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TRANSACTION COST ECONOMICS AND COMPETITION POLICY

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INTRODUCTION

The primary objective of transaction cost economics (TCE) is to understand 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. 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. TCE adopts a comparative institutional choice approach to analyzing alternative governance arrangements. That is, a variety of governance arrangements are available to govern resource allocation. The task is to identify the governance arrangements that best match the attributes of different types of transactions. 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.

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 non-profit organizations, government bureaucracies, 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*.² Moreover, antitrust and competition policy issues have continued to be included in Williamson's research portfolio.³ However, I think that 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). In a paper that I published in 1991, I argued that TCE has important implications for evaluating and reforming antitrust and regulatory policies. However, while TCE appeared to have had a significant impact on antitrust policy, especially in the significant changes in antitrust treatment of vertical integration and vertical contractual arrangements in the U.S. during the 1980s, I suggested that its influence may have been less significant than might first meet the eye. In that paper I also argued that the TCE framework would be especially useful in designing and evaluating alternative approaches to privatizing and restructuring important industrial sectors that had historically been considered to be natural monopolies and subject to price and entry regulation, in an effort to promote competition in one or more horizontal segments of these industries. These industries included telecommunications, electric power, natural gas transportation, and railroads. In 1991, the reform initiatives in these industries were still very young in the countries where they had been implemented and their future in many other countries uncertain. I also suggested that proceeding with restructuring, regulatory and competition reforms in these sectors without taking account

¹ The paper was presented as the Keynote Lecture at the Annual Conference of the International Society for New Institutional Economics, Tübingen, Germany, September 23, 2000. I am grateful to Oliver Williamson for his comments on an earlier version.

² The original title of Williamson's project was *Aspects of Monopoly Theory and Policy* (Williamson (1996), page 368).

³ Williamson (1985), Chapters 4 and 14 and Williamson (1996), Chapter 11.

of TCE considerations was likely to lead to serious problems with the performance of these reform initiatives.

In this paper, I revisit a number of the competition policies that I addressed in my 1991 paper with the benefit of a decade of new research, many policy changes, and additional experience with their consequences. The primary focus is on antitrust policy in the U.S. In the next section I discuss U.S. antitrust enforcement institutions and their implications for the specification of antitrust legal rules. Just as firms take TCE considerations into account in choosing governance arrangements, I argue that antitrust legal rules must be sensitive to the attributes of the institutions that we rely upon to enforce antitrust policies, their capabilities, the uncertainties associated with the diagnosis and mitigation of market power, and the associated costs of Type I and Type II errors. Modern economic theories regarding imperfect competition, strategic behavior, and market power alone cannot be relied upon to produce sound legal rules. Sound economic theory must be used along with the transactional attributes of the antitrust enforcement hierarchy and empirical evidence on the relationship between firm and markets structure, governance arrangements, and market performance, to yield sound legal rules.

I next proceed to discuss so-called "post-Chicago antitrust law and economics," its relationship to TCE, and its contribution to the development of sound antitrust legal rules. I argue that "post-Chicago antitrust law and economics" has ignored many of the teachings of TCE and failed adequately to integrate "good economics" with the transaction cost attributes of antitrust enforcement institutions. As a result, Post-Chicago antitrust law and economics alone cannot and has not led to sound antitrust legal rules. Good antitrust legal rules must take account of sound microeconomic theory, associated empirical work, and the transaction cost attributes of antitrust enforcement institutions. I then explore these issues in the context of a particular antitrust case⁴ and its progeny which advocates of "post-Chicago antitrust law and economics" point to as one of its important contributions to antitrust policy.

The paper then turns to a discussion of divestiture as an antitrust remedy and examines the results of a recent FTC study of divestitures ordered in connection with its reviews of horizontal mergers. I argue that the results of this study show that the failure

⁴ *Kodak v. Image Technical Services* (112 S. Ct. 2072 (1992)).

of the FTC to adopt a TCE perspective in fashioning divestiture orders and approving the associated asset sales agreements is at least partially responsible for many of the problems observed. I urge caution in applying divestiture remedies more widely at least until the enforcement agencies develop a better understanding of the factors that need to be taken into account to craft and administer successful divestiture orders and show that they can apply this new learning successfully in practice.

The paper concludes with a brief discussion of some of the problems that have emerged in connection with vertical and horizontal restructuring of electric power sectors to promote competition in the electricity generation segment. I argue that many of these problems could have been predicted and possibly avoided if the theory and empirical knowledge developed by TCE had been applied more widely in designing these industry restructuring and regulatory reform initiatives.

U.S. ANTITRUST ENFORCEMENT INSTITUTIONS AND LEGAL RULES

The evaluation of legal rules for enforcing antitrust policies can and should be defined from a transaction cost economics perspective. In the U.S., the processes for identifying, evaluating and enforcing antitrust policies and the precise boundaries of these policies rely on a complex set of institutional arrangements. Federal antitrust statutes (Sherman, Clayton, and Federal Trade Commission Acts) define broad principles of antitrust policy as it relates to collusive behavior, predatory and exclusionary practices, horizontal and vertical mergers, price discrimination, horizontal and vertical contractual arrangements between firms, etc.⁵ While these laws have been amended from time to time over the last century, major statutory changes have been fairly rare. Rather, the details of what antitrust policy means in practice have developed and changed over time through efforts to apply these laws to business practices and market structures in specific cases. The resulting federal court and administrative decisions dealing with specific cases defines the boundaries between what is legal and what is illegal under the antitrust laws. This body of case law has changed and is likely to continue to change over time. The answer to the question "what is the law?" at any particular point in time is often uncertain and different antitrust scholars and practitioners will generally offer different

⁵ In addition, most states have antitrust statutes as well.

views on the precise boundaries between what is legal and what is illegal under then prevailing interpretations of the basic antitrust statutes.

Antitrust law in the U.S. relies on both public and private enforcement initiatives. The U.S. has two federal enforcement agencies (the Department of Justice and the Federal Trade Commission) which share responsibilities for antitrust enforcement.⁶ Both agencies have large staffs of lawyers and economists to support their antitrust investigations, complaints, and any resulting litigation. Decisions by these agencies to pursue enforcement actions may result in negotiated consent decrees or in court litigation. The decisions by these agencies to challenge mergers, horizontal agreements, contractual agreements between upstream and downstream firms, etc., decisions by firms to enter into negotiated consent decrees with the enforcement agencies, as well as the court decisions that are issued when litigation ensues, all help to define and refine the details of antitrust policy.

U.S. antitrust law also provides for private enforcement actions. That is, private parties who feel that they have been damaged by the actions of other firms which have engaged in behavior that violates the antitrust laws may sue in federal court for injunctive relief and treble damages (or in state court under the applicable state statutes). Their antitrust claims may be decided by a judge, or by a jury following instructions provided by the judge, based on the record developed in a trial. It is the responsibility of the judge hearing the case to apply her interpretation of the applicable antitrust policies to the facts in the case either directly in her decision or indirectly through her instructions to the jury. It is important to understand that the vast majority of antitrust litigation in the U.S., especially non-merger related antitrust activity, involves private enforcement actions. The heavy reliance on private enforcement reflects the view that buyers and sellers who are in the relevant markets are in a good position to detect abuses, that treble damages provides an incentive for them to sue, that the prospect of private sanctions helps to deter illegal behavior, and that the antitrust laws should allow for compensation to those who have been damaged by anticompetitive behavior.

⁶ While most antitrust initiatives are civil actions, the Department of Justice may bring criminal complaints under Section 1 and Section 2 of the Sherman Act. These days criminal sanctions are limited to “naked” horizontal price fixing and market sharing agreements brought under Section 1.

