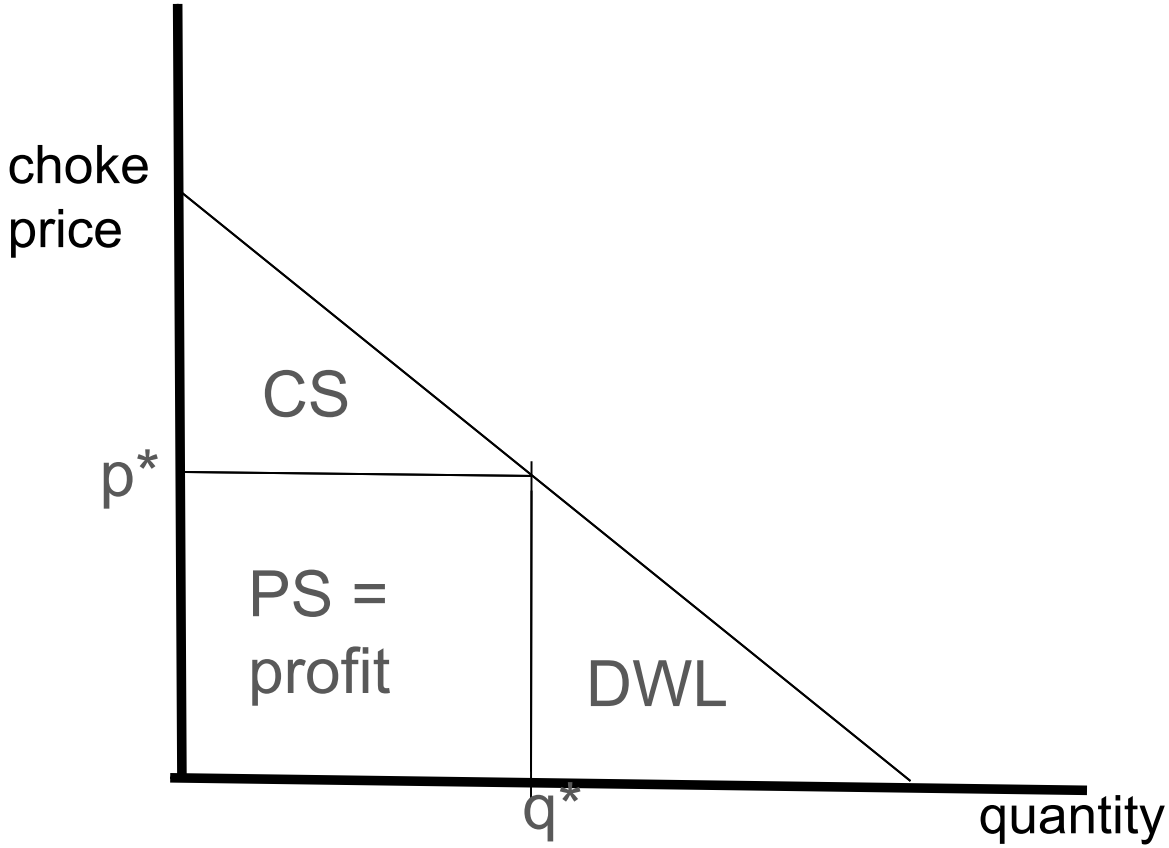
Examples: Saturday night stayover, movie pricing

Third degree (group pricing) – prices differ depending on group membership

Student discounts, senior discounts

Econ 101

With linear demand curve and zero marginal cost, maximum profit when price = 1/2 choke price. Note that WTP at monopoly price exceeds the cost of providing an additional unit. Natural incentive to price discriminate since value to marginal user exceeds cost...



Price differentiation can allow consumers to be served that wouldn't be served otherwise

