Chapter 1

Anticompetitive Behavior by State-Owned Enterprises: Incentives and Capabilities

David E. M. Sappington
and
J. Gregory Sidak

State-owned enterprises (SOEs), also known as public enterprises, are owned by governments rather than private investors and compete directly with private, profit-maximizing enterprises in many important markets. For example, government postal firms typically offer overnight mail and package shipping services in direct competition with private delivery companies. In addition, many public hospitals and educational institutions compete directly with private suppliers of similar services.

Production by public enterprises is 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]

Typically, SOEs are required to pursue goals other than pure profit maximization. One might therefore suspect they would act less aggressively toward their competitors than would private, profit-

maximizing firms. We show, however, that the opposite is often the case. Even though they may be less concerned with generating profit, SOEs have stronger incentives than profit-maximizing firms to pursue activities that disadvantage competitors. Furthermore, such incentives can become more pronounced as an SOE's concern with profit becomes less pronounced. Potential activities to disadvantage competitors 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.

The increased incentive of SOEs to disadvantage competitors can arise from governmental policy objectives and other forces that induce SOEs to value an expanded operating scale for its own sake. 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 blunt incentives for profit maximization and thereby introduce a system in which the success of an SOE manager is measured more by the scale and scope of operations than by the profit those operations generate. Under such an explicit or implicit reward structure, SOEs act as if they value expanded scale and scope—as proxied by revenue, for example—as well as, or instead of, profit. The enhanced value placed on revenue or output leads the SOE to undertake aggressive actions in pursuit of expanded output and revenue, including anticompetitive behavior against private, profit-maximizing enterprises.[2]

In this chapter, we first provide some background on competition law and its application to SOEs.[3] We then explain in detail why, contrary to the prevailing view, SOEs have particularly strong incentives to act anticompetitively. Finally, we explain why SOEs also may have enhanced ability to act on those incentives.

Some Legal Background

For more than a century after the passage of the Sherman Act, the United States led the world in developing a body of legal and eco-

nomic principles for analyzing anticompetitive behavior by private enterprises. The U.S. Constitution, however, is thought to immunize from U.S. antitrust law much anticompetitive behavior by SOEs. Within the American federalist system, the Supreme Court has long addressed whether states may impose and supervise policies that reduce competition. Those cases articulate the state-action immunity in U.S. antitrust law, which generously immunizes states (and, less generously, municipalities) from antitrust claims as long as they actively supervise the suppression of competition. The crude rule of thumb is that private plaintiffs suing states for anticompetitive behavior generally lose.

The body of law with respect to federal government activities that impair competition is far less developed. 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 generally has little chance to prevail in an antitrust proceeding against the SOE. So it is not surprising that the antitrust jurisprudence on SOEs pales in comparison to American antitrust precedent on most business practices.

Capitalism itself has also contributed to the stunted growth of American case law on SOEs. 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 have routinely been owned and operated by the state in Europe and much of the world.[4] In contrast, the U.S. government generally has refrained from nationalizing and from directly managing private industries except in wartime.

Times have changed. The United States now feels the growing influence of the European Commission (EC) and various national enforcement agencies around the world, as General Electric's failed acquisition of Honeywell in 2001 attests.[5] Less noticed than the defeat of the GE-Honeywell merger, but equally important for its long-term implications for the development 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 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.[6] The EC ordered Deutsche Post to divest its parcel delivery business and to engage the new owner only on an arms'-length basis for any continuing commercial relationships.

The *Deutsche Post* case could soon become relevant to SOEs owned by the U.S. government. 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."[7] The Ninth Circuit found that the Postal Service lost its sovereign status upon enactment of the Postal Reorganization Act of 1970, which provided that "The Postal Service shall have the . . . power to sue and be sued in its official name."[8]

Another significant development concerning competition law for SOEs is the complaint filed by United Parcel Service in 2000 against Canada Post under Chapter 11 of the North American Free Trade Agreement (NAFTA).[9] 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. 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.

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 filed by American plaintiffs under American law.

Anticompetitive Incentives of State-Owned Enterprises

In this section, we explain why SOEs 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 its anticompetitive activities can generate less highly than does a private profit-maximizing firm, the SOE will still pursue 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.[10] If prohibitions on below-cost pricing are in effect, an SOE will have a strong incentive to understate its marginal cost of production or to overinvest in fixed operating costs to reduce variable operating costs. A public enterprise may also be more inclined than a private, profit-maximizing firm to raise its rivals' costs and to undertake activities designed to exclude competitors from the market because those activities expand the scale and scope of the SOE's operations.