Private enforcement actions brought under the federal antitrust laws start in one of about 100 federal District Courts. Decisions can be appealed to one of twelve federal Appeals Courts, and may ultimately be decided by the Supreme Court. While the Supreme Court's decisions necessarily play the most important role in defining the details of antitrust policy, the Supreme Court agrees to hear only a tiny fraction of the antitrust cases decided in the federal court system. The judges who preside over these cases have diverse legal training and experience and relatively few have significant experience with antitrust law or economics. Moreover, they do not have large staffs to help them review and evaluate evidence, do not have independent investigative authority, and depend on two or three law clerks who are recent law school graduates to help them to review the applicable law and apply it to the facts in specific cases. While federal judges can retain court masters or experts with specialized antitrust and/or economics training to assist them with complex antitrust matters, this option has been used only rarely.

This 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. Some proponents of "Post-Chicago antitrust law and economics" (see below) appear to think otherwise.⁷ Even as a theoretical matter, this is an impossible goal to achieve. Many markets, in particular all differentiated product markets, are inherently imperfectly competitive and nothing can be done (practically or cost-effectively) to make them perfectly competitive. For example, suppliers in differentiated product markets typically have some economies of scale and face downward sloping demand curves. In equilibrium, prices must be greater than marginal cost and the Lerner Index must be greater than unity. More importantly, 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.

⁷ Klein (1996), pp.157-160, Shapiro (1995), page 484.

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.⁸ The incentives firms have to understand and adhere to antitrust rules derives 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), fines and prison terms.

The pre-merger review process that was created by the Hart-Scott-Rodino Antitrust Act in 1976 (HSR) may appear to be an exception to the general deterrence approach that characterizes other aspects of U.S. antitrust policy. All proposed mergers exceeding a relatively small size in terms of revenues or assets must go through a pre-merger review process at either the Department of Justice (DOJ) or the Federal Trade Commission (FTC) before they can be consummated. Even here, however, the decisions by the DOJ and FTC to oppose mergers, litigation resulting from the relatively rare cases in which firms proceed to court in response to opposition by the enforcement agencies to their merger proposal, as well as the remedies required through negotiated consent decrees, have deterrence effects. No firm wants to go through the time and expense to negotiate a merger if it's going to be opposed by the FTC or the DOJ and their efforts to enjoin the merger upheld by the courts.⁹ Accordingly, firms typically seek advice from antitrust counsel in the course of considering potential merger partners and they in turn base their advice both on the DOJ/FTC Horizontal Merger Guidelines and evidence on applications of these policies in recent cases.¹⁰

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 markets 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 tradeoffs is

⁸ In addition, the FTC may conduct studies of particular industries to see if there are emerging competition or consumer protection issues. These studies may lead to enforcement initiatives.

⁹ See for example "Antitrust Enforcers' Actions on Mergers Chill Wall Street," *The Wall Street Journal*, September 6, 2000, page C1.

¹⁰ Senior officials in the DOJ and FTC also use speeches in public forums to clarify current policies and changes in these policies.

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 pre-merger HSR review process.

5. Nor is economics a precise science in its application to the assessment of the consequences of alternative market structures and firm behavior on performance indicia such as prices, costs, innovation, consumer welfare and economic efficiency. Similar analytical uncertainties are associated with the impacts of alternative proposed "remedies" on these performance variables.
6. The above 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. A legal rule may also lead to the sanctioning of market structures, contractual arrangements or firm behavior that increases economic efficiency, consumer welfare, etc. Moreover, even when a legal rule correctly identifies structural or behavior attributes that lead to performance 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. The test of a good legal rule is not whether it leads to the correct decision in a particular case, but rather whether it does a good job deterring anticompetitive behavior overall given all of the relevant costs, benefits, and uncertainties.

The evolution of antitrust rules and remedies in the U.S. have been heavily influenced by these institutional and transaction cost considerations. Both the courts and firms have an interest in legal rules that are clear, objective, stable, and relatively simple to apply. And the Congress has given the courts significant discretion to fashion legal rules and procedures that further the goals established by antitrust statutes, recognizing that these goals are not crystal clear and may reflect public policy concerns and interest

group configurations that have changed dramatically since the statutes were initially passed. Accordingly, it should not be surprising to find that court interpretations of statutory goals change "with the election returns" over time as well as with advances in knowledge about the effects of alternative market structures, contractual arrangements, and other behavioral considerations on performance indicia such as prices, costs, innovation, etc.

While there are good reasons to seek 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. Accordingly, there is always a tension between the specification of clear simple rules and their confrontation with situations where their rigid application appears to lead to undesirable results.

Per se rules are supposed to specify market structures, individual firm attributes, or business behavior that are illegal on their face. That is, *per se* rules are applied in situations where it is so clear that the structures or behavior at issue are inconsistent with the antitrust laws that once the behavior or structural attribute is identified no further inquiry is required. That is, the direct and indirect costs of a detailed inquiry into the effects of the structure or behavior at issue in the particular case where they arise are significantly greater than the potential benefits of giving the defendants the opportunity to show why in their case the behavior or structural attributes at issue are reasonable. In the U.S., "naked" horizontal price fixing agreements (and equivalent agreements such as market division agreements) are *per se* illegal. Not only don't those accused of participating in a "naked" price fixing agreement get to argue that their price fixing agreement is "reasonable" in their particular circumstances, but they are likely to be subject to both criminal sanctions and private damage actions if they are caught.

However, even the *per se* rule against price fixing and related horizontal agreements has not been absolute. Competitors have been permitted to enter into horizontal agreements that establish rules for stock and commodity exchanges, for

product standards, sports league rules, and for the licensing, marketing and distribution of revenues for music performance rights for copyrighted music.¹¹ Despite the existence of a *per se* rule against price fixing, courts have found it necessary and desirable to depart from it in special cases where the agreements were not designed to increase price and to reduce output but rather to create new products or to expand the supply of existing products. This trick has been accomplished by the courts either by defining what looks like a price fixing agreement as something else or by recognizing that in certain unusual circumstances the courts must examine the motivations for and effects of horizontal agreements to determine whether they are actually inconsistent with antitrust policy. And whenever the courts open a crack in a *per se* rule, defendants endeavor to drive a truck through it by trying to fit their agreement into the exception. So, for example, professional organizations have tried to exploit antitrust rulings which, under certain circumstances, allow such organizations to set professional and service quality standards, in order to hide what is primarily an agreement to reduce competition and to keep fees high. On the other hand, there have also been cases where horizontal price fixing agreements which were likely to have been pro-competitive have been voided under the *per se* rule against price fixing.¹²

For many years a variety of vertical contractual arrangements (e.g. tying agreements, exclusive territories, exclusive distribution agreements, resale price maintenance, etc.) were *per se* illegal. During the 1970s and 1980s economic and legal thinking about these "vertical restraints" changed, the political power of certain interest groups which supported *per se* illegality declined, and changes in antitrust rules soon followed. Aside from resale price maintenance agreements, other vertical contractual arrangements are now governed (effectively) by a *rule of reason*.¹³ In theory I suppose, a rule of reason gives a court the flexibility to explore fully all aspects of the structural or behavioral attributes of the firms and markets at issue and to fully evaluate their effects on the performance indicia of concern to the antitrust laws. And in some cases the Supreme Court or even Appeals Courts do explore in detail the challenged structures or

¹¹ Hovenkamp, *Antitrust Law*, Volume XI, 1998, pp. 250-317.

¹² See e.g. U.S. v. TOPCO Associates 405 U.S. 596 (1972).

¹³ As I will discuss presently, tying agreements have been governed by a peculiar conditional *per se* rule since the Supreme Court's 1984 decision in the *Jefferson Parish Hospital* case.

behavior and their effects on prices, costs, innovation, etc., in the markets at issue. These rare cases are typically those that are used (or misused) as a basis for changing established antitrust legal rules. However, in most cases, a *rule of reason* is no more than a highly structured mechanical framework for analyzing the antitrust problem at issue.

