Topic 4C: Pricing Strategies with Market Power

Business Economics, Organization, and Management (BUEC 211)

James Macek

Alberta School of Business
University of Alberta

Outline

Price Discrimination

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Should firms charge all of their customers the same price?

Types of Price Discrimination

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Type 2: Group Price Discrimination (3rd degree)

- The firm charges each group of customers a different price
- Does not charge different prices within the group

Type 3: Non-linear Price Discrimination (2nd degree)

- The firm charges a different price for large purchases than for small quantities
- Price paid varies according to the quantity purchased

Necessary Conditions for Price Discrimination

1. **Have market power**
   - Monopolist and oligopolist firms
   - Perfectly competitive firm cannot price discriminate (why?)
2. **Identify groups with different price sensitivities**
   - Firm must be able to **identify** demand differences across consumers. Why might this be hard?
3. **Prevent resale**
   - Usually the biggest obstacle to price discrimination
   - Actions: raise transaction costs; require contracts forbidding resale; void warranties if purchase from unauthorized retailer; rely on international trade barriers

Perfect Price Discrimination

An Impossible Benchmark: Perfect Price Discrimination

A firm with market power that can prevent resale and has full information about its customers' willingness to pay price discriminates by selling each unit at the **reservation price**.

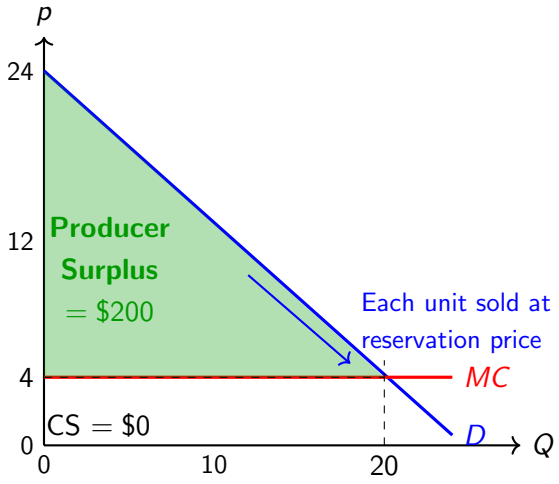
Reservation Price

The maximum amount any consumer would pay for a good.

Given the demand curve indicates the maximum willingness to pay for Q units of the good, the reservation price is given by the height of the demand curve at each output level.

Hence, a perfectly price-discriminating firm's **marginal revenue curve is the same as the demand curve**.

Perfect Price Discrimination for $C = 4Q$ and demand $P = 24 - Q$



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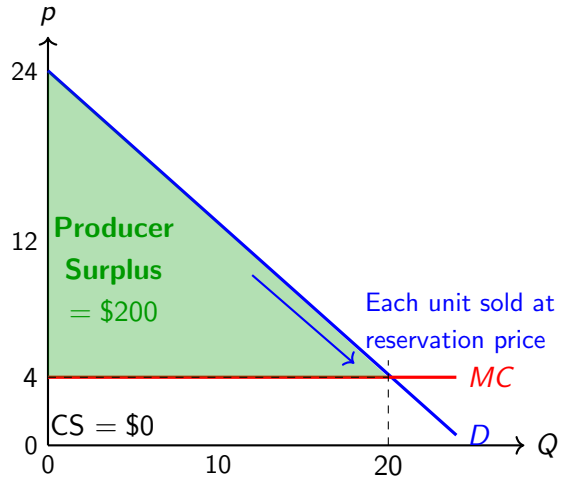

Firm charges each buyer their maximum willingness to pay for each unit produced:

Unit 1: $p = 24 - 1 = \$23$, Unit 10: $p = 24 - 10 = \$14$, Unit 20: $p = \$4$

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Why? If a monopolist can eat the whole pie, the monopolist wants to make the pie as large as possible.

- Consumer surplus is greatest with competition, lower with a single-price monopoly, and eliminated entirely by perfect price discrimination.

Perfect Price Discrimination in Practice

Perfect price discrimination is rarely fully achieved in practice.