The Objective of an SOE

Different SOEs often have different assigned missions and different goals. 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 that "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."[11]

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 service provided. 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 SOEs are permitted to earn is often explicitly limited, and SOEs are commonly instructed to pursue goals that are distinct from, if not fundamentally incompatible with, profit maximization.[12]

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. That discretion arises in part because SOEs are not subject to takeover threats and are generally less subject to the discipline of capital markets than 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.[13] 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 he or she oversees.[14]

This preference for expanded scale and scope of operations suggests that SOEs will act as if they maximize some combination of profit and operating scale. In practice, revenue often serves as a convenient proxy for scale.

In the formal analysis that underlies the discussion in this chapter, we rely on the simplifying assumption that SOEs value both revenue and profit. However, it is important to note that the key qualitative conclusions drawn from our analysis hold more generally. The conclusions hold, for example, if the SOE seeks to maximize a combination 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. Its concern with revenue or output effectively induces the SOE to discount the cost of expanding output. Consequently, even though the SOE values the profit its anticompetitive activities can generate less highly than does a private profit-maximizing firm, the SOE pursues 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.

An SOE's Pricing

In the appendix to this chapter, we present a formal analysis of how SOEs set prices for their services when they seek to maximize a combination of profit and output. Here, we summarize the main findings from that analysis.[15] We find that a multiproduct SOE that maximizes a combination of profit and revenue effectively discounts the marginal costs of producing its services more than a private, profit-maximizing firm does. That is, when it determines prices for its

goods and services, the SOE will be less concerned than its private counterpart about the extra cost it incurs when it expands its output. The greater its focus on revenue rather than profit, the more the SOE discounts marginal costs in pricing its goods and services.

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. 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. When such competition exists, a reduced focus on profit leads the SOE to set particularly low prices for the products on which it faces the most intense competition. Indeed, as John Lott has suggested, an SOE is likely to set the price of a product below its marginal cost of production, even in the absence of predatory intent.[16] We find that the SOE is particularly likely 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.[17]

This conclusion 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 sensitive to price (or both), then the SOE will choose to set some prices below marginal production costs. In doing so, the SOE may drive a more efficient competitor from the market.

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 its prices. For example, it might be prohibited from pricing below marginal cost, just as private, profit-maximizing

firms typically are. We now explain how firms can relax a binding prohibition against below-cost pricing and why a public enterprise may have stronger incentives than a profit-maximizing firm to relax such a prohibition.

One obvious way in which a firm can relax a binding constraint against pricing below marginal cost is to manipulate accounting data to understate its actual marginal cost. 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 some of the personnel hired to supply the product in question as central management. 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 entails 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, the associated benefits may outweigh the costs. Most important, when the SOE values more highly than a private, profit-maximizing firm the expanded output and revenue that result from the lower price the understatement facilitates, the SOE will be more likely than its private counterpart to understate its costs. We therefore conclude that an SOE has a particularly strong incentive to understate its marginal cost of production to relax a binding prohibition against pricing below cost. The less profit-oriented the SOE, the greater this incentive will be.

Now consider a more subtle strategy an SOE might pursue to relax a binding prohibition against pricing below cost. Suppose that instead of misstating its true marginal cost, the SOE chooses to oper-

ate with an inefficient technology that secures a relatively low marginal cost at the expense of a particularly high overhead cost. In practice, a firm can do so by installing general-purpose equipment on a large scale, thereby reducing the need for project-specific equipment. It can also do so by, for example, retaining a large on-site staff with broad legal, engineering, computing, and/or marketing expertise that substitutes for specific expertise on individual products.

More generally, suppose the SOE has a choice among production technologies and suppose this choice is measured by the amount of an overhead resource the firm employs. For expositional convenience, we refer to this resource as *capital*.[18] The more capital the firm installs, the lower its variable and marginal costs of production will be. Therefore, because an SOE values highly the expanded scale and scope facilitated by low marginal production costs, it has particularly strong incentives to overinvest in capital to relax a binding prohibition on pricing below cost.[19]

The more highly the SOE values expanded scale and scope relative to profit, the more it benefits from the expanded scale a lower price provides and the less concerned it is with the associated cost. Therefore, the less concerned the SOE is with generating profit, the greater the technological inefficiency it will endure to secure a lower price and the expanded scale it engenders. Such inefficient overcapitalization can be particularly pronounced if the SOE's capital purchases are subsidized (as they can be, for example if the SOE is afforded privileged access to government funds).

