

**The Economics of Competition Policy:  
Recent Developments and Cautionary Notes in  
Antitrust and Regulation**

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# **The Economics of Competition Policy: Recent Developments and Cautionary Notes in Antitrust and Regulation**

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## **ABSTRACT**

Competition policy has become more prominent while the thinking underlying those policies has undergone substantial revision. We survey advances in antitrust economics and the economics of regulation. Increasing reliance on non-cooperative game theory as a foundation for antitrust has led to rethinking conventional approaches. We review some of these contributions in the context of mergers, vertical restraints, and competition in “network industries.” Turning to regulation, we review standard rationales and identify some major contemporary refinements, with examples of the motives behind them and their application. After brief thoughts on privatization, we conclude with suggestions on design and implementation, with some observations on whether these developments are as valuable in the corridors of policy as they may be in the halls of academe.

*Keywords:* Antitrust, regulation, competition policy

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# **The Economics of Competition Policy: Recent Developments and Cautionary Notes in Antitrust and Regulation**

## **INTRODUCTION**

Public policy to make industries perform more competitively, either through antitrust laws or regulation, has become ever more prominent as we move into the next decade. Much of the economic thinking underlying those policies has undergone substantial revision. Our purpose here is to provide a survey of recent advances in antitrust economics and the economics of regulation that may help a broader audience follow and assess these recent developments.

We begin with an overview of the history of the ideas informing U.S. antitrust policy in the latter half of the 20<sup>th</sup> century. Increasing reliance on non-cooperative game theory as a foundation for microeconomics as a whole, and the economics of industrial organization in particular, has led to some refinement and, in some cases, rethinking of these ideas. We review and critique some of these contributions of game theory to contemporary antitrust policy, examining how these advances have affected the analysis of mergers, vertical restraints, and competition in so-called “network industries.” Turning to regulation, we begin with an overview of themes in the economics of regulation prominent through the 1970s and beyond. We then identify half a dozen major threads in contemporary regulatory economics, with examples of how they have been both motivated by and applied to policy issues in the United States.

After some brief thoughts on privatization, we conclude with suggestions regarding how these advances should affect the setting of priorities in designing and implementing antitrust and regulatory policy. We offer some observations on whether these developments are as valuable in the corridors of policy as they may be in the halls of academe.

## **THE ECONOMICS OF ANTITRUST POLICY**

### **From “Cambridge” to “Chicago”: The Pendulum Swings**

The initial economic underpinnings of antitrust policy, associated with economists at Harvard and MIT, arose from the familiar theories of monopoly and Cournot oligopoly. The former lent support to the view that explicit actions taken to subvert competition led to both inefficiency and an inequitable redistribution of wealth from consumers to the monopolist. The perceived need to address actions that reduce competition and lead to monopolies is reflected in two of the three pillars of U.S. antitrust law—sections one and two of the 1890 Sherman Act. Section 1 prohibits “restraints of trade.” The quintessential restraint of trade is a cartel meeting of the managers of all competing firms in the proverbial “smoke-filled room,” agreeing to set high prices or to partition the set of customers into exclusive monopolized mini-markets. Section 2 proscribes “monopolization,” a term that includes actions under which a firm becomes a monopoly through “unfair” competitive practices such as predatory pricing, rather than by virtue of its own ability to produce attractive products at low cost.

Simple Cournot oligopoly theory supported the third pillar, Section 7 of the 1914 Clayton Act, which prohibits mergers that “may tend to inhibit competition.” The textbook version of Cournot

theory had each firm in an oligopoly choosing a profit-maximizing level of output, taking the output of others as given. As the number of firms falls, each has more of the market left to it, leading to higher prices. Some empirical studies identified a correlation between the share of a market held by the leading firms in an industry and prices. That theory and those studies, along with the view that Section 1 cartel agreements or tacit collusion would be easier to reach with fewer firms in a market, led to policies designed to keep markets from becoming too concentrated.

As these antitrust policies informed the evolution of antitrust law in U.S. courts, a broad range of business practices became suspect. A wide range of “intra-brand” agreements between a single firm and its suppliers or distributors was deemed illegal, even if there remained active “inter-brand” competition. “Monopolization” came to be understood in some quarters as a general rule preserving a populist right of small firms to compete and, thus, protecting competitors against low pricing from large, more efficient corporations rather than protecting competition against high prices from monopolies. Some mergers were held illegal with less than 10% of a market at stake (*U.S. v. Von’s Grocery*, 384 U.S. 270 (1966)).

Economists and law professors associated primarily—but not exclusively—with the University of Chicago and UCLA began to question whether microeconomic principles and econometric data could support the broad reach of antitrust and whether markets deserved more credit than they were getting. Cartels require explicit agreement, because cheaters can reap huge profits by undercutting monopoly prices. Since competition depends on the independence of firms within markets, contracts and mergers that cross market boundaries are presumptively efficient, e.g., in eliminating “double marginalization” that reduces profits and increases price when upstream and downstream firms have market power. Contracts between manufacturers, suppliers, and distributors are no different than other means by which a firm organizes and markets its products. Protecting competitors rather than competition hurts consumers; if a firm’s tactics make a competitor worse off, they are presumptively good. Empirical correlations between profits and concentration may reflect efficiencies from economies of scale rather than the inefficiencies of reduced competition. Predatory pricing below cost cannot pay off because entrants will come in the moment the monopolist raises price to recover its losses.

According to this view, antitrust prosecutors and courts should cease worrying about tacit collusion, conglomerate corporations, and predation. They should restrict their attention to explicit agreements not to compete. “Big” is not per se “bad.” Only horizontal (within market) mergers that would raise concentration to levels that genuinely threatened competition, and where entry or expansion of output would not suffice to make significant price increases unprofitable. Vertical integration is problematic only as a tactic to evade monopoly regulation. These ideas reached an apex during the tenure of William Baxter at the U.S. Antitrust Division during the 1980s. Notable examples include the issuance of “Horizontal Merger Guidelines” and the aggressive prosecution of antitrust charges against the regulated AT&T while dropping similar charges brought in 1969 against the unregulated IBM.

### **“Post-Chicago”: Game Theory and the Pendulum’s Return**

The increasing importance of non-cooperative game theory in economics has led to significant rethinking of the foundations of antitrust economics and at least some of the “Chicago school” policy recommendations. Space does not permit a full review of this rethinking, but a few highlights illustrate its significance.

*Nash equilibrium, competition, and oligopoly*

John Nash supplied the key equilibrium concept in non-cooperative game theory about fifty years ago (Myerson, 1999). When agents are in a strategic situation, i.e., when the results of each agent's actions depend on the actions of the others, each will act in such a way to maximize its objectives (e.g., profits, utility) given the actions chosen by the others. If actions are chosen simultaneously, each agent will expect others to choose the actions they in fact take. A particular "game" may have none, one, or multiple Nash equilibria.