Firms can still increase profits with **imperfect individual price discrimination**:

- Charge individual-specific prices to different consumers
- May or may not be the consumers' exact reservation prices

Historically, it was difficult to gather information on consumer reservation prices due to high transaction costs, but **this is changing**.

Change largely due to computer technology and big data.

Examples: Hotels, car/truck rental companies, cruise lines, airlines increasingly use individual price discrimination.

Group Price Discrimination

Group Price Discrimination

Group price discrimination occurs when potential customers are divided into two or more groups with different prices for each group (and a single price within a group).

Three conditions for group price discrimination:

1. Consumer groups must differ via an **observable characteristic** (age, location, student status, etc.)
2. This characteristic must be **identifiable**; else, the consumers may pretend they belong to a different group to get a discount!
3. The firm must have **market power** and be able to identify the demand curves of different groups
4. The firm must be able to **prevent resale**

Necessary Conditions for Group Price Discrimination

Key issue for group price discrimination: **dividing customers into groups** (or **segments**).

To group-price discriminate, firm must divide based on observable characteristics

- Some characteristics are associated with high/low reservation prices or demand elasticities
- Examples: age (seniors, students) and location

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Note: Cannot divide based on actions (self-selection)

- Providing different service tiers and allowing customers to self-select into purchases is **not** group price discrimination
- Example: Advance purchase flight tickets vs. last-minute tickets
  CAUTION: Textbook has the wrong definition!

Example: Spotify Student Discount

Spotify's Group Price Discrimination Strategy:

Pricing Structure:

- Regular plan: \$10.99/month
- Student plan: \$5.99/month
  IMPORTANT: Requires university email verification

Why students?

- More price-sensitive (elastic demand). A monopolist would want to charge lower prices over marginal cost.
- Hard to resell service (nobody lends each other spotify accounts, right?)

Spotify charges **higher price** to **less elastic group**; lower price to more elastic group $\rightarrow$ increases total profit (remember: P/MC decreases with absolute value demand elast. $|\epsilon|$)

Group Price Discrimination and Consumer Surplus

Consumer surplus is greater and more output is produced with perfect competition than with group price discrimination.

Group price discrimination:

- Transfers some of the competitive CS to the firm as additional profit
- Causes deadweight loss due to reduced output (compared to perfect competition)

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TS increases if total sales are higher. Group price discimination **increases** sales to more elastic group (by charging lower price), but **decreases** sales to more inelastic group (by charging a higher price).

Spotify: Group Price Discrimination Example

Suppose demand for Spotify memberships differs by students and non-students (regular users).

1. Students: $P = 20 - 2q_s$
2. Regular Users $P = 24 - q_r$

   Spotify's Marginal Cost: $MC = 4$

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Q: How should Spotify price discriminate between these groups?

Answer is very simple: set marginal revenue of each group's demand equal to marginal costs!

Spotify Example: Solution

Students

Demand: $P = 20 - 2q_s$

$$MR_s = 20 - 4q_s$$

$$MR_s = MC \Rightarrow 20 - 4q_s = 4$$

$$q_s = 4$$

$$P_s = 20 - 2(4) = 12$$

Spotify Example: Solution

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Regular Users

Demand: $P = 24 - q_r$

$$MR_r = 24 - 2q_r$$

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$$q_r = 10$$

$$P_r = 24 - 10 = 14$$

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Optimal Prices: $P_s = 12$ $P_r = 14$

