Price Differentiation

Outline

- Price Differentiation: Limitations and Tactics
- Volume Discounts
- Pricing with Arbitrage and Cannibalization
- Consumer Welfare

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Price Differentiation

Price differentiation: Different prices for different customers / segments

- For *exactly the same* product
- For a *slightly different* product
  - By customer group
    » UTD students vs. staff
  - By product version
    » Older version vs. newer version
  - By geography
    » US prices vs. international
  - By distribution channel
    » E-commerce vs. brick & mortar
    » Computer vs. computer; see next page

Price differentiation requires segments

- What are the segments? How do they differ?
- Do they remain the same over time?
- Are there customers switching segments?
  - Cannibalization
- Can a product sold to a segment end up in another?
  - Arbitrage
- How can we create barriers between segments?
Channel Dependent Pricing
Avis Car Rental

Product
- **Pick-up**
  - Location: SFO
  - Time: 13:30, May 10, 18
- **Return**
  - Location: SFO
  - Time: 16:00, May 13, 18
- **Standard SUV**

Booking Time: 40 hours in advance
- **Channels:** 1. Mac & 2. Windows
- Simultaneous booking

Channels 1 & 2 yield base rates of
- $185.60
- $167.04
- Any other content difference?

Ultimate question: Cheaper channel?
Version Dependent Pricing
Dallas Symphony

Product: Scheherazade Concert June 9, 2018
Versions: Locations on Orchestra Floor
Data from https://www.mydso.com/buy/tickets/scheherazade

- Acoustics must be the best in the center
  For acoustics, watch The Myerson (Concert Hall) Dance
  https://www.youtube.com/watch?v=FQ5KsQ2E4w8

- Quality of acoustics
  - Concave, maximized at the center
  - Dropping towards the sides, front & back

- Eye-contact:
  - Cellist: Orchestra floor, 4. row, left of center
  - Violinist: Orchestra floor, 4. row, right of center

- Pianist hands: Dress circle, left of center
- Conductor Van Zweden: Grand tier, highest seats

Price based quality deduction
- Acoustics: Cheapest price on the sides & front
- Staged back rows: W,X highest price at $130

Inconsistent prices
1. Center is not the most expensive: L6 is $72
2. G5 and G10 are on the same row and symmetric with respect to the center line, yet priced differently at $72 and $50
3. Non-monotone, non-convex, non-concave:
   C1 is $50; D1 is $130; Q1 is $72; R1 is $130;
4. D1-2 are $130, a high price island in the middle of low prices

Question: Lowest price, best acoustics?
Version Dependent Pricing
Dallas Symphony

Product: Scheherazade Concert Jun 9, 18
Versions: Locations on Orchestra Floor

- Over a week from May 25 to Jun 1, some seats are sold
  - $D1, D2$ are sold
  - $G10$ is sold
- Prices and regions on Jun 1 are the same as those last week on May 25: $29, 50, 72, 94, 130.$

Question: Reduce ticket prices?
Version Dependent Pricing
Dallas Symphony

Product: Scheherazade Concert Jun 9, 18
Versions: Locations on Orchestra Floor

- Over a week from Jun 1 to Jun 8, more seats are sold
- Regions on Jun 8 are the same as those last week on Jun 1

Question: Reduce ticket prices?
Answer: Yes, by $\{1, 2, 3, ?, 5\}$

Prices are now $28, 48, 69, ??, 125$.
- No seat left in previously $94$-region, so no price information
- Estimate the price of $94$-region
  a) 94, b) 93, c) 92, d) 91, e) 90
Price Differentiation: À la Carte

- Consider lunches at Nazar restaurant in Addison.
- Suppose: the demand \(d(p) = 100 - 8p\) and the cost \(c = \$5\) per lunch.
- The total contribution (profit) \([-8p^2+140p-500=(p-5)(100-8p)]\) maximizing price solves \([-16p+140=0]\) & it is \$8.75=\$140/16.
- The demand at \(p = 8.75\) is \([30=100-8*8.75]\), the profit is \$112.5.