The predictability of a Nash equilibrium depends on the belief that the agents view each other as acting consistently. If any agent were to predict a non-Nash outcome, it would have to be expecting that at least one other agent was either not maximizing its objectives given its predictions of others' choices, or was erroneously predicting the others' choices. That each agent chooses an action that is part of a Nash equilibrium, however, need not lead to an accurate prediction when there are multiple Nash equilibria. When two people want to meet at the same place and time, each choosing the same place and time as the other is a Nash equilibrium, but that hardly guarantees that people never miss each other.

Two examples of how this basic idea affects antitrust economics involve oligopoly and competition. The prevailing oligopoly model, the Cournot quantity-choice model, used to be taught apologetically as if it were irrational. In that characterization, each firm was assumed to have a "conjectural variation," i.e., expected effect of its output on that of others, of zero. This expectation was in conflict with the belief that if a firm in fact increased output, others would react by producing less. If the story is recast as a Nash equilibrium in quantity choices made simultaneously by each firm, the notion of "conjectural variations" becomes irrelevant. With simultaneous choices only predictions matter; actual choices by definition have no influence on each other's actions.

Regarding competition, the Nash equilibrium effect is two-edged. If firms have constant marginal costs, then the Nash equilibrium in prices is the competitive equilibrium. If two firms each have the same least marginal cost among the set, price equals marginal cost; if not, price is just below the second-lowest marginal cost among the sellers. All it takes is two to generate the competitive outcome (Tirole, 1988). On the other hand, looking at the competitive model as but the Nash equilibrium in a simultaneous price game portrays it as a special case rather than the norm. One can get considerably different outcomes in such a game, for example, if firms have differentiated products or capacity constraints. Differentiated product models in particular have come to play a much more pronounced role in antitrust policy than suggested by the conventional practice of defining markets so that a firm is either in the market or is not.

*Supergames, the "folk theorem," and tacit collusion*

The Nash equilibrium idea can be applied to the formulation of strategies in repeated games, e.g., when firms make price or quantity decisions periodically in the process of competing with each other over time. When the process has a reasonable chance of going on indefinitely, it is called a "supergame."

Supergame models open up a variety of possible equilibria. Suppose we look at a setting when firms can charge either a monopoly price or a competitive one. In a "one-shot" game, generally only the competitive prices constitute a Nash equilibrium, since each firm earns more profit charging the competitive price, regardless of the prices the others charge. This "Prisoner's dilemma" Pareto-inferior equilibrium need not hold in a supergame. Suppose each firm chooses a strategy to charge the monopoly price unless it observes that another firm charges a competitive price. This is a Nash equilibrium as long as discount rates are sufficiently low so that the one-shot gains from cut-

ting price are outweighed by the present value of the subsequent monopoly profits foregone (Fudenberg and Maskin, 1986). The observed outcome under this Nash equilibrium would be monopoly pricing in perpetuity. Tacit collusion now falls within the set of predictable outcomes (d'Aspremont and Gabszewicz, 1986).

That last sentence illustrates one of the problems of supergame models—multiple Nash equilibria. The “folk theorem,” so-called because its origin is unknown, is that with sufficiently low discount rates, any outcome preferred by all to the Prisoner’s dilemma can be a Nash equilibrium of a supergame. Almost any outcome is predictable—a serious deficiency both for the firms in an industry trying to plan a business strategy and the economists studying them.

But there are other problems as well. Supergame strategies, in which a firm’s move is based on past choices, violate the economic principle that only future opportunity costs affect present choices. At any given time, the game begins anew. If the monopoly prices were right to begin with in the first period, why not at any other period, regardless of whether someone had cut price beforehand? One might respond that one would be less likely to try this outcome once everyone had learned that one of the firms was prone to cheat. However, supergame models do not include learning; the parties know everything there is to know about each other before the game starts. To model learning, one needs to describe an initial level of uncertainty each firm has regarding each other’s likely actions, how each would rationally update its beliefs after seeing what the others did, and how that affects the choices of the others in what to reveal. These are much more complex games.

#### *Subgame perfection, sequential equilibria, and predation*

If a repeated game has a known and finite last period, the folk theorem no longer holds. In the last period, everyone would cheat, since there are no subsequent monopoly profits to lose. Since everyone knows everyone else would cheat in the last period, each would cheat in the next-to-last period. The argument cascades back to the first period in the game, resulting in cheating every step of the way.

This “backward induction” argument illustrates the most important refinement of the Nash equilibrium concept—subgame perfection. In a game where moves are made sequentially, i.e., when a move is made after the other moves become known, one strategy may be the best one actor can make given a strategy chosen by the other. For example, if a potential entrant knows an incumbent will charge a below-cost price after entry, it would choose not to enter in the first place. However, in sequential games, this is insufficient. At any point each player will ask whether the other players will find it individually profitable to carry out a particular strategy from that time forward. The idea that a sequential game has to have a Nash equilibrium not just at the outset but at every step in the way—a “subgame”—is called “subgame perfection.”

Predatory pricing is the standard application of this idea in antitrust economics. In any single instance, an entrant may know that if the incumbent charged a predatory price, the entry would be unprofitable. However, in a wide class of games, the entrant will know that once it enters, the incumbent’s most profitable move will be to accommodate entry by cutting back output rather than by flooding the market to drive prices so low that the entrant loses money. With this knowledge, predation is no longer a subgame perfect outcome, because once the entrant enters, predating is no longer a Nash equilibrium. In effect, the predatory threat is not credible because it is not profitable to carry it out once the entrant enters. Subgame perfection is equivalent to a claim that all threats embodied by a choice of strategy are credible.

One response was that predation might work if the incumbent were to face a succession of entrants. The “backward induction” argument rules out that outcome. The version known as the

“chain store” paradox (Selten, 1978) says that the last entrant will not find the predation threat credible and therefore will enter. The next to the last entrant, knowing that there will be entry in the last period, will find the threat in its period not credible, and will enter, and so on.

The situation may be different with uncertainty. Suppose entrants believe there is some chance, even a slim one, that the incumbent would find it profitable to predate. Perhaps the incumbent is irrational or gets some other payoff from predating. If so, the incumbent, even one who would lose if it predated, nevertheless will be expected by entrants to predate, to keep future entrants thinking that it might be irrational. Entrants will not come in until close to the end of the market term, when the value of preserving a reputation for irrationality no longer suffices to entice even a rational incumbent to predate. Incorporating rational (Bayesian) updating of beliefs into a sequential game leads to what is called a “sequential equilibrium” (Kreps and Wilson, 1982; Milgrom and Roberts, 1982a).

