COMPETITION LAW FOR
STATE-OWNED ENTERPRISES

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I. INTRODUCTION

State-owned enterprises (SOEs), also known as public enterprises, are owned by governments rather than by private investors. SOEs compete directly with private, profit-maximizing enterprises in many important markets. For example, government postal firms often offer overnight mail and package shipping services in direct competition with private delivery companies. Many public hospitals and educational institutions compete directly with private suppliers of similar services. Production by public enterprises can be particularly widespread in developing countries. During the 1980s, for example, public enterprises accounted for approximately 14 percent of gross domestic product in African nations, and approximately 11 percent in developing countries as a whole.[1]

SOEs are typically instructed to pursue goals other than profit maximization. Therefore, one might suspect that SOEs would act less aggressively toward their competitors than would private, profit-maximizing firms. We will demonstrate, however, that the opposite often is the case. Even though they may be less concerned with generating profit, SOEs

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[1] World Bank, Bureaucrats in Business: The Economics and Politics of Govern-ment Ownership 30 (1995). These statistics are consistent with earlier findings that, on average, public enterprises accounted for 8.6% of GDP and 27.0% of capital formation in the late 1970s. *See* R.P. Short, *The Role of Public Enterprises: An International Statistical Comparison, in* Public Enterprises in Mixed Economies: Some Macroeconomic Aspects 118 (Robert H. Floyd, Clive S. Gray & R.P. Short eds., Int'l Monetary Fund 1984). The corresponding percentages for Africa were 17.5 and 32.4, respectively. *Id.*

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may have stronger incentives than profit-maximizing firms to pursue activities that disadvantage competitors. Furthermore, these incentives can become more pronounced as the SOE's concern with profit becomes less pronounced.[2] These activities include setting prices below cost, misstating costs and choosing inefficient technologies to circumvent restrictions on below-cost pricing, raising the operating costs of existing rivals, and erecting entry barriers to preclude the operation of new competitors.

Incentives to act aggressively toward competitors can be created by governmental policy objectives that induce SOEs to value an expanded operating scale. To illustrate, SOEs are often instructed to increase local employment and/or to ensure that affordable service is provided ubiquitously to low-income families. Such directives can blunt incentives for profit maximization and thereby introduce a system in which the success of the manager of an SOE is measured more by the scale and scope of his operations than by the profit that his operations generate. Under such an explicit or implicit reward structure, SOEs may act as if they value expanded scale and scope—as proxied by revenue, for example— as well as, or instead of, profit. The enhanced valuation of increased revenue or expanded output leads the SOE to be less averse to the higher costs associated with expanded output and revenue. In aggressively pursuing expanded scale and enhanced revenues, SOEs may find it advantageous to engage in anticompetitive behavior against private, profit-maximizing enterprises.

For more than a century after the passage of the Sherman Act,[3] the United States led the world in developing a body of legal and economic principles for analyzing anticompetitive behavior by private enterprises. The U.S. Constitution, however, is thought to immunize much of the anticompetitive behavior by SOEs from U.S. antitrust law. Within the American federalist system, the Supreme Court has long addressed whether states may impose and supervise policies that reduce competition. These cases articulate the state action immunity in U.S. antitrust law,[4] which generously immunizes states (and, less generously, municipalities) from antitrust claims as long as they actively supervise the sup-

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[2] The discussion in this article draws from the analysis presented in David E.M. Sappington & J. Gregory Sidak, *Incentives for Anticompetitive Behavior by Public Enterprises*, 22 REV. INDUS. ORG. 183 (2003), which contains formal mathematical proofs of the conclusions presented below in Part III.

[3] 15 U.S.C. §§ 1 *et seq.*

[4] Parker v. Brown, 317 U.S. 341 (1943). We find troubling the law's subordination of competition to federalism in an economy infused with sophisticated strategies of rent seeking. However, this issue is not the focus of the present analysis.

pression of competition.[5] The crude rule of thumb is that private plaintiffs suing states for anticompetitive behavior generally lose.

Far less developed is the body of law on federal government activities that impair competition. If a federal SOE cloaks itself with the claim of sovereign immunity and if Congress has not consented to claims against the sovereign, including the sovereign's economic enterprises, a plaintiff has little chance to prevail in an antitrust proceeding against the SOE.[6] So it is not surprising that the antitrust jurisprudence on SOEs pales in comparison to American antitrust precedent on practically every conceivable business practice.

The other force that has contributed to the stunted growth of American case law on SOEs is capitalism itself. Unlike Europe, Australia, New Zealand, or even Canada, the United States has never embraced government ownership of enterprise. Railroads, telephone companies, electric utilities, banks, airlines, steel mills, automobile factories, and aircraft plants were routinely owned and operated by the state in Europe and much of the world.[7] Other than during wartime, the U.S. government generally has refrained from nationalizing and from directly managing private industries.[8] The 1927 nationalization of the radio spectrum used for wireless communications is a notable exception,[9] and one that is often criticized.[10] The most familiar state-owned enterprise operated by the federal government is probably the U.S. Postal Service.

Times have changed. The United States now feels the growing influence of the European Commission (EC) and the various national enforcement agencies around the world, as General Electric's failed acquisition of Honeywell in 2001 attests.[11] Less noticed than the defeat

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[5] *E.g.*, Bates v. State Bar of Ariz., 433 U.S. 350 (1977); California Retail Liquor Dealers Ass'n v. Midcal Aluminum, Inc., 445 U.S. 97 (1980); Hoover v. Ronwin, 466 U.S. 558 (1984); Southern Motor Carriers Rate Conf. v. United States, 471 U.S. 48 (1985); 324 Liquor Corp. v. Duffy, 479 U.S. 335 (1987); City of Columbia v. Omni Outdoor Adver., Inc., 499 U.S. 365 (1991); FTC v. Ticor Title Ins. Co., 504 U.S. 621 (1992).

[6] *See* 1A Phillip Areeda & Herbert Hovenkamp, Antitrust Law ¶ 252 at 164 (2d ed. 2002) ("The federal government has never consented to be sued for damages under the federal antitrust laws and thus has sovereign immunity.").

[7] *See, e.g.*, John Vickers & George Yarrow, Privatization: An Economic Analysis (1988).

[8] *See, e.g.,* Bernard M. Baruch, American Industry in the War 15–37 (1941) (describing the control of U.S. industry by the War Industries Board during World War I).

[9] *See* Thomas W. Hazlett, *The Rationality of U.S. Regulation of the Broadcast Spectrum*, 33 J.L. & Econ. 133 (1990).

[10] *See, e.g.,* Jerry A. Hausman, *Valuing the Effect of Regulation on New Services in Telecommunications*, 1997 Brookings Papers on Economic Activity: Microeconomics 1, 43.

[11] *See* Edmund L. Andrews, *Merge? Yes and Non*, N.Y. Times, July 8, 2001, § 4, at 2.

of the GE/Honeywell merger, but equally important for its long-term implications for the developments of competition law on all continents, was the EC's decision in 2001 regarding Deutsche Post AG, the German postal monopoly now undergoing privatization. The EC found that Deutsche Post had used profits from its state-granted monopoly in letter mail services to subsidize efforts to dominate the parcel delivery business in Germany by pricing below cost and undercutting competitors.[12] The EC ordered Deutsche Post to divest its parcel delivery business and to engage the new owner only on an arm's-length basis for any continuing commercial relationships.[13]

The *Deutsche Post* case could soon become instructive to SOEs owned by the U.S. government, as they become subject to various forms of competition law. In 2002, the U.S. Court of Appeals for the Ninth Circuit held in the *Flamingo Industries* case that the Postal Service was subject to federal antitrust law because "Congress has withdrawn the cloak of sovereign immunity from the Postal Service and given it the status of a private corporation."[14] The Ninth Circuit found that the Postal Service lost its sovereign status upon enactment of the Postal Reorganization Act of 1970,[15] which provided: "The Postal Service shall have the . . .

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[12] Case COMP/35.141, Deutsche Post AG, 2001 O.J. (L 125) 27, ¶ 36 [hereinafter *Deutsche Post Predatory Pricing Decision*]. Because the Europeans and many other developed economies do not use the label "antitrust," it would be parochial to call the developing body of law on SOEs "antitrust law." Instead, throughout this article we shall refer to "competition law."

[13] In a related decision in 2002, the EC ordered Deutsche Post to repay to the German government the ∈572 million that Deutsche Post had received to finance its public service mission. *See* EC Press Release IP/02/890 (June 19, 2002). The EC concluded that Deutsche Post had unlawfully used those funds to subsidize its pricing policy in the non-reserved parcel business.

The European Union has generally outlawed state aid within its common market. Under Article 87 of the EC Treaty, "any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, insofar as it affects trade between Member States, be incompatible with the common market." Consolidated Version of the Treaty Establishing the European Community, 1997 O.J. (C 340) 173, *available at* http://europa.eu.int/eurlex/en/treaties/dat/amsterdam.html#0173010078. Article 87 is generally applicable in the liberalized postal services sector. *See* Notice from the Commission on the application of competition rules to the postal sector and the assessment of certain State measures to postal services, 1998 O.J. (C 39) 2, ¶ 7(a). The underlying objective of the prohibition against state aid is to prevent trade from being affected by advantages granted by public authorities, which, in various forms, distort or threaten to distort competition by favoring certain undertakings or certain products. *See, e.g.*, Case C-39/94, SFEI v. La Poste (1996), E.C.R. I-3547, ¶ 58.

[14] Flamingo Indus. (USA) Ltd v. U.S. Postal Serv., 302 F.3d 985, 988–89 (9th Cir. 2002).

[15] Pub. L. No. 91-375, 84 Stat.719.

power to sue and be sued in its official name."[16] The Supreme Court granted certiorari in the case for the October 2003 Term.[17]

Another significant development concerning competition law for SOEs is the complaint filed by United Parcel Service in 2000 against Canada Post[18] under Chapter 11 of the North American Free Trade Agreement (NAFTA).[19] Chapter 11 permits an investor of one signatory nation to initiate arbitration against another signatory nation for its failure to comply with NAFTA's obligations concerning foreign investment and regulation of monopolies.[20] Among other things, Chapter 11 enables a foreign firm to sue for damages caused by a nation's preferential treatment of its SOE, even though sovereign immunity might block an analytically identical case brought by a citizen of that same nation and styled as a violation of its domestic law. The applicable law is not necessarily that of any NAFTA country.[21]

The *Flamingo Industries* decision and the pending *Canada Post* NAFTA arbitration illustrate how American SOEs, such as the U.S. Postal Service, the Tennessee Valley Authority, and Federal Prison Industries, all could become the targets of analogous NAFTA complaints filed by Canadian or Mexican parties under NAFTA, as well as targets of antitrust suits

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[16] *Flamingo Industries*, 302 F.3d at 989 (quoting 39 U.S.C. § 401(1)).

[17] 123 S. Ct. 2215 (2003).

[18] United Parcel Serv. of Am., Inc. v. Canada: Notice of Intent to Submit a Claim to Arbitration Under Section B of Chapter 11 of the North American Free Trade Agreement 1, 12 (Jan. 19, 2000), *available at* http://www.dfait-maeci.gc.ca/tna-nac/documents/ups-noi.pdf.

[19] North American Free Trade Agreement, Dec. 17, 1992, art. 1116-17, 32 I.L.M. 605, 642 (1993) [hereinafter NAFTA].

[20] Chapter 11 outlines the standards of treatment required by each signatory nation (called a "party" in NAFTA's nomenclature) toward investors of another signatory nation. These standards include treatment of foreign investors and investments no less favorable than the better of the treatment accorded the party's own investors and investments and the treatment accorded the investors and investments of other parties or non-parties. NAFTA, art. 1102(1)–(2), 32 I.L.M. 605, 639. Chapter 15 of NAFTA sets forth standards relating to monopolies, state enterprises, and fair competition. The chapter requires parties to ensure that any government-granted monopoly, private or public, acts in a manner consistent with NAFTA whenever the monopoly exercises any regulatory, administrative, or other governmental authority that the party has delegated to it. *Id.*, art. 1502(3)(a), 32 I.L.M. 605, 663.

[21] The governing law for such proceedings consists of NAFTA and any applicable rules of international law. *Id.,* art. 1131(1), 32 I.L.M. 605, 645. NAFTA established the Free Trade Commission, comprised of cabinet-level representatives of each party and charged with interpreting the agreement. *Id.*, art. 2001(1)–(2), 32 I.L.M. 605, 693. Those interpretations bind arbitration tribunals. *Id.*, art. 1131(2), 32 I.L.M. 605, 645.

filed by American plaintiffs under American law.[22] The purpose of this article is to begin to fill the void in the American law concerning anticompetitive behavior by SOEs. In particular, we develop a framework for identifying appropriate price floors for the products that SOEs offer in non-reserved markets, in competition with private producers.[23] In doing so, we explain why SOEs may be more likely to engage in anticompetitive activities than are private, profit-maximizing firms.[24]

We begin in Part II by examining the EC's decision in the *Deutsche Post* case. The EC found that pricing below long-run average-incremental cost (LRAIC) is inappropriate for both profit-maximizing firms and SOEs. We argue in Parts III through V that a higher price floor may be appropriate for SOEs. Part II also reviews standard multiproduct cost concepts, including LRAIC.