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$$q_r = 10$$

$$P_r = 24 - 10 = 14$$

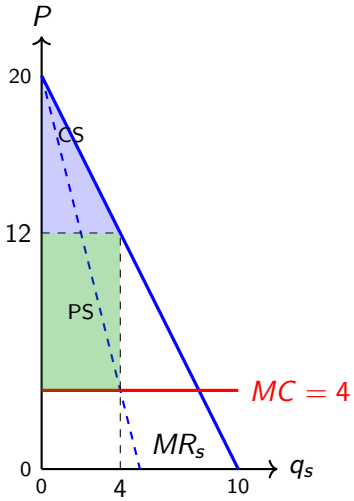
Optimal Prices: $P_s = 12$ $P_r = 14$

More elastic group (students) receives the lower price

Remember the Lerner index: $(P - MC)/P = -1/\epsilon$

Spotify: Group Price Discrimination on a graph

Students: $P = 20 - 2q_s$



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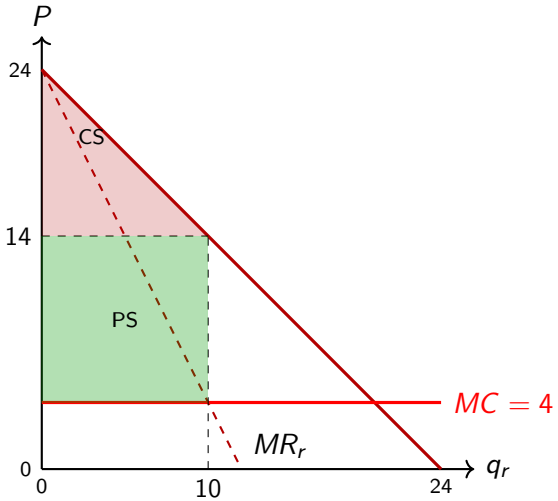

Exercise for you at home

Exercise: find the optimal price if Spotify could not price discriminate.

$\Longrightarrow$ That is, find the aggregate demand curve by **horizontally** summating students and regular users' demand; find the MR curve; set $MR = MC$ ...

$\Longrightarrow$ You will find that Spotify's price will lie **between** $12 - \$14$; students consume less while regular users consume more relative to group-price discrimination

Non-linear Price Discrimination

Non-linear Price Discrimination

Many firms are unable to determine the reservation prices of consumers even though they have market power and the ability to prevent resale.

However, they can exploit the fact that a typical demand curve is **downward sloping**.

In this case, the firm can price discriminate by letting the price each consumer pays **vary with the number of units they buy** (non-linear price discrimination).

Note the contrast with group price discrimination

Example: Block pricing

With block pricing, the firm charges one price per unit for the first block purchased, and a different price per unit for subsequent blocks.

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This strategy is often used by **utilities**.

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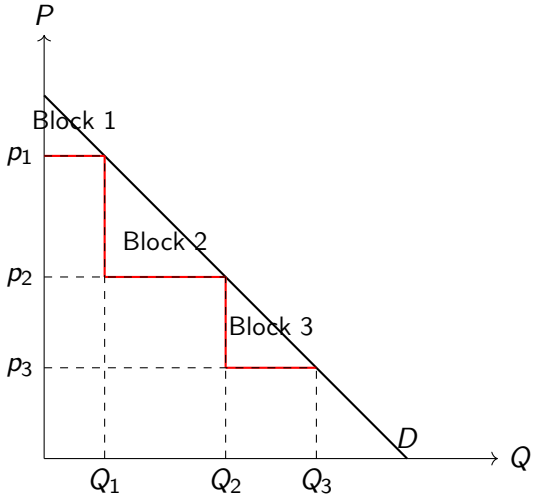
The more block prices a firm can set, the closer the firm gets to **perfect price discrimination**.

Block pricing: Bulk discounts



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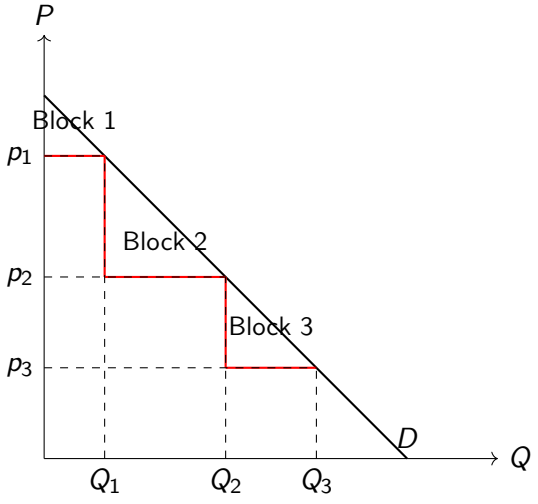

Block pricing: First Q_1 units cost p_1, $Q_2 - Q_1$ units cost p_2 ...