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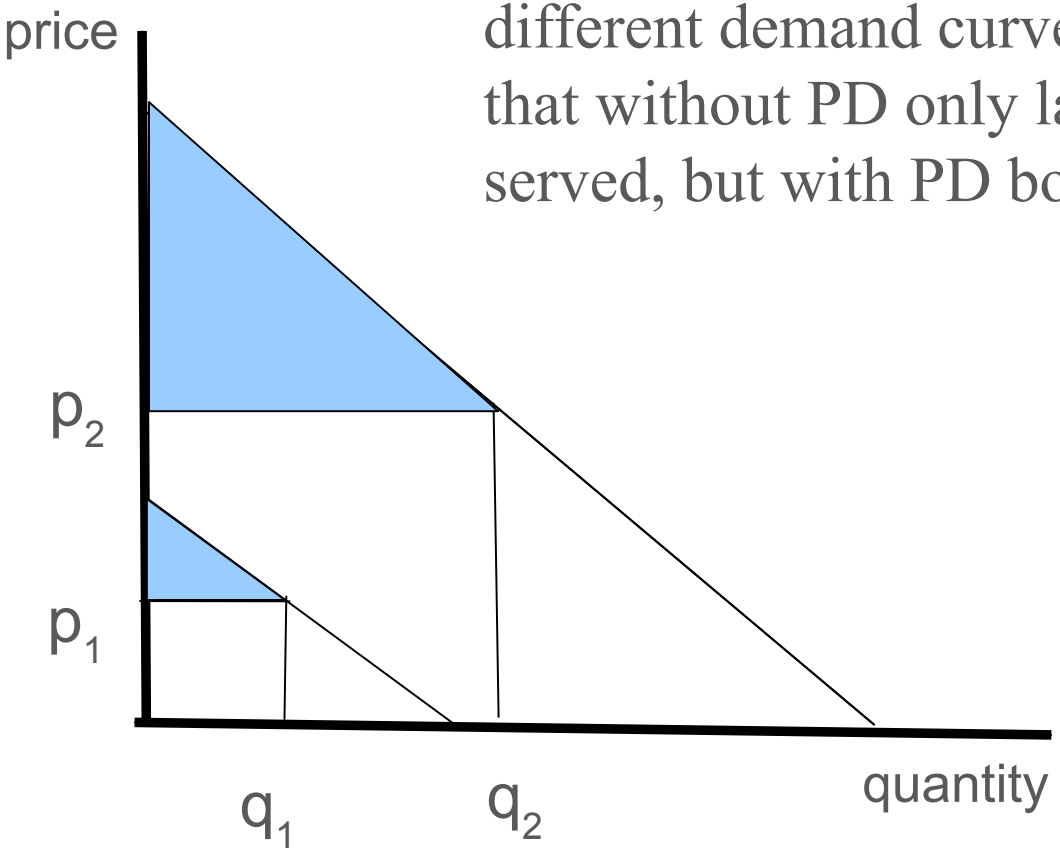

Suppose there are 2 groups with different demand curves. It may happen that without PD only large group gets served, but with PD both get served.

Examples

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Drug prices in US v India

- If drug is used in both place and price must be the same, price will likely be set in US market and India will not be served
- Allowing differential pricing increases welfare

However, it doesn't have to work that way

- With linear demand if both markets are served in the single-price regime, then allowing differential pricing will *decrease* welfare

Critical issue

- Does total output go up or down when differential pricing is allowed?
  - If up: may increase welfare (some would say likely)
  - If down: definitely decreases welfare
  - Have to consider counterfactual – difficult to prove.

Second degree price discrimination

Similar to analysis of 3rd degree in that it may enable new markets to be served. But there is a twist...you have to worry about competing with yourself.

Airline pricing: business travelers wtp a $500 for ticket, tourist travelers wtp $200. Suppose there are 50 of each.

- Price = $500, only 50 business travelers fly make $25,000
- Price = $200, all 100 fly, make $20,000
- So without price discrimination, price=$500 and only business market is served

Solution: require Saturday night stayover.

- Tourist: doesn't mind
- Business traveler: if cost of staying over Saturday night > $300 will not do it
- Airline makes 25,000 + 10,000 = $35,000

Welfare analysis and self-selection problem

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In this example, there is zero consumer surplus in both single-price and two-price case. But *total* welfare (including producer surplus) is higher under 2nd degree price discrimination.

What happens if high end and low end are too similar?

If the business traveler views the cost of staying over Saturday night as $250 then the previous solution is no longer feasible.

However, airline can charge those willing to stay over Saturday night $200 and those who won't stay $440.

Surplus to business traveler of no Saturday stayover: $500 – 440 = $60

Surplus to business traveler with Saturday stayover: $500 – 250 – 200 = value – cost of staying - cost of ticket = $50

Airline loses a little on the high value customers by cutting price to them, but it is worth it in overall profit.

Competing with yourself

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We have seen that you may need to cut the price of the high end version

But another strategy is to cut the *quality* of the low-end version

- Make it less attractive to high-end customers
- For example: baggage allowance, no food, no drink, no room, etc

To make 2nd degree price discrimination work you have to enforce self selection constraint:

Value to high end user from choosing high-end service - **price of high end service** > **Value to high end user from choosing low-end service** – price of low-end service

Two instruments: price of high-end service, quality of low-end service

Emile Dupuit (1849) on railroad pricing

Google

> It is not because of the few thousand francs which would have to be spent to put a roof over the third-class carriage or to upholster the third-class seats that some company or other has open carriages with wooden benches … What the company is trying to do is prevent the passengers who can pay the second-class fare from traveling third class; it hits the poor, not because it wants to hurt them, but to frighten the rich …

> And it is again for the same reason that the companies, having proved almost cruel to the third-class passengers and mean to the second-class ones, become lavish in dealing with first-class customers. Having refused the poor what is necessary, they give the rich what is superfluous.

