

Transaction Cost Economics, Antitrust Rules, and Remedies

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This article discusses the application of transaction cost economics (TCE) to the specification of antitrust legal rules and antitrust remedies and explains why the application of TCE analysis may lead to very different legal rules and remedies from approaches that ignore TCE considerations. Antitrust legal rules must be sensitive to the attributes of the institutions we rely upon to enforce antitrust policies, the information and analytical capabilities these institutions possess, the uncertainties they must confront in the diagnosis and mitigation of anticompetitive behavior and market structures, and the associated costs of type I and type II errors implied by alternative legal rules and remedies. Modern imperfect competition theory that fails to take TCE principles into account is likely to lead to poor legal rules and remedies. These conclusions are supported by a discussion of the *Kodak* case and its progeny and of the proposed divestiture remedies approved by the District Court's decision in the *Microsoft* case.

1. Introduction

This article discusses the application of transaction cost economics (TCE) to the specification of antitrust legal rules and antitrust remedies. It also explains why the application of such a framework may lead to different conclusions from mainstream approaches that ignore TCE considerations. The article begins with a brief discussion of the TCE approach to microeconomic analysis generally. The article then turns to a discussion of the implications of TCE for choosing among alternative antitrust legal rules and remedies within the context of existing U.S. antitrust law and associated enforcement institutions. I argue that antitrust legal rules must be sensitive to the attributes of the institutions that we rely upon to enforce antitrust policies, the information and analytical capabilities they possess, the uncertainties they must confront in the diagnosis and mitigation of anticompetitive behavior and market structures, and the associated costs of type I and type II errors implied by alternative legal rules and remedies. I then explain how

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the controversial legal rules governing predatory pricing claims can be better understood from a TCE perspective as reflecting an effort to balance the costs of type I and type II errors as proposed by Joskow and Klevorick (1979).

I then turn to a more detailed discussion of the differences between approaches taken by TCE and modern imperfect competition theory—what I refer to as “post-Chicago antitrust law and economics” or PCALE—to the analysis of nonstandard vertical contractual arrangements and why they are likely to lead to different antitrust legal rules. The well-known *Kodak* antitrust case [*Kodak v. Image Technical Services*, 112 S. Ct. 2072 (1972)] is then examined to provide a specific example of how these different approaches may lead to different antitrust legal rules and to illustrate why the application of a TCE framework would have led directly to a better legal rule governing antitrust claims arising from ex post contractual holdup disputes.

The article concludes with a brief discussion of divestiture as an antitrust remedy. I argue that sound divestiture remedies cannot be fashioned without a careful analysis of the TCE attributes of incumbent firm organizational structures, the reasons why they emerged, and the consequences of changing them through divestiture. I reject the notion that “organization” should bear a substantial burden of proving superiority over “markets” and urge caution in applying divestiture remedies more widely.

2. Transaction Cost Economics in General

Transaction cost economics is concerned with understanding how variations in certain basic characteristics of transactions lead to the diverse organizational arrangements that govern trade in a market economy. The organizational arrangements that have been of primary interest include the internal organization of firms, the determinants of the boundaries between firms and markets, and the properties of contractual arrangements between buyers and sellers of goods and services. TCE takes a comparative contractual approach to economic organization in which contractual variety is expected to reflect an economizing purpose. The driving force affecting the choice of governance arrangements is the desire to economize on the total costs of goods and services, including costs associated with contractual hazards and the costs of institutional arrangements designed to address such hazards.

Within the comparative institutional framework, TCE also relies heavily on an incomplete contracts approach to the evaluation of alternative contractual and organizational arrangements. The costs associated with writing, monitoring, and enforcing complete contracts, and the problems (contractual hazards) that incomplete contracts engender for harmonizing potentially conflicting interests of buyers and sellers to perform in a mutually satisfactory way as economic conditions change over time is central to the analysis of institutional choice, behavior, and performance from a TCE perspective.

TCE leads to clear predictions about the relationships between a variety of transactional characteristics and the choice of governance arrangements.

These predictions have been subject to extensive empirical analysis and a large body of empirical research has emerged to support the key aspects of TCE theory (Joskow, 1988; Shelanski and Klein, 1995). This empirical research has deepened our understanding of firm decisions to integrate vertically and horizontally and the choice and structure of nonstandard contractual arrangements as alternatives to both vertical integration and anonymous spot market transactions.

As the body of theoretical and empirical work in TCE has grown, the TCE framework has been applied more widely. Not only has TCE become of central importance to theoretical and empirical work in industrial organization, but the TCE framework developed to apply to firms and markets has been extended to understand the structure and performance of nonprofit organizations, government bureaucracies, and political and legal institutions. TCE has always had a policy dimension as well, especially applications to antitrust and competition policies. The full title of Oliver Williamson's seminal work is *Markets and Hierarchies: Analysis and Antitrust Implications*,¹ and antitrust and competition policy issues have continued to be included in Williamson's research portfolio (Williamson, 1975, 1985, 1996). Recent research has extended the TCE framework to a broader set of policy issues (Dixit, 1998) and TCE provides a disciplined and nonideological framework (Matthews, 1986) for both positive and normative public policy analysis. However, I think it is fair to say that TCE has been less concerned with policy applications than has the field of industrial organization more generally (antitrust and regulatory policies).

Modern economic theories of imperfect competition, strategic behavior, and market power are central to the development of sound antitrust policies. However, I will argue here that these theories cannot alone be relied upon to produce sound legal rules. Sound imperfect competition theory must be used along with sound TCE theory and empirical evidence on the relationship between firm and markets structure, governance arrangements, and market performance to yield sound legal rules.

3. Balancing the Costs of Type I and Type II Errors

Antitrust enforcement institutions are faced with and must confront a variety of transaction costs in their efforts to distinguish between "competitive" and "anticompetitive" behavior and market structures in a world where neither perfect competition nor pure monopoly are observed in reality. These transaction costs include the direct costs of identifying firms and markets where behavior or market structures are deemed to violate the antitrust laws and enforcing the associated legal determinations in particular cases. However, these direct transaction costs are likely to be relatively small since relatively

1. The original title of Williamson's project was *Aspects of Monopoly Theory and Policy* (Williamson, 1996:368).

few firms are ever subject directly to antitrust sanctions. The primary transaction costs are associated with the responses made by the target firms and, more importantly, by responses and adaptations that firms and markets *in general* make to antitrust rules defined in particular cases and how these responses affect prices, costs, and innovation throughout the economy.

Antitrust rules carry both potential benefits, by enhancing competition, and potential costs, by restricting behavior or market structures in ways that reduce competition, increase costs, or reduce the speed of innovation in new products or production processes. Neither the benefits nor costs are properly limited to the specific firm that is the target of an antitrust investigation, but should incorporate benefits and costs realized by all firms and markets whose behavior and performance will be affected in the future by legal rules defined by decisions in specific cases. These benefits and costs should be balanced in the development of sound antitrust legal rules.