![Graph showing demand function and profit calculation.](image-url)
Price Differentiation: Lunch Buffet and À la Carte Demands

- Nazar restaurant divides its market into two: those paying below and above $7. The restaurant offers a lunch buffet for low willingness to pay customers.
- \([44=100-8*7]\) people are willing to pay more than $7. Market size for high-payers is 44 and for low-payers is 56.

For \(7 \leq p_1 \leq 12.5\)
\[
d_1(p) = D_1(1 - W_1(p)) = 44 \left(1 - \frac{p - 7}{12.5 - 7}\right) = 44 + 56 - 8p
\]

For \(0 \leq p \leq 7\)
\[
d_2(p) = D_2(1 - W_2(p)) = 56 \left(1 - \frac{p - 0}{7 - 0}\right) = 56 - 8p
\]

\(d_1(p) = D_1(1 - W_1(p))\)
\[= 44 \left(1 - \frac{(p-7)^+}{5.5}\right) = 44 - (8p-56)^+\]
\[= \min\{44,(100-8p)^+\} \text{ for } 0 \leq p \leq 12.5\]
\[= 100-8p \text{ for } 7 \leq p \leq 12.5; \text{ ignore } p < 7.\]

\(d_2(p) = D_2(1 - W_2(p))\)
\[= 56 \left(1 - \frac{p-0}{7}\right)^+ = (56-8p)^+ \text{ for } 0 \leq p \leq 12.5\]
\[= 56-8p \text{ for } 0 \leq p \leq 7; \text{ ignore } p > 7.\]

\(x^+ = \max\{0, x\}\) indicates the positive part of number \(x\).
Lunch Buffet and À la Carte Demands via Pictures

For $7 \leq p_1 \leq 12.5$
\[ d_1(p) = 44 \left(1 - \frac{p - 7}{5.5}\right) = 100 - 8p \]

For $0 \leq p \leq 7$
\[ d_2(p) = 56 \left(1 - \frac{p - 0}{7}\right) = 56 - 8p \]
Lunch Buffet and À la Carte Demands
Segment Demands via Pictures

Before segmentation

After segmentation

Remark: If you know about conditioning in probability, segmentation is conditioning of random variable WTP:

\[ WTP_t := \{WTP|WTP \leq 7\} \text{ and } WTP_a := \{WTP|WTP \geq 7\} \]
Price Differentiation:
Lunch Buffet at $6 and À la Carte at $8.75

- Nazar restaurant continues to charge an average of $8.75 for à la cart service.
  - Still $d_1(p = 8.75) = 30$ people are willing to pay more than $8.75 and bring a profit of $112.5 = 30(8.75-5)$ per lunch time.

- Suppose that the restaurant prices the lunch buffet at $6.
  - Then the buffet demand turns out to be $d_2(p = 6) = 8$ people. This brings in an additional profit of $8 = 8(6-5)$ per lunch time.

- The profit $112.5 \uparrow \$120.5$ per lunch time. This difference can draw the fine line between success and bankruptcy in the restaurant business.
Price Differentiation:

Lunch Buffet at $6.5 and À la Carte at $9

- With $9 à la cart, demand is \( d_1(p = 9) = 28 \) bringing profit of \( 112 = 28(9-5) \) per lunch time.
- With $6.5 buffet, demand is \( d_2(p = 6.5) = 4 \) bringing profit of \( 6 = 4(6.5-5) \) per lunch time.
- These prices under price differentiation increase the profit to 118 from 112.5 under no differentiation.
  - Lower prices on the previous page yielded higher total profit. Some prices under differentiation are better than others.
Price Differentiation:
Lunch Buffet at $5.5 and À la Carte at $8.5