Summary of second degree

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If output goes down, probably bad

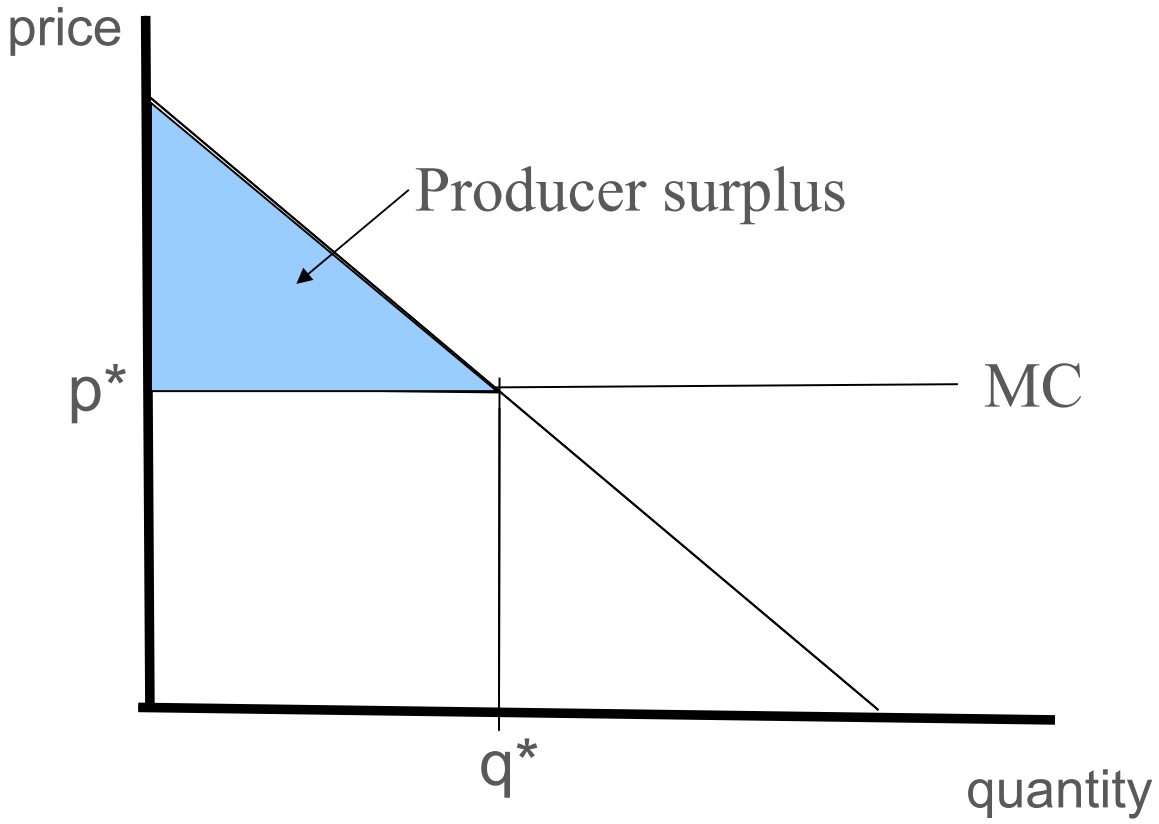
If output goes up and self-selection costs are not bad (as in the original example of Saturday-night-stayover), then welfare probably goes up

Three effects need to be considered

- The impact on output (as before)
- The price reduction to high end (good)
- The quality reduction at low end (bad, but hard to measure)

First degree price discrimination

In textbook analysis, first degree price discrimination turns consumer surplus into producer surplus. If you can really charge every consumer a different price, then optimal to produce efficient level of output.



But first-degree price discrimination is not without problems

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Compare two market organizations

- Search for a product, then bargain over price
- Search for a product, then pay posted price
- Suppose search is (somewhat) costly
- Suppose seller is very good bargainer

If the bargainer is too good at bargaining, market may not be viable

- Search costs are sunk when you arrive in the bargainer's store
- If seller takes too much of your surplus, it isn't worth searching
- Posted price is a commitment device by store to make it worthwhile for consumer to search

Example from copyright

- Registry [no prices] vs a clearing house [with prices]
- (Still allows for 2nd degree price discrimination)

Bundling

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Offer a group of products at a single price. Pure bundling, mixed bundling. Producer assembled or consumer assembled.

Why bundle?

- Product complementarities (left shoes, right shoes)
- Introduce new products via the bundle (Outlook)
- Option value of bundled product (zero incremental price)
- Switching costs are increased

Another reason: reduce dispersion in WTP

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Example: have wordprocessor and spreadsheet to sell

- Mark: WTP $120 for wordprocessor, $100 for spreadsheet
- Noah: WTP $120 for spreadsheet, $100 for wordprocessor
- Assume WTP for bundle = sum of WTP for components

Outcomes

- Sell separately: set price = $100 for each, revenue = $400
- Bundle: set bundle price = $220, revenue = $440

Where did extra revenue come from?

- Reduced dispersion of WTP
- Example: subscription (newspaper, magazine, cable TV, etc.)

Classification

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Type of bundling

- Pure bundling
- Mixed bundling

Legal bundling v illegal tying

- If only way to get monopolized product is to buy another product, may be accused of “tying”
- Must establish that there is market power in the primary market.

Controversies

- “There's only one monopoly rent”
- Leveraging existing monopolies to create new ones