For simplicity, our discussion focuses on the case in which the cost of producing each product is independent of the cost of producing other products. However, the presence of cost complementarities (where the production of one good lowers the cost of producing another) can provide an SOE with an additional means to relax a binding prohibition on pricing below cost. To illustrate, suppose the SOE produces two products, *A* and *B*. Further suppose the SOE is, by law, the sole supplier of product *A*, whereas both the SOE and competi-

tors supply product *B*. Finally, suppose there are economies of scope in the provision of products *A* and *B* that cause the SOE's marginal cost of producing *B* to decline as its supply of product *A* increases. In the presence of such cost complementarities, the SOE can enjoy 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*.

Consequently, when cost complementarities are present, an SOE gains in two distinct ways from accepting an expanded universal service obligation. First, it increases the scale and scope of the SOE's monopoly operations. Second, it reduces the SOE's cost of supplying product *B*. This reduction in marginal cost typically serves to expand the SOE's production of product *B*. It is of particular value in this regard when the SOE faces a binding restriction on pricing below cost.

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

Raising Rivals' Costs

To disadvantage their rivals, firms can undertake activities other than strategically relaxing a binding prohibition against below-cost pricing. 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 those inputs.[20]

A public enterprise has 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 cus-

tomers and/or to increase the prices they charge for their products. Those actions by competitors serve to increase customer demand for the SOE's products, which promotes an expanded scale of operation for the SOE.

Private profit-maximizing competitors enjoy the extra profit they secure when their rivals are disadvantaged. If public enterprises value profit less highly than private firms, it is conceivable that they might be less inclined to disadvantage their rivals. Often, however, the opposite is true. A reduced focus on profit can cause an SOE to be more aggressive in raising its rivals' costs and render the cost of expanded output less onerous for a public enterprise. Because an SOE will pursue the expanded scale it values highly by reducing the output of its rivals by raising their costs, we can conclude that an SOE may have stronger incentives than a private, profit-maximizing firm to raise its rivals' costs. Furthermore, the less profit-oriented the enterprise, the more pronounced such incentives will be for the SOE.[21]

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, it might lobby key policymakers to erect impenetrable entry barriers, such as statutory prohibitions on entry. When successful competitors reduce an SOE's ability to expand the scale and scope of its operations, the SOE has strong incentives to limit the success of those competitors. Often, the more highly the SOE values expanded scale relative to profit, the more pronounced this preference becomes. We thus find that an SOE has strong incentives to undertake activities designed to exclude competitors from the marketplace whenever successful competition would reduce its output. These incentives increase as the SOE becomes less profit oriented.

Economies of Scope between Monopolized and Competitive Markets

The pronounced desire of the SOE to exclude rivals arises even in the absence of cost complementarities. For the reasons identified

above, this desire will become more pronounced when cost complementarities are present. In particular, when the exclusion of rivals in one market serves to increase the SOE's output in that market, its operating costs decline in a second market. That cost reduction, in turn, expands the SOE's scale of operation in the second market.

If the SOE operates in both a monopolized market (such as letter delivery services) served only by the SOE and a competitive 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 an entrant can offer in competition with an SOE. The effect of the monopolized area is to prevent an efficient entrant from achieving economies of scope and thus lowering its marginal cost of supplying the competitive product. Although similar to the raising-rivals'-costs strategy described above, this strategy is more accurately described as denying rivals the opportunity to lower their costs.[22] All other things remaining constant, the rival faces higher costs in the competitive market than the SOE experiences. We call this the direct effect of the statutory monopoly in the competitive market.

In addition to this direct effect, an indirect effect arises if economies of scale exist in the competitive market. If the SOE sets a lower price in the competitive market because of the realized economies of scope, demand will shift from the rival to the SOE. As the SOE's output of the competitive product increases, the SOE experiences economies of scale its rivals cannot achieve. The resulting decline in the SOE's unit cost of operation in the competitive market causes a further shift in sales from competitors to the SOE depending on the SOE's objectives and the nature of the competitive interaction between the SOE and its rivals.