Part III examines the objectives of an SOE and the prices it will set when it pursues the identified objectives and faces no pricing restriction other than the restrictions imposed by competition in non-reserved markets. We identify conditions under which an SOE will choose to set prices below marginal production costs, even though such prices generally are considered to be predatory, and thus anticompetitive.[25] In addition, we discuss the methods that an SOE might employ to relax a binding prohibition against below-cost pricing. We examine an SOE's incentives to raise the costs of existing rivals and to erect barriers to keep potential

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[22] Unfortunately, the recent Presidential Commission on the United States Postal Service seems to have ignored this issue entirely. *See* EMBRACING THE FUTURE: MAKING THE TOUGH CHOICES TO PRESERVE UNIVERSAL MAIL SERVICE: REPORT OF THE PRESIDENT'S COMMISSION ON THE UNITED STATES POSTAL SERVICE 53–73 (discussing public policy oversight of the U.S. Postal Service, but ignoring the relevance of competition law to that discussion), *available at* http://www.ustreas.gov/offices/domestic-finance/usps/pdf/freport.pdf.

[23] We refer to "non-reserved" markets rather than "competitive markets" because the latter often connotes perfectly competitive markets. Our analysis applies as well to markets characterized by imperfect competition.

[24] We summarize here the precise conditions (formally derived in Sappington & Sidak, *supra* note 2) under which an SOE will price below marginal cost, thereby extending John Lott's important analysis. *See* John R. Lott, Jr., *Predation by Public Enterprises*, 43 J. PUB. ECON. 237 (1990); *see also* JOHN R. LOTT, JR., ARE PREDATORY COMMITMENTS CREDIBLE? WHO SHOULD THE COURTS BELIEVE? (1999).
   We do not provide a comprehensive assessment of the benefits and costs of SOEs. In particular, we do not explain why the operation of SOEs may be preferred to operation by private, profit-maximizing firms. We also abstract from any innate cost differences between public and private enterprises, and we take as given the objective of the SOE. Therefore, this article is not designed to deliver broad policy prescriptions regarding the proper scope of SOEs.

[25] We avoid using the term "predatory pricing" to describe the behavior of SOEs. We understand that term usually to connote pricing designed to drive rivals from the market. One of our main points is that SOEs may price below cost even if doing so is certain *not* to drive rivals from the market.

rivals from entering relevant markets. Finally, we examine the implications of an SOE's ability to achieve cost advantages in a non-reserved market by virtue of its statutory monopoly in a reserved market. These advantages can result from economies of scope between the reserved market and the non-reserved market—economies of scope that the SOE's rivals are denied the opportunity to achieve.

Part IV explains why SOEs may have greater ability than private firms to act anticompetitively. This enhanced ability arises in part from the expanded powers and special privileges that often are extended to SOEs. These powers and privileges can help to ensure that an SOE, unlike its private competitors, does not need to recoup the costs of its anticompetitive behavior by subsequently raising prices in non-reserved markets.

Part V concludes that, in light of an SOE's greater incentive and ability to price below cost, the same cost-based standard that is employed to determine whether the prices set by a profit-maximizing firm are anticompetitive is not appropriate for SOEs.[26] Instead, the price floor for an SOE typically should be set higher than the price floor for a profit-maximizing firm. Part V identifies and analyzes the key factors that should inform case-specific guidelines regarding the extent to which price floors should be set higher for an SOE than for a profit-maximizing firm.

II. THE EUROPEAN COMMISSION'S
DEUTSCHE POST DECISION

The EC's 2001 decision in the *Deutsche Post* case raised novel legal questions concerning the application of pricing floors to firms in network industries, including SOEs. The EC declined to apply to SOEs in network industries a lower price floor than would be applied to privately owned firms in industries that do not exhibit significant network effects. In addition, the EC clarified, for purposes of analysis of cross-subsidization or predatory pricing, the difference between a firm's costs of supplying network capacity and its costs of supplying network usage.

A. EXTENDING THE *AKZO* TEST TO NETWORK INDUSTRIES

The established predatory pricing rule at the time of the *Deutsche Post* case was from a 1991 decision of the European Court of Justice, *AKZO*

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[26] Because we focus on the behavior of SOEs that do not seek solely to maximize profit, our rejection of the same cost-based standard as a price floor for SOEs does not conflict with the proposition that, for private firms that do maximize profit, above-cost price cuts should not be deemed predatory. *See* Einer Elhauge, *Why Above-Cost Price Cuts to Drive Out Entrants Are Not Predatory—and the Implications for Defining Costs and Market Power*, 112 YALE L.J. 681 (2003).

Chemie BV v. Commission.[27] Under *AKZO*, a dominant firm that prices below average variable cost is presumed to have done so to eliminate its competitor and thus to have abused its dominant position.[28] In other words, when a dominant firm has so priced its products, it is unnecessary to prove an anticompetitive intent to establish that an abuse of dominant position has occurred. This "first branch" of the *AKZO* decision is distinct from the "second branch," which may apply when the dominant firm prices *above* its average variable cost but *below* its average total cost.[29]

The critical insight in the first branch of the *AKZO* test is that a firm that persistently fails to set a price for the single product it produces above the average variable cost of its operations will not be financially viable. Economic rationality will prevent a profit-maximizing firm from persistently pricing below average variable cost.[30] When prices are too low to generate profit—that is, when total cost exceeds total revenue at the established prices—a firm must confront the prospect of shutting down operations. In particular, the firm should continue to operate in the short run if and only if the loss incurred when the firm stays in business (that is, total cost less total revenue) is less than the loss incurred when the firm shuts down (that is, total cost less total variable cost). Hence, the economic decision to remain in operation distills to the following simple rule: remain in operation if and only if total variable cost is less than total revenue. Because total variable cost and total revenue are both divisible by the quantity produced, the rule can be restated as: A profit-maximizing firm should remain in operation if its average variable cost of producing a product is less than the price at which it sells the product.[31] If this condition is not met, the firm should discontinue its operations because doing so would reduce cost by more than it would reduce revenue and would thereby increase profit. The first branch of the *AKZO* rule captures this economic insight.

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[27] Case C-62/86, AKZO Chemie BV v. Comm'n, [1991] E.C.R. I-3359, [1993] 5 C.M.L.R. 215.

[28] *Id.,* [1991] E.C.R. at I-3372.

[29] *Id.* Because the EC had found Deutsche Post liable for predatory pricing under the first branch of the *AKZO* test, it did not address possible liability under the second branch. Under the *AKZO*'s second branch, public ownership of the dominant firm is highly relevant to anticompetitive intent. For the reasons explained in Part III, an SOE has a greater incentive to price below average total cost with anticompetitive intent than does a private firm.

[30] *See, e.g.*, WILLIAM J. BAUMOL & ALAN S. BLINDER, MICROECONOMICS: PRINCIPLES AND POLICY 216–17 (7th ed. 1997).

[31] This textbook rule may need to be modified in some real-world circumstances, such as when demand fluctuates and there are additional costs of shutting down and restarting production.

The need to articulate the *AKZO* rule more precisely for the case of a multiproduct firm was a subtlety of the *Deutsche Post* case that deserves emphasis. Strictly speaking, the EC's recognition of the multiproduct nature of the *AKZO* test did not require breaking new legal ground, for a close reading of *AKZO* reveals that it too involved a multiproduct firm. In an earlier stage of the *AKZO* litigation before the EC in 1985, Engineering and Chemical Supplies (Epsom and Gloucester) Ltd. (ECS), a small producer of organic benzoyl peroxide in the United Kingdom, alleged that AKZO Chemie BV, part of the large multinational group AKZO, had abused its dominant position in the European Economic Community (EEC) organic peroxides market.[32] ECS alleged that AKZO implemented "a policy of selective and below-cost price-cutting designed to damage the business of ECS and exclude it as a competitor."[33] ECS also claimed that AKZO's tactics had been concentrated in a relatively specialized submarket (the flour additives sector) in the United Kingdom and Ireland, which then accounted for the majority of ECS's sales. Such targeted behavior was allegedly intended to prevent ECS from expanding to the much broader EEC market for organic peroxides for the plastics industry. According to ECS, the actual price-cutting behavior was preceded by "threatened reprisals in the flour additives sector unless ECS agreed to abandon the polymer (or "plastics") market."[34]

When formulating its predatory pricing rule, the EC relied exclusively on generic cost attributes—fixed costs and variable costs—that typically apply to firms that supply a single product.[35] Nonetheless, the multiproduct nature of AKZO was implicit in the EC's formulation of its pricing rule, for it observed: "Besides being one of several facilities in the EEC where AKZO produces organic peroxides for the polymer industry, AKZO UK also manufactures benzoyl peroxide compounds for use as a bleaching agent in the commercial baking of bread together with other

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[32] Commission Decision of 14 December 1985 Relating to a Proceeding Under Article 86 of the EEC Treaty, Case IV/30.698, ECS/AKZO, 1985 O.J. (L 374), ¶¶ 1–3.

[33] *Id.* ¶ 1.

[34] *Id.* ¶ 2.

[35] The EC observed that "AKZO . . . argues that the only criterion for assessing the legality or otherwise of its conduct is whether the prices it charged were above its average variable costs (used as a proxy for marginal costs)." *Id.* ¶ 75. The EC said that a finding that AKZO's prices were indeed "above 'variable' or 'marginal' cost depends upon accepting at face value AKZO's classification of costs which treats as 'variable' only raw material and energy costs." *Id.* ¶¶ 75–76. The EC later defined variable costs as those that vary depending on the quantities produced, such as "materials, energy, direct labour, supervision, repair and maintenance, and royalties," and it defined fixed costs as those that remain constant regardless of the quantities produced, such as "management overheads, depreciation, interest and property taxes." *Id.* ¶ 58.

associated flour or milling additives."[36] Consequently, the EC's task in
Deutsche Post of explaining the application of *AKZO* to a multiproduct
firm in a network industry was more a challenge of economic explication
than of doctrinal legal analysis. [37] The EC concluded that the appropriate
multiproduct counterpart to variable cost is long-run average incremen-
tal cost (LRAIC).

B. Cost Definitions

To clarify the implications of using LRAIC as a predatory pricing floor,
a brief review of this and other standard multiproduct cost concepts is
useful. Most of the cost concepts discussed here have acquired clear
meanings in economic theory and regulatory practice.[38] The distinction
between capacity costs and usage costs, however, is less well understood.
It therefore deserves clarification, particularly in light of its relevance
to network industries in which multiproduct SOEs often operate.

Incremental cost is a generic concept that refers to the increase in the
firm's total cost when it expands its output of a particular product or
products by some specified increment, holding constant the amount of
other products that the firm produces. Often, the increment in question
is the entire output of the relevant product. *Average incremental cost* is
incremental cost per unit of the output in question. *Marginal cost* gener-
ally differs from average incremental cost. The marginal cost of product
X refers to the increase in the firm's total outlays that result from a small
increase in the output of *X*. Marginal cost can be approximated by
average incremental cost if the increment in question is small. But if
the increment is large, marginal cost and average incremental cost can
differ substantially.

The incremental cost of product *X* is computed by taking the differ-
ence between (1) the total cost of the firm if it were to produce all of
its products and (2) the total cost of the firm if it were to produce all
of its products except product *X*. This difference in these total costs is
the incremental cost of producing *X*. If the resulting incremental cost
measure is divided by the number of units of product *X* that the firm

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[36] *Id.* ¶ 5.

[37] Even before the *Deutsche Post* decision, the EC had accepted the applicability of the
AKZO test to the provision of telecommunications services, for which regulators have
examined estimates of average-incremental cost for many years. COMMUNICATION FROM
THE COMMISSION ON THE APPLICATION OF THE COMPETITION RULES TO ACCESS AGREE-
MENTS IN THE TELECOMMUNICATIONS SECTOR—FRAMEWORK, RELEVANT MARKETS AND
PRINCIPLES, 1997 O.J. (C 76) 9.

[38] The following discussion draws from WILLIAM J. BAUMOL & J. GREGORY SIDAK, TOWARD
COMPETITION IN LOCAL TELEPHONY 64–72 (1994).

produces, then the result will be an average, or per-unit, estimate of that product's incremental cost—namely, the average-incremental cost of X, or AIC_X. Although such calculations are relatively fact-intensive, they are routinely generated for regulatory proceedings in telecommunications, energy, and other network industries.

Average-incremental cost generally is the long-run figure obtained after plant and equipment are adjusted so as to minimize the average cost of the pertinent output. It is therefore often called *long-run average-incremental cost.* The average-incremental cost of X includes *any fixed cost that must be incurred to produce that product alone.*[39] A price floor equal to the average-incremental cost of product X would require the producer to recover in its revenue from the sale of X both the fixed costs and the variable costs attributable only to product X.

The *stand-alone cost* of service X (SAC_x) is the outlay that would be required for a firm to produce service X and no other service. The concept of stand-alone cost also applies to combinations of services or products. The stand-alone cost of products Y and Z ($SAC_{Y,Z}$), for example, is the cost incurred by a firm producing only products Y and Z. Stand-alone cost differs from incremental cost in part because the stand-alone cost of producing multiple products can include costs that are common to the group of products in question, even if the costs are not incremental to the production of any one of the products individually.