- With $8.5 à la cart, \( d_1(p = 8.5) = 32 \) and profit of 112 = 32(8.5-5).
- With $5.5 buffet, \( d_2(p = 5.5) = 12 \) and profit of 6 = 12(5.5-5).
- These prices (8.5, 5.5) increase the profit from 112.5 to 118 while a profit of 120.5 is possible with prices of (8.75, 6).
- Price differentiation alone (without optimization) is a profitable strategy.
Perfect Price Differentiation is an Utopia

- There are limitations to achieve perfect price differentiation
  - Imperfect segmentation: Are you willing to pay high or low? This is hard to answer on your own. Your willingness to pay can change depending on various factors, some are objective (such as income) and other are subjective (such as mood).
    » Tactics to identify and segment the customers are very important.
  - Cannibalization: Customers with high willingness to pay may discover the low cost alternative and purchase that alternative. All of the À la Carte customers at Nazar restaurant may buy the lunch buffet. Then the lunch buffet demand $d_1(p = 6) = 44$ the market size due to high paying customers and the lunch buffet demand $d_2(p = 6) = 8$ due to low paying customers. Or $44+8=52=100-8*6$.
    » This gives profit of $52=52(6-5)$ with differentiation $\ll$ the original profit of $112.5$ without differentiation.
    » Tactics to identify and segment the customers are very important.
  - Arbitrage: Third party arbitrageurs buy the product at low price and sell it to high willingness to pay customers.
    » Tactics to identify and segment the customers are very important.

- When segmentation fails due to customer effort, it is cannibalization. When it fails due to third party effort, it is arbitrage.
Tactics to Segment Customers
Pricing by Group, Channel and Region

◆ **Group pricing**: Student discounts
  ➢ Unambiguous indicator of membership: UTD-ID card
    – Experience Dallas Program of Comet Center
  ➢ High correlation between group membership & willingness to pay
  ➢ Legal & ethical acceptance of grouping for health insurance
    – Higher premiums for pre-existing (genetic) condition
    – Higher premiums for smokers.

◆ **Channel pricing**
  ➢ Channel choice indicates willingness to pay: Outlet stores.
  ➢ Tablet users are impulse buyers who buy in large quantities.
    ❖ Conversion rate = # of purchases/# of visits
      - Tablet users = 4 – 5%
      - Traditional PC users = 3%
    ❖ iPad uses apps but not Flash software when browsing.
    ❖ Tablet users place 10-20% larger orders than PC users.

◆ **Regional pricing**
  ➢ Costs and willingness to pay ↑ in affluent areas, so prices ↑.
    - Cheap video games in Estonia; Cheap Spotify membership in Turkey.
Tactics to Segment Customers
Coupons, Versions, Speed

◆ Couponing & Self-Selection
  ➢ Those willing to make an effort for the discount are price sensitive
    ➢ Manufacturer issued mail-in discount/rebate coupons
      ➢ Not everybody mails the coupon
      ➢ Sometimes no rebates even after coupon is mailed in
        ➢ Make the effort, follow up

◆ Versioning
  ➢ Minor differences among versions to exploit price sensitivity
    ➢ Adding minor features: a superior product ← an inferior one
      ➢ Proctor -Silex iron ready button
    ➢ Deleting minor features: an inferior product ← a superior one
      ➢ Disabled math processor of Intel 486DX processor
    ➢ Creating product lines
      ➢ Software with basic-pro-premier-enterprise editions

◆ Speed (time-based) differentiation
  ➢ Faster delivery costs more
    • 1-day Amazon delivery vs. 3-day Amazon delivery
Volume Discounts

- Per unit price of an item decreases when many more items are purchased.
- Why to discount?
  - Cost based pricing: Cheaper to produce/transport items in big quantities.
    - Recall Millie’s cider shop and allocation of rent to cider bottles. If Millie sells more ciders, she allocates less of her rent to a single cider bottle.
  - Value based pricing: Marginal utility decreases for the customer.
    - First glass of the water is the most valuable when you are thirsty.
  - Indicator of price sensitive customers: These customers buy in big quantities.
    - Costco customers are more price sensitive than Target customers.
Two Discounting Schemes