### *Specific assets, signaling games and limit pricing*

One of the classic doctrines of orthodox antitrust theory is the concept of limit pricing, i.e., that a monopolist will hold down price to deter entry. Such pricing may be the outcome of a Bertrand game or, under some conditions, a sequential game in which a dominant firm chooses first a price that fringe competitors take as given. But the opportunity to revise price after entry means that the entrant need not care about the pre-entry price.

A first consequence is that the threat of potential entry need not hold down current prices. If the entrant expects the price to fall post-entry, it may not enter even if it could earn profits at the pre-entry price. As we have seen, a predatory threat to hold post-entry prices below costs need not be credible. However, an incumbent may be able to take actions that would reduce the predicted post-entry price. One way is to install sunk capital equipment that cannot be used to produce other products. This equipment reduces marginal cost and the post-entry price. If the entrant knows that this equipment will be employed in this market and cannot be sold off, this sunk investment can deter its entry (Spence, 1977). Contrary to optimistic views, the absence of legal barriers to entry need not produce competitive outcomes.

Uncertainty adds some interesting wrinkles to the limit pricing story. Suppose the entrant does not know whether the monopolist has high or low costs, and that it could enter profitably only if the entrant had high costs. The monopolist may find it profitable to charge a low price today that would be unprofitable unless it had low costs and entry was deterred. Unlike the simpler game, today’s pre-entry price matters because it signals potentially relevant information about tomorrow’s post-entry price (Milgrom and Roberts, 1982b).

The informational value in a signaling game depends crucially on “out-of-equilibrium beliefs,” e.g., what the entrant would think if a higher price were chosen. Here, for example, the incumbent might set a high price if the entrant, for some reason, believed that low prices indicated high costs. Such an equilibrium is logically consistent, because out-of-equilibrium beliefs, by definition, are never tested against equilibrium outcomes. Game theorists have proposed a number of further refinements to limit the set of permissible out of equilibrium beliefs and rule out implausible equilibria (Rasmusen, 1994).

## **Applications**

Game theory has revived theoretical possibilities that had fallen out of intellectual favor (although some antitrust attorneys still found them useful in promoting their clients’ interests).

Many of these informally recognized in the “Cambridge” era but tended to be ruled out by the “Chicago School’s” disposition, absent explicit collusive horizontal agreements, to let the market control monopoly power and stimulate efficient organization. To illustrate some specific manifestations of this trend, we look at vertical relationships, merger policy, and network industries.

### *Vertical foreclosure and restraints*

Despite the intellectual ebbs and flows in antitrust economics and policy, there has been a broad and persistent consensus opposing agreements among competitors in a market, be they covert agreements to fix prices or overt mergers that create effective monopoly power. Vertical relationships are another story. The original legal and economic view was to regard vertical mergers and contracts that limited a firm’s independent discretion regarding with whom to deal, where, and at what price, as illegal restraints of trade. One such restraint, resale price maintenance that forbids dealer discounts, has been illegal in the U.S. for most of the century (*Dr. Miles Medical v. John D. Park and Sons*, 220 U.S. 373 (1911)), albeit with more and more qualifications. Tying agreements, where purchase of one product requires purchase of another, remains illegal when the firm enforcing the tie has significant market power. Other kinds of nonprice restraints, such as a manufacturer agreeing to give retailers exclusive franchises or requiring that they deal only its product, may be illegal in the U.S. if a court finds them unreasonable (Gellhorn and Kovacic, 1994).

Until recently, courts have tended to view vertical integration more benignly, raising the burden of proving illegality. Asymmetric considerations provide part of the justification. Vertical restraints can provide retailers with incentives to promote and service a manufacturer’s product, when the manufacturer cannot reward these activities directly. The classic example involves resale price maintenance. It can give a retailer an incentive to compete for customers by providing better in-store product demonstrations, without fearing that a buyer would take that information and then purchase the product from a no-frills discount store (Telser, 1960).

Legal and academic trends are tilting more toward concern with vertical contracts. One such concern is that a firm would use its contracts or relationships with input suppliers to “raise rivals’ costs,” creating a competitive advantage for itself (Salop and Scheffman, 1983). Since one cannot generally raise costs to rivals without being able to raise the prices they pay for inputs, this practice requires acquiring market power over an input. Such monopolization, or an agreement restraining trade to create that market power, presumably should be illegal on its face (Brennan, 1988).

Subsequent concerns regarding the ability to use such contracts to create market power have entailed more sophisticated and explicit strategic analyses. The many influential models include the following stories:

- An incumbent monopolist offers buyers contracts with penalty clauses if the buyers subsequently switch to an entrant. If these contracts are signed prior to getting accurate information on the entrant’s cost, these contracts may deter the entry of low cost sellers. Nevertheless, buyers find it worthwhile to sign these contracts at a slight discount rather than take the chance that a cost-competitive entrant will not show up (Aghion and Bolton, 1986). If the entrant can signal its costs prior to the signing of these contracts, however, this incentive to foreclose the market disappears.

- A monopolist offers each of a number of buyers a contract committing the buyers to deal exclusively with it rather than with an entrant that may show up in subsequent periods. If no one buyer can give the entrant enough business to make entry profitable, then a Nash equilibrium is for each buyer to sign the contract (Rasmusen, Ramseyer, and Wiley, 1991). No one signing the contract is also a

Nash equilibrium of this game. If the buyers have to guess which Nash equilibrium will prevail, it might guess the one that leaves the each buyer better off, i.e., the one without exclusive dealing.

- Suppose a monopolist over related products X and Y faces the possibility of an entrant in market Y. The monopolist wants to convince any such entrant that it will not reduce its supply of Y following entry, hence that the post-entry price will be too low to make entry profitable. If it can tie sales of X to sales of Y, then every lost sale of Y will mean a lost sale of X. The lost monopoly profits then represent, in effect, a reduction in the firm's marginal cost of supplying Y, depressing the expected post-entry price and deterring entry (Whinston, 1990). The model requires that the monopolist remain committed to the tie even if entry occurs, raising the issue of credibility. One should also not to apply this model to tying arguments lacking this particular strategic motive.

- A downstream firm buys one of two upstream suppliers and then commits not to compete to sell any inputs to other differentiated downstream firms. The other upstream firm now is a monopolist over those competitors. This causes it to raise prices to those downstream firms, increasing prices of the final product. With downstream product differentiation, a limited increase in the price of the upstream product will lead to higher aggregate profits for the unintegrated downstream firms and their upstream monopolist. One could get an equilibrium where one upstream supplier vertically integrates, the other does not, and prices go up (Ordover, Saloner, and Salop, 1990). This equilibrium, however, depends on two commitments—that the integrated upstream firm not compete to sell inputs to the unintegrated downstream firms, and that the non-integrated upstream firm sell at a monopoly price rather than use “two part” pricing that reduces its output price to marginal cost. If such commitments, particularly the first, can be made with vertical integration, one may ask whether such integration is necessary. One of the upstream firms could simply commit to deal exclusively with just one downstream supplier.

