Errata, Style Corrections, and Reference Update to the 1st Printing (2008) of How to Price

by

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Chapter 2: Demand and Cost

p.25: Equation (2.4) should be

$$\breve{e}(1) = \frac{2-1}{\$30-\$35}\,\frac{\$32.5}{1.5} = -4.33 \quad \text{and} \quad \breve{e}(6) = \frac{7-6}{\$15-\$20}\,\frac{\$17.5}{6.5} = -0.54$$

p.29: Last line: $e(q) = 1$ should be $|e(q)| = 1$

p.37: The first term in equation (2.23) should be

$$q_1 = 200 - \frac{20}{3}\,p_1,$$

p.43: Line 13 [5 lines below (2.29)]: "strictly negative" should be "strictly positive"

p.51: Line -6: $q = \alpha(q)^{-\beta}$ should be $q = \alpha(p)^{-\beta}$

Chapter 3: Basic Pricing Techniques

p.66: Equation (3.13) should be

$$y = (p-\mu)q - \phi \quad \text{to obtain} \quad y = \alpha\beta^{-\beta}\left(\frac{\mu}{\beta-1}\right)^{1-\beta} - \phi$$

p.71: Line -3: Should be

$$y_{1,3} = (10-5)400 - 1000 - 0 - 2000 = -\$1000.$$

p.84: The first equation in *Step I* should be:

$$\frac{\mathsf{d}x(q_\ell)}{\mathsf{d}q_\ell} = p_\ell\left(1 + \frac{1}{e_\ell}\right) = p_\ell\left(1 - \frac{1}{\beta_\ell}\right)$$

p.84: The equation in *Step II* should be:

$$y_\ell = (p_\ell - \mu)q_\ell - \phi_\ell = \alpha(\beta_\ell)^{-\beta_\ell}\left(\frac{\mu}{\beta_\ell - 1}\right)^{1-\beta_\ell} - \phi_\ell,$$

p.86: Second row of (3.35) should begin with

$$y_2 = \left(\frac{125}{3} - 10\right)\frac{250}{3} - 500 = \cdots$$

p.94: 3 lines below Definition 3.1 the argument should be rewritten as follows: More precisely, firm 1 sets p_1^U as high as possible, but not too high, in order to prevent firm 2 from benefiting from undercutting firm 1 by setting $\tilde{p}_2 < p_1^U - \delta$, thereby selling to all $N_1 + N_2$ consumers.

Chapter 4: Bundling and Tying

p.119: Table 4.1: The column under \$25: -62.5 should be 62.5

p.125: Table 4.2, the columns under 5, 6, and 7 should be modified as follows:

q (bundle size)	1	2	**3**	4	5	6	7
$gcs_1(q)$	\$7.00	\$12	\$**15.00**	\$16	\$16.00	\$16	\$16.00
$y_1(q)$	\$5.00	\$8	\$**9.00**	\$8	\$6.00	\$4	\$2.00
$gcs_2(q)$	\$3.75	\$7	\$9.75	\$12	\$13.75	\$15	\$15.75
$y_2(q)$	\$1.75	\$3	\$3.75	\$4	\$3.75	\$3	\$1.75
$\min\{gcs_1, gcs_2\}$	\$3.75	\$7	\$9.75	\$12	\$13.75	\$15	\$15.75
$y_{1,2}(q)$	\$3.50	\$6	\$7.50	\$8	\$7.50	\$6	\$3.50
$\max\{y_1, y_2, y_{1,2}\}$	\$5.00	\$8	\$**9.00**	\$8	\$7.50	\$6	\$3.50

p.125: The sentence before the **Numerical example:...** beginning with "Bundles of sizes larger than $q \geq 5$..." should be deleted.

p.126: Table 4.3, the columns under 5, 6, and 7 should be modified as follows:

q (bundle size)	1	2	3	4	5	6	7
$gcs_1(q)$	\$7.00	\$12	\$15.00	\$16	\$16.00	\$16	\$16.00
$y_1(q)$	\$10.00	\$16	\$18.00	\$16	\$12.00	\$8	\$4.00
$gcs_2(q)$	\$3.75	\$7	\$9.75	\$12	\$13.75	\$15	\$15.75
$y_2(q)$	\$8.75	\$15	\$18.75	\$20	\$18.75	\$15	\$8.75
$\min\{gcs_1, gcs_2\}$	\$3.75	\$7	\$9.75	\$**12**	\$13.75	\$15	\$15.75
$y_{1,2}(q)$	\$12.25	\$21	\$26.25	\$**28**	\$26.25	\$21	\$12.25
$\max\{y_1, y_2, y_{1,2}\}$	\$12.25	\$21	\$26.25	\$**28**	\$26.25	\$21	\$12.25

p.133: The expression at the top of the page should begin with

$$V_\ell^A + V_\ell^B - p_{AB} \geq \cdots$$

p.135: First line should be: tied good is $p_{AB} = 2 + 8 = \$10$ and the ...