The key conclusion here is that the SOE derives from its statutory monopoly over the monopolized product an incremental benefit in the form of both economies of scope and economies of scale in the competitive market. These combined effects, direct and indirect,

are not the intended consequence of the government granting the SOE a statutory monopoly in the monopolized market. Both incremental effects flow causally from the statutory monopoly and not from an inherent cost advantage that only the SOE enjoys.

In sum, the diverse goals of a public enterprise lead it to act more aggressively toward its rivals than does a private enterprise. A reduced focus on profit leads the SOE to price competitive 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 precludes the operation of more efficient competitors and thereby reduces social welfare. So, too, can the advantages an SOE enjoys in competitive markets when it, alone, is authorized to operate in monopolized markets.

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

The Ability of State-Owned Enterprises to Act Anticompetitively

Until recently, an unstated premise in the intellectual literature on pricing had been that the alleged predator is a privately owned firm that seeks to maximize profit. 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 above, an SOE has greater incentive than a private firm to charge below-cost

prices. In addition, an SOE typically has enhanced ability to charge below-cost prices and otherwise disadvantage competitors for at least five reasons.

First, the legislation that creates an SOE usually imposes upon it the duty, or confers upon it the prerogative, to pursue objectives other than profit maximization—such as provision of universal service at a uniform, geographically averaged price. This duty or prerogative endows 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 Committee on Competition Law and Policy of the Organization for Economic Cooperation and Development (OECD) 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 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."[23] 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 need not recoup losses by ultimately raising prices in the competitive market. This feature of public ownership is in direct contrast to the scholarship and jurisprudence on predatory pricing by private firms, which emphasize 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 long enough to recoup the earlier profit sacrifice and more.[24] Unlike a private utility subject to rate-of-return or price-cap regulation, an SOE has sub-

stantial ability to carry losses forward into future periods of the ratemaking process.[25]

More important, unlike a private firm, an SOE has substantial ability to recoup its losses by raising prices in monopolized markets where it has a statutory monopoly or via direct expenditures from the public treasury. The EC, for example, 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.[26] The OECD noted 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 on productive efficiency. Distortionary pricing might induce a more efficient firm to leave or to not enter the competitive market."[27]

Third, unlike the private firm, which may find it impossible to repel entry when prices ultimately rise to profitable levels, SOEs may be able to preclude such entry. This ability arises because SOEs are often multiproduct firms that benefit from statutory monopolies over related products or services. The U.S. Postal Service, for example, has the discretion to interpret the contours of its own statutory monopoly.[28] Thus, the Postal Service enjoys the ability to raise entry costs for private firms by defining the scope of competitive services that can be supplied privately.

Fourth, an SOE enjoys privileges and immunities (apart from explicit state subsidies of operating losses) that facilitate recoupment of losses incurred in noncore markets or that make them irrelevant. The U.S. Postal Service, for example, has no obligation to compensate its investors, the American taxpayers. The absence of an obligation to pay a competitive return on invested capital lowers the

cost of funds an SOE can use to subsidize losses in noncore markets. In addition, an SOE may be exempt from taxation, which reduces its operating costs.[29]

Fifth, an SOE may be subject to less binding price regulation than is the typical private firm subject to regulation. The less binding nature of the price regulation can arise, for example, because the regulatory agency overseeing the SOE's operation has a limited set of policy instruments at its disposal. For example, the U.S. Postal Rate Commission lacks subpoena power, and its powers to set maximum prices for postal services are not unlimited. Thus, in general, an SOE has a heightened opportunity to engage in anticompetitive behavior, including below-cost pricing.[30]

These are only five of the many reasons SOEs may have greater ability than their private, profit-maximizing counterparts to engage in anticompetitive activities. Policymakers 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.[31]

Conclusion

In American jurisprudence, competition law for state-owned enterprises is limited. However, the EC's decision in the *Deutsche Post* case in 2001 establishes an important precedent that could soon affect the United States if the arbitration panel in the *Canada Post* case filed under Chapter 11 of NAFTA is influenced by the EC's decision. 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.