- A prominent specific case in U.S. antitrust law involved a recent court decision saying that a firm could have meaningful monopoly power over the parts used to repair its products, despite undisputed competition in the market for the products themselves (*Eastman Kodak Co. v. Image Technical Services*, 112 S. Ct. 2072 (1992)). Under a traditional “Chicago” analysis, buyers would factor repair expenses into the cost of the product when deciding what to buy, and hence competition for the product would eliminate any market power over repairs. Some analyses suggest inefficient outcomes if product sellers cannot commit to keep repair prices low (e.g., by allowing competition from independent repair firms), or if locked-in consumers are unable to determine replacement part prices, or are otherwise vulnerable to exploitation by a repair monopoly (Borenstein, Mackie-Mason and Netz, 1995). Others question whether these theoretical possibilities are empirically plausible, especially for “big ticket” items where buyers have strong incentives to become informed and protect themselves via contract (Shapiro, 1995).

These stories, and numerous others (Tirole, 1988) illustrate the advantage and disadvantage of the game-theoretic and imperfect information approaches to antitrust. The advantage is that they provide a framework for considering and comprehending a wider variety of strategic possibilities. The disadvantage is that the models tend to depend crucially on specific assumptions regarding timing, information, and the ability to make commitments. Understanding them often requires effort to determine just where the magician sneaked the rabbit into the hat. The advantage and disadvantage go together. A wide array of possible outcomes requires that one can get different results without great differences in underlying circumstances.

### *Mergers*

Merger analysis has long been focussed on the thorny but important tasks of identifying the set of firms making up the “relevant market” that might be monopolized and assessing the threat to competition. The 1980s saw increasing rigor applied to these exercises, exemplified by the Horizontal Merger Guidelines issued by the U.S. Department of Justice’s Antitrust Division. It defined the “relevant market” of firms as the smallest such set that, if they were a cartel, could profit with a “small but significant nontransitory increase in price.” It adopted the Herfindahl-Hirschman Index (HHI), the sum of the squares of the shares of sales or capacity in the relevant market, as the indicator of when a market is sufficiently concentrated for a merger to warrant investigation. It explicitly recognized the role of entry as a potential constraint on market power and, thus, as a reason not to prosecute a merger that might lead to high market concentration.

Revisions of the Guidelines during the 1990s (U.S. Department of Justice, 1997) reflect the increasing importance of game theory in antitrust economics. While retaining the overall framework of the 1980s versions, the newer editions extensively discuss how a merger might lead to anti-competitive outcomes by either increasing the likelihood of coordinated interaction or giving the merging parties unilateral ability to raise price. The discussion of entry extensively assesses the ability of new firms to be able to operate at a scale sufficient to recover any sunk costs of operations. A belief that a general disposition viewing concentration as bad does not suffice. One has to tell stories regarding strategic opportunities and entry barriers consistently, at least broadly, with a plausible game-theoretic equilibrium model.

A less direct but also important influence of these modeling techniques is in the specific prediction of a merger’s effects. Some of this work has been purely theoretical, looking at the effects of mergers in models where merger is an equilibrium outcome and not merely an assumption (Farrell and Shapiro, 1990). More productive applications, however, have been in the development of simulation techniques to predict the effects of mergers. These rely on demand models calibrated to match current industry data regarding price, market shares, elasticity of demand for the product as a whole (e.g., long distance telephone service), and cross-elasticities of demand between products (e.g., MCI and AT&T) (Werden and Froeb, 1994). These demand models have also led to econometric techniques for estimating brand-specific demands, particularly as they may be affected by the prices of other brands (Baker and Bresnahan, 1985; Bresnahan, 1989) and thus provide estimates of the effects of mergers that eliminate independent pricing. These techniques are the result of theoretical advances and increases in computing power, but a major contributor has been the vast quantities of retail purchase data from bar-code scanners at checkout counters.

### *Network externalities*

A final theme with an expanding role in antitrust economics involves industries with network externalities. The defining feature of such industries is that the value of a good to a consumer depends on how many other consumers use it as well, i.e., are “on the same network.” Familiar examples include telephones, videocassette recorder formats, and computer operating systems. Network externalities may arise from the value in being able to communicate or share information with others, to use one’s knowledge or equipment in different locations, or to rely on a broader base of compatible complements such as VHS videocassettes or software applications.

If network externalities are sufficiently strong, an industry may tend toward a monopoly, in terms of a single network or standard. This tendency to monopoly is exacerbated to the extent that the source of the network externality is based on information, e.g., a computer operating system. Information itself has natural monopoly characteristics, in that the fixed costs of providing it may be

substantial, but the marginal cost of its use by additional consumers may be relatively negligible. Information with network externalities creates a formidable impetus toward monopoly. As economies become more information-based, these externalities and their effects become increasingly important (Shapiro and Varian, 1999).

With network effects, competition is more likely to be for the monopoly rather than among firms competing simultaneously to serve the same group of customers. A small competitive advantage may translate into market domination—a phenomenon known as “tipping.” This is likely to make competition quite intense. Incumbency and strategic market manipulations may have more profound effects than they do in conventional markets and may require more policy attention.

But with the entire market at stake, ending up with a monopoly may not be the result of what we normally think of as monopolization. Tactics such as giving away the product to build up network externalities may make sense when competition is for the market, even if they may look like below-cost predation in other antitrust contexts. Moreover, some tactics that might exclude entrants may not work if entrants think that if they survive, they’ll end up with the monopoly. For example, some models suggest that an incumbent might rush to beat entrants to come up with innovations, because the value to the incumbent of keeping the monopoly exceeds the value to the entrant of competing (Gilbert and Newbery, 1982). But if the entrant thinks that an innovation will allow it to take the monopoly from the incumbent, this value difference disappears and the incumbent loses its strategic advantage.

Network externalities also leave open the question of whether we get the “right” monopoly. Usually, this question is framed as whether the outcome of competition to be the “network” leads to the optimal “standard” in terms of generating the greatest benefits in quality for consumers net of the costs of developing and using it. Theorists have shown that consumers may be too reluctant to switch to a better standard, or too willing to switch to an inferior standard, depending in part on their expectations of what others might do (Farrell and Saloner, 1985; Katz and Shapiro, 1985). A debate currently rages as to whether markets empirically end up with an inferior standard or if they get it more or less right in a more or less timely manner (Liebowitz and Margolis, 1990).

## THE ECONOMICS OF REGULATION

### Received Insights

#### *Normative regulation*

The traditional approach to regulation among economists, and a still dominant idea, was first as an exercise in resource application for the public sector to solve. The conceptual setting began with a stable natural monopoly (Berg and Tschirhart, 1988). The typical condition that promotes natural monopoly, high fixed costs relative to variable costs, makes such an industry unsuited to competitive performance.