Chapter 5: Multipart Tariff

p.156: using (5.2) and (5.8), equation (5.9) should be

$$f^{2p} = gcs(q^{2p}) - q^{2p} \cdot p^{2p} = \frac{(2\alpha - \beta q^{2p})q^{2p}}{2} - q^{2p} \cdot p^{2p} = \frac{(\alpha+\mu)(\alpha-\mu)}{2\beta} - \frac{\alpha-\mu}{\beta}\,\mu = \frac{(\alpha-\mu)^2}{2\beta}.$$

There is no mistake in (5.9), only a minor typo, as the left "(" should be deleted

p.161: Equation (5.15): Subtract ϕ (both lines)

p.161: Line -6: $2(p-\mu)q - \phi$ should be $2(p-\mu)(q_1+q_2) - \phi$

Chapter 6: Peak-load Pricing

p.186: Equation (6.2) should be

$$MR(q) = \frac{\mathrm{d}x(q)}{\mathrm{d}q} = \frac{\mathrm{d}[p(q)\,q]}{\mathrm{d}q} = \alpha - 2\beta q.$$

That is, the first "$=$" sign is missing.

p.188: Why is peak-load pricing profitable? The method used to solve for the uniform price p is incorrect and should be replaced with the following procedure:

In view of the seasonal demand functions (6.1), we must distinguish between two cases: $p \leq \$100$ and $p > \$100$. We first compute the profit-maximizing uniform price p for the low-price range $p \leq \$100$. In this price range, both, summer and winter markets are served. That is,

$q_S = 200 - p > 0$ and $q_W = 100 - p > 0$. Also, because the summer demand is higher than the winter demand at every price p, capacity is determined by the summer demand, so we set $k = q_S$. See problem 6.1(b) for the case where the demand functions cross each other. The firm sets a uniform-across-seasons price p to solve

$$\max_p y_{S,W} = (p - 20)q_S + (p - 20)q_W - 20q_S - 2000 = 2(180p - p^2 - 6000)$$

yielding

$$p_{S,W} = \$90, \quad q_S = 110, \quad q_W = 10, \quad \text{and} \quad y_{S,W} = \$4200.$$

If the firm sets $p > \$100$ then $q_W = 0$ so only summer passengers are served. This case is already solved on the top of p.189 in the textbook. Equation (6.7) computes the profit to be $y_S = \$4400 > \$4200$, which is the profit made when the firm charges a low price.

Comparing the two profit levels, under the restriction that the firm must charge uniform price across all seasons, the firm should set $p = \$120$. However, as shown in (6.7), uniform price yields a lower profit than peak-load pricing simply because peak-load pricing makes it possible to charge a high price during the summer without losing the winter passengers who are willing to pay a much lower price. Under uniform pricing capacity stays idle during the winter. This example shows that peak-load pricing can be viewed as a pricing discrimination technique in which the basis for discrimination is the "season" in which consumers need to be served.

Chapter 7: Advance Booking

p.232: Line 3: $EV(k_t)$ should be $EV_t(k_t)$

p.232: Last line before 7.1: $\mathsf{E}V(k_t) - \mathsf{E}V(k_t - 1)$ if $d_t(P_t) = 1$ should be $\mathsf{E}V_{t+1}(k_t) - \mathsf{E}V_{t+1}(k_t - 1)$ if $d_t(P_t) = 1$.

p.235: Equation (7.7): Replace $\mathsf{E}V_2$ by $\mathsf{E}V_T$ (5 times)

p.236: Equation (7.10): $\$14.6$ should be $\$13.54$

p.238: Section 7.2, line 3 should be: "Subsections 7.2.1 and 7.2.2 extend ..."