In the United States, the processes for identifying, evaluating, and enforcing antitrust policies and the precise boundaries of these policies rely on a complex set of institutional arrangements involving both public and private litigation actions. The associated statutory and enforcement hierarchy has important implications for what antitrust policy can and cannot expect to accomplish and for the specification of sound antitrust legal rules. I offer the following observations:

1. The antitrust laws and antitrust enforcement institutions are not designed or well suited to identify and “fix” all market imperfections that lead markets to depart from textbook models of perfect competition. Neither the state of economic science, nor the capabilities of public and private policy enforcement institutions, would make it feasible or desirable for antitrust policy to seek to identify a wide range of market imperfections, and associated firm behavior and market structures, and then to evaluate each case to determine whether some way can be found to improve economic efficiency by changing the structure of the market or constraining firm behavior. This kind of micromanagement of firms and markets cannot be successful because it would involve enormous transaction costs.
2. U.S. antitrust policy is primarily a *deterrence* system not a regulatory system. That is, antitrust policy and the associated enforcement hierarchy are not, in general, designed broadly to scrutinize, screen, or approve firm behavior or market structures throughout the economy. Instead, antitrust policy relies on administrative and case law developed through public and private antitrust enforcement actions to develop a set of “antitrust legal rules” which businesses are expected to internalize into their decisions. The incentives firms have to understand and adhere to antitrust rules derive from the potential costs of treble damage actions, administrative restrictions on their behavior, other equitable relief (e.g., divestiture), and for certain infringements (e.g., price fixing),

finances and prison terms all weighted by the probability of getting caught and convicted.²

3. If this deterrence system is to work effectively, antitrust policy needs to evolve in a way such that firms receive clear signals from these enforcement institutions, so that they are able to determine where to draw the line between behavior and market structures that are likely to be legal and those that are likely to be illegal. They can then take these signals, and associated probabilities and costs of being sanctioned, into account when they make decisions that may have antitrust implications.
4. The ability of the trial courts to perform or evaluate complex economic analysis, economic efficiency studies, and economic welfare trade-offs is extremely limited. Trial judges typically have neither the training nor the staffs to conduct economic analysis of this kind. They must rely on expert reports and testimony prepared for the plaintiff and the defendant, cross-examination of both, and on assistance from their law clerks in evaluating them. The experts retained by the plaintiff and defendant generally come to very different conclusions from the same set of facts. Obviously juries are not in any better position to perform or evaluate such studies than are the judges who must instruct them. Antitrust enforcement agencies are, however, in a much better position to perform these types of economic analysis and this is reflected in the economic tools used by the agencies in the premerger review process.

These considerations imply that any set of legal rules will necessarily lead to “mistakes” of both the type I and type II varieties when applied to particular cases. A legal rule may fail to detect market structures, contractual arrangements, or firm behavior that reduces economic efficiency, consumer welfare, etc. (type I error). A legal rule may also lead to the sanctioning of market structures, contractual arrangements, or firm behavior that increases economic efficiency, consumer welfare, etc. (type II error). Moreover, even when a legal rule correctly identifies structural or behavior attributes that lead to social welfare losses compared to some theoretical alternative structural and behavioral configurations, the courts may apply *remedies* that either do not lead to performance improvements or actually make market performance even worse. That is, the ability of antitrust sanctions to remedy the performance problems at issue (what Williamson calls “remediableness”) is both limited and uncertain, and the application of remedies in particular cases can also lead to type I and type II errors.

Just as the choice of governance arrangements for private transactions requires an evaluation of the comparative costs and benefits of alternative imperfect governance arrangements, so too does a TCE perspective imply that the test of a good legal rule is not primarily whether it leads to the

2. The premerger review process that was created by the Hart–Scott–Rodino Antitrust Act of 1976 (HSR) may appear to be an exception to the general deterrence approach that characterizes other aspects of U.S. antitrust policy.

correct decision in a particular case, but rather whether it does a good job deterring anticompetitive behavior throughout the economy given all of the relevant costs, benefits, and uncertainties associated with diagnosis and remedies. While there are good reasons to develop antitrust rules that are clear, objective, stable, and relatively simple to apply, it is neither easy to achieve these goals nor can they be achieved without potentially significant costs. The relationships between the wide array of market structures, organizational arrangements, transactional attributes, and contractual arrangements that we observe in a market economy and the market performance indicia of concern are imperfectly understood from both a theoretical and empirical perspective. As a result, there is always a tension between the specification of clear simple rules and their confrontation with situations where their rigid application can lead to type I or type II errors.

4. Antitrust Market Power, Predatory Pricing, Type I and Type II Errors

The interaction between the transaction cost attributes of the U.S. antitrust enforcement hierarchy and the evolution of legal rules that balance the costs of type I and type II errors is nicely illustrated by the current state of the legal rules governing predatory pricing claims. These rules are controversial because it is clear that modern imperfect competition theory can demonstrate that there are *possible* cases of predatory behavior that prevailing legal rules will fail to sanction. To explain why this is the case, a brief digression to discuss how “market power” is defined and diagnosed under the relevant U.S. antitrust laws is necessary.

“Market power” as that term is used in the enforcement of the antitrust laws does not mean the same thing as “market power” as that term is used in economic theory. In economic theory, any firm that is not a pricetaker and faces a downward sloping demand curve has “market power” (i.e., the Lerner index is greater than unity). In most real markets, and in all differentiated product markets, firms have market power in this sense and prices will differ from marginal cost. This can be true even if firms earn zero economic profits. Firms in these imperfectly competitive markets may and frequently do engage in second- or third-degree price discrimination. Indeed, price discrimination of some sort is present in many markets that most people think of as being “competitive.”

Antitrust is reserved for situations where there is a much greater degree of market power than a simple departure from perfect competition. Unfortunately it is hard to know exactly how much more market power qualifies as antitrust market power, since antitrust cases tend to infer market power from market shares of the relevant market and the presence of entry barriers rather than measuring it directly. Moreover, different types of antitrust problems seem to require a showing of greater market power than do others [e.g., monopolization cases require that the firm is or is likely to become a “dominant” firm (e.g., greater than 60% market share), while merger cases

can trigger enforcement actions with much lower market shares]. Klein (1996, 1999) argues that antitrust market power in a differentiated product market must refer to the power profitably to raise the overall level of prices for all of the (imperfectly) competing suppliers in the market and cannot simply refer to the fact that individual firms are not price takers because their firm-specific demand curves are downward sloping. He also argues that second- and third-degree price discrimination among different buyers should not lead to an inference that the firm has antitrust market power. I agree.