In the U.S., the industries characterized by these conditions were the so-called utilities—electricity, telephone service, water, and natural gas delivery. All of these industries feature a large fixed cost associated with the construction of a delivery system—the electricity grid, the local telephone lines, and the set of pipes distributing water and gas. Once this delivery system is in place, it can meet the needs of virtually any amount of additional users, at least within its general geographic area, at relatively low cost. Some other sectors involving long distance transportation also had monopoly characteristics, in that the fixed costs associated with rights-of-way and the main transportation plant were both substantial and, once incurred, could meet demand for transport between

any two points. Industries that fit this mold, at least at one time, included railroads, long distance telephone service, and oil and gas pipelines.

High fixed costs need not prevent competition, but these industries were unlikely to see much of it. Absent policy intervention, one would get the inefficiency and inequitable effects associated with monopoly pricing and profits. Economic thinking about regulation thus began with understanding how best to control monopoly power. The analysis began with assuming the regulator has complete information regarding demand and cost and that its objective is to maximize consumer surplus. The constraints were that the regulated firm had to get enough money to cover its costs and that the revenues had to come from sales of the regulated product. The latter ruled out setting price equal to marginal cost and covering any revenue shortfalls from the state treasury. It undoubtedly reflected political reality, but it also had some warrant in that raising government revenues itself requires deviations from marginal cost pricing.

With just one product, the problem translated directly into minimizing price such that revenues from sales at that price just cover cost. The regulated firm sells the amount of output at the point where the demand curve intersects the average cost curve. This provided a modicum of support for the dominant form of regulation in these industries. Called cost-of-service regulation, this procedure has a regulator estimate demand and the cost of meeting that demand (including operating expenses, depreciation, and allowances for investor earnings). The regulator then divides cost by demand to get a price. As much of the effort in determining cost went into estimating the risk-adjusted opportunity cost of funds invested in the utility, this method for setting price came to be known as “rate of return” regulation.

#### *More efficient pricing*

Most of the normative strides in analyzing cost-of-service regulation involved exploiting opportunities to increase overall welfare through price discrimination. The impetus came from Frank Ramsey’s early work on optimal taxation (Ramsey, 1927). To collect a given amount of revenue with the least cost in overall wealth, one should set each commodity’s tax rate equal to a common proportionality factor divided by the elasticity of demand, assuming demand for each commodity is independent of the level of consumption of the others. Raising revenues from a regulated firm’s customers to cover the firm’s fixed costs with the least inefficiency is a formally identical problem.

For a regulated firm producing different commodities, “Ramsey pricing” was directly importable. Its main application, however, came from realizing that a service, e.g., local telephone service or electricity, could be disaggregated into a number of separate “commodities” based upon users (commercial vs. residential, urban vs. rural) and usage (daytime vs. evening, summer vs. winter). As long as demands among different groups or at different times were sufficiently independent, Ramsey pricing is a useful policy guide (Baumol and Bradford, 1970). When demands are independent, one can calculate Ramsey prices using determinates of elasticity matrices.

Economists proposed other means for improving the efficiency of regulatory pricing. One was peak-load pricing. Prices at busy times would include the marginal cost of added capital or higher cost plants necessary to meet demand, while prices at other times would be based on the marginal cost of lower cost plants or utilizing capacity already in place (Crew and Kleindorfer, 1986). A second method was the “two-part tariff,” in which consumers would pay an up front fee for getting the service at all, and a price equal or closer to marginal cost for the service itself (Brown and Sibley, 1986). A variation on this theme would be to give consumers a menu of two-part tariffs. Those with low usage could opt for a low fixed fee and high unit costs, and those with high usage would find it appealing to pay a high fixed fee and a low usage rate. In the limit, self-selection from a menu of two-part tariffs approximates nonlinear pricing.

*Difficulties in implementation*

From a political and distributional perspective, Ramsey pricing, peak-load pricing, two-part tariffs, and non-linear prices, are often not appealing. They generally take a higher fraction of surplus away from those with the least demand or with inelastic demand—usually the poorest. In addition, Ramsey pricing “inverse elasticity” rules suggest that a regulated firm should be able to cut price in markets that become competitive—facing higher elasticity of demand for those services—and raise prices in less competitive markets. The line between efficient response to entry and predatory pricing can be difficult to determine.

Normative analysis of regulation leads to the identification of a variety of problems that inevitably imperfect process or contexts could create. If a regulator allows the firm to earn a rate of return exceeding the risk-adjusted opportunity cost of capital, the firm has an incentive to make the input mix more capital intensive at best, and to engage in “gold plating” with unproductive capital at worst (Averch and Johnson, 1962). Under some conditions essentially having to do with rising marginal costs, an efficient monopolist might be vulnerable to inefficient entry at any set of cost-covering prices (Faulhaber, 1975). This led to concerns regarding “sustainability” of a natural monopoly and whether entry should be legally barred.

*Regulators as economic actors*

During this period, a growing set of economists began to treat regulation not as a problem to solve but as a phenomenon to study. The “public interest” motivation should not be an assumption. Rather, it should be tested empirically and theoretically as to whether it is consistent with the rational self-interest postulate underlying the rest of economics, by treating the public bureaucracy just as economists treat consumers and firms. Regulatory decisions will depend on how well affected parties can each translate the benefits they receive into incentives (political support, campaign contributions, in-kind payments) for the regulator to act on their behalf (Stigler, 1971; Peltzman, 1976). In many cases, these incentives may cross the line from permissible activities, e.g., campaign contributions, to impermissible activities, e.g. bribes. At some point, the nominal regulator may essentially be colluding with the regulated firm to exploit the electorate (Laffont and Tirole, 1998).

The main insight from this work, associated with the University of Chicago, UCLA, and the “public choice” school, was the so-called “capture” theory. The targets of regulation are better able than are dispersed consumers to marshal resources to affect regulators. Regulators are more likely to act on the regulated firm’s behalf rather than to promote the overall public interest. The capture theory also helped explain the presence of price regulation in industries that did not seem prone to natural monopoly, such as banking, trucking, and airlines.

One response to this idea could be to replace regulation with competition for the market to be the monopolist (Demsetz, 1968). While interesting theoretically, the benefits turned out to be less dramatic than originally envisioned. For this “franchise competition” to be beneficial, the bids have to be based on the prices charged to consumers, rather than being simple lump-sum payments for the right to become the monopolist. Lump-sum bidding may solve distributional issues, but it leaves the winner free to charge monopoly prices. But if bids have to be based on prices, and if the winner is likely to have the franchise for an extended period, the franchise contract has to include provisions for renegotiating prices as demand, costs, and competitive conditions change over time. Inevitable complications diminish any differences between regulation of the firm by the government and a long-term contract between a firm and the government (Williamson, 1976).

