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Errata:
Industrial Organization:
A Strategic Approach

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Contents

Preface

This manual contains, by chapter, errata to *Industrial Organization: A Strategic Approach* by Jeffrey Church and Roger Ware. Despite our best efforts, and the considerable efforts and talents of numerous reviewers and copy editors, some mistakes—in some cases unbelievably—made it into the first printing of the book. These mistakes range from obvious typographical errors including missing spaces and superscripts that should be lowercase or subscripts in equations to errors in the presentation (fortunately, the last are very few!). In addition, I have included "clarifications" when the presentation in the text is, in retrospect, either unduly complicated, misleadingly incomplete, or terse and warrants further elaboration. Those entries are typically labelled "clarification".

This errata manual is incomplete as I have not yet compiled errata for chapters 15, 16, 17, 18, 20, 21, 22, and 23, and the compilation for chapters 5 and 6 is not comprehensive. As I finish comprehensive compilations for these chapters their errata will be posted by chapter at the IOSA website. A complete edition of this manual will be made available once I have finished compiling errata for all chapters.

The errata in this manual have been compiled in part from errors identified by adopters and students. If you find an error that is not documented here, please send an email note to Jeffrey Church (jrchurch@ucalgary.ca).

Chapter 1

Introduction

1.1 Front Matter

- Missing from the list of Case Studies on page xxiii are the cases in Chapter 4:

- Missing from the list of Examples on page xxv are the examples in Chapter 4:

- Missing from the list of Exercises on page xxvi are the exercises in Chapter 4:

- On page xxv Example 23.1 is really Exercise 23.1. It should be deleted from the list of examples on xxv and added to the list of exercises on page xxvi. The heading on page 717 needs to be changed from Example 23.1 to Exercise 23.1.

- Missing from the list of Figures on page xxvii:

- On page xxvii the title for Figure 5.2 should be *The Effects of a Simple Two-Block Pricing Scheme on Two Types of Consumers*

1.2   Introduction

- Page 6, line 4 (after changing come to came):
  "And then Price Discounter **came** to Isolation."

- Page 17, Schmalensee (1988) cite (after correcting the name of the journal):
  Schmalensee, R. 1988. "Industrial Economics: An Overview." *The Economic Journal* 98: 643-681.

Chapter 2

The Welfare Economics of Market Power

- Page 29, last sentence of first paragraph of Section 2.4 (after clarification that both demand side and supply side substitution apply to homogenous goods) should read:

  Supply side substitution is often *more* relevant when products are homogeneous, whereas **demand side substitution** is *only* applicable when products are differentiated.

  For homogenous goods, a firms market power will depend on the ability of consumers to switch to other suppliers (supply side substitution) and their willingness to switch to other products (demand side substitution). This later substitution is the basis for antitrust market definition—determining which products are in competition with one another—and is discussed extensively in Chapter 19.

- Page 44, Problem 6, second sentence should read (after defining y and w):

  "The cost function for all firms is $C(y) = wy^2 + f$, where f is a fixed set-up cost, y is output, and w is a parameter."

Chapter 3

Theory of the Firm

- Page 83, line 8 (after changing suppose to supposed):
  "**supposed** to preserve high-powered incentives."

- Page 87, (3.15) should read (after making it clear that it is the marginal benefit of investment, not the rate of change in the downstream firm's profits with respect to investment):

$$MB(i) = \frac{a}{\sqrt{i}}$$

- Page 92, Table 3.2 (after correcting the font size) the entry for aggregate profits under upstream integration should read:

$$k + \frac{(a+b)\,(3a-b)}{4} + \frac{3\alpha^2}{4}$$

- Page 99, second sentence following *Bankruptcy Constraints* heading should read (after grammatical correction):

"Bankruptcy occurs when a firm is not able to service its debt."

Chapter 4

Market Power and Dominant Firms

- Page 114, third line of second paragraph should read in part (after correcting economics):

  "Positive economic profits"

- Page 115, beginning of the fifth line up from bottom (excluding footnote) should read (after changing ordersfor to orders for):
  "**orders for** a million pens."

- Page 120, Discussion of Ricardian Rents (Clarification):

  A way to distinguish if control of a scarce factor gives a firm market power and is a barrier to entry, is to ask if a redistribution of the scarce factor would result in a change in price. If redistributing the factor among a group of competing firms would result in a reduction in price, its control by a single firm creates market power and a barrier to entry.