Many economists active in antitrust policy enforcement skirt the issues raised by the differences between what is technically market power in economic theory and what constitutes market or monopoly power under the antitrust laws. Phrases like “workable competition,” “effective competition,” and “significant market power” are frequently found in expert testimony. While it may be unfortunate that a more precise definition of antitrust market power is not available, it is clear that the antitrust laws are concerned about firms and markets where there is “a lot” of market power, not just departures from perfect competition.

In monopolization cases where the claim is predatory pricing, the courts apply a “rule of reason” according to which the judge or jury must first define a relevant product and geographic market and determine whether or not the defendant firm has or is likely to obtain a dominant market share (e.g., more than 60%). The judge or jury may also examine whether there are significant barriers to entry into the relevant market. If the firm has a large enough share of the relevant market and there are significant barriers to entry then the court will find that it has either “market power” or “monopoly power” for antitrust purposes. That is, in litigated antitrust cases, monopoly power is typically inferred from structural indicators, not from direct measurement, though sometimes the firms provide direct evidence of market power [e.g., *FTC v. Staples*, 970 F. Supp. 1066 (1997)]. If the firm has been shown to have market power or monopoly power, the court will then examine its behavior to determine whether it has engaged in “exclusionary” behavior that has reduced competition.

If the claimed exclusionary behavior is predatory pricing, the current legal rule is that the plaintiff must then demonstrate that the dominant firm could recoup any short-run losses from reducing prices today by raising prices in the future when competition is reduced by its pricing behavior, and that it cut prices to a level below an appropriate measure of its marginal or incremental costs. One may object to this approach on the grounds that pricing behavior theoretically may be “predatory” and satisfy a recoupment test without involving below-cost pricing, in the sense that there are situations in which a dominant firm may theoretically be able to adversely affect entry and the future trajectory of prices without reducing prices to a level below some measure of its marginal or incremental costs. I would argue that this legal rule represents a sensible balancing of type I and type II errors consistent with a TCE framework. That is, the TCE-sensitive response to this criticism is that while there may in fact be situations where the incremental cost test will fail

to detect predatory pricing, the expected costs of adopting less precise legal rules that allow or encourage the courts to search for such situations and to distinguish them are greater than the expected benefits. In the case of predatory pricing, the reliance on a recoupment showing followed by applying a below-cost pricing test reflects both the absence of empirical evidence indicating that predatory pricing is a serious problem in the U.S. economy and the institutional and transaction cost considerations associated with antitrust enforcement discussed above that would make less precise legal rules more costly.

5. Nonstandard Vertical Relationships: TCE versus Post-Chicago Antitrust Economics

TCE has made perhaps its most important contributions to the theoretical and empirical analysis of vertical relationships that require specific investments by one or both parties to support an economical trading relationship. When potential transacting parties first meet (*ex ante*) to consider whether they will enter into a trading relationship they generally have a choice of many different trading partners (large numbers bargaining situation). However, once they agree to enter into a trading arrangement, and make relationship-specific investments to support it, they are “locked in” to this relationship in the sense that they will lose at least some of the value of their relationship-specific investments if the relationship is terminated prematurely and they seek to transact with another party. Once specific investments have been sunk, the parties to the transaction face a small numbers bargaining situation that is characterized by potential *ex post* opportunism or “holdup” problems.

Recognizing the potential for opportunistic behavior *ex ante*, the transacting parties have an incentive to choose a governance arrangement (mutual hostages, written contracts, reputational capital, etc.) that mitigates the *ex post* holdup potential. This in turn facilitates the creation of an economical trading relationship that supports efficient investments in specific assets, lower costs, and lower prices. But vertical contractual arrangements are necessarily incomplete and contingencies may arise which lead one or both parties to behave opportunistically. This is a cost of transacting which TCE insists must be included in the comparative economic assessment of contracts. Of importance, *ex post* lock-ins and associated potential opportunistic and hold-up behavior are not exceptional cases that are typically associated with market power problems that are properly the focus of antitrust scrutiny and sanctions, but rather are the norm. Transacting parties enter into relationships to mitigate these and other contractual hazards but cannot do so perfectly.

TCE’s contributions to our understanding of nonstandard vertical contracts and vertical integration turn heavily on its emphasis on the necessity of examining the transactional characteristics, trading and governance options, and potential opportunism problems that face the contracting parties *ex ante* before they entered into their relationship. The much-criticized 1960s

antitrust legal rules governing nonstandard vertical contractual relationships on the other hand focused largely on the relationships between the parties ex post, after the contractual agreements had been struck. If one only examines vertical contractual arrangements ex post one will almost inevitably find that there are potential ex post holdup opportunities. Moreover, the contractual arrangements are likely to include restrictions on the behavior of one or both parties to mitigate these opportunities (imperfectly). Because the parties have made relationship-specific investments, they are “locked in” to the relationship in the sense described earlier. Depending on the distribution of specific investments, it is the bargaining power or “market power” arising from these specific investments that can give one or both parties the opportunity to behave opportunistically.

This focus on the ex post bargaining situation is especially troublesome when it involves suppliers of specific brands of products that have many competitors ex ante who enter into sales or franchise agreements with individual downstream firms that place obligations and restrictions on the downstream contracting parties ex post. Rather than focusing on (ex ante) “interbrand competition,” this approach led antitrust policy to focus on (ex post) “intra-brand” competition. This in turn led to single-brand market definitions, in which the supplier of the brand necessarily had a very high market share, and a resulting inference that the supplier of the brand had “market power” of concern to the antitrust laws in its relationships with the firms that it had contracted with downstream ex ante [e.g., *United States v. Arnold Schwinn & Company* 388 U.S. 365 (1967)].

TCE on the other hand leads to an antitrust policy that focuses primarily on the ex ante market environment and recognizes that the restrictive portions of the vertical agreements have usually been put in place to protect the buyer and seller from ex post hold ups and other opportunistic behavior. This view is supported with a rich set of empirical analyses of vertical integration and vertical contractual arrangements. Thus one’s understanding of the “power to impose a tie” observed by the court in *Chicken Delight* [488 F.2d 43 (1971)] looks very different once one recognizes that *Chicken Delight* was simply one of many fast food franchisers whose franchisees had an opportunity to bargain with ex ante (Joskow, 1991:60–61). A TCE analysis of *Chicken Delight* would start with the presumption that it was likely that the restrictions in the agreement were there for some good economic reason, not a consequence or cause of market power problems that should be of concern to the antitrust laws. TCE also recognizes that there are a variety of legal institutions, for example, contract law and consumer protection laws, that can respond more effectively to contractual hazards than can the antitrust laws. During the 1970s and 1980s this TCE perspective, as well as the influence of the “Chicago” school of antitrust law and economics (Joskow, 1991), had a major influence in changing the antitrust treatment of vertical integration and nonstandard vertical contractual arrangements in ways that are widely viewed as being socially beneficial.