## Recent developments in regulatory economics

In the last couple of decades, technological changes have made it possible to expand competition in areas where natural monopoly had been present, most notably long distance telephone service and electricity generation. Local telephone service is becoming more competitive, particularly in central business districts where usage is high and users are located close together. Accompanying these technological trends has been a general if not smooth political trend toward a reallocation of economic power from the government to the market. A notable example in the U.S. was opening national airline deregulation prices in the late 1970s, following evidence from intrastate routes that open airline markets led to lower prices.

These changes inspired and were inspired by a number of developments in regulatory economics.

### *Contestability*

Franchise competition requires an ongoing contractual relationship between the government and the winning bidder. An alternative would be to let firms compete on an ongoing basis to be the monopolist. The threat of potential competition from firms outside the market would replace regulation as the means for holding prices down to the point where revenues just covered costs (Baumol, 1982). Reliance on potential competition also offered to simplify oligopoly theory. The host of possibilities presented by a variety of game-theoretic models could be replaced with the simpler, familiar competitive outcome.

A monopolized market subject to ongoing potential competition is said to be “contestable.” For contestability to work, the incumbent monopolist has to be vulnerable to a hit-and-run entrant. In the time it would take an incumbent monopolist to realize that it is facing competition and cut price, the entrant has to be able to make enough money to cover the costs of production that it cannot salvage upon exit.

The most important contribution of contestability was in clarifying a distinction between the *fixed* costs that may make an industry a natural monopoly and the *sunk* or irreversible costs that make it costly to enter and then exit an industry. The concept was less successful as a rationale for dismissing concerns with strategic behavior and market power. The fraction of fixed costs that were sunk had to be implausibly small, or the incumbent’s price response implausibly lagging, for a market to be contestable (Schwartz and Reynolds, 1984). In the instance that seemed to best fit contestability—airlines—the theory proved to be inconsistent with empirical findings that the number of competitors in an airline market affected price (Graham, Kaplan and Sibley, 1983). If a market is contestable, potential competition holds down price; the number of actual competitors should not matter.

### *Controlling corporate diversification*

Broadly speaking, and with some important recent exceptions, competition policy has emphasized concerns relating to “horizontal” concentration and conduct that would tend to reduce rivalry, facilitate collusion, and raise prices. Agreements and forms of corporate organization that straddle market boundaries, e.g., vertical integration, have been viewed more benignly, although controversies about their efficiency and legality have intensified in recent years.

An exception to a general willingness to let firms choose how to organize their operations across market boundaries has occurred when the boundary is between regulated and unregulated sectors. Diversification by a regulated firm into unregulated markets can create the ability to act on the incentive to evade the profit constraints that price regulation imposes (Brennan, 1987). In both the academic literature and in policy debate, three concerns stand out:

- *Transfer pricing from integrated upstream suppliers.* A regulated firm integrates into an unregulated upstream market and sells itself inputs at inflated prices. Higher input costs justify higher regulated rates. The increased revenue shows up as profits on the books of the unregulated upstream affiliate.

- *Cross-subsidization.* A regulated firm designates costs of inputs (engineers, sales forces, administrators, equipment) used to provide an unregulated service as costs of providing the regulated service. The regulator then raises rates to cover these higher “costs.” Profits show up on the books of the unregulated service, resulting from the implicit subsidy of revenue flows from the ratepayers. One variation on this theme is using future revenues from the regulated service to back bonds financing unregulated enterprises, forcing the regulated firm’s customers to bear the cost of the higher risk. A second variation is that a regulated firm may have an incentive to adopt inefficient technologies used jointly to provide regulated and unregulated services, if the regulator disallows financing of only those costs incurred solely for unregulated operations.

- *Discrimination against downstream competitors.* A regulated firm may be able to reduce the quality or timeliness of access to regulated services that downstream firms need to compete. If the regulated firm operates in the downstream market, it can provide inferior access to its competitors and create an artificial competitive advantage for itself. In the limit, the regulated firm can use access discrimination to tie its unregulated downstream service to its regulated upstream service. It could then raise the price of the latter to exploit its nominally price-regulated monopoly.

- *Undersizing.* If a regulated transportation facility (a pipeline, electric transmission line) is owned by one or more firms that compete at the end of the link, the owner(s) may have an incentive to reduce the capacity of the line. As the capacity of that link falls, the overall volume of delivery may fall, raising the price at which they can sell their output at the end of the line above competitive levels (Flexner, 1979).

Regulation, along with market power, is crucial. If the firm could charge the monopoly price for its regulated service, it would gain nothing by overcharging itself for inputs, cross-subsidizing other operations, or discriminating against downstream competitors. Absent regulation, the firm would already “undersize;” vertical integration would provide no greater incentive to do so.

Anticompetitive consequences of vertical integration have been paramount in U.S. telecommunications policy. They justified forcing AT&T to divest its regulated local telephone monopolies and to limit (re)entry by those divested companies into related markets, especially long distance telephone service. These concerns also have a long history in electricity, beginning with legislation in the 1930s that forced a separation of state-based utilities from national corporate administrative overhead. They currently underlie proposals to create independent operators of regulated transmission and distribution systems, to prevent discrimination against generators unaffiliated with the regulated monopoly grid owners (Brennan, Palmer et. al., 1996).

#### *Incentive regulation*

A third influential development in regulatory economics has been the discovery and application of methods to give to regulated firms the incentive to produce more efficiently, cut present expenses and invest in cost-reducing technologies (Laffont and Tirole, 1998). In the environmental arena, the most prominent advance has been the introduction of tradable emissions permits. For price regulation, the advance has been substituting “price caps” for cost-of-service regulation.

The essential feature of price caps is that the regulator commits in advance to a path of prices, where that path cannot be altered by actions taken by the regulated firm. For a firm producing a single product, the procedure involves specifying an initial price and prescribing a path that price will take over time. That prescription includes an allowance for inflation, using a price index relevant to the costs of producing the regulated firm but independent of the costs actually incurred by the regulated firm. In addition, the regulator (usually through bargaining with the regulated firm) commits to a rate of price decreases, reflecting expected gains in productivity.

Those expected gains in productivity are the primary benefit of price-caps. By divorcing prices from actual costs, the regulated firm has a marginal incentive to control expenses that it lacks when prices are tied to costs. If rate-of-return regulation were implemented in an ideal fashion, profits would be zero regardless of the firm's costs, thus eliminating any gains from cutting costs. Simulations suggest that the even a small efficiency gain in percentage terms can outweigh the losses from even a substantial divergence between the price-cap price and a price equal to average cost (Brennan, 1996).