A *cross-subsidy* is present when the extra revenue derived from the sale of a product of a firm is less than the incremental cost of the product, but the firm nevertheless earns sufficient revenue from all of its products to cover all of its costs. When total revenue exceeds total cost, some products other than the cross-subsidized product must be generating the revenue required to offset the shortfall of the revenues of the cross-subsidized product. Thus, one can say that product X receives a subsidy if its revenues are inadequate to cover the costs caused by the firm's supply of X, but the firm's overall operations are financially viable.

As noted above, average-incremental cost includes any fixed cost incurred exclusively for the service in question. But the average-incremental cost of service X does not include any contribution toward any fixed costs incurred *in common* for X and some other service Y supplied by the same firm. In this simple two-product example, a particular common cost constitutes no part of the incremental cost of either X or Y by itself. But it is distinctly included in the incremental cost of X and Y in combination. Thus, to ensure the absence of cross-subsidies

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[39] *See id.* at 57–58.

in this example, the following *three* conditions must *all* be satisfied: (1) the price of *X* must not be below the AIC of *X*; (2) the price of *Y* must not be below the AIC of *Y*; and (3) the prices of *X* and *Y* must be such that their combined incremental revenue is not less than the combined incremental cost of *X* and *Y* together. This case is the simplest version of the combinatorial incremental-cost test, introduced by Gerald Faulhaber.[40] A profit-maximizing firm will set prices that satisfy the combinatorial incremental-cost test. If it persistently failed to do so, the firm could increase its profits by setting different prices. The more general version of the combinatorial test states that the prices of the firm must be such that the resulting revenue of every product by itself, and the combined revenue of every combination of the firm's products, must at least equal the corresponding average-incremental costs of production.

The proper implementation of the combinatorial incremental cost test can help to avoid erroneous conclusions about appropriate price floors. To illustrate this point, suppose a firm produces three products, *X, Y,* and *Z.* Suppose further that when it is producing *Z,* the firm's incremental cost of producing *X* and *Y* is relatively high, but its incremental cost of producing *X* is low and its incremental cost of producing *Y* is also low. In this case, if price floors simply reflected product-specific incremental costs, the appropriate price floors for *X* and *Y* would both be low. However, if prices were set at these (low) floors, the firm's incremental revenue from *X* and *Y* would fall short of the incremental cost of producing *X* and *Y.* Under such circumstances, higher price floors for *X* and/or *Y* would be appropriate to ensure that the firm does not drive a more efficient supplier of goods *X* and *Y* from the market. Products *X* and *Y* may not be entirely unrelated products or services; instead, they may be variants of what usually would be seen as a common family of services. Although throughout the remainder of this article we speak of a test of the LRAIC of a product *X,* in fact the discussion should be read as applying equally to the LRAIC of a group of products.[41]

Prices that are set at or above product-specific average incremental-costs and that satisfy the combinatorial incremental-cost test preclude cross-subsidies. This is the case because a product or group of products is being cross-subsidized only if it generates incremental revenue below the relevant incremental cost of production.

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[40] Gerald R. Faulhaber, *Cross-Subsidization: Pricing in Public Enterprise,* 65 AM. ECON. REV. 966 (1975).

[41] For a nontechnical elaboration on the combinatorial incremental cost test, see BAUMOL & SIDAK, *supra* note 38, at 71–72.

C. Sunk Costs, Capacity Costs, and the Relationship of LRAIC to Average Avoidable Cost

The level of sunk costs and the relevant production decision affect the magnitude of LRAIC. To see why, notice that one might construct the incremental cost of product *X* by using either of two different measures of the cost of producing all but product *X*. The first measure would be the cost of producing all but *X* for a firm that had never produced *X*. The second measure would use the cost of producing all but *X* for a firm that initially produced all products and subsequently ceased production of *X*. Any sunk, irreversible costs that the firm must incur to produce *X* would be part of the incremental cost of *X* using the first measure, but not the second measure.

In an influential article, William Baumol advocates that "average avoided cost" (AAC), rather than average variable cost, be the price floor used to judge predation.[42] In essence, Baumol recommends the use of the second measure of LRAIC in which the firm initially produces all products and subsequently ceases production of the product in question. Baumol defines AAC as "the decremental rather than the incremental cost to firm *B* if it decides to exit"—that is, "the cost that *B* can escape or avoid by leaving."[43] The critical distinction between Baumol's measure of AAC and AVC is that the former includes "all pertinent portions of the product-specific fixed but avoidable costs, that is, all portions of such costs that can be escaped in the pertinent period of time."[44] Baumol advocates that the traditional Areeda-Turner rule for predatory pricing[45] be construed to use AAC instead of AVC as the price floor. Baumol's AAC standard remains the topic of continuing commentary.[46]

The question of the proper test for whether prices charged by profit-maximizing firms are predatory is the subject of a large and growing literature. We do not examine that literature in detail because our primary conclusions are not sensitive to the resolution of the questions addressed in that literature. Our focus is on the behavior of SOEs and the implications of this behavior for setting the floor for SOE prices relative to the floor for profit-maximizing firms. We argue in Part V that

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[42] William J. Baumol, *Predation and the Logic of the Average Variable Cost Test*, 39 J.L. & Econ. 49 (1996).

[43] *Id.* at 58.

[44] *Id.* at 59.

[45] Phillip E. Areeda & Donald F. Turner, *Predatory Pricing and Related Practices Under Section 2 of the Sherman Act*, 88 Harv. L. Rev. 697 (1975).

[46] Proponents of Baumol's AAC standard include 3 Areeda & Hovenkamp, *supra* note 6, ¶¶ 735b3, 740d3; Patrick Bolton, Joseph F. Brodley & Michael H. Riordan, *Predatory Pricing: Strategic Theory and Legal Policy*, 88 Geo. L.J. 2239, 2272–73 (2000).

the floor for SOEs should be set above the corresponding floor for profit-maximizing firms. Our arguments apply whether the floor for profit-maximizing firms is set at long-run average-incremental cost, average avoidable cost, or some other measure of cost.

For expositional ease, we will focus on one measure of LRAIC in the ensuing discussion. We will focus on the first measure (in which LRAIC reflects the costs of producing a product for a firm that has never produced the product), in part, because we believe this is the more conventional interpretation of LRAIC.[47] This focus, though, does not imply that this measure of LRAIC, which includes product-specific sunk costs, is the only relevant measure. For the present purpose, it is simply the particular measure of LRAIC on which we focus for expositional simplicity. Our central qualitative conclusions regarding the appropriate price floor for an SOE relative to the corresponding floor for a profit-maximizing firm are not sensitive to the particular measure of LRAIC that we adopt.

Regardless of the measure of LRAIC that is employed, a universal service obligation (USO) can affect significantly a firm's LRAIC. To understand why, consider, first, the example of an independent, profit-maximizing barge owner who faces no obligation to provide service. Such an entrepreneur can design the barge's capacity however he likes, even if he is a dominant supplier. He can incur the fixed costs of constructing an enormous barge that is capable of accommodating the shipments of the highest-volume shippers. If he does so, he will need to forecast the likely demand of such shippers, and then he will bear the risk (or must contract around the risk) that his enormous barge will sometimes leave him with excess capacity. Alternatively, the barge owner may incur lower fixed costs to build a smaller barge, which will have a higher likelihood of operating at full capacity. If the barge owner faces excess demand with the smaller barge, he can raise his price and thus ration the scarce capacity of his barge to those customers who value the service at least as highly as the specified price.

Now, in contrast, consider how a state-owned postal operator might determine the characteristics of its delivery network. Governments often announce social policies of universal access, geographically averaged prices, and minimum service-quality standards. Such policies imply for the SOE a particular capacity requirement for its letter delivery network,

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[47] In the long run, when all costs are avoidable, any meaningful difference between avoidable costs and incremental costs disappears. Therefore, our focus on the common usage of LRAIC may be most appropriate for settings in which the prices in question are long-term, persistent prices.

as well as an "obligation to serve" all customers as the "carrier of last resort."[48] Once the SOE has built its delivery network according to these mandates, its "barge" must sail every specified day, regardless of whether it is nearly empty or entirely full. Unlike the owner of a real barge who bears no obligation to serve, the SOE may not raise prices (or offer particular customers inferior service quality) to ration scarce capacity on its delivery network when faced with excess demand. Similarly, a firm with a USO does not lawfully have the discretion to limit its output by restraining the capacity of its network. The firm's USO generally compels it to supply a level of network capacity that exceeds the level of network capacity that would be supplied in a competitive market by firms that do not have USOs. "Mandating that the [regulated incumbent firm] alone act as the carrier of last resort forces the firm to hold capacity in reserve to meet demand at peak load."[49] The SOE must therefore build its network with "reserve" or "standby" capacity that will accommodate peak demand.

To provide customers the *option* of sending letters on any given day to any given destination in the nation, the SOE must incur many kinds of costs that do not vary with the number of letters ultimately transported that day. One cannot attribute such network costs to any particular customer. The cost of standing ready to provide service on demand cannot be attributed to Customer *A,* rather than Customers *B* and *C,* because the firm is required to offer the same service to *all* of them. Consequently, "when a regulated firm has special-service obligations imposed upon it," "[t]hese obligations are appropriately treated as sources of common fixed costs for the firm . . . ."[50] The SOE's USO implicitly requires it simultaneously to offer both network *access* and network *usage.* Even if a customer sends no letters on a given day, he will nonetheless have enjoyed the option of doing so.[51] The delivery infrastructure was there to be used, if the customer had wanted to use it.

The option value of network access has implications for network capacity and for the distinction between network capacity costs and network usage costs. To ensure that consumers will be able to use the delivery

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[48] For economic analysis of the obligation to serve, see J. GREGORY SIDAK & DANIEL F. SPULBER, DEREGULATORY TAKINGS AND THE REGULATORY CONTRACT: THE COMPETITIVE TRANSFORMATION OF NETWORK INDUSTRIES IN THE UNITED STATES 119–29 (1997).

[49] *Id.* at 513.

[50] BAUMOL & SIDAK, *supra* note 38, at 108–09.

[51] The analogous option value inherent in the telecommunications network is well recognized. *See, e.g.,* J. Gregory Sidak & Daniel F. Spulber, *Cyberjam: The Law and Economics of Internet Congestion of the Telephone Network,* 21 HARV. J.L. & PUB. POL'Y 327, 362 (1998) ("There are costs associated with providing both connections and standby capacity to supply the option to achieve a connection. The costs of standby capacity are capital costs

network with relative ease, if they so desire, the network must be designed with capacity sufficient to accommodate expected demand, including peak demand during particular times of the day, month, or year. Such capacity costs are, by definition, fixed and sunk—they have already been made when a customer ships a parcel. Stated differently, if an existing customer stopped using the SOE's delivery network, these fixed costs of network capacity could not be avoided. The fixed costs of the network neither increase nor decrease when a particular customer, large or small, actually uses the network for parcel delivery service. Such fixed costs may include labor as well as capital.

The distinction between network capacity costs and network usage costs is intimately related to the scale of the network required to ensure a reasonable quality level for core operations. Absent strategic behavior, it would seem reasonable to count as overhead costs all costs associated with the network infrastructure required to ensure the established level of core service quality, even if they also support the delivery of non-core services. At the same time, such a rule for classifying costs provides strong incentives for the SOE that wishes to expand the scale and scope of its operations to set too high a quality standard for its core services. A high quality standard can justify expanded network investment (to ensure ample reserve capacity, for example), which can lower the SOE's incremental cost of providing non-core services. We discuss later an SOE's incentives and opportunity to make such strategic choices.[52]

D. The *Deutsche Post* Decision

Deutsche Post AG (DPAG) is a public limited company that in 1995 succeeded to Deutsche Bundespost Postdienst, which was a section of a special federal fund. Deutsche Post functions much like the U.S. Postal Service and has a profitable letter mail monopoly in Germany.[53] Deutsche Post also has a business parcel delivery operation that faces competition from United Parcel Service (UPS), Federal Express, and others. Deutsche Post's expansion from monopoly letter mail services into non-reserved

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of network capacity that are similar to the merchant's cost of holding inventory to provide 'immediacy' to customers.").

[52] We note here, though, that an SOE typically has ongoing opportunity to choose strategically its level of network investment. Infrastructure investment typically does not occur just once, but rather occurs sequentially as capacity wears out and as the expected demand for the firm's services increases. In this respect, the sequential sunk costs of a network owner differ from the one-time sunk costs incurred by a creator of pure intellectual property, for example.

[53] For an overview of German postal regulation, see Anne Heinen, *Country Report Germany, in* The Liberalization of Postal Services in the European Union 259 (Damien Geradin ed., 2002).

parcel delivery services raises the issue not of a competitors' access to services controlled by Deutsche Post, but rather the use of infrastructure and cash flows available to Deutsche Post as a regulated public monopoly to distort competition in an adjacent market.