The decade of the 1990s saw an explosion of applications of modern imperfect competition theory built on game theoretic foundations to the antitrust treatment of vertical integration and vertical restraints. This work, often referred to as “post-Chicago antitrust law and economics,” (PCALE) is a reaction to the “Chicago antitrust law and economics” view that vertical integration and vertical contractual restraints cannot be used to “leverage” market power at one horizontal level of the vertical production chain profitably to increase prices and reduce welfare calculated over two or more vertical levels of the chain (Salop 1993a,b).³ More generally, Salop tells us that post-Chicago antitrust law and economics draws on recent advances in industrial organization that focus on “strategic and dynamic competition, game theoretic analysis of oligopoly markets, and a focus on the market power that may flow from pre-commitment, installed base, and switching costs” (Salop 1993b:1, emphasis added). Salop’s article does not contain a single reference to relevant research in the TCE tradition.

Post-Chicago antitrust law and economics has focused on antitrust issues associated with vertical integration and vertical restraints (*Antitrust Law Journal*, 1995). PCALE has shown that a variety of market imperfections can *theoretically* lead to the *possibility* that vertical integration and vertical contractual restraints can enhance market power upstream and/or downstream and, as a result, lead to higher prices, higher costs, and welfare losses. This approach to the applications of economic theory to antitrust problems is not unlike an earlier flurry of game theoretic analysis which demonstrated that the view that (profitable) predatory pricing was impossible was wrong and that there were in fact theoretical cases in which predatory pricing could be a rational strategy for an incumbent firm with market power (Milgrom and Roberts, 1982). As was the case with this theoretical literature on predatory pricing, PCALE has not produced much in the way of solid empirical research that demonstrates that these theoretical possibilities are in fact observed in real markets, the situations where they are most likely to be observed, and where they are, they lead to significant increases in prices and/or costs and reductions in economic efficiency. The absence of such empirical research also means that the theories provide little in the way of practical guidance for the development of empirical techniques to identify situations where nonstandard vertical contracts or vertical integration should be of antitrust concern or for the development of good antitrust legal rules.

PCALE recognizes that there may be good economic efficiency reasons for firms to vertically integrate or to enter into nonstandard vertical contractual arrangements, that there may be trade-offs between the efficiency-enhancing benefits of these arrangements and their costs in terms of increased market

3. It is also a reaction to “Chicago school” views in other areas of antitrust policy such as predatory pricing. In all fairness to antitrust scholars associated with the University of Chicago, critics tend to be focusing on Robert Bork’s antitrust views rather than the more diverse views on antitrust policy which are properly associated with economists and lawyers at the University of Chicago.

power, and even that vertical mergers will not lead to consumer harm *in most cases* [Salop and Riordan, 1995:521 (emphasis added)]. However, the focus of the analysis is on the market power aspects of vertical relationships, not on the kinds of economizing motivations for nonstandard vertical arrangements that have been the focus of TCE.⁴ Moreover, essentially no effort has been made to harmonize the large body of theoretical and empirical work in the TCE tradition that is relevant to understanding why specific governance arrangements emerge, and for performing any trade-offs that may arise between increases in market power and reductions in the costs of transacting à la Williamson (1975, 1985, 1996).

Where post-Chicago antitrust law and economics miss the mark is not with faulty economic theory. Rather it is in the application of that economic theory to the development of good antitrust legal rules and remedies where it fails to deliver. Identifying potential market power problems is only the first step in the development of good legal rules for antitrust policy. This kind of modern economic theory is a necessary, but not a sufficient input to the creation of good antitrust legal rules. Moreover, the failure to incorporate theoretical and empirical research in TCE makes it very difficult to evaluate the kinds of trade-offs between market power and efficiencies that are relevant to developing and applying good legal rules or for designing efficient remedies to respond to competitive concerns. These remedies may include restrictions on contracting practices, divestiture of assets, or rejections of merger applications. It is here where TCE provides important theoretical and empirical insights, and these insights have been largely ignored by PCALE. The discussion of the *Kodak* case below demonstrates this.

At the present time TCE and PCALE are like ships passing in the night. The development of sound antitrust legal rules and remedies would benefit from integrating these approaches and recognizing that they are compliments rather than substitutes. Otherwise PCALE runs the risk of returning us to the 1960s antitrust treatment of nonstandard vertical arrangements.

6. *Kodak*: How “Good Economics” Can Lead to Bad Legal Rules

The Supreme Court’s 1992 decision in *Kodak v. Image Technical Services* [112 S. Ct. 2072 (1992)] is often pointed to as an excellent example of the application of post-Chicago antitrust law and economics and the kind of “improvement” it can bring to antitrust policy. I will argue here that in fact the application of PCALE to this case undermined the development of good legal rules governing situations where ex post opportunism might arise. The potential damage was eventually mitigated by lower courts that ultimately returned to a TCE framework which distinguishes more clearly and appropriately between ex ante bargaining and ex post opportunism.

4. Salop and Riordan devote only 6 of the 55 pages of their article to potential efficiency benefits of vertical mergers, but most of this discussion focuses on traditional rationales for vertical integration, such as the elimination of double marginalization, and largely ignores the TCE approach to these issues.

Kodak is presented as a tying case. At the time *Kodak* was decided, the legal rules applied to tying claims were defined in *Hyde v. Jefferson Parish Hospital District No. 2* [466 U.S. 2 (1984)].⁵ *Hyde* relaxed the then-prevailing legal rule that tying was illegal per se. However, it replaced it with a confusing conditional per se rule which provided that under certain circumstances (significant market power associated with the sale of the tying product) a tying agreement would be per se illegal. Otherwise it would be evaluated under a rule of reason. I have critiqued this rule elsewhere (Joskow, 1991:65).

Much has been written about the *Kodak* case, so I will only briefly summarize here its most salient facts (Salop, 1993; Shapiro, 1995; Borenstein, MacKie-Mason and Netz, 1995; Klein, 1996, 1999). *Kodak* manufactured and sold high-volume photocopier and micrographic equipment to businesses and government entities. It faced competitors such as Xerox and IBM in the supply of these products and had about a 20% share of the sales of each type of equipment when the litigation was initiated. When *Kodak* entered the photocopier market to compete with Xerox it also manufactured or contracted with third parties to manufacture replacement parts for this equipment. Many of these parts were unique to *Kodak* copiers (and were generally patented by *Kodak*) and parts for copiers supplied by other manufacturers could not be used in the repair of *Kodak* copiers because they didn't "fit." Finally, *Kodak* offered to provide service, as well as parts, to purchasers of its copying equipment. Customers were free to sign a service contract with *Kodak* or to service the copiers themselves. *Kodak* sold parts to customers who chose to service the copiers themselves.