A second gain relates to pricing efficiency. A multiproduct firm can be regulated under a single price cap, in which a weighted average of prices has to stay under a prescribed ceiling (adjusted for inflation and overall productivity). If weights for calculating the average are based on prior period sales, the price path over time will increase profits without causing any reduction in consumer welfare. It converges to a vector that satisfies Ramsey pricing conditions, albeit with positive rather than zero profits (Brennan, 1989). In addition, price caps reduce the need to worry about cross-subsidization and transfer pricing, since rates are no longer tied to reported costs. Finally, price caps eliminate the need for costly rate hearings and regulatory micromanagement to mitigate production inefficiency or Averch-Johnson "gold plating."

But price caps in practice are not perfect. The firm, knowing that current period outputs will be the weights assigned to next period's prices, can strategically manipulate the weights in ways that could deter entry into some of its markets. Moreover, price caps do not eliminate the need to be concerned with discrimination, especially if the price cap regime still keeps prices substantially below the monopoly level.

Most significantly, price cap regulation requires a commitment by the government that it will not raise prices if the regulated firm ends up not meeting productivity targets and threatens to go out of business rather than incur negative profits. The concern is not only that regulated industries are too important to allow providers to halt operations. Inducing investors to supply capital in regulated industries requires a credible commitment by the government that it will not opportunistically cut prices later, so that only variable costs are covered. In the U.S., this commitment is supported by constitutional proscriptions against uncompensated takings of private property, with implied rights to a fair opportunity to earn a "just and reasonable" return on investment. Of course, such a commitment also creates the potential for moral hazard, as noted above, if the regulated firm believes the government will ensure that it recovers its investments. The extent of this commitment to provide a fair opportunity to earn reasonable returns, particularly if the government decides to open formerly regulated industries to competition, dominates U.S. policy debates regarding the future of electric power generation (Brennan and Boyd, 1997).

Similarly, the government needs to commit that it will not cut rates in response to political pressure from customers if they observe that the firm reaps high profits in exceeding productivity targets. As a practical matter, neither commitment, allowing the regulated firm to pocket large profits or to go under, is practical over the long term. Operationally, price cap regulation can be a useful transition mechanism to a market that will eventually become competitive. It can also lead to modi-

fied forms of rate-of-return regulation, in which profits are shared with consumers if they exceed a target level, or with a substantial lag that allows firms to keep some of the profits they gain from more efficient operations (Sappington, 1994).

### *Sharing of network economies*

In some regulated industries, most notably local telephone service, one cause of natural monopoly has been the advantage of having everyone on the same network. Each person's telephone becomes more valuable as more subscribers can be reached. Even without significant fixed expenses in physical facilities that create standard natural monopoly conditions, a market with these "network externalities" discussed above might find itself evolving to monopoly.

Technological and policy changes in telecommunications are reducing physical natural monopoly characteristics. Wireless systems can duplicate many of the functions of wired systems. Other wires into the home—cable television, perhaps electric power—can be adapted to carry the voice and data services typically associated with telephone lines. However, the potential fruits of this local competition will be thwarted unless each firm can reap the economies of being part of the whole network.

This requires interconnection. Regulatory policy in the U.S. has been occupied with how to get an incumbent monopolist to interconnect with entrants, when the value to the incumbent of retaining its monopoly typically exceeds the value to the entrant of being a competitor. Down the line, regulators will have to decide whether interconnection can be left to industry participants, or if it requires regulation. Different models so far offer different conclusions, but one fear is that the firms could use interconnection agreements as a device for raising each others' marginal costs, leading to monopoly pricing, with the profits taken in call termination fees (Brennan, 1997). The issue may not lie as far in the future as it may take local telephone competition to evolve. It could become relevant to the Internet as it continues to evolve from an informal public and nonprofit partnership to collaboration among private investor-owned competitors.

### *Asymmetric information*

The ascension of asymmetric information in economic theorizing has not left regulatory economics behind. Beginning with the traditional view of regulatory economics as solving a monopoly pricing policy, economic theorists have investigated how to design regulatory mechanisms in the face of the fact that the regulated firm knows more about its costs or demand for its services than does the regulator. More complex models include contexts in which the regulator is itself an agent of a legislature or electorate, including devising means to keep the regulator from becoming the firm's agent or partner in economic exploitation, as noted above (Laffont and Tirole, 1998).

The most significant advances in this area began with looking at how to regulate a monopolist with unknown costs (Baron and Myerson, 1982). The solution started from a fundamental property of principal-agent problems known as the "Revelation Principle." In this context, the principle says that a regulator can do no better than to restrict itself to the set of mechanisms that induces the regulated firm to reveal its true costs. The intuition behind the principle is that any mechanism entails some inference about the firm's costs from what it says or does. Accordingly, since both the regulator and firm know that the information will come out anyhow, the analysis may as well take that as given.

Once the Revelation Principle is recognized, the regulator then maximizes social welfare subject to the condition that its payment to the regulated firm, based on what the firm says its costs are, gives the firm the incentive to reveal its true cost. In the simplest first-best formulation—marginal cost pricing with lump-sum payments—the mechanism entails a regulatory commitment to give the

firm the incremental surplus it creates by announcing lower costs. This is not a particularly appealing result, in that all of the benefits of cost reductions go to the firm. If the regulator is inclined to trade off overall efficiency for increased consumer surplus, these “information rents” accrued by the firm may be reduced.

Somewhat more appealing results come about from making use of another potential regulatory tool—the threat of an audit and penalty. There are mixed strategy equilibria under which the regulator commits to audit with a particular probability (depending on the costs of the audit), and the regulated firm reports costs accurately with another probability (depending on the penalty and the gains from reporting high costs when costs are actually low). A noteworthy variation on this theme is the use of self-selection in regulatory mechanisms. Regulated firms likely to innovate choose price caps (akin to fixed-price procurement contracts), while those that do not choose cost-of-service regimes (akin to “cost-plus” contracts) (Lewis and Sappington, 1989).

### *Empirical estimation of benefits*

Expansion in theoretical and policy ideas in regulatory economics has been followed, if perhaps not matched, by empirical work in the benefits of regulatory reform. Such empirical work faces two significant hurdles. First, for time-series approaches, is the need to design models that allow one to estimate what a market would have been like had it not been deregulated. A simple “before and after” test will not work because underlying demand and cost conditions may have changed independently of the change in the regulatory regime (Morrison and Winston, 1986). A second, affecting cross-sectional comparisons, is selection bias. The likelihood that a jurisdiction adopts a regulatory reform is correlated with the expected benefits of that reform. Observing such a correlation need not imply that the reform would be beneficial in jurisdictions that had not adopted it.