- **All-unit quantity discount**
  - Discount is applied to every unit

- **Marginal-unit quantity discount, or Incremental quantity discount**
  - Discount is applied to additional units

Other uses of discounting schemes are in OPRE 6366 Supply Chain Management.
Decreasing Marginal Value of Number of CPA Certified Employees

- CPA is a common accounting certification. A community college offers CPA classes for companies at the premises of the companies. This is convenient for the personnel of the companies.
- A certain bank has 50 employees at the level of associate, manager and senior manager, assistant director who consider taking the CPA classes if they are offered at the bank’s premises. The accounting personnel at the level of director and above already have a CPA.
- The utility of the CPA class for employees are not the same.
  - An assistant director requires a CPA to be promoted to be a director so the utility of the CPA class is high for him/her.
  - Associates can be promoted all the way up to an assistant director over time without a CPA so the utility of the CPA class is low for them.
  - The community college estimates the utility of the class to range uniformly over $0-$2500 for the employees.
- Using the number of employees interested in CPA and its utility estimate, the college forecasts the demand to be $D(p) = 50(1 - p/2500) = 50 - p/50$.
- Revenue $R(p) = 50p - p^2/50$ so the revenue maximizing price is found from solving $50 - p/25 = 0$ and it is $1250$. 

Cost of CPA Class by an Marginal-unit Discounting

- With the price of $1250 per employee, 25 bank employees take the CPA class.
- Community college makes a revenue of $31,250 by offering classes at the premises of the bank.
- For the community college, the cost of offering class to 25 or to 30 people is identical. The college computes that if the price were $1000, 30 people would take the course. This gives a revenue of only $30,000.
- To obtain more than the revenue of $31,250 and to enroll 30 people, the college offers a volume discounting scheme:
  - Each of the first 25 people pay $1250
  - Each additional person pays $1000, optimize this price?
- This discounting scheme provides the bank with an additional revenue of $5000, represented by the red box on the left.
Market Segmentation vs. Volume Discounting

- Pictures that have boxes representing revenue/profit underneath the demand curve are common in market segmentation and volume discounting. Each box indicates some more revenue.

- If all we are doing with both market segmentation and volume discounting is inserting boxes under the demand curve, can we apply both in the same buyer-seller context?
  - Either you say “yes”,
  - Or you say “no” and explain the difference(s) between the contexts.
  - Hint: Does the presence of the box above depend on the box below?
Calculating Differentiated Prices by Eliminating Arbitrage

- Arbitrage happens when a lower priced product i is
  - transported to be sold as a higher priced product j
    - transportation cost $a_{ij}$
  - upgraded to be sold as a higher priced product j
    - upgrade cost $a_{ij}$
  - stocked to be sold as a higher priced product j
    - inventory holding cost $a_{ij}$

- Arbitrage can be eliminated with constraints
  \[ p_j \leq p_i + a_{ij} \quad \text{and} \quad p_i \leq p_j + a_{ji} \]
  on the price decision variables.

- Constraints are called “arbitrage elimination constraint”.
- The constraint makes the cost of using arbitrage $p_i + a_{ij}$ higher than the price $p_i$. 
Motivating Example of Chips

- Intel chips are sold both in US (country 1) and in Brazil (country 2). The demand functions are given by
  
  \[ d_1(p) = a_1 - b_1 p = 508000 - 100000 p \]
  \[ d_2(p) = a_2 - b_2 p = 48600 - 10000 p \]

- The transportation cost per chip is $0.08 between these countries.
- With the constant slope demand curves (lines), the revenue maximizing prices are given as
  
  \[ p_1^0 = \frac{a_1}{2b_1} = 2.54 \quad \text{and} \quad p_2^0 = \frac{a_2}{2b_2} = 2.43 \quad \text{but} \quad p_1^0 = 2.54 > 2.51 = p_2^0 + a_{21} \]

  Since the constraint is not satisfied, an arbitrageur can buy chips in Brazil and transport them to US to sell them in US.