- Pages 123-124, Case Study 4.5:
  The correct spelling of Nielson is **Nielsen**.

- Page 127, Figure 4.2:
  For levels of output where residual inverse demand is horizontal, the marginal revenue of the firm is also horizontal and equal to p^0. The horizontal segment of MR^D should coincide with $Q^D(p)$ at $p = p^0$. A corrected version of Figure 4.2 is available at the IM Website.

- Page 151, Problem 1 (to clarify that $r + w$ is both marginal and average cost of production):
  "Then the **unit** cost of production is $c = r + w$."

- Page 152, Problem 4:

  For consistency with the text, per period willingness to pay should be denoted r_t, so the demand per services per period should be $r_t = 1000 - Q_t$, not $P_t = 1000 - Q_t$.

Chapter 5

Non-Linear Pricing and Price Discrimination

- The caption for Figure 5.2 on page 158 should read (after deleting Part):
  "The Effects of a Simple Two-Block Pricing Scheme on Two Types of Consumers"

- Page 159, 8th line should read (after correcting for the incorrect superscripts on the prices in the fixed fee of the second two-part tariff listed):
  "then the above block pricing scheme is equivalent to $\{A, p^a\}$ for $q \leq q^a$; $\{A + (p^a - p^b)q^a, p^b\}$ for"

- Page 160, first sentence:
  The definition of price discrimination is a bit obtuse. A common definition is that price discrimination occurs when a firm charges different prices to different consumers or different prices per unit to the same consumer *or* both. However, this definition should be adjusted to reflect that production and sale of different units, or to different consumers, may involve cost differences. If different prices for different consumers (or units) simply reflect cost differentials, then there is no price discrimination. In the case of cost differentials, price discrimination exists if the price differential does not equal the cost differential for provision of the same commodity. For example, differences in prices exactly equal to the differential in transportation costs are not discriminatory.

  In addition the definition should be adjusted to allow for the possibility that the commodity being sold differs by customer and the differences in varieties of the commodity sold to different customers are systematically chosen by the firm to extract greater consumer surplus. However, if we recognize that differences in quality or other characteristics are similar to differences in location—being just another characteristic over which the good is differentiated—then price discrimination exists if the difference in prices does not equal the cost differential. Phlips defines price discrimination "as implying that two varieties of a commodity are sold (by the same seller) to two buyers at different *net* prices, the net price being the price (paid by the buyer) corrected for the cost associated with the product differentiation.[1]

- Page 165, 8 lines up from bottom should read (after correcting for the inversion of the slope of the inverse demand curve):

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[1]L. Phlips (1983), *The Economics of Price Discrimination,* Cambridge University Press: 6. Phlips contains an extensive discussion of the appropriate definition of price discrimination.

$$\mathrm{MR}_1(q_1) = p_1 + \frac{dp_1}{dq_1} q_1,$$

- Page 175, Figure 5.12:
  The dashed vertical line on the right indicates q_2^*, which is missing from the horizontal axis.

- Page 180, last line of Discussion Question 3 should read (after changing involvingdifferentiated to involving differentiated):
  "other examples of price discrimination **involving differentiated** products."

Chapter 6

Market Power and Product Quality

- Page 204, Problem 5 the probability of a high-quality good breaking down is ρ, not p, so the second line should read in part:
  "but the probability of a high-quality good breaking down, ρ,"

Chapter 7

Game Theory I: Static Games of Complete Information

No errata to post—yet!

Chapter 8

Classic Models of Oligopoly

- Page 233, equation (8.2) should read (after changing q_1 to q_2):
  "for any q_2"

- Page 239, first line after (8.14) should read in part (after eliminating the subscript on Q^C):

  "where s_i is the market share of firm i (q_i^c/Q^c)"

- Page 253, Figure 8.12:
  The demand curve should be labeled $P(t)$.

- Page 262, first line (after changing one of the (8.46)'s to (8.45)) should read in part:

  "For (8.45) and (8.46) to be"

- Page 277, first sentence of Problem 6 (to make it clear that the demand curve specifications is for both countries:) should read:

  "Let the demand curve for branded bottled water in the United States and in Australia be given by $P(Q) = 40 - Q$."