Despite these problems, some researchers have nevertheless attempted to estimate the benefits of reform. The time-series approaches have been among the most successful. An important lesson from those studies appears to be that pre-reform benefits are often underestimated. Major gains from opening markets to competition have come from the unforeseen and perhaps unforeseeable innovations in technology and organization (Winston, 1993). Redirecting entrepreneurship away from manipulating the political process and toward designing new services and cutting costs may be the most substantial justification for regulatory reform.

## **PRIVATIZATION**

An oft-invoked policy for regulatory reform is privatization. If privatization implies eliminating a state monopoly in a market that can be competitive, it is presumably good if appropriate underlying legal, financial, and social institutions are in place. But “privatization” is not synonymous with “competition.” Privatizing a natural monopoly does not change whatever underlying cost or network conditions made it so. Regulation may remain necessary. If it does, the policy choice is between state regulation of a privately owned monopoly and state provision of the service itself. The choice turns on relatively subtle factors. Does having an independent private firm create an observable check on regulator discretion? When is a profit-maximizing firm more likely to carry out the wishes of a public regulator? Privatization reforms should be accompanied by careful attention to these questions (Sappington and Stiglitz, 1987; Laffont and Tirole, 1998).

In natural monopoly industries, the policy choice between a regulated private firm and a state-owned enterprise (SOE) is akin to the close business call as to whether or not a firm should vertically integrate with a supplier or rely on the market, i.e., the “make/buy” decision. With regulated

natural monopolies, both the state and the firm are committed to each other and thus vulnerable to exploitation by the other. Regulation will entail a long-term contract specifying numerous responsibilities one side has toward the other—not unlike what one would see if one (the state) retained explicit ownership in the firm.

A second consideration is the extent to which a government can promote its objectives by privatizing enterprises it then regulates. Privatization creates considerable advantages in that the enterprise, with well-designed regulation, should be more inclined to reduce costs. It also should be more insulated from tax preferences and other policies that might reduce overall efficiency. But creating a separate enterprise could exacerbate information asymmetries that make control difficult. These may be more acute if the social goals of the privatized enterprise include not just efficiency but political or distributional objectives as well, e.g., universal service. Moreover, a privatized enterprise will still have considerable political influence over its regulator, mitigating the potential advantages of insulating it from state-supported favoritism and financial protection.

In practice, rationales for privatization are more mundane. A first rationale is fiscal. Selling profitable state assets can reduce government deficits. For unprofitable public operations, a sale can put them in the hands of private operators who may be more able politically to raise prices to levels sufficient to cover costs. These fiscal motivations may be necessitated in developing economies by insufficient liquidity for the government to cover justifiable expenses or to service foreign debt. However, fiscal motivations may be risky. Selling “stocks” such as SOE assets to cover “flows” in public operating expense can bankrupt a country (or a firm or household) in the long run. Moreover, a government may have an incentive to create or maintain unwarranted monopolies in order to maximize the selling price of the public assets.

A second practical rationale for privatization may be to evade civil service regulations that set minimum wages or benefit levels for public employees and restrict the ability to tie rewards and retention to performance. Whether this is good or bad depends upon the merits of the case for these regulations. Finally, in some developing economies, e.g. Chile (Hachette and Luders, 1993; Bitran and Sáez, 1994) privatizing SOEs through widely distributed stock grants or sales may be a device to deconcentrate political power associated with these enterprises. Whether this reduces the role of politics in society overall, or whether it reduces the ability of other sectors in society to counter the power of factions running the government, is a delicate question.

## CAUTIONARY OBSERVATIONS

The economics of antitrust and regulation covers a much broader landscape than it did a couple of decades ago. From the perspective of an academic researcher, this is a fruitful and engaging development. But academic and policy goals differ. It is fair to ask to what extent this breadth improves competition policy in a real world of businesses, bureaucracies, lawyers, and courts.

Consider first regulation. Many of the advances in regulatory economics, such as incentive regulation and careful patrol of the boundary between regulated and unregulated sectors, have arisen from or accompanied developments in the policy arena. Others, such as designing formal mechanisms to induce cost revelations, have been less influential. Many years ago, I asked a colleague at a U.S. regulatory agency if research in asymmetric innovation and regulatory mechanism design might contribute to policy development. His response was that if we could educate regulatory officials on the difference between nominal and real interest rates, we would make a substantial contribution. Productive regulation and its reforms have to be relatively fundamental, simple, and clear. Policy makers will not implement what they do not understand, and should not implement what

they misunderstand. Regulated firms and consumers need to understand their environment so they can make and implement the economic decisions that the regulators expect.

The benefits of a broad game theoretical landscape may bring along costs in making antitrust policy (Brennan, 1999). Despite the influence of technical economics in antitrust, it shares with other policies the reality of a difference between theory and implementation. As with regulation, antitrust law, as perhaps differentiated from antitrust economics, should give significant weight to simplicity and predictability. Legal doctrines that make it harder to understand the roles of evidence and the burdens of proof introduce a general risk of doing business that can impose costs on an economy. Businesses should be able to understand what to do to avoid prosecution or civil lawsuits without spending substantial financial resources on lawyers and consultants. Moving from simplistic doctrines and guidelines to policies that depend on the ability to weigh the relative relevance of inherently assumption-sensitive game-theoretic models may reduce error in evaluating business practices after the fact. But they make it harder for businesses to determine in advance when their conduct is likely to be safe from prosecution.

Game theory models can also excuse rather than justify enforcement decisions. The existence of some model in which vertical integration leads to market foreclosure, or tying establishes an entry barrier, does not mean that vertical integration or tying are frequently or even occasionally troublesome. A legal system should cultivate a sense that prosecutions are decided apart from ideological whims or political predilections. These models, while academically important, can make it easier for prosecutors to go on crusades against business practices apart from their economic or social merits.

We close with final words regarding the importation of antitrust and regulatory policy into emerging market economies. The net effect of expansive antitrust economics may still be positive in an economy and legal system with the income to afford the luxury of sophisticated and experienced legal and economic expertise. For developing economies, one should think carefully about the merits of adopting simpler rules based on simpler economic visions (Noll, 1999). Such rules may excuse some bad conduct and punish some good practices. But those costs may be outweighed by the benefits from greater certainty and engendering greater confidence in both markets and the legal and political systems supporting them.

Also in these contexts, no regulatory or antitrust policy will succeed unless the regulated firm, its suppliers, its customers, and its actual or potential competitors believe that the regulator will not reverse course and act opportunistically after investments are sunk and prices are set. Establishing confidence in a rule of regulatory law is just as necessary in the regulatory context as is confidence in the stability and enforcement of property and contract law for supporting a market economy. Debates over regulatory methods and mechanisms that take place in academic environments and in developed economies focus on relatively fine points regarding forecasting ability, price stability, and the like. These may be germane considerations in a setting where, for example, we consider inflation “high” if it exceeds five percent. They need not be so pressing in developing economies where one cannot take financial stability, legal authority, business information and market experience for granted.

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