In the early 1990s, UPS complained to the EC that Deutsche Post was using letter mail monopoly profits to subsidize the sale of its parcel delivery services at below-cost prices. In July 1994, UPS asked the EC to stop the allegedly predatory pricing and to separate Deutsche Post's letter mail business from its parcel delivery businesses. In March 2001, the EC found that for five years Deutsche Post failed to cover incremental costs in its pricing of parcel delivery service, violating Article 82 of the EC Treaty.[54]

1. Cross-Subsidization in Non-Reserved Markets

The EC concluded that Deutsche Post's overall revenues in the reserved area (letter mail) exceeded its stand-alone costs, whereas revenue from its mail-order parcel service was below the incremental cost of providing that specific service.[55] Such mail-order parcels are not processed through the postal counter system but are collected by Deutsche Post directly at the customers' premises.[56] After collecting these parcels, Deutsche Post used the same infrastructure to process mail-order services that it used to process three other commercial parcel services.[57] These other commercial parcel services are (1) business-to-business parcels (B-to-B), (2) parcels that are handed in at post office counters and sent from one private person to another (P-to-P-services), and (3) mail-order returns (P-to-B-services). During the years investigated by the EC, mail-order services accounted for approximately 71 percent of the total volume of all commercial postal services every year.[58]

The EC defined cross-subsidization to occur when "the earnings from a given service do not suffice to cover the incremental cost of providing that service and where there is another service or bundle of services the earnings from which exceed the stand-alone costs."[59] The EC stated that "when establishing whether the incremental costs incurred in providing

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[54] *Deutsche Post Predatory Pricing Decision, supra* note 12, ¶ 36. The EC also found that Deutsche Post had violated Article 82 by granting "fidelity rebates" to large customers. *Id.* ¶¶ 33, 37. For this violation, the EC fined Deutsche Post €24 million. *Id.* ¶ 51.

[55] *Id.* ¶¶ 6, 36.

[56] *Id.* ¶ 26.

[57] Deutsche Post used a separate infrastructure to process the reserved letter-post service, joint delivery service being the only exception. *Id.* ¶ 11.

[58] *Id.* ¶ 11.

[59] *Id.* ¶ 6.

mail-order parcel services are covered, the additional costs of producing that service, incurred solely as a result of providing the service, must be distinguished from the common fixed costs, which are not incurred solely as a result of this service."[60] This passage indicates that the EC's interpretation of "incremental" is consistent with the interpretation employed here.

2. *Universal Service and the Appropriate Price Floor*

In making its calculation of the incremental cost of mail-order parcel services, the EC understood and considered the impact of Deutsche Post's universal-service obligation. Under the German Postal Universal Service Ordinance, Deutsche Post must maintain a capacity reserve large enough to cover any peak demands that may arise in over-the-counter parcel services while meeting statutory service-quality standards for those services.[61] Parcel services up to a weight of twenty kilograms are included in Deutsche Post's USO.[62] At least 80 percent of the parcels covered by the universal-service obligation must be delivered within two business days (known as D+2).[63] To comply with universal-service obligations, Deutsche Post must also maintain a certain minimum number of facilities, including at least one in every city with more than 2,000 inhabitants.[64]

As a consequence of these obligations, the EC concluded that even "if Deutsche Post were to stop offering a specific parcel service, it could not, unlike a private firm like UPS, cut back on staff and equipment in perfect proportion to the reduction in volume," because "some staff and equipment are also needed to provide over-the-counter-services that meet statutory quality standards."[65] Therefore, the EC held that "the costs of maintaining capacity arise independently of the services provided and the volume of parcels processed only as a consequence of maintaining capacity to allow everyone the standard option of having their parcels sent over-the-counter in the normal way."[66] These capacity costs consequently were found not to be attributable to any specific service, but rather to constitute common fixed costs.[67] Only where services other than

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[60] *Id.* ¶ 7.

[61] German Postal Universal Service Ordinance (Post-Universaldienstleistungsverordnung (PUDLV)) § 1 (1) Nr. 2, *available at* http://bundesrecht.juris.de/bundesrecht/pudlv/gesamt.pdf.

[62] *Id.*

[63] *Id.* § 3 Nr. 2.

[64] *Id.* § 2 Nr. 1.

[65] *Deutsche Post Predatory Pricing Decision, supra* note 12, ¶ 8.

[66] *Id.* ¶ 9.

[67] *Id.* (citing BAUMOL & SIDAK, *supra* note 38, at 108).

over-the-counter parcel services are provided can costs be attributable to a specific service. Such costs cease to exist if the service at issue is stopped. The EC held that, to avoid subsidizing mail-order parcel services, Deutsche Post must earn revenue from this parcel service that at least covers the cost attributable (incremental) to producing the specific service, but not revenue sufficient to cover the network capacity costs that the SOE incurs as a result of its statutory USO.[68]

To determine the particular incremental costs of providing mail-order parcel services, the EC examined every stage in mail-order parcel processing (collection, sorting, long-distance transport, regional and local transport, and delivery) and asked whether these costs would be saved if mail-order services were discontinued.[69] The EC concluded that all costs of collection were fully attributable to the mail-order service because the parcels (unlike over-counter-services) are collected by Deutsche Post from the customer's premises and transported directly to one of the thirty-three outward and inward freight centers.[70] Regarding sorting, the EC found that capital cost of creating freight centers and delivery points could not be attributed to a particular service because these costs would be incurred as long as the USO for over-the-counter parcels applies to the postal service, but the staffing and equipment cost of sorting depend entirely on traffic volume and can be attributed in direct proportion to the mail-order services.[71] Costs of long-distance transport—staffing, equipment, and capital—were not attributed to a particular service because they could only be eliminated if universal-service obligations no longer applied to parcel services.[72] Half of the costs of regional and local transport (between freight centers and delivery points) were attributed to mail-order services.[73] Finally, delivery costs were divided into the cost of driving, which were not attributable to any specific service, and the cost of stopping and handing over the parcel, which was partially attributable to mail-order services.[74]

On the basis of this distribution between common costs and product-specific costs, the EC concluded that revenue generated from mail-order services did not suffice to recoup product-specific costs. Consequently, during the relevant period at issue in the case, every additional sale of

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[68] *Id.* ¶ 10.

[69] Notice that this procedure considers avoided costs, which can differ from the costs associated with beginning a new service.

[70] *Id.* ¶ 12.

[71] *Id.* ¶ 13.

[72] *Id.* ¶ 14.

[73] *Id.* ¶ 15. The analytical basis for this cost allocation is not obvious from the record.

[74] *Id.* ¶ 16.

mail-order services not only entailed the loss of at least part of the services' cost, but also made no contribution toward Deutsche Post's capacity maintenance costs.[75] By "remaining in the market without any foreseeable improvement in revenue," Deutsche Post was found to have "restricted the activities of competitors which are in a position to offer the service at a price that covers their costs."[76]

3. *Remedy*

In ordering a remedy for this violation of Article 82, the EC sought to "guarantee that competitors are not eliminated by offers which are not based on efficiency or superior performance, but solely on a basis of a price below the additional costs of providing the competitive service."[77] Deutsche Post was required to structurally separate its reserved letter mail business from its parcel delivery business, the latter to become a separate legal entity operating under a new name.[78] This new firm—Deutsche Post Euro Express—may procure necessary inputs (such as sorting, transport, and delivery) by purchasing them from Deutsche Post or its competitors, or by producing the inputs itself. If the new entity chooses to purchase inputs from Deutsche Post, Deutsche Post must provide them at market prices. In addition, all input services supplied by Deutsche Post to the new entity must be supplied to its competitors at the same price and on the same conditions. The EC intended that, with these structural and behavioral rules in place, Deutsche Post would have no incentive to treat the new firm differently from other parcel delivery services—in particular, to sell inputs to the affiliated firm at prices below incremental cost.[79]

III. WHY STATE-OWNED ENTERPRISES MAY HAVE STRONGER INCENTIVES THAN PRIVATE FIRMS TO ACT ANTICOMPETITIVELY

The EC's conclusion that Deutsche Post should not be permitted to set prices below LRAIC is undoubtedly correct. A question remains, though, as to whether SOEs should be required to set prices significantly above LRAIC in non-reserved markets. For the reasons presented in this

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[75] *Id.* ¶ 36. This description goes beyond saying that the total revenue of the service fell short of total avoidable costs. It also suggests that marginal revenue fell short of the marginal costs associated with changes in the level of the service, given that the service remained in place.

[76] *Id.*

[77] *Id.* ¶ 18.

[78] *Id.* ¶ 44.

[79] *Antitrust Proceedings in Postal Sector Result in Deutsche Post Separating Competitive Parcel Services from Letter Monopoly,* EU INSTITUTIONS PRESS RELEASES, Mar. 20, 2001 (IP/01/419).

Part and the next, we believe a price floor above LRAIC generally is appropriate for SOEs.

In this Part, we explain why SOEs may have stronger incentives than private firms to engage in anticompetitive activities. We demonstrate that when an SOE values an expanded scale of operation in addition to profit, it will be less concerned than its private, profit-maximizing counterpart with the extra costs associated with increased output. Consequently, even though an SOE may value the profit that its anticompetitive activities can generate less highly than does a private profit-maximizing firm, the SOE may still find it optimal to pursue aggressively anticompetitive activities that expand its own output and revenue. To illustrate, the SOE might set the price it charges for a product below its marginal cost of production, particularly if the product is one for which demand increases substantially as price declines. If prohibitions on below-cost pricing are in effect, an SOE may have a strong incentive to understate its marginal cost of production or to over-invest in fixed operating costs so as to reduce variable operating costs. A public enterprise may also often have stronger incentives than a private, profit-maximizing firm to raise its rivals' cost and to undertake activities designed to exclude competitors from the market because these activities can expand the scale and scope of the SOE's operations.

A. THE OBJECTIVE OF AN SOE

SOEs often have specific assigned missions and goals that go beyond profitability. For example, the U.S. Postal Service is charged with providing ubiquitous service throughout the United States at uniform rates across different geographic regions. Congress has mandated:

> The Postal Service shall have as its basic function the obligation to provide postal services to bind the Nation together through the personal, educational, literary, and business correspondence of the people. It shall provide prompt, reliable, and efficient services to patrons in all areas and shall render postal services to all communities. The Postal Service shall provide a maximum degree of effective and regular postal services to rural areas, communities, and small towns where post offices are not self-sustaining.[80]

When it proposes rate increases (subject to Postal Rate Commission review), the Postal Service is required to consider the fairness, equity, and simplicity of its rate structure (across multiple services), as well as the relationships among prices, production costs, and the value of the

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[80] 39 U.S.C. § 101(a), (b).

service provided.[81] Such mandates indicate that, in contrast to the typical private firm in a capitalist society, SOEs seldom seek solely to maximize the profit they generate. The profit that SOEs are permitted to earn often is explicitly limited, and SOEs are commonly instructed to pursue goals that are distinct from, if not fundamentally incompatible with, profit maximization.[82]

In practice, an SOE is not a monolithic entity that faithfully executes its mandate. Rather, it is an organization comprised of many individuals, including managers who often have considerable discretion to pursue their own objectives. This discretion arises in part because SOEs are not subject to takeover threats and are generally less subject to the discipline of capital markets than are private enterprises. Even though the managers of private, profit-maximizing firms may have goals and interests similar to those of managers in SOEs, the discipline of capital markets will limit the freedom of private managers to pursue private interests that do not maximize shareholder value.[83] Managers of SOEs (and government officials who monitor them) often have considerable interest in expanding the scale or scope of their activities, in part, because a manager's abilities may be inferred from the size of the operations that he or she oversees.[84]

This preference for expanded scale and scope of operations suggests that SOEs might act as if they seek to maximize some combination of profit and a measure of operating scale.[85] In practice, revenue often

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[81] *Id.* § 3622.

[82] If an SOE is not maximizing its profits, it necessarily is not minimizing its losses. Operating losses are the difference between total cost and total revenue. To say that an SOE seeks to price so as to minimize its losses in a non-reserved market is to say that it chooses a price that minimizes the difference between total cost and total revenue. This is the same price that maximizes the difference between total revenue and total costs. *See, e.g.,* HAL R. VARIAN, MICROECONOMIC ANALYSIS 487 (3d ed. 1992) ("Note that the problem of maximizing $f(x)$ with respect to x is the same as the problem of minimizing $-f(x)$.").

[83] *See* R. Richard Geddes, *Agency Costs and Governance in the United States Postal Service, in* GOVERNING THE POSTAL SERVICE 114 (J. Gregory Sidak ed., 1994); *see also* R. RICHARD GEDDES, THE POLITICAL ECONOMY OF POSTAL REFORM (2002).

[84] *See* WILLIAM NISKANEN, BUREAUCRACY AND REPRESENTATIVE GOVERNMENT (1971); *see also* William Niskanen, *Bureaucrats and Politicians,* 18 J.L. & ECON. 617 (1975). In summarizing the relevant empirical evidence, Andre Blais & Stephane Dion, *Conclusion: Are Bureaucrats Budget Maximizers, in* THE BUDGET-MAXIMIZING BUREAUCRAT: APPRAISALS AND EVIDENCE 355 (1991), conclude that bureaucrats may seek to expand the scale of their operations (by securing larger budgets) to realize the power and prestige that often accompany expanded operations. Expanded output can also promote expanded employment, which can be a goal of SOEs.