p.240: Line 2 in Section 7.2.2: "except except" should be "except"

p.242: Equation (7.22) should be:

$$d_{T-2}(\$40) = \begin{cases} 1 & \text{if } k_{T-2} \geq 1 \\ 0 & \text{if } k_{T-2} = 0 \end{cases} \quad \text{and} \quad d_{T-2}(\$10) = \begin{cases} 1 & \text{if } k_{T-2} = 2 \\ 0 & \text{if } k_{T-2} \leq 1. \end{cases}$$

p.242: Equation (7.24) should be:

$$d_t(\$40) = \begin{cases} 1 & \text{if } k_t \geq 1 \\ 0 & \text{if } k_t = 0 \end{cases} \quad \text{and} \quad d_t(\$10) = \begin{cases} 1 & \text{if } k_t = 2 \\ 0 & \text{if } k_t \leq 1. \end{cases}$$

p.244: Equation (7.27) should be:

$$d_{T-2}(\$40) = \begin{cases} 1 & \text{if } k_{T-2} \geq 1 \\ 0 & \text{if } k_{T-2} = 0 \end{cases} \quad \text{and} \quad d_{T-2}(\$10) = \begin{cases} 1 & \text{if } k_{T-2} \geq 2 \\ 0 & \text{if } k_{T-2} \leq 1. \end{cases}$$

p.244: Equation (7.29) should be:

$$d_t(\$40) = \begin{cases} 1 & \text{if } k_t \geq 1 \\ 0 & \text{if } k_t = 0 \end{cases} \quad \text{and} \quad d_t(\$10) = \begin{cases} 1 & \text{if } k_{T-2} \geq 2 \\ 0 & \text{if } k_{T-2} \leq 1. \end{cases}$$

p.256: Table 7.8: The bottom 3 entries under the right column labeled as $\langle 0, 2\rangle$, should have $2p^B$ instead of just p^B. That is: $\pi^A(\pi^B)^2p^B$ should be $\pi^A(\pi^B)^2 2p^B$ (3 entries) .

p.256: Line -2: "probablility" should be "probability"

p.261: Table 7.12: Right column: The two profitable choices $\langle 0, 2\rangle$ should be $\langle 2, 2\rangle$

Chapter 8: Refund Strategies

p.272: Equation (8.4) should be:

$$y \stackrel{\text{def}}{=} n\left[(p - \mu_k) - \pi\mu_o - (1 - \pi)r\right] - \phi.$$

p.274: Equation (8.7) should be:

$$y \stackrel{\text{def}}{=} \sum_{\ell=1}^{M} n_\ell \left[(p-\mu_k) - \pi_\ell \mu_o - (1-\pi_\ell) r\right] - \phi.$$

p.274: Equation (8.8) should be:

$$y \stackrel{\text{def}}{=} \sum_{\ell=1}^{M} n_\ell \left[(p-\mu_k) - \pi_\ell \mu_o - (1-\pi_\ell) rp\right] - \phi.$$

p.274: Assumption 8.2 should be

Consumer types are indexed according to increasing order of their threshold refund levels (8.3). Formally,

$$\frac{\bar{p}-\pi_1 V_1}{1-\pi_1} \le \frac{\bar{p}-\pi_2 V_2}{1-\pi_2} \le \ldots \le \frac{\bar{p}-\pi_M V_M}{1-\pi_M}.$$

p.275: Equation (8.9) should be:

$$y^{NR} = 500(6-1) - 0.8 \times 500 \times 2 - (1-0.8) \times 500 \times 0 - 1000 = 700.$$

p.276: The discussion on the bottom paragraph beginning with "The above two-consumer type analysis has also taught us...and/or a low survival probability." should be modified as follows:

The above two-consumer type analysis also taught us that we should always consider the possibility that the seller may be able to use the refund strategy to control which consumer types buy this service. That is, under some circumstances, which were carefully characterized in the above analysis by a low refund satisfying $r < 2$, the seller can reduce the refund level to exclude consumers with either a low expected valuation and/or a low survival probability.

p.277: Reverse all inequalities in *Step I*

$$\frac{\bar{p}-\pi_1 V_1}{1-\pi_1} \le \frac{\bar{p}-\pi_2 V_2}{1-\pi_2} \le \ldots \le \frac{\bar{p}-\pi_M V_M}{1-\pi_M}.$$

p.288: The first sentence of the last paragraph "Because of the "linear" nature...three consumer types." is probably incorrect and should therefore be deleted.

p.290: Equation (8.29) should be:

$$y = N_1\left[(7.2-\mu_k) - \pi_1\mu_o - (1-\pi_1)4.5\right] + N_2\left[(9-\mu_k) - \pi_2\mu_o - (1-\pi_2)9\right] \\ + N_3\left[(9-\mu_k) - \pi_3\mu_o - (1-\pi_3)9\right] - \phi = 12,500.$$