We have explained why SOEs 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 discounts the cost of output expansion. Consequently, even though such an SOE values the profit its anticompetitive activities generate less highly than does a private profit-maximizing firm, the SOE pursues aggressively anticompetitive activities that expand the scale of its operations. In particular, an SOE will set prices below marginal production costs, especially on products for which demand is sensitive to price. An SOE also may understate its marginal cost of production and overinvest in capacity to relax a binding prohibition on pricing below cost. In addition, an SOE has stronger incentives than a private, profit-maximizing firm to raise its rivals' costs and to undertake activities designed to exclude rivals from relevant markets.

SOEs also commonly have enhanced ability to engage in anticompetitive activities relative to private firms. This 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 competitive markets.

In light of the greater incentive and ability of SOEs to engage in anticompetitive activities, enhanced scrutiny of SOEs under antitrust law is appropriate. Furthermore, because a monopoly position in one market enables an SOE to reduce competition in another market, it is wise to construe narrowly any statutory monopoly that is conferred upon it. In addition, strict limits on an SOE's ability to expand beyond the market covered by its statutory monopoly may be appropriate.

Appendix: A Formal Analysis of SOE Pricing

We explained in the text why an SOE has the incentive to maximize a combination of revenues and profits. Here we develop formally the pricing decisions implied by that behavior.

Different SOEs may value revenues and profits differently. To capture differences among SOEs, we employ the parameter w, which can range from 0 to 1, to denote the weight an SOE places on revenue. We let $1 - w$ denote the corresponding weight on profit. By varying w, we can capture the objectives of different SOEs.

The following additional notation permits a formal statement of the class of objective functions under consideration. Let $n \geq 1$ denote the number of products supplied by the SOE. Also let $p_i \geq 0$ denote the price the SOE charges for its i-th product, and let $p \equiv (p_1, \ldots, p_n)$ denote the 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 the SOE sets prices p (customers will buy more of any product the lower is its price). $Q \equiv (Q_1(p), \ldots, Q_n(p))$ will denote all of the output produced by the SOE. For simplicity, the ensuing analysis focuses on the setting in which customer demand for each of the SOE's products is independent of the prices charged for other products. The function $C(Q)$ denotes the SOE's cost of producing output Q.[32]

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.

Before discussing the prices preferred by an SOE that maximizes 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 price.[33] 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 $\epsilon_i = |[\partial Q_i / \partial p_i][\, p_i / Q_i]|$, 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. The larger the price elasticity of demand for a product, the more pronounced 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:

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

Expression (2) indicates that the profit-maximizing firm will always set the price of each of its products above its marginal cost of production.[34] In the simple, static setting considered here, reducing a price below marginal cost serves only to reduce 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:

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

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, $[1 - w]\partial C(Q)/\partial Q_i$, that vary inversely with the price elasticity of demand. The more inelastic the demand for the product, the further above modified marginal cost the prices are set.

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 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. It is apparent from expression (3) that even in the absence of predatory intent, an SOE may set the prices for some of its products below their marginal costs of production. The SOE will be particularly likely 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.

Notes

1. World Bank, *Bureaucrats in Business: The Economics and Politics of Government Ownership* (Oxford: Oxford University Press, 1995), 30.
2. We use the term *anticompetitive* instead of *predatory* because the latter often connotes that the firm recoups losses from below-cost pricing after it causes rivals to exit the market or desist from aggressive competition. An SOE may not need to recoup such losses, for reasons we explain.
3. Because European nations, among others, typically do not employ the term *antitrust law*, it would be parochial to use that term to describe the developing body of law on SOEs. Instead, we employ the term *competition law*.
4. See, for example, John Vickers and George Yarrow, *Privatization: An Economic Analysis* (Cambridge: MIT Press, 1988).
5. See Edmund L. Andrews, "Merge? Yes and Non," in *New York Times*, 8 July 2001, sect. 4, 2.
6. Case COMP/35.141, Deutsche Post AG, 2001 O.J. (L 125) 27 at ¶ 36.
7. *Flamingo Indus. (USA) Ltd v. U.S. Postal Serv.*, 302 F.3d 985, 988–89 (9th Cir. 2002).
8. *Flamingo Industries*, 302 F.3d at 989 (quoting 39 U.S.C. § 401(1)).
9. *United Parcel Service of America, 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 (19 Jan. 2000), available at http://www.dfait-maeci.gc.ca/tna-nac/ups-noi.pdf.
10. 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.
11. 39 U.S.C. § 101.
12. 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 to minimize its losses in a competitive 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.

