Diversion ratios: Homework problem 1

- Consider the following shares for fresh orange juice:

	Orange Juice Production (million gal.)	Share
Tropicana	291.4	45.0%
Coca-Cola	136.0	21.0%
Fresh OJ	136.0	21.0%
OJ Natural	46.0	7.1%
Others (6)	38.2	5.9%
	647.6	100.0%

  - Assume that all diversion occurs within orange juice (that is, there is no switching to a nonorange juice option) and switching within orange juice is gallon for gallon. Using the relative market share method, what are the diversion ratios from Coca-Cola to each of the other orange juice products?

Diversion ratios: Homework problem 1

Orange Juice

	Production (million gal.)	Share
Tropicana	291.4	45.0%
Coca-Cola	136.0	21.0%
Fresh OJ	136.0	21.0%
OJ Natural	46.0	7.1%
Others (6)	38.2	5.9%
	647.6	100.0%

General formula:

$$D_{A\to B} = \left(1 - \frac{\Delta q_{outside}}{\Delta q_A}\right)\frac{s_B}{1-s_A}$$

Here, $\frac{\Delta q_{outside}}{\Delta q_{Coca-Cola}} = 0\%$

$$D_{CocaCola\to Tropicana} = \frac{45\%_B}{1-21\%} = 57.0\%$$

$$D_{CocaCola\to FreshOJ} = \frac{21\%}{1-21\%} = 26.6\%$$

$$D_{CocaCola\to OJNatural} = \frac{7.1\%}{1-21\%} = 9.0\%$$

$$D_{CocaCola\to Others} = \frac{5.9\%}{1-21\%} = 7.5\%$$ collectively

Allocates 100% of the diverted sales. No sales go to the outside option.

Diversion ratios: Homework problem 2

- Consider the following shares for fresh orange juice:

	Orange Juice Production (million gal.)	Share
Tropicana	291.4	45.0%
Coca-Cola	136.0	21.0%
Fresh OJ	136.0	21.0%
OJ Natural	46.0	7.1%
Others (6)	38.2	5.9%
	647.6	100.0%

  - Same as Problem 1 except that 10% of Coca-Cola's lost sales are diverted to the outside option

Diversion ratios: Homework problem 2

Orange Juice

	Production (million gal.)	Share
Tropicana	291.4	45.0%
Coca-Cola	136.0	21.0%
Fresh OJ	136.0	21.0%
OJ Natural	46.0	7.1%
Others (6)	38.2	5.9%
	647.6	100.0%

General formula:

$$D_{A\to B} = \left(1 - \frac{\Delta q_{outside}}{\Delta q_A}\right)\frac{s_B}{1-s_A}$$

Here, $\frac{\Delta q_{outside}}{\Delta q_{Coca-Cola}} = 10\%$

$$D_{CocaCola\to Tropicana} = (1-10\%)\left(\frac{45\%_B}{1-21\%}\right) = 51.3\%$$

$$D_{CocaCola\to FreshOJ} = (1-10\%)\left(\frac{21\%}{1-21\%}\right) = 23.9\%$$

$$D_{CocaCola\to OJNatural} = (1-10\%)\left(\frac{7.1\%}{1-21\%}\right) = 8.1\%$$

$$D_{CocaCola\to Others} = (1-10\%)\left(\frac{5.9\%}{1-21\%}\right) = 6.7\%$$

collectively

Allocates 90% of the diverted sales. The remaining 10% goes to the outside option.

GUPPIs: Homework problem 3

Products A and B are being tested as a candidate market. Each is priced at $140 per unit, has an incremental cost of $110, and sells 2000 units. For every dollar increase in the price of Product A, for any given price of Product B, Product A loses 40 units of sales to products outside the candidate market and 10 units of sales to Product B, and likewise for Product B. Under these conditions, what price would a hypothetical monopolist of Products A and B charge if (a) it had to increase prices of both products by the same amount, and (b) if it increased the price of only one product? (c) Are Products A and B a relevant market?

- Summary of parameters (linear demand and complete symmetry):

$$p = \$140 \qquad c = \$110$$

$$D = \frac{10}{10+40} = 0.2 \qquad m = \frac{p-c}{p} = \frac{140-110}{140} = 0.21$$

- Two product price increase:

$$\frac{\Delta p_A^*}{p_A} = \frac{\Delta p_B^*}{p_B} = \frac{Dm}{2(1-D)} = \frac{(0.2)(0.21)}{2(1-0.2)} = 2.7\%$$

$$\text{New price} = (1+0.27)(140) = 143.75$$

- One-product price increase

$$\frac{\Delta p_A^*}{p_A} = \frac{Dm}{(1-D)} = \frac{(0.2)(0.21)}{(1-0.2)} = 5.4\%$$

$$\text{New price} = (1+0.54)(140) = 147.50$$

NB: These are *profit-maximizing price increases*, so they provide a necessary test for a profit-maximizing HMT but only a sufficiency test for a profitability HMT.

A and B are a relevant product market under a 5% one-product SSNIP test