At this point, a brief digression to discuss the meaning of "market power" under U.S. antitrust law is in order. "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 price-taker 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 also 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 market power appears to refer to 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 be 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.

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.

So, for example, in monopolization cases (Section 2) the rule of reason effectively means that the court must first define a relevant product and geographic market and determine whether or not the firm has or is likely to obtain a dominant market share (e.g. more than 60%). It will 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, monopoly power is typically inferred from structural indicators, not from direct measurement.¹⁴ 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, a plaintiff must then demonstrate that the dominant firm reduced its prices to a level below an appropriate measure of its marginal or incremental costs.¹⁵ While some Circuits appear to give the plaintiff more freedom to demonstrate that the pricing behavior is anticompetitive even if prices have not been reduced to a level below the relevant measure of marginal or

¹⁴ Of course, sometimes the firms provide direct evidence of market power. For example, in the litigation involving the merger of Staples and Office Depot, documents were found in Staples files indicating clearly that its retail prices varied from place to place depending upon the number of proximate "office superstore" competitors that it faced. The court appears to have been more impressed with this evidence than with the econometric analyses of market power submitted by the FTC and Staples. *FTC v. Staples* 970 F. Supp. 1066 (1997).

¹⁵ The appropriate measure of marginal or incremental cost will depend upon, among other things, whether the firms produce one product or multiple products, whether there are economies of scale, whether there is excess capacity, etc. Analyses of predatory pricing that focus primarily on single product firms, constant returns to scale, and no excess capacity (as in Joskow and Klevorick (1979)) may oversimplify the identification of appropriate cost-based tests.

incremental cost, as a practical matter "below cost pricing" has become a sort of conditional *per se* rule in predatory pricing cases.

One may object to this approach on the grounds that pricing behavior theoretically may be "predatory" without involving below-cost pricing in the sense that there are situations in which a dominant firm may theoretically be able adversely to affect entry and the future trajectory of prices without reducing prices to a level below some measure of its marginal or incremental costs. The application of game theory to industrial organization has increased significantly the range of *possible* outcomes of strategic interactions in market environments that are not perfectly competitive. The 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. Antitrust policy should not be based on possibility theorems. Good antitrust legal rules should reflect a balance of the Type I and Type II errors associated with the institutional and transactions cost attributes of the antitrust enforcement hierarchy discussed earlier and a recognition that the antitrust laws will not always get it right in particular cases. In the case of predatory pricing, the reliance on an incremental cost 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 transactions cost considerations associated with antitrust enforcement discussed above.

POST-CHICAGO ANTITRUST ECONOMICS

In my 1991 paper I observed (approvingly) that dramatic changes had taken place during the late 1970s and the 1980s in the antitrust treatment of "restrictive" vertical contractual arrangements and vertical integration.¹⁶ The courts began to appreciate that non-standard vertical contractual arrangements were not inherently suspect and were not generally indicators of troublesome market power problems. Rather, the courts began to recognize that non-standard vertical governance arrangements were likely to be responses to a variety of transactional characteristics and associated contracting hazards. Rather than creating competitive problems, non-standard vertical agreements could reduce the

¹⁶ Joskow (1991), pp. 57-65.

overall costs of transacting, enhance product quality and variety, and improve incentives to innovate. Antitrust rules evolved quickly from treating many types of non-standard vertical contractual relationships as being *per se* illegal to making them subject to a rule of reason which dramatically increased the burden of proof placed on plaintiffs complaining about being "restrained" by the agreements. They now had to demonstrate that the target firm on one side of the vertical relationship had significant market power at the time the agreement was struck and, if it did, that the restrictions had anticompetitive effects. The target firm also had the opportunity to show that there were good efficiency justifications for the vertical restraints.

Since one of the major contributions of transaction cost economics during this time period was to deepen our understanding of the incentive and cost-saving motivations for non-standard vertical relationships --- based on both a rich theoretical and a rich empirical literature --- I argued in my 1991 paper that TCE might take some credit for the motivating these changes in public policy. However, I also suggested that these changes might reflect instead the growth in the importance of the "Chicago School" approach to vertical relationships. That approach emphasized the "impossibility" of extending monopoly power from one market to another (except for enhancing price discrimination opportunities) by vertical integration and restrictive vertical agreements. There was only one monopoly profit to be had and firms with monopoly power at one horizontal level could not "leverage" it into additional monopoly power at a second horizontal level of the vertical production chain. Moreover, since according to this view vertical integration and vertical contractual arrangements could not be motivated by an extension of monopoly power from one market to another, then they must be motivated by efficiencies of one type or another. The precise sources of such efficiencies were of much less interest to the "Chicago school of law and economics."

In contrast, the focus of TCE has been on understanding why and how variations in the attributes of different types of transactions, and associated contractual hazards, led to a variety of more complex arrangements to govern transactions between buyers and sellers as firms seek to economize on the costs of transacting. TCE has been much less (perhaps insufficiently) concerned about the implications of these governance arrangements for conventional market power issues. In my 1991 paper, I suggested

further that the relative contributions of Chicago school law and economics and TCE to the changes in antitrust policy regarding vertical restraints and vertical integration during the 1970s and 1980s had potentially important implications for the durability of these changes in policy.

So-called "Post-Chicago antitrust law and economics" 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.¹⁷ 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, 1993, page 1, emphasis added).¹⁸

"Post-Chicago law and economics" responds to "Chicago antitrust law and economics' " "impossibility" theories with a set of their own "possibility" theories. Its approach to the analysis of vertical integration and vertical contractual restraints is a good example. The basic strategy through which these theoretical exercises demonstrate that it is possible for firms with market power to use vertical integration and/or vertical restraints profitably to increase prices at one or more levels of the vertical production chain is as follows.¹⁹ Following Ordover, Salop and Saloner (1990), consider a situation where there are two downstream firms which supply differentiated products and engage in Bertrand competition using prices as strategic variables (strategic complements). That is, there is an existing downstream duopoly with equilibrium prices that exceed marginal

¹⁷ See, for example, the "Symposium on Post-Chicago Economics in the *Antitrust Law Journal*, Volume 63 (2), Winter 1995 and Salop (1993). 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.

¹⁸ Let me note that this paper does not contain a single reference to TCE research on these issues from a TCE perspective.

¹⁹ I exclude from consideration here cases where prices and entry are regulated at one level of the vertical production chain but not the other. Both Chicago antitrust law and economics and Post-Chicago antitrust law and economics recognize that vertical integration and vertical contractual arrangements may be used to

cost. These downstream firms purchase inputs from two identical competing suppliers of homogeneous inputs whose production is characterized by constant returns to scale and constant marginal costs. These upstream input suppliers also compete Bertrand, but since they produce a homogeneous product, the input price charged is the same for each upstream firm, is equal to marginal cost, and there are no monopoly profits upstream. The equilibrium prices charged by downstream suppliers increase as input prices/costs incurred by either downstream firm increase.

One of the downstream firms now merges with one of the upstream input suppliers and credibly commits to cease selling inputs to its downstream rival. It now "buys" all of its input needs from its affiliate at the pre-merger price (marginal cost). The remaining independent input supplier now is the only supplier of the input to the other unintegrated downstream firm. The independent input supplier can now increase the prices it charges to the unintegrated downstream firm for inputs since it has a de facto monopoly. This in turn will lead to an increase in final prices for the differentiated products supplied by both downstream firm and, as a result, will benefit the firm that has vertically integrated (it may also benefit one or both of the unintegrated firms). By "raising rivals' costs," vertical integration has led to an increase in the price of input supplies, which in turn leads to an increase in the price of the differentiated products sold to consumers.²⁰

Post-Chicago antitrust law and economics has shown that a variety of market imperfections can theoretically lead to the possibility that vertical integration and vertical contractual restraints can lead to higher prices, higher costs, and welfare losses. Contrary to the Chicago view that such a result is impossible (or perhaps hardly possible), we now have a rich set of theories that show that it is possible in certain specific theoretical cases; impossibility theories have been replaced with possibility theories. This is not unlike an earlier flurry of theoretical 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 rationale strategy for an incumbent firm with

leverage market power from the regulated market to the unregulated upstream or downstream market under certain circumstances. See Joskow and Noll (1999).