Two-Part Pricing

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With **two-part pricing**, the firm charges each consumer:

- A lump-sum **access fee** (A) for the right to buy
- A **per-unit price** (p) for each unit purchased

This is a special form of nonlinear price discrimination.

Total expenditure for quantity q:

$$E = A + pq$$

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Conditions: To engage in two-part pricing, a firm must have:

- Market power
- Knowledge of how individual demand curves vary across customers
- Ability to prevent resale

Two-Part Pricing: Identical Consumers

With **identical consumers**, a firm can set a two-part price that is:

- **Efficient**: $p = MC$
- Results in **all surplus going to the firm**: $CS = 0$

In this case, if the firm were to charge $p > MC$, it would sell fewer units and make a smaller profit.

Strategy:

- Set $p = MC$ (maximize consumer surplus)
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  Note: same outcome as perfect price discrimination!

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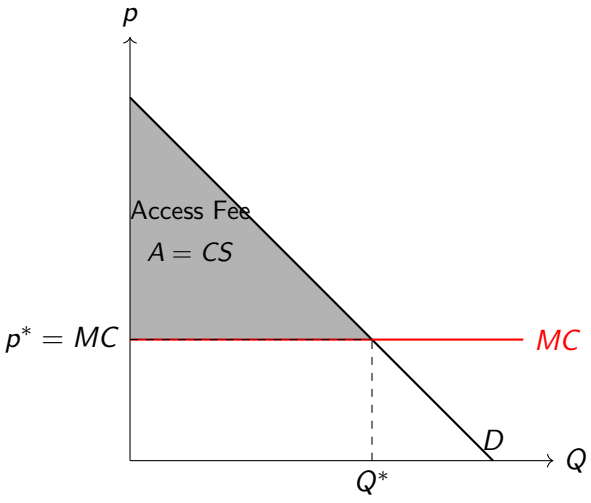

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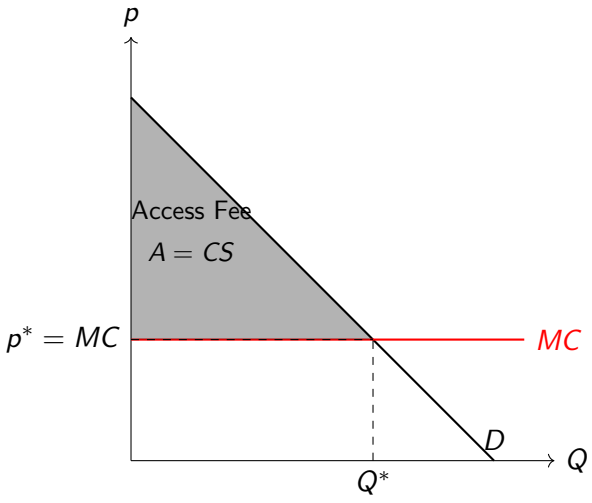

Firm sets $p = MC$ and charges access fee A equal to the consumer surplus triangle.

Two-Part Pricing: Heterogeneous Consumers

Two-part pricing is more complex if different consumers have **different demand curves**.

Different demand curves implies consumers have **different consumer surplus**.

Two-part pricing would require that the monopolist charge **different access fees**, and this may not be possible.

Trade-off:

- High access fee: Captures more surplus from high-demand consumers, but excludes low-demand consumers
- Low access fee: Includes more consumers, but leaves surplus on the table from high-demand consumers

Peak-Load Pricing

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Peak-load Pricing: Charge higher prices during periods of peak demand than in other periods.

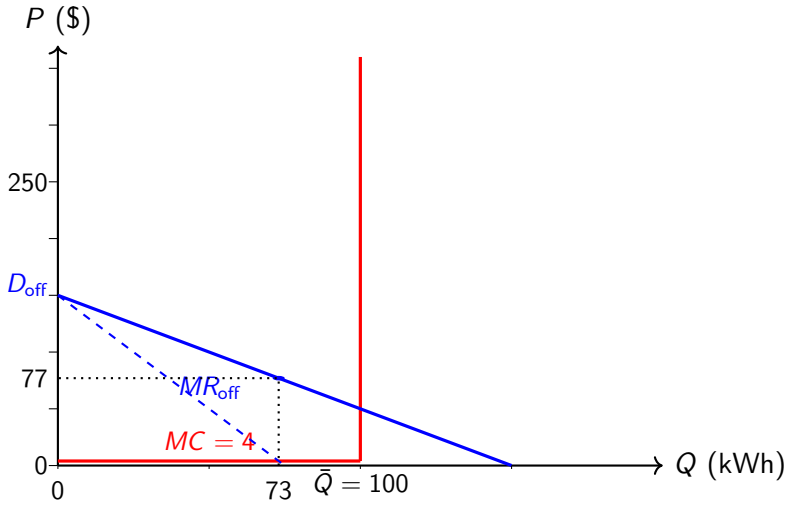
Commonly used by firms that face **capacity constraints**:

- Hotels
- Airlines
- Utilities (electricity)
- Ride-sharing platforms

Strategy:

- During sufficiently high demand (peak) period: Set high price to limit demand to available capacity ($MC = \infty$ when at capacity)
- During low demand period: Profit-maximizing price leaves excess capacity

Dynamically Pricing Electricity: $MC = \$4$ below capacity $= 100$ KwH



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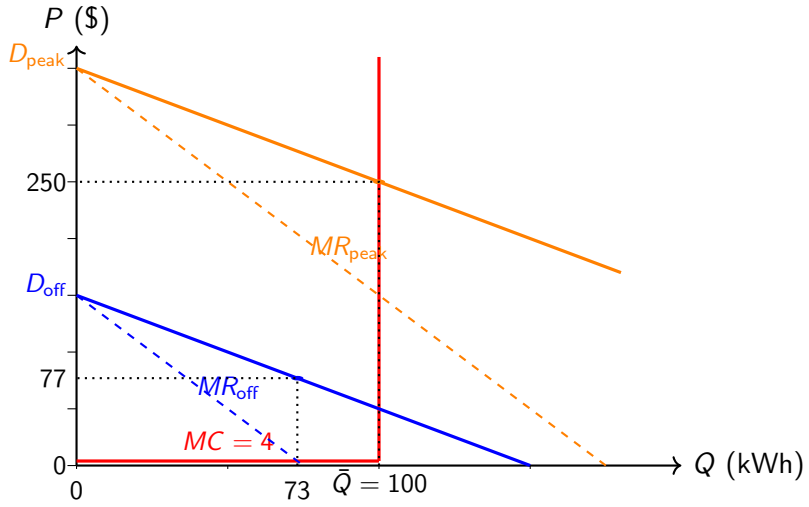

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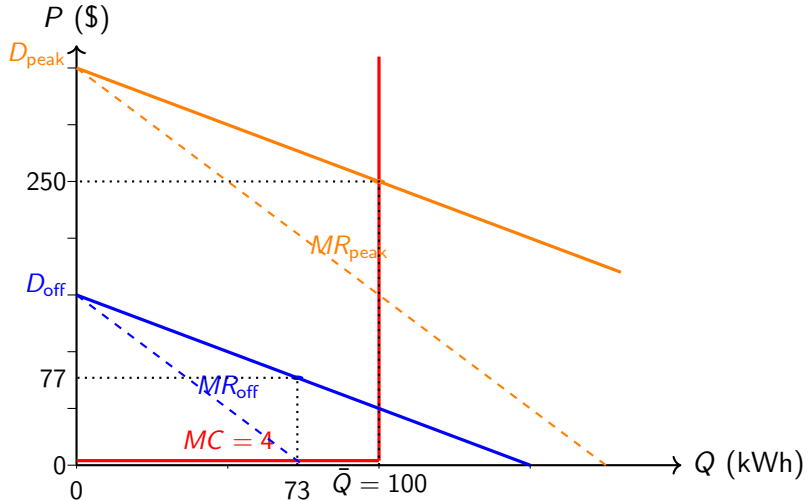

Capacity constraint binds during peak (price rations demand at marginal cost), but not during off-peak (excess capacity remains).