Initially *Kodak* was the only supplier of outside repair services. However, over time *Kodak* employees left the firm to form independent service organizations (ISOs) which were able to purchase *Kodak* parts and to provide service in competition with *Kodak*. By the mid-1980s, however, *Kodak* still accounted for about 80% of the service revenues for these types of *Kodak* copiers and (ignoring second-hand parts for the purposes of this discussion) effectively controlled 100% of genuine *Kodak* repair parts for these machines. In 1985 and 1986 *Kodak* announced that it was changing its parts policy. It would no longer make parts available to ISOs. Purchasers of *Kodak* copiers would be able to obtain parts from *Kodak* in conjunction with a *Kodak* service contract or they could obtain parts from *Kodak* if they serviced the copiers themselves. *Kodak* would no longer sell or allow its manufacturing licensees to sell replacement parts to ISOs.⁶

5. The Appeals Court decision in *Microsoft* may signal a long-needed reinterpretation of the antitrust treatment of tying arrangements [*U.S. v. Microsoft*, U.S. Court of Appeals for the District of Columbia, no. 00-5213, June 28, 2001]. Whether or not the Supreme Court endorses the D.C. Circuit's more sophisticated approach only time will tell.

6. There is some confusion in the literature following this case as to whether *Kodak* applied this policy only to new copiers or to all copiers, including the existing installed base. I will assume here that the policy applied to all *Kodak* copiers, including the installed base, since this is the assumption made by the Supreme Court in its decision.

In 1987, 18 ISOs sued Kodak for tying the sale of service (the tied product) to the sale of Kodak parts produced (the tying product). Since Kodak effectively accounted for 100% of the supply of Kodak replacement parts (the tying product), if the ISOs could show that Kodak replacement parts were a relevant product market and that parts and service were separate products, *Hyde's* conditional per se rule for tying arrangements would lead to the conclusion that the tying arrangement was per se illegal. Not surprisingly the ISOs argued that Kodak replacement parts were a relevant product market because once consumers had purchased Kodak copiers they were dependent on Kodak for the parts. Switching to another parts supplier could only be accomplished by abandoning the Kodak copier and purchasing a new one, a very high switching cost for owners of Kodak copiers that were otherwise economical to continue to utilize and maintain. That is, purchasers of Kodak copiers were “locked in” to purchasing Kodak parts. They argued that Kodak’s new replacement parts policy was exploiting this lock-in opportunistically to “hold up” copier owners by extracting excessive prices from them for service. Note, however, that it was the ISOs, not the owners of the copiers who were suing Kodak.

On the other hand, Kodak argued that, *as a matter of law*, if the (ex ante) equipment market was competitive, a conclusion that the ISOs apparently conceded, then Kodak could not have market power for antitrust purposes in the “aftermarkets” for parts and service. Kodak supported this legal rule with the theoretical argument that if the equipment market was competitive, then purchasers would recognize that higher prices in the parts or equipment markets effectively represented an increase in the life-cycle costs of the equipment and that competition among equipment vendors would compete any expected rents away through lower equipment prices. Thus, from a life-cycle cost perspective, Kodak argued that any power Kodak might have to raise prices for parts and services would be anticipated by buyers and reflected in lower equipment prices due to competition in the (ex ante) equipment market.

The District Court accepted Kodak’s argument on a summary judgment motion and dismissed the ISOs’ complaint. The ISOs appealed and the Appeals Court reversed. The Supreme Court sustained the Appeals Court and sent the case back for a new trial. The Supreme Court’s analysis⁷ focused on Kodak’s theory that competition in the equipment market *necessarily* precluded Kodak from acting opportunistically and harming consumers when they purchased replacement parts and service. The Court rejected this theory, focusing on the potential importance of market imperfections that could make this theory invalid. In particular, the Court emphasized the potential role of information costs, undermining the ability of equipment purchasers to fully

7. It is important to understand that the Supreme Court heard this case on a summary judgment motion before the facts had been developed in a trial and was under the obligation to consider the issues raised from a perspective that accepted the ISOs factual assertions.

evaluate life-cycle costs,⁸ and the potentially high switching costs associated with the equipment purchasers' being "locked in" to buying Kodak replacement parts once they had purchased Kodak copying equipment. The Court concluded that Kodak might have been able to use the strategy of tying Kodak parts to Kodak service in order to increase aftermarket service prices to existing equipment customers, since ISOs could no longer compete to provide service once they could no longer acquire replacement parts. Kodak's decision to do so, the Court observed, would require Kodak to balance the additional profits from engaging in installed-base opportunism against the potential lost profits from reduced sales of copiers in the future as potential new purchasers responded to higher expected service prices. Accordingly, the Court decided that whether Kodak had the ability to harm consumers as the plaintiff's claimed and in fact engaged in an opportunistic holdup strategy were factual matters that had to be resolved in a trial.

What exactly does the Court's decision in *Kodak* stand for? Some have focused on the emphasis the Court placed on information costs, lock-ins, and associated potential for opportunistic behavior and concluded that if a plaintiff can show that these market imperfections exist, it necessarily leads to the conclusion that the supplier of the durable equipment or the franchiser has antitrust market power (which in turn can be inferred from brand-specific market shares).⁹ This interpretation implies that a wide range of ex post holdup or "lock-in" situations become the potential grist for antitrust claims, focuses attention on the ex post relational situation, ignores ex ante competition, and could bring the behavior of any supplier of durable goods with continuing relationships with its customers, or any franchiser, under the scrutiny of antitrust courts, with the presumption that they have antitrust market power. Indeed, it could make disputes arising in connection with almost any supply relationship supported by specific investments a potential subject of antitrust scrutiny. This interpretation could turn antitrust policy toward vertical contractual relationships back to where it was in the 1960s or worse.

An alternative interpretation is that all the Court did was send the case back for a trial in which the plaintiffs were given the opportunity to demonstrate, based on a complete empirical analysis, that Kodak had the incentive and ability to use the new tying arrangement to increase the overall package price to locked-in consumers in a way that they could not have been expected to

8. The "dumbest" purchaser of all was the U.S. government, since equipment, parts, and service were purchased by separate agencies with different budgets. However, even if all purchasers completely ignore life-cycle costs when they purchase equipment, this does not necessarily imply that competing equipment manufacturers will not compete away the rents from high aftermarket parts and service prices by driving prices down in the equipment market. It is not just the information that consumers possess about aftermarket prices that is relevant to the issue of whether equipment prices have fallen in recognition of high aftermarket prices and profits. The information about these prices and profits possessed by the competing equipment manufacturers is also important.