²⁰ See Salop and Riordan (1995) for a more complete exposition of the application of Post-Chicago Economics to vertical mergers.

market power.²¹ As was the case with the theoretical literature on predatory pricing, Post-Chicago antitrust law and economics has not produced much in the way of solid empirical research which shows that these theoretical possibilities are in fact observed in real markets and where they are, 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 diagnose vertical restraints that should be of antitrust concern or for the development of good antitrust legal rules.

Post-Chicago antitrust law and economics does recognize that there may be good economic efficiency reasons for firms to vertically integrate or to enter into non-standard vertical contractual arrangements, that there may be tradeoffs between the efficiency-enhancing benefits of these arrangements and their costs in terms of increased market power, and even that vertical mergers will not lead to consumer harm *in most cases*.²² However, the focus of the analysis is on the market power aspects of vertical relationships, not on the kinds of motivations for non-standard vertical arrangements that have been the focus of TCE.²³ Whether these are pathological cases which rarely occur in real markets has not been a concern of Post-Chicago antitrust law and economics. Moreover, essentially no effort is 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 tradeoffs that may arise between increases in market power and reductions in the costs of transacting.

It is clear that as a matter of economic theory, it is possible for firms with market power to use vertical integration and non-standard vertical contracts to increase market power and reduce welfare in the senses discussed above. While this observation may be inconsistent with the most extreme views of "Chicago antitrust law and economics," it is not inconsistent with TCE. Indeed, TCE provides the tools to understand the costs and benefits of alternative vertical governance arrangements in terms of their ability to

²¹ For example, Milgrom and Roberts (1982)

²² Salop and Riordan (1995), page 521, emphasis added.

²³ Salop and Riordan (1995) devote only six 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.

mitigate contractual hazards and reduce the costs of transacting.²⁴ Moreover, TCE's intellectual contribution to the changes in antitrust policies regarding vertical integration and vertical contractual arrangements does not depend on the adoption of the so-called Chicago antitrust law and economics view regarding the relationships between vertical governance arrangements and enhanced market power.

Where Post-Chicago antitrust law and economics misses 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 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. The interesting question is not whether post-Chicago antitrust economics is supported by good economic theory, but rather what contribution does Post-Chicago antitrust law and economics make to the development and application of *legal rules* for enforcing the antitrust laws?

Some commentators appear to view post-Chicago economics as standing for the proposition that if one can show that there are market imperfections then this should create the opportunity to use the antitrust laws to scrutinize the behavior of any firms and the performance of any markets which may be affected by these market imperfections and to then endeavor to find remedies that will reduce the associated inefficiencies. According to this view, all firms buying and selling in markets that depart from textbook perfect competition become plausible candidates for antitrust complaints, litigation, and antitrust sanctions. If this is the implication of post-Chicago economics it is an implication that I hope policymakers will ignore. This approach completely ignores the institutional and transaction cost consideration relevant to developing and applying good antitrust legal rules which I discussed earlier.

Others proponents of the application of post-Chicago law and economics are more cautious and propose that screening criteria be developed and applied which allow the antitrust enforcement institutions to screen for firm, market and regulatory structures in which vertical integration and vertical restraints are *likely* significantly to enhance market power and then to examine the market power and efficiency effects of vertical

²⁴ Joskow (1991), pages 81-82.

governance structures, and perform tradeoffs between the benefits and costs of the proposed vertical governance arrangements, only in those situations where the preconditions exist for these governance arrangements to enhance market power. It is hard to argue with this approach in concept. Moreover, it is not clear that it is even different conceptually from the antitrust rules that emerged in the late 1970s and 1980s which required evaluation of vertical integration and most vertical contractual arrangements under a *rule of reason* rather than under a *per se* rule.²⁵ However, in practice, the utility of this approach will depend on the ability to develop good screening criteria, the ability of judges and juries to perform the requisite assessment of market power and the tradeoffs between efficiencies and market power, the remedies that are applied to fix the problems identified, and the associated expected costs of Type I and Type II errors. The appropriate screening criteria, the nature of any tradeoff analyses, and the remedies to be applied are, from this perspective, interdependent. Developing good screening and evaluation criteria will be difficult in the absence of a body of good empirical analysis that shows when, how, and how much vertical integration and vertical restraints enhance market power. That is, in the absence of an empirical literature on the market power enhancing effects of non-standard vertical relationships, comparable to what has emerged in TCE for understanding how alternative vertical governance arrangements mitigate contractual hazards, it is difficult to use this new theoretical work to fashion good antitrust legal rules.

These considerations suggest that a good way to evaluate the incremental contribution that post-Chicago antitrust law and economics has made to antitrust policy is to examine cases in which its proponents are pleased to claim that it has been applied. The Supreme Court's decision in *Kodak v. Image Technical Services* (112 S. Ct. 2072 (1992)) is often pointed to proudly as an example of the application of post-Chicago economics.²⁶ Since the case happens to involve ex post "lock-ins" and "hold-ups" it is an especially interesting case to explore potential complementarities and conflicts between post-Chicago antitrust law and economics and TCE. I do so in the next section.

²⁵ Moreover, this two-stage approach has been applied to formulate antitrust rules in other areas. For example, Joskow and Klevorick (1979) propose a two-stage approach for evaluating predatory pricing claims from a framework that recognizes that antitrust legal rules must account for Type I and Type II errors in the identification of and remedies for predatory pricing.

SHOULD POST-CONTRACTUAL HOLD-UPS BE SUBJECT TO ANTITRUST SANCTIONS?

One of the most important contributions of TCE is the theoretical and empirical analysis of vertical relationships that require specific investments by one of 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 "hold-up" 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 hold-up 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 generally assumes is not remediable. Importantly, 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 non-standard 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

²⁶ Salop (1993).

problems that faced the contracting parties *ex ante* before they entered into their relationship. The much maligned 1960s antitrust analysis of vertical restraints on the other hand had 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 inevitably find that there are potential *ex post* hold-up 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 and, depending on the distribution of specific investments, it is the bargaining 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 which have many competitors *ex ante* who enter into sales or franchise agreements with individual downstream firms which 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.

TCE on the other hand leads to an antitrust policy that focuses primarily on the *ex ante* market environment and which recognizes that the restrictive portions of the vertical agreements were most likely to have been put in place to protect the buyer and seller from *ex post* hold-ups and other opportunistic behavior. This view was 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*²⁷ looks very different once one recognizes that Chicken Delight was simply one of many fast food franchisers whose franchisees had an opportunity to

²⁷ 488 F.2d 43 (1971).

bargain with *ex ante*.²⁸ 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.

In my 1991 paper I suggested that the then relatively recent treatment of tying arrangements in the *Jefferson Parish Hospital* case (466 U.S. 2 (1984)) raised serious questions about whether TCE had really had a significant impact on legal thinking about vertical contractual arrangements. While this case relaxed the prevailing rule that tying was illegal *per se*, 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. In other circumstances it would be evaluated under a rule of reason. "Rather than providing a coherent framework for evaluating complex vertical arrangements, this case simply strings together a long series of confusing gibberish from earlier confused tying cases. There is no evidence of any new learning about either the analysis of competitive effects of complex vertical contracts or the application of transaction cost economics to try to understand why hospitals might choose to contract for anesthesiology services in this way." (Joskow (1991, page 65).