Chapter 9

Game Theory II: Dynamic Games of Complete Information

- Page 291, Figure 9.8:
  In the second stage of the game shown in this figure both players know the choice of player 1 in the first stage. This means that player 1 should have two information sets in the second stage of the game, not one as drawn. As drawn, the extensive form implies that player 1 forgets their first-stage move! A corrected version of Figure 9.8 is available at the IM Website.

Chapter 10

Dynamic Models of Oligopoly

- Page 308, six lines up from Section Head 10.1 should read (after addition of a colon):

"In this chapter we:"

- Page 356 Definition of Conscious Parallelism (Clarification):

Firms engage in tacit collusion when they are able to coordinate their activities simply by observing and anticipating their rivals pricing behavior. If the result is that the price of all firms are identical and move in parallel, then there is conscious parallelism. As the U.S. Supreme Court notes[1]

> Tacit collusion, sometimes called oligopolistic price coordination or conscious parallelism, describes the process not in itself unlawful, by which firms in a concentrated market might in effect share monopoly power, setting their prices at a profit-maximizing supracompetitive level by recognizing their shared economic interests and their interdependence with respect to price and output decisions.

More recently courts in the United States have applied tacit collusion to circumstances where there is only circumstantial evidence of an explicit agreement. As a matter of logic an express agreement established with circumstantial evidence is not the same thing as a tacit agreement. However, from the view point of a judge or jury the two sets of circumstances will be indistinguishable so a common legal standard is appropriate.[2] Tacit collusion and conscious parallelism are not illegal even if the result is successful coordination and enhanced market power, and this is so even though conscious parallelism and tacit collusion likely can be construed as an agreement. In the case of conscious parallelism there is an agreement if the action by a firm is only profit maximizing if the others follow suit. The reason such an agreement is not unlawful is that it is unavoidable that oligopolists would take into account the reactions of their rivals when setting their own price and thus there is no remedy except deconcentration or regulation to insure prices are based on costs.[3] Because this exercise of market power is

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[1] *Brooke Group v. Brown and Williamson* 509 U.S. 209 (1993). Footnote omitted.
[2] See Baker (1993, p. 145) and Kovacic (1993, p. 20).
[3] See Turner (1962), Posner (1976) , Baker (1993), and especially Lopatka (1996).

thought to be beyond the reach of antitrust laws, it was called the "oligopoly problem." [4] Parallel pricing coupled with "plus" factors indicating *avoidable* behavior to promote coordination make tacit coordination a tacit agreement and reachable under Section 1 of the *Sherman* Act.

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[4]Stigler writing after Turner and Chamberlin recast the oligopoly problem as enforcement of coordinated behavior, disputing its inevitability.

Bibliography

[1] Baker, J. 1993. "Two Sherman Act Section 1 Dilemmas: Parallel Pricing, the Oligopoly Problem, and Contemporary Economic Theory." *Antitrust Bulletin* 38: 143-219.

[2] Kovacic, W. 1993. "The Identification and Proof of Horizontal Agreements Under the Antitrust Laws." *Antitrust Bulletin* 38: 5-82.

[3] Lopatka, J. 1996. "Solving the Oligopoly Problem: Turner's Try." *Antitrust Bulletin* XLI: 843-908.

[4] Posner, R. 1976. *Antitrust Law.* Chicago: University of Chicago Press.

[5] Turner, D. 1962. "The Definition of Agreement Under the Sherman Act: Conscious Parallelism and Refusals to Deal." *Harvard Law Review* 75: 655-706.

Chapter 11

Product Differentiation

- Page 382, line 7:
  The market length of firm i (l_i) is not $x + y$, but $y - x$. Therefore the line before (11.8) and (11.8) should be replaced by:

  then $l_i = y - x$, or
  $$l_i = \frac{\theta_{i+1} - \theta_{i-1}}{2}.$$

- Page 396, equation (11.21):
  The marginal consumer is defined as $\overline{\theta}$, so (11.21) should be
  $$U(\overline{\theta}, \theta_A) = U(\overline{\theta}, \theta_B).$$

- Page 405, last paragraph of the solution to Exercise 11.3:
  If f is sunk the firm should consider only avoidable costs and compute its quasi-rents under the two alternatives. If f is sunk then its quasi-rents if the incumbent produces both products are 3/4. Its quasi-rents if it withdraws the product located at 1/4 are 1/2. Hence it is better to maintain production of both products since its quasi-rents are greater by 1/4.