9. See Grimes (1999), as this point relates to franchise agreements.

anticipate *ex ante*. That is, the plaintiffs would have to show that Kodak had the incentive and ability to engage in a harmful holdup of existing equipment owners *and* that it in fact implemented a holdup strategy *and* that the typical customer could not have reasonably anticipated such a policy when it made its initial purchase decisions.

One potential problem with this second interpretation is that it fails to take account of the mechanical fashion in which antitrust courts actually evaluate market power claims. Specifically, they look for a relevant market, calculate market shares, and from the market shares infer if there is market power. Whether the market shares are high or low will generally be decided largely by the decision whether the *ex ante* (interbrand) or *ex post* (brand specific) markets are the appropriate markets to look at for antitrust purposes. If the resulting market shares lead to the conclusion that the defendant has antitrust market power, then the court proceeds to examine whether the practices at issue excluded competitors and, if they did, whether the practices can be “saved” with efficiency justifications. Once a market power finding is made based on single-brand market shares, the defendant then effectively has the burden of showing that the complained about “restrictive” behavior is not anticompetitive and has legitimate business justifications. The process through which the courts determine whether a party has violated the antitrust laws does not easily accommodate the kind of complete empirical analysis that the second interpretation above suggests.

An examination of what the lower courts actually did when applying the Court’s decision in Kodak’s subsequent trial demonstrates how difficult it is to square the second interpretation of the Court’s decision with the mechanics of antitrust jurisprudence. Despite what appeared to be the Court’s direction that a trial explore empirically whether Kodak had the incentive, ability, and actually used the tying policy to harm consumers, the ISOs instead apparently argued a fairly conventional tying/monopolization case in front of a jury. They largely relied on the emphasis on *ex post* switching costs in the Court’s decision to justify defining relevant product markets that consisted only of Kodak replacement parts and Kodak service. Kodak necessarily effectively had 100% of such a Kodak replacement parts “market” and, the ISOs argued, used the tying arrangement to exclude competition in the Kodak service “market,” where Kodak also held a large market share. Clearly the new parts policy “excluded” ISO competitors from the service market. Kodak ultimately lost the case, was required to pay the ISOs damages, and was required to sell parts to all buyers at a “reasonable price” for 10 years. The Appeals Court affirmed most of the trial court’s jury instructions and the jury’s conclusions, except it changed the obligation to sell equipment for 10 years at “a reasonable price” into an obligation to sell its equipment at a “nondiscriminatory” price because of concerns that the “reasonable price” obligation would require the court to engage in ongoing price regulation [Klein (1999) and *Image Technical Service, Inc. et al. v. Eastman Kodak Co.* 1997-2 Trade Cases ¶ 71,908]. A complete empirical analysis of the rele-

vant issues never occurred, because it's not the kind of analysis that antitrust courts engage in.

Looking at the Kodak case from the perspective of the *economic theory* proposed by Kodak to support its proposed *legal rule*, it is clear that as a theoretical matter, a competitive equipment market (or a competitive franchise market) *does not* make ex post holdups resulting from specific investments impossible in the presence of information costs, incomplete contracts, and *imperfect* ex ante competition. So Kodak's appeal to economic theory to justify its proposed legal rule could not be supported by economic theory! On the other hand, Shapiro (1995: 485) has shown that "significant or long-lived consumer injury based on monopolized aftermarkets is likely to be rare, especially if equipment markets are competitive."¹⁰ Potential welfare losses would be reduced further if consumers negotiated contractual protections against the most serious potential holdup problems. Moreover, it is unlikely that Kodak would have had an antitrust problem if it had simply implemented its strategy by increasing replacement parts prices—a more conventional "holdup"—a strategy that was certainly feasible since Kodak controlled the supply of replacement parts by virtue of its patents.¹¹ Accordingly, an appropriate empirical analysis of the costs of the tying agreement would compare the associated price and quantity outcomes with an alternative strategy that simply involved equivalent replacement parts price increases. The difference in the costs of these two strategies would be very small since their effects would be almost identical, but for the costs of any substitution between parts and service if they are not supplied in fixed proportions.

More importantly, the conclusion that Kodak's economic theory was only correct under fairly restrictive assumptions, and ignored potentially relevant market imperfections, does not in and of itself lead us either to an appropriate legal rule or to the conclusion that Kodak's proposed legal rule was incorrect. From a TCE perspective, an appropriate legal rule must take account of both the basic theoretical and empirical economic analysis relevant to cases with these attributes *and* of the institutional arrangements, transaction costs, and potential for costly errors in diagnosis and remedies which characterize the antitrust enforcement hierarchy I discussed earlier. Two attributes of these institutions are especially relevant. First, it is unlikely that the courts can or will perform or rely on detailed analysis of information market imperfections, switching costs, life-cycle costs, or the measurement of the degree to which consumers in general are harmed in the long run by installed-base opportunism. Instead, they will seek to apply simple rules of thumb that are

10. Contrary results by Borenstein, MacKie-Mason, and Netz (1995) appear to depend heavily on inefficient substitution possibilities between the durable equipment and the ex ante replacement parts and service for that equipment.

11. It is also fairly clear from the Supreme Court's decision and decisions in subsequent related cases that if Kodak had adopted a policy of bundling equipment, replacement parts, and service together at the outset, there would have been no antitrust liability. It was the *change* in policy that offended the Supreme Court.

thought to be adequate indicia for the more detailed empirical analysis that the Supreme Court and some commentators on these cases may have had in mind. These rules are characterized by both type I and type II errors. Second, because antitrust policy is largely a deterrence system, transacting parties will respond to the incentives created by new legal rules. Good legal rules will lead them to respond in ways that are consistent with the goals of the antitrust laws. Bad legal rules can lead to behavior that is inconsistent with these goals. These incentive effects should be part of the development and analysis of alternative antitrust legal rules.

The experience with aftermarket parts litigation and related litigation regarding franchise contracts since *Kodak* provides some insight regarding both of these considerations. Not surprisingly, after the Supreme Court's decision in *Kodak* there was a significant increase in litigation by firms that service durable equipment, firms that sell aftermarket parts, and by franchisees unhappy about one or more terms of their franchise agreement (Klein, 1996, 1999; McDavid and Steuer, 1999). The presence of information costs, market imperfections, lock-ins, and potential or actual ex post opportunism and holdups played a critical, though often confused role in this litigation. However, the trial and Appeals Courts hearing these cases quickly reigned in the more expansive interpretations of *Kodak* and gradually narrowed the kinds of cases in which plaintiffs were likely to apply it successfully. The courts did so largely by focusing much more on the ex ante market environment and reducing attention to the ex post presence of specific investments and the potential for holdups.