A simple model of Uber with capacity constraints

1. Riders' peak hour aggregate demand: $Q = 150 - p$

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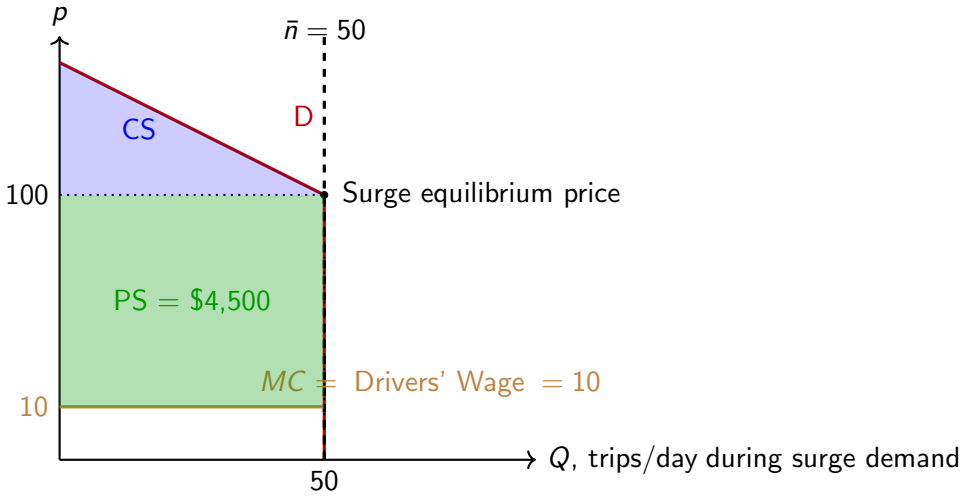
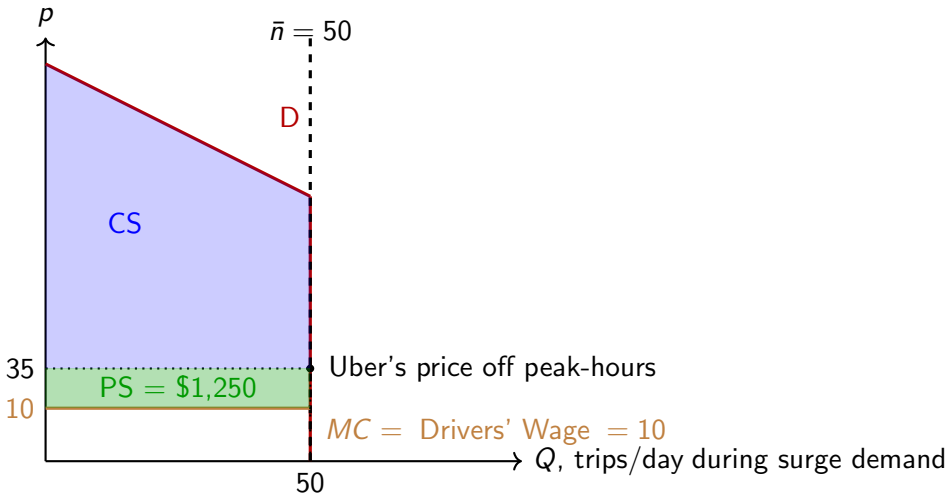
   Uber's marginal costs are the driver's wage per trip = \$10.

   If there are more riders than drivers, the market does not clear. The riders that are matched to drivers have the highest willingness to pay for a trip.

Uber Surge Prices: sets price so that # of Drivers = # of Riders



What happens when Uber holds prices at $35 in times of peak demand?



$\Longrightarrow$ **Surge pricing transfers surplus from consumers to producers**

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  All of these ideas are not captured by the simple model we discussed.

Summary

Price discrimination strategies:

- **Perfect:** Charge each consumer their reservation price (CS $= 0$, efficient)
- **Group:** Charge different prices to identifiable groups (e.g., Spotify students)
- **Non-linear:** Price varies with quantity purchased (block pricing)
- **Two-part:** Access fee + per-unit price (Costco model); a form of non-linear price discrimination

Peak-load pricing:

- Charge higher prices during peak demand periods
- Rations scarce capacity efficiently when demand for output $=$ output capacity
- Example: Uber surge pricing eliminates deadweight loss from random matching

Common theme: Firms with market power use pricing strategies to extract more consumer surplus and increase profits.