- Page 407, second paragraph, second sentence of Section 11.5.2 should read (after changing threated to threatened):
  "As f decreases it becomes profit maximizing for a protected monopolist (an incumbent not threatened with entry) to introduce a second store:"

- Page 409, second paragraph, sixth sentence (after eliminating f for its existing product since it is sunk):
  "Allowing entry means that the incumbent earns **quasi-rents** of π^d until T and $8\pi^d$ thereafter."

- Page 416, Discussion Question 3, line 2 (clarification that the increase in the HHI is in RTE cereals):

  "shredded wheat cereals, in 1992 raised the HHI in RTE cereals by 66 points to 2281."

Chapter 12

Identifying and Measuring Market Power

- Page 454, Problem 3 should read in part (after correcting for case of superscript): "$Q^M = Q^C$."

Chapter 13

An Introduction to Strategic Behavior

- Page 468, (13.3) should read (after making the specification of costs consistent with (13.4)):

$$\pi_1(q_1, q_2) = P(Q)q_1 - C(q_1).$$

- Page 471, (13.9) should read (after inserting missing q_1):

$$\max_{q_1} \pi_1[q_1, R_2(q_1)] = [A - bq_1 - bR_2(q_1)]q_1 - cq_1.$$

- Page 476, first line of Exercise 13.2 should read in part (after correcting for the slope):

  "Suppose that demand is linear: $P = A - bQ$"

- Page 477, first line of Exercise 13.3 should read in part (after correcting for the slope):

  "Suppose that demand is linear: $P = A - bQ$"

Chapter 14

Entry Deterrence

- Page 494, Figures 14.6, 14.7, and 14.8:
  These figures show the label $q_1 = R_1^{w+r}(q_2)$, but not the corresponding best-response function for firm 1. That best-response function is omitted on purpose from the figure to reduce clutter. Corrected versions of these figures without the unnecessary label are available at the IM Website.

- Page 511, second line, should read in part (after changing profits to quasi-rents):
  "incumbent's price (p) and earn quasi-rents equal to $\pi(p)$."

- Page 511, Figure 14.13:
  The three vertical dashed lines in the figure are *very* faint. There should be a vertical dashed line from A to s_1, B to s_2, and C to 1. In addition there should be a horizontal dashed line from A to p^M.

- Page 512, Section 14.2.4
  This section uses the term entry barrier as defined by the proponents of contestability, Baumol, Panzar, and Willig (see page 514). However, that is different from the definition in Church and Ware. Section 14.2.4 demonstrates that in the contestability framework, sunk expenditures required for entry accompanied by a finite response lag creates a situation where the incumbent can exercise market power and earn economic profits, what we call profitable entry deterrence. See the last sentence of the first full paragraph on page 513.

- Page 513, second full paragraph, last sentence should read:
  "Sunk costs plus a finite response lag allows incumbents to engage in profitable entry deterrence."

Chapter 15

Strategic Behavior: Principles

Chapter 16

Strategic Behavior: Applications

Chapter 17

Advertising and Oligopoly

Chapter 18

Research and Development

Chapter 19

The Theory of the Market

- Page 603, Section 19.2.1:
  Alternatively, the question of significance depends on the definition of the competitive price used to define market power in an antitrust context if it is not marginal cost. One alternative is to define the competitive price as the non-cooperative (static) free-entry equilibrium price, which is average cost.

- Page 617, Section 19.4, first paragraph, last line (should read):
  "competitive price. The relevant competitive price may not be marginal cost, but average cost—the price that would prevail in the non-cooperative (static) free-entry equilibrium— when economies of scale precludes marginal cost pricing."

- Page 620, Discussion Question 8 should read in part (after adding relevant):
  "Are the following **relevant** antitrust markets:"

Chapter 20

Exclusionary Practices I: Raising Rivals' Costs

Chapter 21

Exclusionary Practices II: Predatory Pricing

Chapter 22

Vertical Integration and Vertical Restraints

Chapter 23

Horizontal Mergers

Chapter 24

Rationale for Regulation

- Page 766, Figure 24.6:

  In the figure at (Q_1, p_1) the three curves $AC^I(Q)$, $AC(Q)$, and D_1 should all be tangent. A revised version of this figure is available at the IM website.

- Page 779, Problem 6(c) (after changing "(b)" to "(a)") should read in part:

  "What do you results in (a) suggest about . . ."