The *Kodak* case provides the Supreme Court's most recent thinking on tying arrangements and is often pointed to as a good example of the application of post-Chicago antitrust law and economics. Much has been written about the *Kodak* case so I will only briefly summarize here its most salient facts.²⁹ 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. Indeed, when Kodak entered these markets, they were apparently dominated by Xerox. When Kodak began supplying these products it also manufactured or contracted with third parties to manufacture replacement parts for the equipment. Many of these parts were unique to Kodak copiers (and were generally patented by Kodak). That is, replacement parts for copiers supplied by other manufacturers could not be used in the repair of Kodak copiers

²⁸ See Joskow (1991), pp. 60-61

²⁹ Salop (1993), Klein (1996, 1999), Shapiro (1995), Borenstein, MacKie-Mason and Netz (1995).

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.³⁰ 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 was a relevant product market and that parts and service were separate products, *Jefferson Parish Hospital's* analysis would lead to the conclusion that the tying arrangement was *per se* illegal. The ISOs argued that Kodak replacement parts was 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

³⁰ 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 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.

exploiting this lock-in opportunistically to "hold-up" copier owners by extracting excessive prices from them for service.³¹

However, 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's view of the appropriate legal rule was supported by the theoretical economics argument that if the equipment market was competitive this made it impossible for Kodak to harm purchasers via its policies regarding the sales of parts and service. Specifically, Kodak argued 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 compensated for by lower equipment prices due to competition in the (ex ante) equipment market.

The District Court accepted Kodak's argument on a summary judgement 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. As I will discuss, Kodak lost that trial and the subsequent appeals. It was assessed treble damages and the courts imposed a duty to sell parts to all purchasers obligation on Kodak for ten years.

It is important to understand that the Supreme Court heard this case on a summary judgement 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. The Supreme Court's analysis 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 Supreme Court rejected this theory, focusing on the potential importance of market imperfections that could make this theory invalid. In particular, the Supreme Court emphasized the potential role of information costs, undermining the ability of equipment purchasers to

³¹ Note, however, that it was the ISOs, not the owners of the copiers who were suing Kodak.

fully evaluate life cycle costs,³² 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. In particular, the Court argued that Kodak could use a parts tie-in 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.³³ 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 hold-up strategy were factual matters that had to be resolved in a trial. While the Court's decision is filled with rhetoric about potential information market imperfections, lock-ins, switching costs, and market power, I was unable to find a single reference to relevant work in TCE or a hint that the court was looking at the issues being raised using the analytical framework of TCE.

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 can be inferred from brand specific market shares!).³⁴ Moreover, a wide range of ex post holdup or "lock-in" situations become the potential grist for antitrust claims. Such an interpretation focuses attention on the ex post relational situation and ignores ex ante competition and could

³² The "dumbest" purchaser of all was the U.S. government since equipment, parts and service were purchased by separate agencies with different budgets. Let me note, however, that 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.

³³ At this point I can't help but observe that Kodak could achieve much of the same effect simply by increasing replacement parts prices. The only difference would arise as a consequence of substitution possibilities between parts and service if they are not supplied roughly in fixed proportions.

bring the behavior of any supplier of durable goods with continuing relationships with its customers and any franchiser under the scrutiny of antitrust courts with the presumption that they have antitrust market power.³⁵ This interpretation could turn antitrust policy towards vertical contractual relationships back to where it was in the 1960s or worse.

Others have argued that the Court's decision cannot be read nearly so expansively. All the Court did was to 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 anticipate *ex ante*. That is, the plaintiffs had 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 hold-up strategy *and* that the typical customer could not have reasonably anticipated such a policy when it made its initial purchase decisions.

A potential problem with this interpretation is that it must be twisted to fit into the mechanical way 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* (inter-brand) 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 they 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.

These problems with the second interpretation can be illuminated by examining what actually happened to Kodak when the case went back to trial. Despite what appeared to be the Supreme Court's direction that a trial explore empirically whether Kodak had the incentive, ability, and actually used the tying policy to harm consumers,

³⁴ Grimes (1999) as this point relates to franchise agreements.

the ISOs instead apparently argued a fairly conventional tying/monopolization case in front of a jury.³⁶ They relied on the Supreme Court's decision's emphasis on ex post switching costs largely to justify defining relevant product markets that consisted only of Kodak replacement parts and Kodak service. Kodak had effectively 100% of the 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's efficiency justifications for its behavior were unconvincing. Kodak ultimately lost the case, was required to pay the ISOs damages and required to sell parts to all buyers at a "reasonable price" for ten 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 ten years at "a reasonable price" into an obligation to sell its equipment at a "non-discriminatory" price because of concerns that the "reasonable price" obligation would require the court to engage in ongoing price regulation.³⁷

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 hold-ups resulting from specific investments impossible in the presence of information costs, incomplete contracts, and *imperfect* ex ante competition. So, Kodak's appeal to economics to justify its proposed legal rule could not be supported by economic theory! On the other hand, Shapiro (1995, page 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."³⁸ Potential welfare losses would be reduced further if consumers negotiated contractual protections against the most serious potential hold-up problems. Moreover, it is unlikely that Kodak would have had an antitrust problem if it

³⁵ Indeed, it could make disputes arising in connection with almost any supply relationship supported by specific investments a potential subject of antitrust scrutiny.

³⁶ Klein (1999) and *Image Technical Service, Inc. et. al. V. Eastman Kodak Co.* 1997-2 Trade Cases ¶ 71,908.

³⁷ The theory here is that sales of replacement parts to large customers who service their own equipment and are continuing potential equipment purchasers will discipline the prices Kodak can charge to ISOs and avoid the need for the court to engage in price regulation.

³⁸ Contrary results by Borenstein, MacKie-Mason and Netz appear to depend heavily on inefficient substitution possibilities between the durable equipment and the ex ante replacement parts and service for that equipment.

had simply implemented its strategy by increasing replacement parts prices --- a more conventional "hold-up"---, a strategy that was certainly feasible since Kodak controlled the supply of replacement parts by virtue of its patents.³⁹ Accordingly, an appropriate empirical analysis of the costs of the tying agreement would compare the associated price and quantity outcomes with an alternative strategy which simply involved equivalent replacement parts price increases. This would further reduce the societal cost of the tying strategy itself.

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 to an appropriate legal rule, or even to the conclusion that Kodak's proposed legal rule was incorrect. From a TCE perspective, An appropriate legal rule must take account both of the basic theoretical and empirical economic analysis relevant to cases with these attributes *and* of the institutional arrangements, transactions costs, and potential for costly errors in diagnosis and remedies which characterize the antitrust enforcement hierarchy which 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 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 to 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

³⁹It 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,

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.⁴⁰ The presence of information costs, market imperfections, lock-ins, and potential or actual ex post opportunism and hold-ups 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 returning attention to the ex ante market environment and reducing attention to the ex post presence of specific investments and the potential for hold-ups.

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 that the franchise agreement was negotiated, what the franchisee knew, should have known, or should have reasonably expected to happen 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.

there would have been no antitrust liability. It was the *change* in policy that offended the Supreme Court.

⁴⁰ Klein (1996, 1999) and McDavid and Steuer (1999).

Accordingly, after nearly a decade of litigation, the end result appears to be moving toward a legal rule which effectively says that "post-contractual hold-ups 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 post-contractual hold-up claims, but it must show that a hold-up 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.

Durable equipment suppliers and franchisers have also apparently altered their behavior in response to the evolution of the *Kodak* rules. I am told the antitrust lawyers counsel their durable goods manufacturing clients either to decide that they will supply parts and services exclusively when they begin selling equipment, or make changes in replacement equipment and service policies that may hurt competing service suppliers applicable only to purchasers of new durable equipment. Similarly, it appears that antitrust lawyers counsel their franchiser clients to fully reveal their franchise policies and potential future changes in them at the time they enter into franchise agreements. None of these responses to the deterrence incentives created by *Kodak* and its progeny is likely to be particularly costly and some may be desirable.⁴¹ Moreover, under this kind of rule buyers and franchisees continue to have incentives to enter into agreements ex ante that protect them from contractual hazards.