- We need to jointly optimize prices in US and Brazil to eliminate arbitrage rather than separately as we have done above.
Quadratic Program Formulation to Eliminate Arbitrage

- When we have linear demands $d_i(p_i)$, the profit $(p_i - c_i)d_i(p)$ is a quadratic function (it is a polynomial of degree 2). Summing these profits over $N$ regions, we still have a quadratic objective for the joint optimization problem:

$$\max_{p_1, \ldots, p_N} \sum_{i=1}^{N} (p_i - c_i)d_i(p_i)$$

subject to

$$p_j \leq p_i + a_{ij} \quad \text{for } 1 \leq i \neq j \leq N$$

$$p_i \geq 0 \quad \text{for } 1 \leq i \leq N$$

- This is a quadratic programming problem and it can be solved efficiently with algorithms similar to those used to solve linear programming problems.
Solving Quadratic Program for $N=2$

- When there are two regions (US and Brazil), $N=2$ and we can solve the quadratic program without a software.

\[
\max_{p_1, p_2} \quad p_1 (a_1 - b_1 p_1) + p_2 (a_2 - b_2 p_2)
\]

subject to

\[
p_1 \leq p_2 + a_{21} \quad \text{and} \quad p_2 \leq p_1 + a_{12}
\]

\[
p_1, p_2 \geq 0
\]

- If the separately found prices satisfy the arbitrage eliminating constraints, they are optimal and we stop.

- Else let the region with higher price be 1 and the other be 2, we have

\[
p_1^0 > p_2^0 + a_{21} \quad \text{and} \quad p_2^0 \leq p_1^0 + a_{12}
\]

- In the optimal solution, the violated constraint must be satisfied as an equality, so we can let

\[
p_1 = p + a_{21} \quad \text{and} \quad p_2 = p \quad \text{for some} \ p \ \text{that we shall find next}
\]

- This reparameterization reduces the number of decision variables to one and hence simplifies the solution procedure.
Solving Quadratic Program for $N=2$

- After price reparameterization, the constraints will hold and we focus on the objective

$$\max_p (p + a_{21})(a_1 - b_1(p + a_{21})) + p(a_2 - b_2p)$$

whose derivative is

$$a_1 - 2b_1(p + a_{21}) + a_2 - 2b_2p = 0$$

which yields

$$p = \left(\frac{a_1 + a_2}{2} - b_1a_{21}\right)\frac{1}{b_1 + b_2}$$

this can be shown to be nonnegative by using the violated constraint $a_{21} < p_1^0 - p_2^0$.

This argument also leads to $p_2 = p > p_2^0$.

- Plugging in the parameters of US-Brazil pricing problem, we obtain

$$p = \left(\frac{a_1 + a_2}{2} - b_1a_{21}\right)\frac{1}{b_1 + b_2} =$$

$$= \left(\frac{508000 + 48600}{2} - 10000(0.08)\right)\frac{1}{100000 + 10000} = 2.457$$

$p_1 = 2.457 + 0.08 = 2.537$ and $p_2 = 2.457$
Calculating Differentiated Prices by Incorporating Cannibalization

- Market segmentation often assumes that markets are perfectly segmented in that higher wtp (willingness to pay) customers do not buy at lower price.
- Recall Nazar restaurant, some à la cart customers can buy lunch buffet so cannibalization can happen.
- Suppose that $0 \leq \alpha \leq 1$ percentage of high wtp buy at lower price.