[85] *Cf.* Ray Rees, *A Positive Theory of The Public Enterprise, in* THE PERFORMANCE OF PUBLIC ENTERPRISES: CONCEPTS AND MEASUREMENT 179 (Maurice Marchand, Pierre Pestieau & Henry Tulkens eds., 1984) (assumes that managers in a public enterprise seek to maximize

serves as a convenient proxy for scale, because revenue provides a natural metric for comparing the outputs of multiple products.[86] Thus, one might view the SOE as seeking to maximize a weighted average of revenue and profit.[87] Different SOEs may value these two performance dimensions differently. To capture differences among SOEs, we employ the parameter w, which can range from 0 to 1, to denote the weight that an SOE places on revenue. We will also let $1 - w$ denote the corresponding weight on profit. By varying w, we can capture the objectives of different SOEs.

In the discussion that follows, we focus on this simple class of objective functions for the SOE. However, it is important to note that the key qualitative conclusions drawn in this discussion hold more generally. The conclusions hold, for example, if the SOE seeks to maximize a weighted average of output and profit, or if it seeks to maximize revenue (or output) subject to the constraint that its profit exceed some specified level. The key assumption is that the SOE values revenue or output as well as profit. Unlike a private firm that values only profit, an SOE may find value in increased revenue even when costs increase by as much or more. Its concern with revenue or output effectively induces the SOE to discount the cost of output expansion. Consequently, even though the SOE values the profit that its anticompetitive activities can generate less highly than does a private profit-maximizing firm, the SOE finds it optimal to pursue particularly aggressively anticompetitive activities that serve to expand its own output and revenue. In essence, the SOE's increased concern with output outweighs its reduced concern with profit in determining its interactions with competitors.[88]

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an increasing, concave function of output, subject to capital constraints and workers' preferences for high wages and expanded employment).

[86] William Baumol has observed: "In ordinary business parlance the term 'sales' refers not to the number of physical units . . . but, rather, to the *total revenue* obtained by the firm from the purchases of its customers." WILLIAM J. BAUMOL, BUSINESS BEHAVIOR, VALUE AND GROWTH 45 (1959). Furthermore, "in the near universal multi-product firm any measure of overall physical volume must involve index number problems, and the adoption of a value measure is doubtless to be expected." *Id.*

[87] Alternative objective functions for SOEs are certainly possible, and some are discussed below. For example, managers of SOEs may seek to maximize those dimensions of output that are most highly valued by and most readily monitored by Congress, and that are subject to specified budget constraints. *See* Cotton Lindsay, *A Theory of Government Enterprise*, 84 J. POL. ECON. 1061 (1976). For simplicity, we abstract from multiple performance dimensions, although this possibility merits attention in future research.

[88] This is not to say that all of the qualitative conclusions drawn below necessarily hold whenever an SOE is not concerned solely with profit maximization. Suppose, for example, that an SOE seeks to maximize the sum of consumer and producer surplus. In this case, even though the SOE will typically expand output beyond profit-maximizing levels, it will not generally set prices below marginal production costs. Although the objective of welfare maximization merits further consideration, the objective abstracts from a range of management and control issues within public firms.

Anecdotal evidence supports this theoretical analysis. For example, scholars and government analysts have noted that a series of specific investments and market-entry decisions of the U.S. Postal Service evince a proclivity for revenue maximization.[89] Moreover, that evident maximization of revenue can entail substantial risk and even financial losses. A March 2003 report filed by the Postal Service at the Postal Rate Commission noted the inherent riskiness of the agency's ventures into such non-postal services as prepaid calling cards and electronic bill payment:

> Like any venture that depends on creating value and attracting revenue, the Postal Service needs the room to try new things, spread risk, stimulate innovation, and have flexible access to marketplace skills through partnerships. As with any new business initiative, it is reasonable to expect that some offerings will meet planned objectives while others will not. Undertaking new services requires a look forward and thus involves inherent risk.[90]

Some of the Postal Service's operations in non-postal markets have produced financial losses. The losses raise questions about whether concern with expanded scale and scope, rather than profit maximization, might have driven the decision to initiate these operations. In 1998, the General Accounting Office found that, from 1995 through 1997, the Postal Service lost more than $84 million on its development and marketing of non-postal products.[91] In addition to prepaid telephone calling card and electronic commerce services, those money-losing non-postal products included a remittance service, REMITCO, which the Postal Service ultimately discontinued.[92]

To analyze the implications of objectives other than profit maximization, it is convenient to introduce a formal statement of the class of objective functions under consideration. To do so, let $n \geq 1$ denote the number of products supplied by the SOE. Also let $p_i \geq 0$ denote the price that the SOE charges for its i-th product, and let $p \equiv (p_1,...,p_n)$ denote the various prices the SOE charges for its n products. In addition, let $Q_i(p)$ denote the amount of product i that customers will buy when

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[89] *See, e.g.*, J. GREGORY SIDAK & DANIEL F. SPULBER, PROTECTING COMPETITION FROM THE POSTAL MONOPOLY 150–51 (1996) ("The Postal Service no longer seeks to plug gaps in the provision of public services. Rather, it seeks to divert business from private firms in existing and emerging industries."); RICK GEDDES, SAVING THE MAIL: HOW TO SOLVE THE PROBLEMS OF THE U.S. POSTAL SERVICE (2003).

[90] U.S. Postal Service, Notice of the U.S. Postal Service of Filing Report: Report on Nonpostal Initiatives 10 (filed Mar. 10, 2003, Postal Rate Comm'n), *available at* http://www.prc.gov/docs/37/37405/Notice_Report.3.10.03.pdf.

[91] GENERAL ACCOUNTING OFFICE, U.S. POSTAL SERVICE: DEVELOPMENT AND INVENTORY OF NEW PRODUCTS (GAO/GGD-99-15, 19–20 Nov. 24 1998).

[92] *Id.*

the SOE sets prices p. (Customers will buy more of any product the lower is its price.) $Q \equiv (Q_1(p),...,Q_n(p))$ will denote all of the output produced and sold by the SOE. For simplicity, the ensuing discussion will focus on the setting in which customer demand for each of the SOE's products is independent of the prices charged for other products of the SOE. Unless otherwise noted, the discussion will also abstract from cost complementarities by assuming that the SOE's cost of supplying one product does not vary with the amounts of the other products it supplies. The function $C(Q)$ will denote the SOE's cost of producing output Q.[93]

This notation enables us to specify the SOE's objective, which is to maximize:

$$w \left[\sum_{i=1}^{n} p_i Q_i(p) \right] + [1 - w] \left[\sum_{i=1}^{n} p_i Q_i(p) - C(Q) \right]. \qquad (1)$$

The first term in square brackets in expression (1) is the SOE's total revenue. Total revenue is the sum of the revenue derived from the sale of each of the SOE's n products. The revenue derived from the sale of any particular product (i) is simply the product of the number of units of the product sold (Q_i) and the price (p_i) at which each unit is sold. The last term in square brackets in expression (1) is the SOE's profit. Profit is the difference between total revenue and total operating cost. Thus, with the weight w applied to revenue and the weight $[1 - w]$ applied to profit, expression (1) is simply the aforementioned weighted average of revenue and profit. Note that if $w = 0$, expression (1) collapses to the objective function of a private firm, which is to maximize profit only.

B. AN SOE'S PRICING

Before discussing the prices preferred by an SOE that seeks to maximize a weighted average of revenue and profit, we consider the prices that a private, profit-maximizing firm would set in the simple, static setting described above. It is well known that a firm will maximize profit in this setting by raising prices above marginal production costs by amounts that are inversely proportional to the sensitivity of customer demand to

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[93] In this simple setting with independent demands, $\partial Q_i(p)/\partial p_j = 0$ for all $j \neq i$, and so the demand for the SOE's i-th product can be written as $Q_i(p_i)$. Furthermore, in the absence of cost complementarities, the SOE's cost function can be expressed as

$$C(Q) = \sum_{i=1}^{n} C_i(Q_i(p_i)).$$

price.[94] In other words, the firm will set the price for a product close to its marginal cost of production when a higher price would cause many potential customers to decide not to purchase the product. In contrast, on products for which customer purchases do not decline much in response to price increases, the profit-maximizing firm will set prices well above marginal production costs.

This pricing strategy is summarized formally in Finding 1. The Finding refers to $\varepsilon_i = |[\partial Q_i / \partial p_i]\ [p_i / Q_i]|$, which is the own-price elasticity of demand for product i. The price elasticity of demand for product i measures the rate at which customer purchases decline as the price of product i increases.[95] The larger is the price elasticity of demand for a product, the more pronounced is the decline in customer purchases as the price of the product increases.

Finding 1. The preferred prices of a profit-maximizing multiproduct firm are characterized by the following inverse-elasticity rule:

$$\frac{p_i - \dfrac{\partial C_i(Q)}{\partial Q_i}}{p_i} = \frac{1}{\varepsilon_i}, \quad \text{for } i = 1,\dots,n. \tag{2}$$

Expression (2) indicates that the profit-maximizing firm will always set the price of each of its products above its marginal cost of production.[96] In the simple, static setting considered here, reducing a price below marginal cost reduces profit, and so such pricing is not attractive to the profit-maximizing firm.

Now consider the prices preferred by a multiproduct SOE that seeks to maximize a weighted average of revenue and profit in the same setting. The prices that maximize expression (1) are characterized in Finding 2.

Finding 2. The SOE's preferred prices are characterized by the following modified inverse-elasticity rule:

$$\frac{p_i - [1 - w]\dfrac{\partial C_i(Q)}{\partial Q_i}}{p_i} = \frac{1}{\varepsilon_i}, \quad \text{for } i = 1,\dots n. \tag{3}$$

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[94] *See* Frank P. Ramsey, *A Contribution to the Theory of Taxation,* 37 ECON. J. 47 (1927); William J. Baumol & David F. Bradford, *Optimal Departures From Marginal Cost Pricing,* 60 AM. ECON. REV. 265 (1970).

[95] Notice that the own-price elasticity of demand, ε_i, is written here as a positive number.

[96] This conclusion follows because the price elasticity of demand is defined here to be a positive number. Therefore, the term to the right of the equal sign in expression (2) is positive, which implies that the expression to the left of the equal sign must also be positive. This latter expression will be positive only if price (p_i) exceeds marginal cost ($\partial C_i(Q)/\partial Q_i$).

Finding 2 reveals that the prices preferred by an SOE that seeks to maximize expression (1) follow a modified inverse-elasticity rule. To maximize a weighted average of revenue and profit, the SOE implements proportional markups of price over modified marginal cost, $[1 - w]\partial C_i(Q)/\partial Q_i$, that vary inversely with the price elasticity of demand. Prices are set further above modified marginal cost the more inelastic is the demand for the product.

Expressions (2) and (3) reveal that the SOE's pricing rule is the same rule that a profit-maximizing firm follows, except that marginal costs are scaled down by the factor $1 - w$ to reflect the SOE's reduced focus on profit. The greater is its focus on revenue rather than profit (that is, the larger is w), the more the SOE discounts marginal costs in the modified inverse-elasticity rule.[97]

This discounting of marginal costs reflects the fact that, as the SOE becomes more concerned with revenue relative to profit, it becomes less averse to the higher costs that arise from increased output.[98] Consequently, the SOE favors more highly the expanded output and revenue that result from low prices on those products for which competition from alternative suppliers is most pronounced. The rule suggests that when such competition exists, a reduced focus on profit can lead the SOE to set particularly low prices for the products on which it faces the most intense competition. This conclusion supports John Lott's observation that an SOE might set the price of a product below its marginal cost of production.[99]

> *Conclusion 1.* Even in the absence of predatory intent, a SOE may set the prices for some of its products below their marginal costs of production. The SOE will tend to prefer below-cost prices when its focus on profit is more limited and when customer demand for its products is more sensitive to price.[100]

Conclusion 1 holds because, even though profit declines as the SOE reduces price below marginal cost, revenue can increase as price declines. Therefore, if the SOE's relative valuation of revenue is sufficiently pronounced, or if customer demand for some of its products is sufficiently

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[97] If the SOE is concerned only with profit, then $w = 0$, and the pricing rule for the SOE is the same as that given by expression (2) for a private firm.

[98] This fact may be seen most readily by noting that expression (1) can be written as the difference between revenue and modified cost, where modified cost is total cost scaled by the factor $[1 - w]$.

[99] Lott, *supra* note 24, at 237.

[100] Precise conditions under which an SOE will set below-cost prices are presented in Sappington & Sidak, *supra* note 2.

sensitive to price (or both), then the SOE may choose to set some prices below marginal production costs even when demands are independent.