So, for example, a franchisee or a competing supplier of goods and services to franchisees cannot now expect to come to court and ride very far on a claim that she is locked in to purchasing supplies from the franchiser and should be relieved of such franchise obligations. Instead, the courts look first at the point in time when the franchise agreement was negotiated, and what the franchisee knew, should have known, or should have reasonably anticipated as the relationship unfolded. Franchise terms that the franchisee agreed to initially and changes that should have been reasonably expected based on information provided by the franchiser at the agreement stage are now unlikely to face a successful antitrust challenge if the ex ante franchise market is competitive. While changes in franchise terms may still potentially lead to a trial, the plaintiff bears a significant burden of showing that the changes are harmful and do not have a sound business/efficiency justification. Similarly, durable equipment suppliers who clearly reveal to purchasers that they will be the exclusive supplier of replacement equipment and service are unlikely to face a successful antitrust challenge if the equipment market is reasonably competitive. In addition, equipment suppliers who "hold up" a customer by increasing prices for equipment ex post (rather than tying it to service) are unlikely to face successful antitrust challenges if the ex ante equipment market is competitive.

After nearly a decade of litigation, the end result appears to be moving toward a legal rule which effectively says that postcontractual holdups are

not an antitrust problem if the ex ante market is reasonably competitive, buyers (franchisees) have been adequately informed about the suppliers' (franchisers) intentions, and the supplier (franchiser) does not implement ex post changes in policies that were not revealed or reasonably anticipated ex ante. If these conditions are met then the buyer (franchisee) may get a trial on its postcontractual holdup claims, but it must show that a holdup that exploits specific investments has actually occurred and that there is no countervailing business or efficiency justification for the changes in behavior. This is an exercise that the courts appear to want to engage in as rarely as possible. Earlier appeal to TCE reasoning and evidence would have led us to this ultimate result directly. It would have recognized as well that we have contract laws and various other consumer protection laws to deal with the bulk of the potential problems that lead to ex post opportunism. Antitrust law is simply not a good institutional environment to deal them.

7. Divestiture Remedies

Under U.S. antitrust law, divestiture of assets is available as a remedy for what are deemed to be "market structure" problems. For example, a firm found guilty of violating Section 2 of the Sherman Antitrust Act (monopolization) may be subject to a divestiture requirement if the court determines that behavioral remedies (e.g., cease and desist orders, obligation to unbundle product elements such as equipment and service, obligations to sell or lease certain products, requirement to revise agreements with competitors or customers, patent or copyright licensing, etc.) and the threat of future fines and treble damage awards are not likely to adequately deter the firm's incentive and ability to restrain competition. These were the kinds of considerations that led the District Court in *U.S. v. Microsoft* to order divestiture as part of a package of remedies.¹²

Despite the recent flurry of interest in divestiture related to *Microsoft*, divestiture orders have been used relatively rarely as remedies in Section 2 cases, and especially rarely in the last 30 years. Many of the most famous divestiture cases (e.g., Standard Oil, American Tobacco) involved divestiture of operating subsidiaries of holding companies which were already individually structured as viable operating firms prior to divestiture. The most

12. *U.S. v Microsoft Corp.*, 87 F. Supp. 2d 30 (D.D.C. 2000). Though the trial court's decision required a vertical divestiture (creating an operating systems company and an applications company) rather than a horizontal divestiture (e.g., create three operating systems companies, all with rights to sell and develop Windows). The remedy is apparently based on the theory that separating control over the Windows operating system from the supply of popular Microsoft application programs will lead the new applications program company to port its programs to other operating systems, thereby making it easier for them to sell competing operating systems to consumers. Thus the divestiture remedy is designed to induce competing operating systems to compete more effectively against Windows rather than to create more competitors directly through the divestiture process. On appeal, the D.C. Circuit rejected a divestiture remedy, in part because the trial court held no hearings to evaluate its costs and benefits. (*U.S. v Microsoft Corp.* U.S. Court of Appeals for the District of Columbia, no. 00-5213, June 28, 2001.)

recent major Section 2-related divestiture, involving AT&T, relied heavily on divestiture along operating company lines, though there were significant shared asset issues that had to be addressed as well.

Divestiture remedies are used much more frequently in Section 7 (merger) cases. Indeed, one of the rationales for the Hart–Scott–Rodino premerger notification requirements was to give the enforcement agencies the opportunity either to challenge a merger or to order certain assets to be divested as a condition of approval before the merging firms had an opportunity to “scramble the eggs.” For example, the mergers of Exxon and Mobil and of BP/Amoco and Atlantic Richfield were approved subject to extensive asset divestiture requirements.

Many years ago Judge Wyzanski chastised the Department of Justice for proposing horizontal divestiture as a remedy in the *United Shoe Machinery* case—“It takes no Solomon to see that this organism cannot be cut into three equal and viable parts . . .” [*United States v. United Shoe Machinery Corp.*, 110 F. Supp. 295 (D.Mass. 1953) *aff’d per curiam* 347 U.S. 521 (1954)]. Apparently the Justice Department didn’t learn the lesson from *United Shoe Machinery*. The affidavits supporting its divestiture proposal in *Microsoft* contained essentially no analysis of how Microsoft would be broken up vertically or what the associated costs and benefits of restructuring of a company that is fully integrated and relies heavily on a complex web of patents and copyrights linking many of its activities. To make matters worse, the trial court then decided not to have a hearing to explore any of the details of a divestiture remedy. This approach reflects the inaccurate assumption that organizational design does not matter for economic performance and that restructuring complex firms is a “piece of cake” without the need for careful analysis or any significant economic consequences. It ignores everything that we have learned from theoretical and empirical work in TCE.

The knowledge base that we have today to guide divestiture remedies is limited. While there have been a few studies of the effects of divestiture remedies on competition in the affected industries (e.g., oil and tobacco), generally showing that the divestitures were not particularly successful in stimulating competition in the short run, there has been little study of the effects of the details of divestiture remedies from a TCE perspective (or any perspective) on the costs of the divested entities, the competitive viability of the divested assets, and the resulting effects on competition. Moreover, TCE can be very useful in designing effective divestiture plans and avoiding implementing divestiture plans that are likely to fail to meet their goals.

A recent Federal Trade Commission (FTC) staff study of the effects “voluntary” asset divestitures accompanying settlements of antitrust concerns arising from merger applications during the premerger review process suggests that we have much to learn about designing effective divestiture strategies (Federal Trade Commission, 1999).