While the evolution of legal rules in this area post-*Kodak* appears to be in the right direction, a reading of recent cases sometimes suggests a fairly tortured effort to distinguish the facts from those in *Kodak* and to avoid dealing directly with the theoretical market imperfections issues raised by the Court in its decision. Moreover, some commentators and litigators continue to insist that *Kodak* should be read more expansively.

I do not believe that it is sensible to open up ex post hold-ups arising from "lock-ins" due to from specific investments widely to antitrust scrutiny, especially when the ex

⁴¹ The incentive to offer service exclusively at the outset, however, could increase the costs of entry.

ante market is reasonably competitive. We have contract laws and various other consumer protection laws to deal with the bulk of these potential problems. I suspect that the Supreme Court did not intend this result either. (A clever law clerk who learned enough economics to be dangerous may have gotten carried away with the rhetoric on market imperfections contained in the Court's opinion.) So, while Kodak's theory that ex post opportunism was impossible when equipment markets are competitive was clearly wrong, a *legal rule* that places a very significant burden on plaintiffs to show that there is a hold-up problem of concern to the antitrust laws when ex ante markets are competitive actually makes a lot of sense. Indeed, I would not be unhappy with Kodak's proposed legal rule, though for different reasons from those advanced by Kodak. As a general matter, post-contractual holdups should not be subject to antitrust sanctions. Buyers and sellers should have incentives to negotiate mutually satisfactory contract terms at the contract execution stage. Contractual disputes should be governed by contract law and, perhaps, consumer protection laws governing the provision of pre-contractual information. Without very clear legal rules that place a very high burden of proof on plaintiffs making post-contractual hold-up claims under the antitrust laws, large numbers of disputes regarding contract terms, post-purchase replacement parts and service, and disputes between franchisees and franchisers could (once again) be turned into antitrust cases due to the lure of treble damages.

The courts have managed so far to interpret *Kodak* in a way that is likely to have much the same effect as Kodak's proposed legal rule would have had in the sense that if ex ante markets are competitive and suppliers deal fairly with buyers and franchisees at this stage, ex post hold-up claims face a significant burden of proof in an antitrust court. It would be useful, however, for the Supreme Court to clarify the continuing confusion over what *Kodak* stands for and what it does not stand for. It could do so by taking one of the post-contractual hold-up cases that comes up through the appeals process and using it to specify a more precise legal rule. The appropriate legal rule would be something like the following: If the ex ante market is reasonably competitive, then for a plaintiff to get a trial on an ex post hold-up claim he must show (a) that the behavior at issue represents changes from what was promised at the time the equipment was purchased or franchise agreement negotiated, (b) that the changes in policy were not reasonably

foreseeable by the buyer (franchisee) when the equipment was purchased, (c) that contractual arrangements were not available to mitigate the potential hold-up problem, and (d) explain how he will demonstrate at trial both the presence of specific investments and associated high switching costs and that the seller has exploited these switching costs to implement a hold-up. If the plaintiff satisfies these criteria, the trial then focuses on analyzing the presence and magnitude of the lock-in, the associated potential for hold-ups and other opportunistic behavior, and whether the changes in behavior at issue represent a holdup or have an alternative business/efficiency justification. Simply examining brand specific market shares and drawing inferences about ex post “market power” from them is not a substitute for this kind of analysis.

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 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 deter adequately the firm's incentive and ability to restrain competition. These were the kinds of considerations that led the District Court hearing the *U.S. v. Microsoft* case to order divestiture as part of a package of remedies.⁴² 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

⁴² Though the order requires a vertical divestiture (creating an operating systems company and an applications company) rather than a horizontal divestiture (e.g. create three operating system companies with rights to sell and develop Windows). The remedy is apparently based on the theory that separating the control over the Windows operating system from the supply of popular Microsoft applications programs will lead the new applications program company to port its programs to other operating systems and thereby make it easier for them to sell competing operating systems to consumers. Thus, the divestiture remedy is designed to induce competing operating system to compete more effectively against Windows rather than to create more competitors directly through the divestiture process.

which were already individually structured as viable operating firms prior to divestiture. The most recent Section 2 divestiture involving AT&T, relied heavily as well 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 pre-merger 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 recent mergers of Exxon and Mobil and of BP/Amoco and Atlantic Richfield were approved subject to extensive asset divestiture requirements.

It is important to understand that under U.S. antitrust law, having a "monopoly" in a relevant market is not itself illegal. It is "monopolization" that is illegal, not monopoly power itself. If a firm obtains a dominant market position "fair and square" then its monopoly power cannot be attacked under the antitrust laws. To be subject to antitrust sanctions under Section 2 of the Sherman Act, a firm must have monopoly power in the relevant market (or a dangerous probability of obtaining such power) *and* must be shown to have adopted predatory or exclusionary practices to obtain and maintain that monopoly power. Accordingly, a successful antitrust claim against a dominant firm must show that it has engaged in predatory or exclusionary practices. The treatment of mergers under Section 7 is symmetrical in the sense that the merger inquiry focuses on whether the merger (an action by the merging firms) will create or significantly enhance market power in the relevant market.

The requirement that antitrust sanctions against dominant firms must be based on a showing of "bad behavior" by the dominant firm has been criticized by some as improperly limiting the ability of the antitrust laws to attack structural monopoly problems. During the 1960s in particular, statutory reforms were proposed that would have given the enforcement agencies the authority to use divestiture to "deconcentrate" industries based merely on a conclusion that the relevant markets were not structurally competitive.⁴³ For example, in *Markets and Hierarchies: Analysis and Antitrust*

⁴³ See for example, *Report of the White House Task Force on Antitrust Policy*, July 5, 1968.

Implications, Williamson proposes that "Section 2 of the Sherman Act should be interpreted by the courts to require a finding that persistent dominance is presumptively unlawful, provided only that the industry can be judged to have reached an advanced stage of development [footnote omitted].... The dominant firm charged with a violation would be able to rebut the presumption of unlawful monopolization by demonstrating that its dominance was the result of economies of scale leading to a natural monopoly, of the existence of an unexpired patent [footnote omitted], or of continuing indivisible, absolute management superiority."⁴⁴ A firm that was found by a court to have reached a state of persistent dominance, and which could not show that it satisfied the exceptions, would be required "voluntarily" to divide itself into two competing parts within, say, five years. If it did not do so, the government would be entitled to court ordered divestiture.

The primary rationale for such a policy is that firms may gain a dominant position by virtue of historical managerial skill and foresight, by a series of lucky draws from the hat, or by a combination of both. However, once a firm has obtained a dominant position, "unassisted market forces" may not erode its position quickly even though any superior managerial skill or foresight has long ago retired and not been replaced. Thus, despite the absence of ongoing managerial superiority, consumers of the goods and services sold by the dominant firm would continue to be burdened by the higher prices and dead-weight loss associated with monopoly pricing even in the absence of exclusionary or predatory behavior. Antitrust policy can then be used to break up the dominant firm to create a more competitive industry, leading to lower prices, without destroying a firm that has ongoing cost advantages.