Chapter 9: Overbooking

p.308: Equations (9.19) and (9.21): $+\psi(\bar{s}-K)$ should be: $-\psi(\bar{s}-K)$

p.309: Section 9.2.3, end of first paragraph: …, so $y(0)$. should be: …, so $y(0)=0$.

p.310: Equation (9.24) underbrace: $d=1$ should be $ds=1$

p.310: 2 lines before (9.25): "...books to full capacity..." should be: "...books to the maximum allowable level..."

p.310: Equation (9.25) underbrace: $d=2$ should be $ds=2$

p.311: Equation (9.27), underbraces: $s(2)=1$ should be $s(3)=1$, and $s(2)=2$ should be $s(3)=2$

p.311: Equation (9.28), below the third term: 8 cases should be: 6 cases

p.316: Table 9.3 should be:

$\psi\backslash\pi$	0.2	0.4	0.6	0.8
$\psi_{2,1}$	1980.00	742.50	330.00	123.75
$\psi_{3,2}$	880.00	278.44	94.29	20.62

p.317: Equation (9.32): The second $=$ sign should be: $+$

p.318: Equation (9.33) should be:

$$(3N) \geq y(2N) \quad \Longleftrightarrow \quad \psi \leq \psi_{3,2} \overset{\text{def}}{=} \begin{cases} \dfrac{(1-\pi)^2(P-\mu_o)}{\pi(2-\pi)} & \text{if } 2N > K \\ \dfrac{(1-\pi^2)(P-\mu_o)}{\pi^2} & \text{if } 2N \leq K < 3N. \end{cases}$$

p.318: Table 9.4 should be:

ψ	$y(0)$	$y(60)$	$y(120)$	$y(180)$	b^*	$b^* - K$	$\mathrm{E}s(b^*)$	$\mathrm{E}ds(b^*)$
		"High" survival probability: $\pi = 0.8$						
5	0	23,160	27,720	28,440	180	80	144	84.48
100	0	23,160	24,072	20,414	120	20	96	38.40
150	0	23,160	22,152	16,190	60	-40	48	0.00
		"Low" survival probability: $\pi = 0.4$						
10	0	11,280	18,312	22,435	180	80	72	24.96
400	0	11,280	14,568	12,700	120	20	48	9.60
800	0	11,280	10,728	2,716	60	-40	24	0.00

Chapter 10: Quality, Loyalty, Auctions, and Advertising

p.334 , Line -17: $\$22,000$ should be $\$2200$.

p.334 , Line -8: $\$22,000$ should be $\$2200$, and $\$18,000$ should be $\$1800$.

Chapter 12: Instructor and Solution Manual

p.384 last line: $y_2 = \$400$ should be $y_2 = -\$500$.

p.386: The solution to Exercise 3.9(b) is incorrect. The monopoly will not utilize the entire capacity when serving market 2 only. The correct solution is $q_2 = 230$ (not $q_2 = 240$). Hence, $p_2 = 240 - 0.5 \cdot 230 = \$125$. Therefore, $y_2 = (125 - 10)230 - 10000 = \$16,450$, and hence, $y = y_2 - \phi = \$6450$.

p.386: Table 12.6 should be:

p_1	70	60	55	40	30	20	10
q_1	10	20	30	40	50	60	70
q^b	2.00	2.50	2.86	5.00	10.00	$+\infty$	n/a
Δq	1.11	2.86	5.00	13.33	50.00	n/a	n/a
$\frac{\Delta q}{q_1} \cdot 100$	11.11%	14.28%	16.67%	33.33%	100.00%	n/a	n/a

p.394: At the end of the solution for 5.3(c): Add total profit:

$$y(\langle \$0.13, \$1\rangle, \langle \$1, \$0\rangle) = 0.13 + 1 \cdot 0.25 + 1 + 0 \cdot 2 = \$1.38 > \$1.$$

p.396: The solution to 6.1(b) is incorrect and should be replaced by the following solution: Let $p = p_W = p_S$. In this case, the direct demand functions are:

$$q_S = 2(12 - p) \quad \text{and} \quad q_W = 12 - \frac{p}{2}.$$

We first would like to "estimate" which would be the "high" season. From the above $q_S \le q_W$ if $p \ge 8$. So, let us assume (and later verify) that winter is the "high" season (which means that the equilibrium price should satisfy $p > \$8$). In this case the seller solves