Chapter 25

Optimal Pricing for Natural Monopoly

- Page 791, Equation (26.2)—after changing the subscript in the cost function from i to 1— should read:

$$\pi = p_1 Q_1 + p_2 Q_2 - C(q_1,\, q_2).$$

Chapter 26

Issues in Regulation

- Page 877, five lines up from Section Head 26.4 should read in part (after changing efficiency to inefficiency):

  "**inefficiency**—P is too high."

- Page 877, sentence immediately preceding Section Head 26.4 should read in part (after changing greater to less):
  "and is **less** than that suggested by the ECPR:"

Chapter 27

Selected Solutions

- Page 901, Chapter 3 Problem 5(a) should read (after changing the superscripts to subscripts):
  (i) if $e = e_h = 2$ then $y = 2$
  (ii) if $e \neq e_h = 2$ then $y = 0$

- Page 901, Chapter 3 Problem 5(c) should read (after changing the superscripts to subscripts):

  (i) if $\pi = 10$ then $y = y_h = 5/2$
  (ii) if $\pi = 5$ then $y = y_l = 1/2$

- Page 901, Chapter 4 Problem 3(d) should read:
  "Increase production in first-period since second-period profits are valued less."

- Page 902, Chapter 6 Problem 5(b):
  The denominator should equal $(l - h)V$.

- Page 903, Chapter 8, Problem 5(b):

$$M_A = (1/4)(40 + 5c_a - 6c_B)$$

  not

$$M_A = (1/2)(40 + 5c_a - 6c_B).$$

- Page 903, Chapter 8 Problem 5(c):
  The reduction in global surplus is 55, not 11.

- Page 904, Chapter 11 Problem 15(b):

$$\Delta CS^B = \alpha(1.12k^{1/2} - P_1 - 0.32)$$

  not

$$CS^B = \alpha(1.12k^{1/2} - P_1 - 0.32).$$

- Page 904, Chapter 11 Problem 15(c):

$$\Delta PS^B \; = \; \alpha(P_1 \; - \; 0.8k)$$

  not

$$\Delta PS^B \; = \; \alpha(p \; - \; 0.8k).$$

- Page 904, Chapter 11 Problem 15(f):

$$\Delta PS^B \; = \; 0.99P_1$$

  not

$$\Delta PS^B \; = \; 0.99p.$$

- Page 907 Chapter 21.9(f) (after changing *Prey* to *Accommodate* in the last sentence) should read:

  "There will exist a market N_0, such that in any market before N_0 the sane incumbent will *Prey* with certainty in order to establish a reputation for preying. This then implies that the entrant will play *Out* with certainty in all markets before N_0. In markets after N_0, the sane incumbent will mix. In order for the incumbent to mix the Entrant must also be mixing. As the market nears the final market, the incumbent is more likely to *Accommodate* and will not prey in the last period."

- Page 907, Chapter 24 Problem 3(b):
  $N^C = 1$ if
  $(1/4)(A - c)^2 > f \geq (1/9)(A - c)^2.$

- Page 907, Chapter 24 Problem 5(a) (after changing lower case to upper case):
  $Q^R = 3$ and $P^R = 6$.

- Page 907, Chapter 24 Problem 5(b) (after changing lower case to upper case):
  "No. There does not exist a P and q such that $6 > P > AC(q)$."

- Page 907, Chapter 25 1(c) should read in part (after changing average cost to average variable cost):
  "Some if the price exceeds minimum short-run average variable cost."

- Page 908, Chapter 25 1(d) should read (after changing average cost to average variable cost):
  "Yes, since if price did not exceed minimum short-run average variable cost the firm would shut down."

- Page 908, Chapter 25 1(e) should read in part(after changing *LRAC* to *SRAC*):
  Yes, if there was an increase in demand such that $P = SRMC > SRAC$.

- Page 908, Chapter 25 Problem 11(a) (after changing to upper case):
  $K = 900$.

- Page 908, Chapter 25 Problem 11(b) (after changing superscripts and to upper case):
  $P^d = 10, P^n = 4$.

- Page 908, Chapter 25 Problem 11(c) (after changing superscripts and to upper case):
  $P^d = 4, P^n = 4$.

- Page 908, Chapter 25 Problem 11(d) (after changing to upper case):
  $K = 640$.

- Page 908, Chapter 26 Problem 1(d):

$$\pi = \pi^M = 729$$

not 728.