To illustrate this more general point, consider the simple case where the elasticity of demand for a product does not vary with the price of the product.[101] In this case, an SOE with the objective function specified in expression (1) will set a price below marginal cost on all products for which the price elasticity of demand exceeds $1/w$. For example, if the SOE values revenue and profit equally (so $w = 0.5$), the SOE will set a price below marginal cost on all products for which the price elasticity of demand exceeds 2.[102]

Pricing below marginal cost is undesirable because it introduces three forms of inefficiency: allocative, productive, and dynamic.[103] Allocative inefficiency arises when too much of a service is consumed in the sense that the resources employed to produce the marginal units of the service exceed the value that consumers derive from those units. When the marginal cost of producing a service exceeds the marginal value that consumers derive from the service, society as a whole would benefit if less of the service were produced. The reduced production level would allow resources to be redeployed to produce other services that consumers value more highly. Pricing a service below its marginal cost of production results in allocative inefficiency because some consumers (those whose valuations exceed the established price but are less than the marginal cost of producing the service) choose to purchase the service even though their marginal valuation of the service is less than the marginal cost of producing the service. Although those who purchase the service that is priced below cost benefit from the low price, their benefit comes at the expense of consumers of other products. The costs of producing other products, and thus the prices of these products, could be reduced if production resources were redeployed to more highly valued uses. Most importantly, on balance, society as a whole would gain if the allocative inefficiency were eliminated by ensuring that prices do not fall below marginal production costs.[104]

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[101] The demand for product i exhibits constant elasticity of demand (ε_i) if $Q_i(p_i) = a_i p_i^{-\varepsilon_i}$, where a_i is a positive constant.

[102] See Corollary 2 in Sappington & Sidak, *supra* note 2, for a formal statement and proof of this conclusion.

[103] Antitrust cases in network industries can present particularly subtle tensions between these three distinct forms of economic efficiency. *See* Howard A. Shelanski & J. Gregory Sidak, *Antitrust Divestiture in Network Industries*, 68 U. Chi. L. Rev. 1, 16–31 (2001) (discussing allocative, productive, and dynamic efficiency in the context of fashioning remedies in the *Microsoft* case).

[104] *See, e.g.*, Michael L. Katz & Harvey S. Rosen, Microeconomics 482 (1991).

Productive inefficiency arises when a service is produced by a firm that is not the least-cost provider of the service. Pricing below marginal cost can introduce productive inefficiency by rendering unprofitable the operation of the most efficient producers.[105] Industry costs increase, and thus the net benefits to society decline, when below-cost pricing limits or precludes production by the least-cost supplier.

Dynamic inefficiency arises when the level of investment in research and development that maximizes the net value to society is not undertaken. When one firm prices a service below the cost of producing the service, the profit that other firms anticipate from supplying the service is reduced. Consequently, firms may decide to devote research and development efforts to other services rather than to the service that is priced below cost. Although such a reallocation of investment in research and development will increase profit, it may reduce the net benefits that accrue to society as a whole.[106]

C. Avoiding Restrictions on Below-Cost Pricing

The foregoing analysis considers the prices preferred by an SOE when its pricing flexibility is unrestricted. In practice, an SOE may face restrictions on feasible prices. For example, an SOE might be prohibited from pricing below marginal cost by law, by regulatory fiat, or by the firm's charter. Profit-maximizing firms also may face regulatory or legal constraints on pricing below marginal cost. We now explain how firms might attempt to relax a binding prohibition against below-cost pricing, and why a public enterprise can have stronger incentives than a profit-maximizing firm to relax such a prohibition.

First, a firm might attempt to relax a binding constraint against pricing below marginal cost by manipulating accounting data so as to understate

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[105] To illustrate this point, consider a setting where there are two potential producers, firm *A* and firm *B*, each of which operates with constant unit production costs. Suppose firm *B* is the least-cost producer because its marginal cost of production is 6 while firm *A*'s marginal cost is 7. If firm *A* charges a price of 4 for its product, firm *B* cannot profitably match this (below-cost) price, even though it is the least-cost provider of the service. Consequently, below-cost pricing results in production by a high-cost supplier in this setting, as it can more generally.

[106] To illustrate this point, return to the simple setting considered *supra* in note 105, where firm *A*'s marginal cost is 7 but it sets a price of 4. Now suppose that firm *B* could reduce its marginal cost from 6 to 5 by incurring negligible research and development expenditures. Absent the below-cost pricing by firm *A*, firm *B* would undertake the research and development expenditures because the expenditures would increase its profit by reducing its operating costs. However, firm *B* will not undertake the socially beneficial investment when firm *A* charges a unit price of 4, because firm *B* cannot operate profitably in the industry even when its unit costs are reduced to 5. Consequently, below-cost pricing

its actual marginal cost.[107] Such understatement might be achieved by classifying as overhead production costs some or all of the costs that truly vary as output varies. For example, the firm might count as central management some personnel whose daily efforts are devoted entirely to the delivery of the product in question. An alternate way for the firm to understate its true marginal cost is to record, as variable costs incurred in the provision of a different product, costs that are truly incurred in producing the product whose price the firm would like to set below marginal cost. For example, the firm might claim that materials and supplies employed to produce the product in question were employed to produce a different product.

Intentional understatement of marginal production costs is likely to entail personal risk. Laws against fraud carry severe financial penalties, and career prospects can be dimmed for managers who are suspected of knowingly reporting false information. But even if the SOE bears the full costs of the manipulation (and thus does not discount those costs by the factor $1 - w$, as it implicitly discounts production costs), the associated benefits may outweigh the costs. Most importantly, when the SOE values more highly the expanded output and revenue that result from the lower price that the understatement facilitates than does a private, profit-maximizing firm, the SOE will be more likely than its private counterpart to understate its costs.[108] For emphasis, we record this observation formally as Conclusion 2.

> *Conclusion 2.* An SOE that values both revenue and profit typically will have stronger incentives than a profit-maximizing firm to understate its marginal cost of production in order to relax a binding prohibition against pricing below cost. The less profit-oriented is the SOE, the greater is this incentive, all else equal.[109]

Next consider a more subtle strategy that an SOE might pursue to relax a binding prohibition against pricing below cost. Rather than misstate its true marginal cost, an SOE might choose to operate with an inefficient technology that secures a relatively low marginal cost at the expense of

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eliminates a firm's incentives to undertake socially desirable research and development expenditures in this setting, as it can more generally.

[107] *See* SIDAK & SPULBER, PROTECTING COMPETITION FROM THE POSTAL MONOPOLY, *supra* note 89, at 105–26.

[108] In the simple setting considered here, a profit-maximizing firm will set price above marginal cost and will not understate marginal cost. In a dynamic setting with entry barriers, however, a profit-maximizing firm might choose to price below marginal cost and understate marginal cost.

[109] Precise conditions under which the strong incentives identified in Conclusion 2 (and all subsequent conclusions) emerge are presented in Sappington & Sidak, *supra* note 2.

a particularly high overhead cost. In practice, a firm might do so by installing costly general-purpose equipment on a large scale and thereby reduce the need for project-specific equipment. It might also do so by, for example, retaining a large on-site staff with broad legal, engineering, computing, and/or marketing expertise that can substitute for specific expertise on individual products.

More generally, suppose that the SOE has a choice among production technologies and suppose that this choice is indexed by the amount of an overhead resource that the firm employs. For expositional convenience, refer to this resource as "capital."[110] The more capital the firm installs, the lower are its variable and marginal costs of production. In this setting, the following conclusion is readily verified.

> *Conclusion 3.* An SOE that values both revenue and profit typically will have stronger incentives than a profit-maximizing firm to overinvest in capital in order to relax a binding prohibition on pricing below cost. The less profit-oriented is the SOE, the greater is this incentive, all else equal.

The more highly the SOE values expanded scale and scope relative to profit, the more it benefits from the expanded scale that a lower price provides and the less concerned it is with the associated cost. Therefore, the less concerned that the SOE is with generating profit, the greater the technological inefficiency (and higher cost) it will accept to secure a lower price and the expanded scale it engenders, all else equal. Conclusion 3 reports that the SOE may install an inefficiently large level of capital to reduce its marginal cost even if it faces the same market cost of capital that private enterprises face. If the SOE's capital purchases are subsidized (as they can be, for example, when the SOE has privileged access to government funds), then inefficient over-capitalization typically will become even more pronounced.

For simplicity, the preceding discussion focuses on the case where the SOE's cost of producing each product is independent of the cost of producing its other products. The presence of cost complementarities, though, can provide an SOE with an additional means of relaxing a binding prohibition on pricing below cost. To illustrate this point, suppose the SOE produces two products, *A* and *B*. Further suppose the SOE is, by law, the sole supplier of product *A*, whereas the SOE and competitors both supply product *B*. Finally, suppose there are economies of

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[110] The overhead cost could include labor. The critical feature of overhead cost is that it does not vary with the level of output produced by the firm, but that employing more of this resource reduces the level of marginal or variable costs that do vary with output.

scope in the provision of products *A* and *B* that cause the SOE's marginal cost of producing *B* to decline as the SOE's supply of product *A* increases. In the presence of such cost complementarities, the SOE can secure a lower marginal cost for product *B* by increasing its output of product *A*. This output expansion might be accomplished, for example, by agreeing to take on an expanded universal service obligation in the delivery of product *A*.

When cost complementarities are present, an SOE can gain in two distinct ways from accepting an expanded universal service obligation. First, it can increase the scale and scope of the SOE's monopoly operations. Second, it can reduce the SOE's cost of supplying product *B*. This reduction in marginal cost allows the SOE to lower the price and expand the production of product *B*, regardless of whether the SOE faces a binding restriction on pricing below cost.

In sum, an SOE with strong preferences for expanded scale and scope can have particularly strong incentives to disadvantage competitors by strategically relaxing a binding prohibition against below-cost pricing in a variety of ways.

D. Raising Rivals' Costs

SOEs, like other firms, also may be able to pursue other activities to disadvantage their rivals. For example, firms might lobby for regulations that increase rivals' operating costs, restrict rivals' access to essential productive inputs, and buy excessive amounts of inputs to raise the market price of these inputs.[111]

The preceding discussion suggests why a public enterprise can have particularly strong incentives to raise the costs of its competitors by undertaking such activities. When it raises its rivals' costs, the SOE induces its profit-maximizing competitors to reduce the amount of output they choose to sell to customers and/or to increase the prices they charge for their products. Such actions by competitors increase customer demand for the SOE's products, which leads to an expanded scale of operation for the SOE.

Private profit-maximizing competitors enjoy the extra profit they can earn when their rivals are disadvantaged. One might think that, if public

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[111] For formal analyses of such activities, see Thomas G. Krattenmaker & Steven C. Salop, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power over Price*, 96 Yale L.J. 209 (1986); Steven C. Salop, *Strategic Entry Deterrence*, 69 Am. Econ. Rev. 335 (1979); Steven C. Salop & David T. Scheffman, *Cost-Raising Strategies*, 36 J. Indus. Econ. 19 (1987); Steven C. Salop & David T. Scheffman, *Raising Rivals' Costs*, 73 Am. Econ. Rev. 267 (1983).

enterprises value increased profit less highly than private firms, they might be less likely to try to disadvantage their rivals. Often, though, the opposite is true. A reduced focus on profit can cause an SOE to be more aggressive in raising its rivals' costs. As noted above, a reduced focus on profit and an increased focus on scale and scope effectively renders the cost of expanded output less onerous for a public enterprise. Consequently, an SOE may be motivated to pursue the expanded scale that it values highly by reducing the output of its rivals via raising their costs.

Conclusion 4. An SOE that values both revenue and profit often will have stronger incentives than a profit-maximizing firm to raise its rivals' cost. Furthermore, these incentives for the SOE often will be more pronounced the less profit-oriented is the enterprise, all else equal.

In addition to raising the operating costs of an existing rival, an SOE might undertake activities designed to preclude the operation of potential rivals. For example, the SOE might lobby key policy makers to erect impenetrable entry barriers, such as statutory prohibitions on entry. When successful competitors would reduce an SOE's ability to expand the scale and scope of its operations, the SOE will wish to limit the success of competitors. This preference often is more pronounced the more highly the SOE values expanded scale relative to profit. This observation is recorded formally as Conclusion 5.

Conclusion 5. An SOE that values both revenue and profit typically will have stronger incentives than a profit-maximizing firm to undertake activities designed to exclude competitors from the market place whenever successful competition would reduce the SOE's output. These incentives typically increase as the SOE becomes less profit-oriented, all else equal.

E. ECONOMIES OF SCOPE BETWEEN RESERVED AND NON-RESERVED MARKETS

The pronounced desire of the SOE to exclude rivals reported in Conclusion 5 can become more pronounced when cost complementarities are present. In the presence of cost complementarities between products in reserved and non-reserved markets, the exclusion of rivals from reserved markets can both directly increase the costs of rivals and indirectly reduce the SOE's costs. These direct and indirect effects of exclusion are described in turn.

If an SOE operates both in a reserved market (such as letter delivery services) served only by the SOE and a non-reserved market (such as

parcel delivery services) served by the SOE and one or more rivals, then the SOE can exploit economies of scope (cost complementarities) between the two markets. A statutory monopoly, however, truncates the range of services that an entrant can offer in competition with an SOE. The effect of the reserved area may be to prevent an efficient entrant from achieving economies of scope that would lower its LRAIC of supplying the *non-reserved* product. Although similar to the "raising rivals' costs" strategy described above, this strategy may be more accurately described as "denying rivals the opportunity to lower their costs." In *Deutsche Post,* for example, the EC noted that "joint deliveries [of mail-order parcels and letters] create economies of scope that exist between the reserved product and the competitive product. Due to the reserved area these economies of scope are not available to competitors."[112] All other things remaining constant, the rival faces higher costs in the non-reserved market than the SOE experiences. This is the "direct effect" of the statutory monopoly in the non-reserved market.