$$\max_p y_{S,W} = p(q_W + q_S) - (2+2)q_W - 2q_S = 42p - \frac{5}{2}p^2 - 96$$

The first-order condition yields $0 = dy/dp = 42 - 5p$. The second-order condition for a maximum is satisfied since $d^2y/dp^2 = -5 < 0$. Therefore,

$$p_{S,W} = \frac{42}{5} = \$8.4 \quad \text{and} \quad y_{S,W} = \$80.4 < \$92.5$$

which is the profit obtained under peak-load price discrimination. Notice that $p_{S,W} = 8.4 > 8$ which confirms that winter is indeed the peak season. Alternatively, we can also confirm that winter is the peak season by looking at the equilibrium quantities: $q_W = 7.8 > 7.2 = q_S$.
Finally, we are not done until we check one more possibility which is raising the price above $p = \$12$ thereby serving only winter consumers. In this case, solving $MR_W = 24 - 4q_W = 2 + 2 = r + c$ yields $q_W = 5$, hence $p = 24 - 2q_W = \$14 > \$12$. Under $p = \$14$, the profit is

$$y_W = pq_W - (c + r)q_W = 14 \cdot 5 - 4 \cdot 5 = \$50 < \$64.9.$$

Therefore, $p = \$8.4$ is the profit-maximizing price when the monopoly is forced to set uniform prices across all seasons.

p.403, Solution to Exercise 7.4: First displayed equation should be:

$$\mathrm{E}V_T(k_T) = (0.3 \times \$0) + (0.1 \times \$60) + (0.6 \times \$20) = \$18,$$

Second displayed equation should be:

$$\mathrm{E}V_{T-1}(k_{T-1}) = 2 \times 18 = \$36 \text{ for all } k_{T-1} \geq 2,$$

p.405, Solution to Exercise 7.10: Last line should be: $\langle K^A, K^B \rangle = \langle 2, 2 \rangle$.

p.406, Table 12.14: The first column should be: $t = 1, 2, 3, 4, 5$ (instead of $t = 1, 1, 2, 3, 4$).

p.408, Solution to Exercise 8.4: First displayed equation should be:

$$y^{\mathsf{NR}} = 500\,[(7-3) - 0.8 \times 2 - (1-0.8)0] - 1200 = 0.$$

p.408, Solution to Exercise 8.4: Last equation should be $= 400$ instead of $= 1600$.

p.409, Solution to Exercise 8.5: Line 2: Replace $y_3 = 900$ by $y_3 = 2200$. Line 5: Replace $V_3 = 8$ by $V_1 = 8$.

p.413, Solution to Exercise 9.2(f): Should be:

$$\mathsf{E}ds(5) = \frac{5!}{4! \cdot 1!}\, 0.8^4\, 0.2(4-3) + 0.8^5(5-3) = 1.06496.$$

p.413, Solution to Exercise 9.3: $y(3)$ should be:

$$y(3) = \underbrace{3\pi(1-\pi)^2(P-\mu_o)}_{\text{3 cases } s(3)=1} + \underbrace{3\pi^2(1-\pi)\cdot 2(P-\mu_o)}_{\text{3 cases } s(3)=2} + \underbrace{\pi^3 \cdot 3(P-\mu_o)}_{\text{case } s(3)=3} - \underbrace{(\phi + 3\mu_k)}_{\text{fixed costs}}.$$

Explanation for this corrections: There are two (minor) typos in the first two under braces where $s(2)$ should be $s(3)$. Next correction, $y(4)$ should be:

$$y(4) = \underbrace{\frac{4!}{1! \cdot 3!}\, \pi(1-\pi)^3(P-\mu_o)}_{\text{4 cases } s(4)=1} + \underbrace{\frac{4!}{2! \cdot 2!}\, \pi^2(1-\pi)^2 \cdot 2(P-\mu_o)}_{\text{6 cases } s(4)=2}$$
$$+ \underbrace{\frac{4!}{3! \cdot 1!}\, \pi^3(1-\pi) \cdot 3(P-\mu_o)}_{\text{4 cases } s(4)=3} + \underbrace{\pi^4[3(P-\mu_o) - \psi(4-3)]}_{\text{case } s(4)=4} - \underbrace{(\phi + 3\mu_k)}_{\text{fixed costs}}.$$

Explanation for this corrections: The second under brace should state 6 cases (instead of 8). The last case in which $s(4)=4$ should have $3(P-\mu_o)$ [instead of $2(P-\mu_o)$].

References

p.426: Last reference should be: Ringbom, S., and O. Shy. 2008 "Refunds and Collusion in Service Industries." *Journal of Economics & Business* 60: 502–516.

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End of Errata File