The enthusiasm for using the antitrust laws to deconcentrate industries absent a showing of "bad behavior" has waned considerably over time. Indeed, I was surprised to find this proposal upon rereading *Markets and Hierarchies* in the course of preparing this paper. I believe that there are several reasons for the waning enthusiasm for using the antitrust laws in this way. First, dominant firms which do not also engage in illegal

⁴⁴ Williamson (1975), pages 220-221. Williamson's proposal for mandatory divestiture by mature dominant firms is much more cautious than some other contemporary proposals which would have applied mandatory deconcentration rules to markets with several competing firms but which had concentration ratios that exceeded specified targets. Indeed, Williamson is much less concerned about market power problems in markets where there is not a single dominant firm than were contemporary proponents of mandatory deconcentration.

exclusionary conduct are unlikely to be able to sustain monopoly prices for long periods of time. Second, large market shares are highly imperfect predictors of monopoly pricing.⁴⁵ Third, mandatory deconcentration policies are likely to catch in their net some firms which do have superior capabilities on the cost and/or product quality dimensions. Fourth, antitrust courts are not well suited to draw fine lines between "superior" dominant firms and "ordinary" dominant firms based on analyses of managerial capabilities and recent performance. Fifth, the antitrust enforcement hierarchy is not well suited to devise divestiture strategies for reassigning physical assets, human assets, patent and copyrights, corporate cultures, etc., which will not create significant new costs. Finally, a dominant firm may react to the expectation of divestiture by engaging in behavior that increases prices or costs in the short run and increases the cost and complexity of divestiture.⁴⁶

It is not my intention to open this debate again here. Rather, I want to discuss only the question of whether antitrust enforcement agencies and courts are likely to be in a good position to fashion or approve effective divestiture remedies even in situations where firms make a "voluntary" divestiture proposal. While there have been a few studies of the effects of divestiture remedies on competition in the affected industries (e.g. oil and tobacco)⁴⁷, 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. However, the FTC recently published the results of a study of "voluntary" asset divestitures which accompanied settlements of antitrust concerns arising from merger applications during the pre-merger review process. The results show that the enforcement agencies have much to learn about designing effective divestiture strategies and that TCE can be very useful in designing effective divestiture plans and avoiding implementing divestiture plans that are likely to fail to meet their goals.

⁴⁵ The enthusiasm for inferring serious monopoly pricing problems from market share indicia has also waned over time.

⁴⁶ Williamson recognizes these last two sets of problems and other similar problems but argues that these potential costs can be mitigated, pp. 224-226.

⁴⁷ Generally showing that the divestitures were not particularly successful in stimulating competition in the short run.

In 1999, the FTC published a study which examined the outcomes of 35 divestiture orders (37 divestitures) entered from 1990 through 1994.⁴⁸ This was the first time that the FTC had studied the outcomes of its divestiture orders since it began to implement the HSR pre-merger notification process in 1979 (when ten divestitures were ordered). The study reports on the results of a series of 37 post-divestiture case studies, based largely on interviews with the buyers of the divested assets.⁴⁹ The primary conclusions of the study were:

- a. About 3/4 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. Most buyers do not have access to sufficient information to prevent mistakes in the course of their acquisitions. The study found evidence of widespread mistakes by buyers in negotiating the details of divestiture agreements. 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. 22 of 37 divestitures studied were on ongoing businesses and 19 were viable in the relevant market virtually immediately.
- e. Continuing post-divestiture 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. 19 of 37 buyers maintained continuing relationships with the seller. In 13 of these cases the continuing relationships led to problems for the buyer and in 6 of these cases the problems kept the buyer from operating successfully. However, in 6 cases continuing

⁴⁸ Federal Trade Commission (1999).

⁴⁹ The limited data previously available in the Commission's records have tracked divestitures only to the point that the Commission approved the contract and the assets were divested.

relationships were critical to the success of the buyer, though not necessarily contributing to increasing competition. The results of a few of the individual case studies are quite interesting in this regard:

- Firm 4 was a small but diversified manufacturer that viewed its acquisition of the to-be-divested assets as a good opportunity to enter a new product market with an on-going manufacturing facility. Firm 4 entered into an agreement to obtain a supply of a necessary part from the seller at a price that was profitable for Firm 4. The supply agreement was to last for a specified time period. At the end of the period Firm 4 could find no alternative supplier and had to negotiate a new contract with the seller. The seller required a higher price and this made Firm 4's production unprofitable and it left the market.⁵⁰
 - Firm 7 was a large, successful, technologically sophisticated diversified manufacturing company. It acquired a brand name, product formula, and a stockpile of key ingredients from the seller. However, the supplier contract provided that the price of the key ingredient would be negotiated annually. This effectively gave the seller control over the buyer's supply costs for the several years it took to find an alternative supplier and limited the ability of the buyer to compete in the relevant market.⁵¹
 - Firm 27 took over part of the operations of the seller and continued to operate at the same location. It had a transitional arrangement that allowed it to sell products under the seller's marketing umbrella while at that location. It decided to maintain this relationship after the transitional period. This has resulted in an implicit partnership rather than competition.⁵²
- f. Smaller buyers of divested assets succeeded at least at the same rate as did larger buying firms.

The FTC staff which performed this study appear to have found many of these results to be surprising. Serious students of TCE should not find them surprising at all. Firms subject to "voluntary" divestitures should be expected to behave strategically; ongoing businesses that have been divested are likely to fare better post-divestiture than are assets that require the creation of a complete new business organization to be used effectively; buyers negotiating divestiture agreements in which they are dependent on the seller and have not protected themselves against ex post holdups are likely to face the

⁵⁰ FTC (1999), page 21.

⁵¹ FTC (1999), pages 21 and 27.

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.

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.

RESTRUCTURING REGULATED MONOPOLIES TO PROMOTE COMPETITION

One of the most important set of changes in industrial organization that has taken place around the world in the last 15 years is associated with the restructuring of industries which were historically considered to be natural monopolies and were subject to price and entry regulation (and often publicly owned as well). These industries include telecommunications, electric power, natural gas transportation, and railroads. The primary goals of these restructuring initiatives have been to promote competition in those horizontal segments of these industries which are conducive to it, to shrink the scope of regulated monopoly, and to introduce new regulatory mechanisms for residual regulated monopoly segments to provide better incentives for cost reduction and efficient pricing.⁵³

In my 1991 paper I argued that transaction cost economics provides an indispensable set of tools for understanding how the organizations subject to reform had emerged and how they are likely to respond as economic and regulatory conditions change.⁵⁴ A major thrust of these restructuring initiatives has involved vertical separation of potentially competitive (e.g. electricity generation) from natural monopoly segments (e.g. electricity transmission). It has been my view that there are very sound TCE reasons why these industries evolved with vertically integrated structures.⁵⁵ Moreover, vertical restructuring to promote competition in certain horizontal segments must necessarily confront a tradeoff between the potential benefits of market forces replacing inefficient regulated monopolies and the potential costs associated with contractual hazards arising from vertical disintegration. The challenge for the development of new

⁵² FTC (1999), page 26.

⁵³ See for example, Peltzman and Winston (2000).

⁵⁴ pages 76-78.

⁵⁵ See Joskow (1996) regarding the electricity sector.

governance arrangements in these industries is to keep the costs of vertical separation low without seriously undermining the benefits of competition. These challenges are especially great when the performance of the competitive segments (e.g. generation) depends critically on the details of relationships with segments that continue to be regulated monopolies (e.g. transmission) which buyers and sellers in the competitive segments depend upon to support competitive trading relationships.⁵⁶

"Major vertical restructuring of industries that involve significant non-redeployable sunk investments, the operation of complicated networks, and significant costs of system failure, necessarily raise precisely the kinds of organizational issues that transaction cost economics is supposed to be able to deal with well. However, while transaction cost economics has played a role in the debates about vertical restructuring in these industries, and the precise form that such restructuring would take, it is my sense that the direct role of transaction cost considerations in influencing the direction of public policy has, so far, been quite modest." (Joskow (1991), page 77).