![Decision Tree Diagram]

- Cannibalization alters the demands

<table>
<thead>
<tr>
<th>$d_1(p)$</th>
<th>$d_2(p)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$d_1(p) = \min{44, (100 - 8p)^+}$</td>
<td>$d_2(p) = (56 - 8p)^+$</td>
</tr>
<tr>
<td>$d_1(p) = (1 - \alpha) \min{44, (100 - 8p)^+}$</td>
<td>$d_2(p) = (56 - 8p)^+ + 44\alpha$</td>
</tr>
</tbody>
</table>
Calculating Differentiated Prices by Incorporating Cannibalization

- The optimal price for à la cart service is found by maximizing
  \[(p_1 - 5)(1 - \alpha) \min\{44, (100 - 8p_1)^+\} = (p_1 - 5)(1 - \alpha)(100 - 8p_1) \text{ for } 7 \leq p_1 \leq 12.5\]
  The optimal price satisfies \((1 - \alpha)(140 - 16p_1) = 0\), so \(p_1 = 8.75\).

- The optimal price for lunch buffet is found by maximizing
  \[(p_2 - 5)((56 - 8p_2)^+ + 44\alpha) = (p_2 - 5)(56 + 44\alpha - 8p_2) \text{ for } 0 \leq p_2 \leq 7\]
  The optimal price satisfies \((96 + 44\alpha - 16p_2) = 0\), so \(p_2 = \min\{7, 6 + 2.75\alpha\}\).
Effect of Cannibalization on Total Profit

- Suppose $\alpha=0.1$, profit from à la cart service is $(8.75-5)(1-0.1)(100-8(8.75))=101.25$
- Then the profit from the lunch buffet is $(6.275-5)(60.4-8(6.275))=13.005$.
- Profit with optimal segment prices under cannibalization $\alpha=0.1$ is 114.255
- The same profit without cannibalization is 120.5 and without segmentation is 112.5.

- Suppose $\alpha=0.2$, profit from à la cart service is $(8.75-5)(1-0.2)(100-8(8.75))=90$
- Then the profit from the lunch buffet is $(6.55-5)(64.8-8(6.55))=19.22$
- Profit with optimal segment prices under cannibalization $\alpha=0.2$ is 109.22.
- Profit of 109.22 is less than 112.5 obtained without segmentation.

- Cannibalization can quickly wash away the benefits of segmentation.

- Should the cannibalization depend on the price differential $p_1-p_2$?
Best Segmentation
Obtain Demands

◆ The restaurant divided its market into two: those paying below and above $7.
◆ Is this value of $v = 7$ the best price to segment the market?
◆ What is the best segmentation value $v$?

\[ d_1(p; v) = D_1(1 - W_1(p)) \]
\[ = 100 \frac{12.5 - v}{12.5} \left(1 - \frac{p - v}{12.5 - v}\right) \]
\[ = 8(12.5-p) \text{ for } v \leq p \leq 12.5 \]

\[ d_2(p; v) = D_2(1 - W_2(p)) \]
\[ = 100 \frac{v}{12.5} \left(1 - \frac{p - 0}{v}\right) \]
\[ = 8(v-p) \text{ for } 0 \leq p \leq v \]

For $v \leq p \leq 12.5$
\[ d_1(p; v) = 100 - 8p \]

For $0 \leq p \leq v$
\[ d_2(p; v) = 8v - 8p \]
Best Segmentation
Obtain Optimal Segmentation Value & Prices

- Formulation of the segmentation problem
  - Outer maximization over the segmentation value \( v \): \( \max_{v} \{ \cdot \} \)
  - Inner maximizations over prices \( p_1 \) and \( p_2 \): \( \max p_1 \) and \( \max p_2 \)

\[
\max_v \left\{ \max_{p_1} (p_1 - 5)(100 - 8p_1) + \max_{p_2} (p_2 - 5)(8v - 8p_2) \right\} \quad \text{for } 0 \leq p_2 \leq v \leq p_1 \leq 12.5
\]