The FTC study examined the outcomes of 35 divestiture orders (37 divestitures) entered from 1990 through 1994. The primary conclusions of the

study were

- a. About 75% of the divestitures in the study succeeded to some degree as measured by whether or not the buyer was able to enter the market and maintain operations. This is not a very high standard for “success.” From an antitrust enforcement perspective the primary issue should be whether the new firms that survived in fact mitigated the concerns about increased market power arising from the merger and which led to the divestiture order. On the other hand, 25% of the divestitures were completely unsuccessful in the sense that they did not lead to the creation of new suppliers that were viable at all and either never entered the relevant market or quickly exited the market.
- b. Divesting firms behave strategically and tend to look for marginally acceptable buyers and may engage in strategic conduct to impede the success of the buyer in using the divested assets to create a strong competitor.
- c. The study found evidence of widespread mistakes by buyers in negotiating the details of divestiture agreements. Most buyers do not have access to sufficient information to prevent mistakes in the course of their acquisitions. Since the FTC approved the divestiture plans and sales agreements, one must infer that the FTC had no better information than did the buyers.
- d. Divestitures of ongoing businesses tended to succeed more frequently than divestitures of selected assets.
- e. Continuing postdivestiture relationships between buyer and seller created serious problems for some buyers but were critical to the success of others, though what was successful for the buyer was not necessarily an outcome with positive effects on competition.
- f. Smaller buyers of divested assets succeeded at least at the same rate as did larger buying firms.

Students of TCE should not find these results surprising. Firms subject to “voluntary” divestitures to mitigate market power should be expected to behave strategically; ongoing businesses that have been divested are likely to fare better postdivestiture than are assets that require the creation of a complete new business organization to be used effectively; buyers negotiating divestiture agreements in which they depend on the seller and have not protected themselves against ex post holdups are likely to face the consequences of these holdups; contractual arrangements for input supplies between competing firms can soften competition between them; it’s not the size of the acquirer but its ability to utilize the assets effectively that matters.

It seems to me that divestiture remedies should be used very cautiously and only in conjunction with careful analysis reflecting TCE considerations. Enforcement agencies and courts are unlikely to be in a good position to fashion or approve effective divestiture remedies, even in situations where firms make a “voluntary” divestiture proposal. The knowledge base upon

which we can draw is very limited. Until the enforcement agencies become more sophisticated in their understanding of the consequences of alternative governance arrangements for divested assets, I would be disinclined to expand their opportunities to rely on divestiture remedies.

8. Conclusion

TCE can and has played an important role in the evolution of antitrust policy in the United States. This is especially the case with regard to antitrust policies toward vertical contractual arrangements. However, TCE can and should play a more central role in the development and application of antitrust legal rules and remedies. TCE needs to be better integrated with modern theories and evidence on imperfect competition and oligopoly behavior as they are used to develop and apply legal rules and remedies. In *Kodak* a sensible application of TCE would have led more directly to a clear legal rule; a legal rule that the lower courts eventually evolved toward as they thought more clearly about ex ante versus ex post behavior and the problems created by a legal rule which opened up ex post opportunism complaints widely to antitrust scrutiny. In *Microsoft* a credible case for divestiture would have had to be supported by a careful analysis of the costs and benefits of alternative governance arrangements and the costs and benefits of moving from one set to another. This too is a central focus of TCE. Similarly, the failures of divestiture remedies in merger cases identified by the FTC could have been avoided if the enforcement agencies adopted a TCE perspective in evaluating alternative divestiture remedies.

Those of us doing research applying a TCE framework continue to bear the burden of demonstrating its utility, integrating it with “black box” imperfect competition models and empirical applications, and bringing it into the mainstream of education in economics and law. Occasional slippage (such as *Kodak*) notwithstanding, we take satisfaction that both antitrust enforcement and regulation are better informed today because, directly and indirectly, TCE reasoning and empirical work are part of the dialog. Our task is to bring TCE reasoning to bear more assiduously.

References

- Antitrust Law Journal*. 1995. “Symposium on Post-Chicago Economics,” 63 *Antitrust Law Journal* 445–695.
- Borenstein, Severin, Jeffrey K. MacKie-Mason, and Janet S. Netz. 1995. “Antitrust Policy in Aftermarkets,” 63 *Antitrust Law Journal* 455–82.
- Dixit, Avinash. 1998. *The Making of Economic Policy: A Transaction Cost Politics Perspective*. Cambridge: MIT Press.
- Federal Trade Commission. 1999. “A Study of the Commission’s Divestiture Process,” staff report. Washington, DC: Bureau of Competition.
- Grimes, Warren, S. 1999. “Market Definition in Franchise Antitrust Claims: Relational Market Power and the Franchisor’s Conflict of Interest,” 67 *Antitrust Law Journal* 243–82.
- Joskow, Paul L. 1988. “Asset Specificity and the Structure of Vertical Relationships: Empirical Evidence,” 4 *Journal of Law, Economics, & Organization* 95–117.

- . 1991. "The Role of Transaction Cost Economics in Antitrust and Public Utility Regulatory Policies," 7 *Journal of Law, Economics, & Organization* 53–83.
- Joskow, Paul L., and Alvin Klevorick. 1979. "A Framework for Analyzing Predatory Pricing Policy," 89 *Yale Law Journal* 213–70.
- Klein, Benjamin. 1996. "Market Power in Aftermarkets," 17 *Managerial and Decision Economics* 143–64.
- . 1999. "Market Power in Franchise Cases in the Wake of *Kodak*," 67 *Antitrust Law Journal* 283–326.
- Matthews, R. C. O. 1986. "The Economics of Institutions and the Sources of Growth," 96 *Economic Journal* 903–18.
- McDavid, Janet L. and Richard M. Steuer. 1999. "The Revival of Franchise Antitrust Claims," 67 *Antitrust Law Journal* 209–43.
- Milgrom, Paul, and John Roberts. 1982. "Predation, Reputation and Entry Deterrence," 27 *Journal of Economic Theory* 280–312.
- Salop, Steven C. 1993a. "Exclusionary Vertical Restraint Law, Has Economics Mattered?" 82 *American Economic Review* 168–72.
- . 1993b. *Kodak as Post-Chicago Law and Economics*. Boston: Charles River Associates.
- Salop, Steven C., and Michael Riordan. 1995. "Evaluating Vertical Mergers: A Post-Chicago Approach," 63 *Antitrust Law Journal* 513–68.
- Shapiro, Carl. 1995. "Aftermarkets and Consumer Welfare: Making Sense of *Kodak*," 63 *Antitrust Law Journal* 483–512.
- Shelanski, Howard A., and Peter G. Klein. 1995. "Empirical Research in Transaction Cost Economics: A Review and Assessment," 11 *Journal of Law, Economics, & Organization* 335–61.
- Williamson, Oliver E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: Free Press.
- . 1985. *The Economic Institutions of Capitalism*. New York: Free Press.
- . 1996. *The Mechanisms of Governance*. Oxford: Oxford University Press.