In addition to this direct effect, an "indirect effect" may arise if economies of scale exist in the non-reserved market. If the SOE sets a lower price in the non-reserved market because of the realized economies of scope, demand will shift from the rival to the SOE. As the SOE's output of the non-reserved product increases, the SOE may realize economies of scale that its rivals cannot achieve. The resulting decline in the SOE's unit cost of operation (and hence prices) in the non-reserved market may cause a further shift in sales from competitors to the SOE, depending upon the SOE's objectives and the nature of the competitive interaction between the SOE and its rivals.

The key conclusion here is that an SOE may derive from its statutory monopoly over the reserved product an incremental benefit in the form of both economies of scope *and* economies of scale *in the non-reserved market.* Both incremental effects result from the statutory monopoly the SOE is awarded, not from an inherent cost advantage that only the SOE has the skill or acumen to obtain.

F. Conclusions

The diverse goals of a public enterprise can lead it to act more aggressively toward its rivals than a private enterprise. A reduced focus on profit

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[112] *Deutsche Post Predatory Pricing Case, supra* note 12, ¶ 11 n.18. The EC, however, did not draw any legal conclusion from this observation, as further analysis was not necessary in the *Deutsche Post* case. The EC had already found that Deutsche Post had abused its dominant position by pricing below the incremental cost of providing mail-order parcel service.

can lead the SOE to price products below cost. It can also increase the SOE's incentive to raise the costs of existing rivals, to erect entry barriers to preclude entry by potential rivals, and to understate costs and adopt inefficient production technologies to circumvent regulations designed to foster competition. Each of these activities can preclude the operation of more efficient competitors and thereby reduce social welfare. So, too, can the advantages that an SOE enjoys in non-reserved markets when it, alone, is authorized to operate in reserved markets.

These findings influence the optimal design of competition law as applied to public enterprises.[113] Because an SOE may have greater incentive to engage in anticompetitive practices and circumvent antitrust laws than its private counterpart, particular vigilance in monitoring the market activities of SOEs may be warranted. It may also be appropriate to subject an SOE to more stringent competition laws and harsher penalties for violating them.

IV. WHY STATE-OWNED ENTERPRISES MAY HAVE GREATER ABILITY THAN PRIVATE FIRMS TO ACT ANTICOMPETITIVELY

The second branch of the *AKZO* test provides that it is an abuse of dominant position for a firm to price below average total cost (though above average variable cost) if it does so with anticompetitive intent.[114] Having found Deutsche Post liable under the first prong of the *AKZO* test, the EC did not apply this second standard in its 2001 *Deutsche Post* predatory pricing decision. Because the EC found that the evidence supported the conclusion that Deutsche Post's prices were below average variable cost, an inquiry into Deutsche Post's intent was unnecessary.

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[113] We have only analyzed selected anticompetitive activities that an SOE might undertake, and we have postulated a particular class of objectives for the SOE. We have not undertaken a comprehensive benefit-cost analysis of public enterprises. Therefore, as explained above, our analysis alone cannot provide broad policy prescriptions regarding the proper scope of SOEs. However, the fact that SOEs may have greater incentive than private enterprises to pursue anticompetitive actions suggests that the costs of public enterprises need to be weighed carefully against any benefits that such firms may provide. A comprehensive benefit-cost analysis of public enterprises would need to consider any benefits flowing from other possible objectives of the enterprises, including welfare maximization, income redistribution, and the promotion of national security. The analysis would also need to consider market failures that an SOE might help to correct (for example, inadequate supply of public goods), and contrast the internal operations of public and private enterprises. The expanded analysis should also endow the SOE with a richer set of policy instruments than that considered here, including an expanded choice of markets in which it might participate, the possibility of bundling or tying products, nonlinear and discriminatory prices, products of varying quality, and different intensities of product and process innovation.

[114] *AKZO*, [1991] E.C.R. at I-3372.

Nevertheless, in a case in which the second branch of *AKZO* is applicable, an SOE's status as a public enterprise would be relevant to whether the SOE had an anticompetitive intent when setting its prices.

Until relatively recently, an unstated premise in the intellectual understanding of predatory pricing had been that the alleged predator is a privately owned firm that seeks to maximize profit.[115] A profit-maximizing firm will undertake predatory pricing only if doing so is expected to increase long-term profit. But a public enterprise typically does not seek to maximize long-term profit. Thus, for the reasons explained in Part III, an SOE may have greater *incentive* to charge below-cost prices than does a private firm.

In addition, an SOE may have expanded *ability* to charge below-cost prices and otherwise disadvantage competitors. There are at least five sources of this enhanced ability.

First, the legal framework that creates an SOE may impose upon it the duty, or confer upon it the prerogative, to pursue objectives other than profit maximization—such as the provision of universal service at a uniform, geographically averaged price.[116] This duty or prerogative may endow an SOE with greater ability than a private, profit-maximizing firm to sustain prices below costs for extended periods of time. In its October 1999 report on competition in postal services, the Organization for Economic Cooperation and Development's (OECD's) Committee on Competition Law and Policy observed:

> In practice the vast majority of incumbent postal operators are state-owned. The precise objectives of state-owned firms are contested, and probably differ according to the governance arrangements for state-owned firms in each country, but generally-speaking profit-maximisation is typically merely one amongst a number of objectives pursued by such firms. Where a firm, for whatever reason, does not seek to

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[115] The implications of removing that premise are explored in Lott, *supra* note 24; *see also* Lott, *supra* note 24; David E.M. Sappington & J. Gregory Sidak, *Are Public Enterprises the Only Credible Predators?*, 67 U. Chi. L. Rev. 271 (2000); Sappington & Sidak, *Incentives for Anticompetitive Behavior by Public Enterprises, supra* note 2. For specific application to state-owned postal enterprises, see Organization for Economic Cooperation and Development, Committee on Competition Law and Policy, Promoting Competition in Postal Services (Best Practices Roundtables on Competition Policy No. 24, DAFFE/CLP(99)22, Oct. 1, 1999), *available at* http://www.oecd.org/dataoecd/35/36/1920548.pdf [hereinafter OECD Report on Postal Competition].

[116] For theories of why and how SOEs differ from private firms, see Henry B. Hansmann, The Structure of Ownership (1996); Henry B. Hansmann, *Ownership of the Firm*, 4 J.L. Econ. & Org. 267 (1988); Henry B. Hansmann, *The Role of Nonprofit Enterprise*, 89 Yale L.J. 835 (1980); Oliver Hart, Andrei Shleifer & Robert W. Vishny, *The Proper Scope of Government: Theory and an Application to Prisons*, 112 Q.J. Econ. 1127 (1997); William J. Baumol, *Toward a Theory of Public Enterprise*, 12 Atl. Econ. J. 13 (1984).

> strictly maximise profits, it may be able to sustain prices below cost indefinitely, supported by either prices above cost in some other segment or by some other source of funds.[117]

The very decision to create an SOE suggests that the firm embodies an attempt by government to rectify a perceived market failure or to advance a desired social objective, such as income redistribution, through means other than profit maximization.

Second, an SOE may not need to recoup losses by ultimately raising prices in the non-reserved market.[118] This feature of public ownership is in direct contrast to the scholarship[119] and jurisprudence[120] on predatory pricing by private firms, which has emphasized that, after the exit of competitors or the prevention of entry, the dominant firm will seek to raise the price sufficiently above the competitive level for a sufficient time to, at a minimum, recoup the earlier profit sacrifice. Unlike a private utility subject to rate-of-return or price-cap regulation, an SOE may have substantial ability to carry forward losses into future periods of the ratemaking process.[121] More important, unlike a private firm, an SOE may have substantial ability to recoup its losses by raising prices in reserved markets where it has a statutory monopoly, or via direct expenditures from the public treasury.[122] The OECD has drawn the distinction that, in the case of a public enterprise, predatory pricing is a subset of "distortionary" pricing, which does not necessarily require conventional recoupment of losses:

> It is convenient . . . to label pricing below cost as "distortionary". "Predatory" pricing is a temporary form of distortionary pricing. Even where distortionary pricing does not lead to prices subsequently being raised above cost, it may still be of public policy concern, because of the effect

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[117] OECD REPORT ON POSTAL COMPETITION, *supra* note 115, at 55.

[118] Traditional predation models usually have assumed recoupment of short-run losses. For a review, see JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 373 (1988); Janusz A. Ordover & Garth Saloner, *Predation, Monopolization, and Antitrust, in* 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 537 (Richard Schmalensee & Robert D. Willig eds., 1989).

[119] *See* Phillip Areeda & Donald F. Turner, *Predatory Pricing and Related Practices Under Section 2 of the Sherman Act*, 88 HARV. L. REV. 637 (1975); William J. Baumol, *Predation and the Logic of the Average Variable Cost Test*, 39 J.L. & ECON. 49 (1996).

[120] *See AKZO, supra* note 27, at I-3371, ¶ 7 (describing predator's interest in "eliminating competitors so as to enable it subsequently to raise its prices by taking advantage of its monopolistic position"); Brooke Group Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 221–25 (1993).

[121] *See* SIDAK & SPULBER, PROTECTING COMPETITION FROM THE POSTAL MONOPOLY, *supra* note 89, at 116.

[122] A private firm subject to rate-of-return or price-cap regulation also might have the ability to recoup losses by raising prices in reserved markets, depending on the extent to which regulation constrains the firm's rate structure as well as its overall level of revenue or returns.

on productive efficiency. Distortionary pricing might induce a more efficient firm to leave or to not enter the competitive market.[123]

This reasoning supports the conclusion that the EC should not require proof, under the second branch of the *AKZO* test, that an SOE intended to recoup losses through subsequent price increases.

Third, unlike the private firm that may find it impossible to repel entry when prices ultimately rise to profitable levels, SOEs may be able to preclude any such entry.[124] This ability arises because SOEs often are multiproduct firms that benefit from statutory monopolies over related products or services. The U.S. Postal Service, for example, has some discretion in interpreting the contours of its own statutory monopoly.[125] Thus, the Postal Service enjoys some ability to raise entry costs for private firms by defining the scope of non-reserved services that can be supplied privately.

Fourth, an SOE may enjoy privileges and immunities (apart from explicit state subsidies of operating losses[126]) that facilitate recoupment of losses incurred in non-core markets or make them irrelevant. The U.S. Postal Service, for example, has no obligation to compensate its investors, the American taxpayers.[127] The absence of an obligation to pay a competitive return on invested capital lowers the cost of funds that an SOE may use to subsidize losses in non-core markets. In addition, an SOE may be exempt from taxation,[128] which in effect reduces its operating costs.

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[123] OECD Report on Postal Competition, *supra* note 115, at 55.

[124] The SOE is also less likely to attract entry by raising prices because, as we noted earlier, it may not need to raise prices to recoup losses and may not even wish to do so given its objective function.

[125] *See* Sidak & Spulber, Protecting Competition from the Postal Monopoly, *supra* note 89, at 18–19, 26–31.

[126] *See* Lars Bergman, Chris Doyle, Damien Neven & Lars-Hendrik Röller, *General Principles and European Deregulation, in* Europe's Network Industries: Conflicting Priorities 1, 52 (Centre for Economic Policy Research 1998) ("When most of the network firms held exclusive rights and operated largely within national territories, or were protected from competition, the provision of state aid was a matter for Member States alone. The single market programme and the commitment to opening up network industries to greater competition mean, however, that the granting of state aid is a more sensitive issue. This is particularly important when competition takes place between public and private enterprises. If a Member State grants aid to a public firm operating in a liberalized network industry, it may provide the firm with an unfair competitive advantage, and this could be considered incompatible with the common market.").

[127] *See* Sidak & Spulber, Protecting Competition from the Postal Monopoly, *supra* note 89, at 2, 88.

[128] The U.S. Postal Service is exempt from taxation. *See id.* at 2.

Fifth, an SOE may be subject to less binding price regulation than is a typical private firm subject to regulation because the agency overseeing the SOE, unlike those overseeing private firms, lacks key regulatory instruments.[129] For example, the U.S. Postal Rate Commission lacks subpoena power and has limited powers to set maximum prices for postal services.[130] Thus, the SOE may have a heightened opportunity to engage in anticompetitive behavior, including below-cost pricing.[131] The EC found that the letter-mail monopoly in Germany produced "a guaranteed source of income exceeding stand-alone cost" during the period covered by the *Deutsche Post* case.[132]

These are five of the many reasons why SOEs may have greater ability than their private, profit-maximizing counterparts to engage in anticompetitive activities. Policy makers increasingly are recognizing that this greater ability, coupled with a corresponding greater incentive of SOEs to disadvantage rivals, deserves the heightened scrutiny of competition authorities.[133]

V. TOWARD AN APPROPRIATE PRICE FLOOR
FOR THE NON-RESERVED PRODUCTS
OF A STATE-OWNED ENTERPRISE

Having demonstrated that SOEs may have greater incentive and ability than profit-maximizing firms to set prices below incremental production costs and undertake other anticompetitive activities, it remains to analyze appropriate public policy to limit the harms from such activities. In this Part, we consider one element of such public policy: the level of appropriate cost-based price floors for the SOE's non-reserved services relative to the appropriate floor for profit-maximizing firms. We focus on long-term pricing rules that a court or a regulatory agency might impose on SOEs. The long-term nature of the rules makes them

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[129] This difficulty compounds the problem of regulating firms (public or private) in the presence of asymmetric information. *See generally* JEAN-JACQUES LAFFONT & JEAN TIROLE, A THEORY OF INCENTIVES IN PROCUREMENT AND REGULATION (1993).