- Inner maximizations: For a fixed \( v \), the optimal prices are
  - \( p_1 = \max\{v, 8.75\} \) \( \left\ll  \max_{p_1} \{-8p_1^2 + (40 + 100)p_1 - 500\} \text{ yields } 16p_1 + 140 = 0 \)
  - \( p_2 = \min \left\{ v, \frac{v+5}{2} \right\} \) \( \left\ll \max_{p_2} \{-8p_2^2 + (40 + 8v)p_2 - 40v\} \text{ yields } 16p_2 + (40 + 8v) = 0 \)
    - If \( 0 \leq v \leq 12.5 \), then \( 0 \leq p_2 = \min \left\{ v, \frac{v+5}{2} \right\} \leq v \leq \max\{v, 8.75\} = p_2 \leq 12.5 \)
    - Since \( v \geq c = 5 \), we obtain \( v \geq \frac{v+5}{2} \) and \( p_2 = \frac{v+5}{2} \)

- The objective then for \( 0 \leq v \leq 12.5 \) is

\[
\max_{v} \left\{ \left( \max\{v, 8.75\} - 5\right)(100 - 8\max\{v, 8.75\}) + \left( \frac{v+5}{2} - 5\right)\left( 8v - 8 \frac{v+5}{2} \right) \right\}
\]

- This objective can be evaluated in Excel for various \( v \); see best_segmentation.xlsx.
  - Segment with \( v = \$10 \): \( \frac{12.5 - 10}{12.5} = 20\% \) for à la cart & \( \frac{10 - 0}{12.5} = 80\% \) for buffet
  - Price with \( p_1 = \$10 \) for à la cart & \( p_2 = \$7.5 \) for buffet
    - Selling to 100% of à la cart & 25% of buffet customers
Consumer Surplus

- For each consumer, the positive part of the difference between wtp and the product price is the surplus: \((wtp-p)^+\).
- Summing this up for all consumers, we find total consumer surplus. Graphically,

- Consumer surplus is positive only for the consumer buying the product.
- It can be increased by selling to more customers with a lower price; see the middle figure above.
- It can be decreased by selling to the same number of customers with a higher price; see the figure on the right above.
Price Differentiation

Summary

- Price Differentiation: Limitations and Tactics
- Volume Discounts
- Optimal Pricing with
  - Arbitrage
  - Cannibalization
  - Market segmentation
- Consumer Welfare
Legally Eliminate Arbitrage

- For each empty beverage container
  - Michigan State offers 10 cents
  - Other states do not offer as much: New York State offers 5 cents.

- It is tempting to collect containers in other states to bring them to Michigan and to deposit them for 10 cents in grocery stores such as
  - Save Plus Superstore in Pontiac, The Larosa Market in Sylvan Lake and Value Foods in Ypsilanti, The Farmer John, Savemart Food Center and Americana Foods, the last three in Detroit.

- Can smuggling across states is illegal as it frauds Michigan Bottle Deposit Fund set up for environmental clean up.
  - A pop-can smuggling ring has been arraigned in Michigan. 15 man ring face charges that include maintaining a criminal enterprise (20 year felony) and fraud (5 year felony). Suspects Arraigned In Pop Can Smuggling Ring, Sep 26, 2007. [http://www.clickondetroit.com/news/14214576/detail.html](http://www.clickondetroit.com/news/14214576/detail.html)

- On a lighter side, watch a 1996 episode of Seinfeld: “The Michigan Deposit Bottle Scam” from YouTube [http://www.youtube.com/watch?v=x1b1sZxXDCU](http://www.youtube.com/watch?v=x1b1sZxXDCU)

- Gist of the scam: Newman, who has spent days trying to calculate a profit to the deposit scheme, realizes that there will be a surge of mail the week before Mother’s Day (the "mother of all mail days") to be sorted in Saginaw, Michigan. He tells Kramer that he signed up for a mail truck that would carry spillover mail from the other four main trucks, leaving plenty of space left over in theirs for bottles and cans to refund in Michigan. Kramer realizes that by avoiding truck rental fees, Newman has found a loophole and they set off collecting cans and bottles around the city.

- For the info, thanks to Seinfeld fan Osman Kazan, DemReAn 2011 Teaching Assistant.