13. See R. Richard Geddes, "Agency Costs and Governance in the United States Postal Service," in J. Gregory Sidak, *Governing the Postal Service* (Washington, D.C.: AEI Press, 1994).
14. In summarizing the relevant empirical evidence, Andre Blais and Stephane Dion 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. See Andre Blais and Stephane Dion, "Conclusion: Are Bureaucrats Budget Maximizers?," in Andre Blais and Stephane Dion, *The Budget-Maximizing Bureaucrat: Appraisals and Evidence* (Pittsburgh: Pittsburgh University Press, 1991), 355.
15. For further discussion and analysis, see David E. M. Sappington and J. G. Sidak, "Incentives for Anticompetitive Behavior by Public Enterprises," in *The Review of Industrial Organization* 22 (2003): 183–206.
16. John R. Lott Jr., "Predation by Public Enterprises," *Journal of Public Economics* 43 (1990): 237.
17. See the appendix to this chapter for a formal demonstration of this point.
18. 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.
19. For a related insight in the context of a regulated firm, see Kenneth Baseman, "Open Entry and Cross-Subsidization in Regulated Markets," in Gary Fromm, *Studies in Public Regulation* (Cambridge: MIT Press, 1981).
20. See Steven Salop and David Scheffman, "Raising Rivals' Costs," *American Economic Review* 73 (1983): 267–71; Steven Salop and David Scheffman, "Cost-Raising Strategies," *Journal of Industrial Economics* 36 (1987): 19–34.
21. Notice that when cost complementarities are present, rivals' costs can be increased simply by the fact that they are precluded from operating in markets that are reserved exclusively for an SOE. As we explain in greater detail, the mere presence of a monopolized market can prevent rivals from reducing their costs to the level enjoyed by an SOE, even in the absence of any deliberate attempt by the SOE to raise its rivals' costs.
22. In the *Deutsche Post* case, for example, the EC noted that "joint deliv-

eries [of mail-order parcels and letters] create economies of scope that exist between the monopolized product and the competitive product. Due to the monopolized area these economies of scope are not available to competitors." Case COMP/35.141, Deutsche Post AG, 2001 O.J. (L 125) 27 at ¶ 11 n.17.

23. Organization for Economic Cooperation and Development, Committee on Competition Law and Policy, *Promoting Competition in Postal Service* (No. 24, DAFEE/CLP (99)22, 1 October 1999), 55.
24. See Philip Areeda and Donald F. Turner, "Predatory Pricing and Related Practices Under Section 2 of the Sherman Act," *Harvard Law Review* 88 (1975): 697–733; William J. Baumol, "Predation and the Logic of the Average Variable Cost Test," *Journal of Law Economics* 39 (1996): 49–72.
25. For an application to the U.S. Postal Service, see J. Gregory Sidak and Daniel F. Spulber, *Protecting Competition from the Postal Monopoly* (Washington, D.C.: AEI Press, 1996), 116.
26. Case COMP/35.141, Deutsche Post AG, 2001 O.J. (L 125) 27, p.32, n. 52. The stand-alone cost of service X is the outlay that would be required for a firm to produce service X and no other service.
27. Organization for Economic Cooperation and Development, Committee on Competition Law and Policy, *Promoting Competition in Postal Service* (No. 24, DAFEE/CLP (99)22, 1 October 1999): 55.
28. See Sidak and Spulber, *Protecting Competition from the Postal Monopoly*, 18–19, 26–31.
29. The U.S. Postal Service is exempt from taxation. See Sidak and Spulber, *Protecting Competition from the Postal Monopoly*, 2.
30. 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 and Spulber, *Protecting Competition from the Postal Monopoly*, 101–46.
31. See, for example, Organization for Economic Cooperation and Development, Committee on Competition Law and Policy, *Promoting Competition in Postal Service* (No. 24, DAFEE/CLP (99) 22, 1 October 1999), 55, 336–37 (Aide Memoire of the Discussion).
32. 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 $Q_i(p_i)$.

33. See Frank Ramsey, "A Contribution to the Theory of Taxation," *Economic Journal* 37 (1927): 47–61; William J. Baumol and David F. Bradford, "Optimal Departures From Marginal Cost Pricing," *American Economic Review* 60 (1970): 265–83.
34. This conclusion follows because the price elasticity of demand is always 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 ($\partial C(Q)/\partial Q_i$).