[130] *See* SIDAK & SPULBER, PROTECTING COMPETITION FROM THE POSTAL MONOPOLY, *supra* note 89, at 159–60; 39 U.S.C. §§ 3601 *et seq.*

[131] In the United States, for example, there is a significant risk of anticompetitive cost misallocation by the U.S. Postal Service despite the fact that its independent regulator, the Postal Rate Commission, regularly presides over adversarial, evidentiary rate cases that often last nine months or more. *See* SIDAK & SPULBER, PROTECTING COMPETITION FROM THE POSTAL MONOPOLY, *supra* note 89, at 101–46.

[132] *Deutsche Post Predatory Pricing Decision, supra* note 12, at 32 n.53.

[133] *See, e.g.*, OECD REPORT ON POSTAL COMPETITION, *supra* note 115, at 55, 336–37 (Aide Memoire of the Discussion).

appropriate for settings in which all of the SOE's relevant production costs can reasonably be viewed as variable.

We continue to employ the conventional measure of LRAIC as the benchmark for our discussion of price floors, taking as given that this measure of LRAIC is the appropriate price floor for a private, profit-maximizing, multiproduct enterprise in the setting under consideration. Using LRAIC as a reference point, we explain why LRAIC generally is too low a floor for the prices that an SOE charges for its non-reserved services. In addition, we identify several key factors that influence the extent to which price floors for an SOE's non-reserved services should be raised above the SOE's measured LRAIC.

A. The Determinants of SOE Price Floor to Limit Exclusion of Efficient Private Enterprises

As explained in Part III, an SOE may wish to persistently price its non-reserved services at levels that would not be rational or compensatory for a similarly situated profit-maximizing firm in order to expand the scale and scope of its operations. In doing so, an SOE may drive more efficient producers from non-reserved markets, and thereby increase the costs that society incurs in producing non-reserved services. To reduce the likelihood that more efficient service providers will be driven from non-reserved markets by SOEs (and to help avoid the other losses from below-cost pricing identified in Part III), price floors above those for profit-maximizing firms (which we take here to be LRAIC) can be appropriate for SOEs.[134]

The likelihood that an SOE will drive more efficient suppliers from non-reserved markets if the price floor for the SOE is not raised above its LRAIC depends upon a variety of factors. All of these factors warrant consideration when determining the extent to which the price floor should be raised above LRAIC. Such key factors include the following four: (1) the incentive and ability of the SOE to pursue objectives other than profit maximization; (2) the extent to which the SOE's LRAIC is difficult to measure accurately; (3) the degree of the SOE's autonomy in choosing its network configuration and operating technology; and (4) the magnitude of the scope economies that the SOE enjoys because of any statutory monopoly that it is afforded in the provision of reserved services.

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[134] For expositional simplicity, the ensuing discussion will focus on the losses from productive inefficiency that arise when prices below LRAIC result in production by a firm that is not the least-cost supplier of the service in question.

1. *The SOE's Objectives*

As demonstrated in Part III, the more able and the more inclined is an SOE to expand the scale and scope of its operations rather than to maximize the profit it generates, the more inclined it will be to set below-cost prices, even if doing so entails the strategic manipulation of accounting costs or the implementation of inefficient operating technologies. Therefore, to limit the likelihood that an SOE will drive more efficient private competitors from the market (or otherwise unduly limit the ability of competitors to serve customers) when that likelihood is most pronounced, price floors for the SOE's non-reserved services should be raised further above the SOE's LRAIC the more concerned is the SOE with the scale and scope of its operations, *ceteris paribus.*

In practice, the mandates of the SOE and its historic performance can provide useful information about its objectives. An SOE that is not charged with generating revenue in excess of operating costs and that consistently incurs substantial deficits with little or no public outcry may well have considerable incentive and ability to pursue objectives other than profit maximization. An SOE that has aggressively pursued operations beyond the provision of its core monopoly services may also be one that has particular concern with expanding the scale and scope of its operations.

2. *Measurement Difficulties*

The floors on an SOE's prices also should be raised further above the SOE's observed LRAIC (or any other appropriate cost-based price floor) the more difficult it is to measure the SOE's costs accurately. When costs are difficult to measure accurately (either for unavoidable technological reasons or because the SOE has strong incentive and ability to understate its costs of providing non-reserved services), an SOE's measured costs may lie substantially below its actual costs. Consequently, even if prices exceed measured LRAIC, the prices may fall below actual LRAIC. Higher price floors for an SOE's non-reserved services can help to limit such outcomes and the associated incidence of deterring the operation of more efficient private competitors.

In practice, several factors are likely to influence the prevailing difficulty in measuring an SOE's costs accurately. These factors include: (1) the resources that the relevant oversight body (for example, a court or a regulator) devotes to assessing costs; (2) the expertise and experience of the oversight body; (3) the SOE's autonomy in keeping its books of account and in preparing cost estimates; and (4) the similarity of the SOE's operating conditions and operating technology to the correspond-

ing conditions and technologies that are commonly employed and measured in other jurisdictions. The historical accuracy of past cost estimates can often serve as a useful practical indicator of the likely accuracy of future cost measurements.

3. *The SOE's Autonomy*

As explained in Part III, SOEs may have strong incentives to choose inefficient production technologies in order to avoid binding restrictions on below-cost pricing. When this strong incentive is accompanied by considerable autonomy to select production technologies and operating procedures, higher price floors for an SOE's non-reserved services can be appropriate.[135] This autonomy for the SOE might manifest itself, for example, in the form of limited regulatory control over the SOE's investments and limited regulatory investigation of the efficiency of the SOE's operations.

4. *Economies of Scope*

Higher price floors for the SOE's non-reserved services also can be appropriate when pronounced economies of scope exist in the provision of reserved and non-reserved services. When these scope economies are large and when competitors do not enjoy corresponding economies of scope in the services they provide, the SOE's LRAIC of producing non-reserved services can be substantially lower than the corresponding costs of competitors. The low costs arise in this case simply because the SOE enjoys a statutory monopoly in the provision of reserved services, not because of any inherent technological or operational superiority on the part of the SOE. Consequently, if price floors for the SOE simply reflect its LRAIC of producing non-reserved services, the SOE will be afforded considerable opportunity to drive private suppliers of non-reserved services from the market. This is the case even when the private suppliers are operating efficiently and could produce all services at lower cost than the SOE if they were permitted to provide reserved services. Price floors that are further above the SOE's LRAIC the more pronounced are observed economies of scope between reserved and non-reserved

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[135] If an SOE has complete autonomy in selecting operating scales and production technologies, the SOE may implement a more inefficient technology (one with higher costs of producing core services and lower costs of producing non-core services) the higher is the price floor set above the SOE's realized LRAIC. By doing so, the SOE can ensure that it will be allowed to charge low prices for non-core services, despite being required to price these services above realized LRAIC. In practice, an SOE's freedom to implement inefficient production technologies often is not entirely unfettered. Although moderate levels of inefficiency may go undetected, extreme levels of inefficiency are likely to be noticed, and so can be deterred.

operations can reduce the likelihood that efficient providers of non-reserved services will be excluded from the market.[136]

B. Other Determinants of Price Floors for SOEs

Two additional factors may influence the choice of the proper price floor for the SOE: the intensity of competition in non-reserved markets and the welfare of core customers.

1. *The Intensity of Competition in Non-Reserved Markets*

Limiting the extent to which consumers suffer because an SOE drives more efficient competitors from non-reserved markets is not the only relevant objective when setting price floors for SOEs. A related objective is to limit the likelihood and expected magnitude of losses that arise when an SOE is precluded from providing non-reserved services even though it is the least cost supplier of these services. When an SOE is not permitted to reduce a price for a non-reserved service to the level of the SOE's LRAIC of producing the service, the SOE may be precluded from selling the service to consumers, even though the SOE enjoys lower production costs than its competitors.

The losses from such exclusion can be pronounced if private enterprises are not competing vigorously to best serve consumers of non-reserved services. In this case, prices for the non-reserved services may be relatively high and service quality may be relatively low if the SOE's provision of non-reserved services is constrained. However, when competition among private enterprises produces high-quality services and low prices for consumers, the potential increase in consumer welfare that is likely to result from an SOE's operation in the non-reserved markets may be limited. Under such circumstances, higher floors for the prices that the SOE sets for non-reserved services may be justified. The higher price floors can help to ensure that more efficient providers of non-reserved services are not driven from the market, while limiting the likelihood that consumers will suffer substantial harm because a more efficient SOE is excluded from the market.

2. *The Welfare of Core Customers*

Another relevant objective to consider when setting price floors for SOEs is to increase the welfare of consumers of the SOE's reserved services. Substantial concern with the welfare of these consumers can render optimal a higher price floor for the SOE's non-reserved services.

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[136] Recall from the discussion in Part III.C that realized cost advantages may exceed the advantages an SOE would enjoy if it adopted the cost-minimizing operating technology.

Price floors set at the level of LRAIC do not guarantee that an SOE's operations in non-reserved markets provide any benefit to core customers. Only if the SOE's prices for non-reserved services exceed its LRAIC of producing those services will non-reserved operations produce net revenues (or profit) that can be employed to reduce the prices of reserved services while maintaining prevailing levels of profitability for the SOE. As long as the SOE's prices are not forced above profit-maximizing levels in non-core markets, higher price floors will ensure that the SOE's operations in non-reserved markets generate greater net revenue for the SOE. This enhanced net revenue can be particularly valuable when it is deemed important to ensure low prices for reserved services, perhaps because universal subscription to reserved services has substantial social value and/or because many customers of reserved services have limited wealth.

C. Summary

In summary, there are multiple objectives and corresponding factors that warrant consideration when determining the extent to which the floors on prices charged by an SOE in non-reserved markets should exceed the SOE's LRAIC of producing the non-core services. The many relevant considerations render it difficult, if not impossible, to specify a single, simple rule for setting price floors for all SOEs in all settings. However, reasonable price floors can be established in any particular setting through judicious consideration of the many relevant objectives and factors, including those identified above.

VI. CONCLUSION

Competition law for state-owned enterprises is virtually nonexistent in American jurisprudence. However, the EC's decision in the *Deutsche Post* case in 2001 has already established an important precedent, one that may soon have an effect on the United States if it informs the analysis of the arbitration panel in the *Canada Post* case filed under Chapter 11 of NAFTA. The challenge ahead is to infuse emerging legal principles in such cases with sound economic analysis that reflects the special characteristics of public enterprises and the network industries in which SOEs commonly operate.

Our economic analysis has shown that SOEs may have strong incentives to engage in anticompetitive activities that serve to expand the scale and scope of their operations. When an SOE values both profit and expanded scale, it will discount the cost of output expansion. Consequently, even though such an SOE values the profit that its anticompetitive activities

can generate less highly than does a private profit-maximizing firm, the SOE will find it optimal to pursue aggressively anticompetitive activities that expand the scale of its operations. In particular, an SOE may set prices below marginal production costs, especially on products for which demand is price-elastic. An SOE also may understate its marginal cost of production and overinvest in capacity in order to relax a binding prohibition on pricing below cost. In addition, an SOE may have stronger incentives than a private, profit-maximizing firm to raise its rivals' costs and to undertake activities designed to exclude rivals from relevant markets. An SOE's incentive to undertake such anticompetitive activities generally increases as the SOE's concern with profit decreases and its concern with expanded scale and scope increases.

SOEs also commonly have an enhanced ability to engage in anticompetitive activities relative to private firms. The enhanced ability stems from several sources. For example, SOEs often enjoy privileges and immunities that afford them considerable discretion in the activities they undertake. In addition, an SOE's legal framework may impose upon it the duty, or confer upon it the prerogative, to pursue objectives other than profit maximization. Furthermore, SOEs often are multiproduct firms that benefit from statutory monopolies over related products. Consequently, SOEs, unlike their private competitors, may not need to recoup the costs of anticompetitive activities by raising prices in non-reserved markets.

In light of the greater incentive and ability of SOEs to engage in anticompetitive activities, we recommend higher price floors in non-reserved markets for SOEs that enjoy a statutory monopoly in a reserved market than would be set for a profit-maximizing firm serving the non-reserved market. In particular, we recommend that the price floor for the SOE should exceed the cost measure that sets the floor for a profit-maximizing firm. The extent to which the price floor should exceed the SOE's LRAIC will depend upon a variety of factors, including the incentive and ability of the SOE to pursue objectives other than profit maximization, the extent to which the SOE's LRAIC is difficult to measure, and the magnitude of the scope economies that the SOE enjoys because of its statutory monopoly in a reserved market. These factors differ for different SOEs, and thus the most appropriate price floor generally will differ for different SOEs.