We now have an additional decade of experience with industry restructuring in these segments since I made these observations in 1991. Let me focus here on the experience with electricity sector reforms which I follow most closely.⁵⁷ While the electricity sector reform programs in many countries have been successful in the sense that the benefits of the reforms exceed the costs of the reforms,⁵⁸ a number of common problems have emerged in many of them.⁵⁹

The supply of electricity is generally divided into three or four separate functions:

1. The generation (**G**) of electricity using falling water, internal combustion engines, steam turbines powered with steam produced with fossil fuels, nuclear fuel, and various renewable fuels, wind driven turbines, and photovoltaic

⁵⁶ See Joskow (1997) regarding the nature of the potential short run costs and the potential long term benefits associated with reforms in the electricity sector.

⁵⁷ Joskow (1997) and Joskow (2000). A longer version of the second paper can be found on my web page at <http://web.mit.edu/pjoskow/www/>.

⁵⁸ Joskow (1998).

⁵⁹ Joskow (2000) provides a detailed discussion and evaluation of electricity sector restructuring, competition and regulatory reforms in the United States.

technologies. In most developed countries there are typically many generating plants in service dispersed over a large geographic area.

2. The distribution (**D**) of electricity to residences and businesses at relatively low voltages using wires and transformers along and under streets and other rights of way.
3. Related to distribution, a set of power procurement and retailing (**R**) functions. They include making arrangements for supplies of power from generators, metering, billing, and various demand management services. The dividing line between distribution and retailing is still murky and controversial.
4. The transmission (**T**) of electricity involving the "transportation" of electricity between generating sites and distribution centers, the interconnection and integration of dispersed generating facilities into a stable synchronized network, the scheduling and dispatching of generating facilities that are connected to the transmission network to balance demand and supply in real time, and the management of equipment failures, network constraints, and relationships with other interconnected networks.

The attributes of electricity demand, electricity supply, and physical constraints associated with the operation of synchronized alternating current (AC) networks are highly relevant for understanding the organizational structure of the electric power sector that has evolved over the last century. These attributes are also highly relevant for designing transmission network and competitive wholesale power market institutions with good performance attributes. Electricity usually cannot be stored or inventoried economically, and demand varies widely from hour to hour during an individual day and from day to day over the year. The aggregate short run elasticity of demand is very small. Moreover, there is generally no meaningful direct physical relationship between a specific generator and a specific customer and no way to curtail an individual customer's consumption when specific generators fail to perform. Electricity consumed at a specific point in time must be manufactured in a generating plant virtually contemporaneously with its consumption. Since consumers continue to draw power as long as the circuits are closed and they are connected to the network, the aggregate generation of electricity and the consumption of

electricity must be balanced continuously for the entire network to meet certain physical constraints (frequency, voltage, stability) on network operations.

A modern AC transmission network makes it possible to utilize generating facilities dispersed over wide geographic areas efficiently in real time to meet continually changing demand levels through the substitution of increased production from low marginal cost facilities (say in New Mexico) for production from high marginal cost facilities (say in California). In principle, an efficiently operated network would constantly equate the marginal costs of supplying an additional kWh of energy at all generating nodes adjusted for marginal losses, thermal and operating constraints throughout the network. It would also economize on the reserve capacity required for any given level of reliability (responses to equipment outages and unanticipated swings in demand) by effectively aggregating loads and reserve generating capacity over a wide geographic area and by providing multiple linkages between loads and resources that can provide service continuity when transmission facilities fail. To accomplish these tasks, the network must be operated to maintain its frequency and voltage parameters within narrow bands and to respond to rapidly changing system conditions on the demand and supply sides, especially short term demand swings and unplanned equipment outages. Generating facilities must be called upon almost continuously to provide a variety of network support services in addition to providing energy to run customer appliances and equipment. These “ancillary services” include spinning reserves, standby reserves, blackstart capability, frequency regulation (Automatic Generation Control), scheduling and dispatch control, and others.

Electric power networks are not switched networks like railroad or telephone networks where a supplier makes a physical delivery of a product at point A that is then physically transported to a specific customer at point B. A free-flowing AC network is an integrated physical machine that follows the laws of physics (Kirchoff's Laws), not the laws of financial contracting. Electricity produced by all generators goes into a common pool of electric energy and demand by consumers draws energy out of that common pool. The network operator must ensure that the pool stays filled to a constant level, balancing inflows and outflows. The electric energy produced by a particular generator cannot be physically associated with the electricity consumed by a particular consumer. When a generator turns on and off, it affects system conditions throughout the interconnected

network. Large swings in load at one node affects system conditions at other nodes. A failure of a major piece of equipment in one part of the network can disrupt the stability of the entire system if resources are not available to the network operator to respond quickly to these contingencies. Moreover, efficient and effective remedial responses to equipment failures can involve coordinated reactions of multiple generators located remotely from the site of the failure. These attributes create potential network externality and “commons” problems.

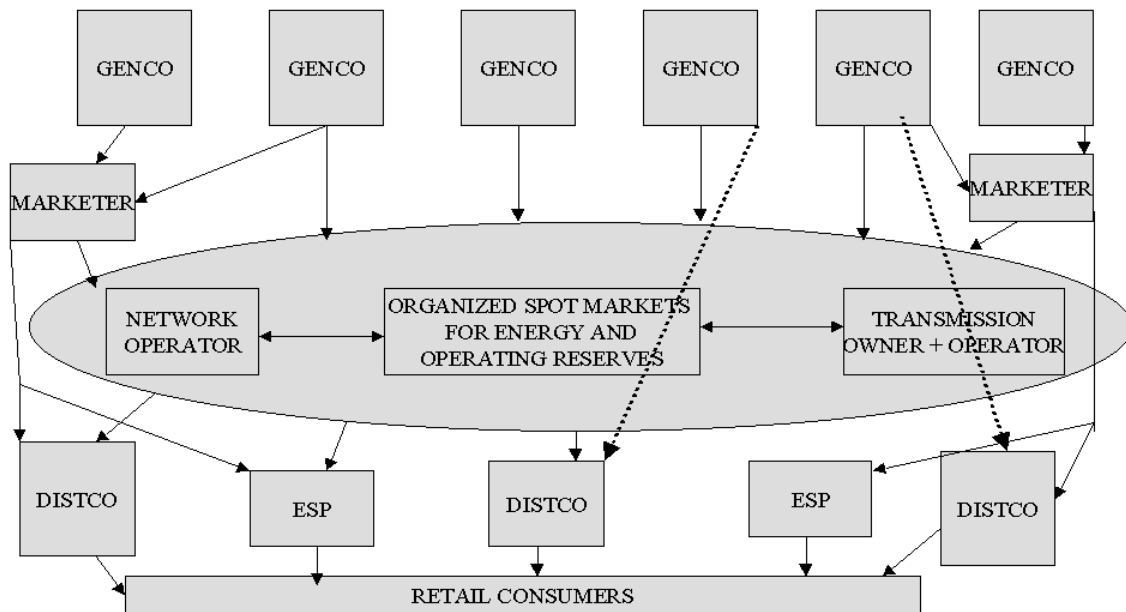
Everywhere on earth electric power systems evolved with similar governance structures. Electricity suppliers typically had de facto exclusive rights to serve all consumers in a particular geographic area and an obligation to supply them with reliable supplies of electricity at “cost-based” regulated prices. Electric utilities typically met their supply obligations by vertically integrating into all four supply segments, owning generation, transmission and distribution facilities, operating them in an integrated fashion using internal operating protocols, and providing consumers in their franchise areas with a single bundled electricity supply product.⁶⁰ The physical and economic attributes of generation and transmission in particular led to vertical integration as an efficient governance arrangement (Joskow (1996) and Joskow and Schmalensee (1983)). However, vertical integration between a natural monopoly segment (e.g. transmission and network operations) and potentially competitive segments (e.g. generation and retailing), extended the institution of regulated monopoly to both segments.

In response to perceived performance problems with these traditional governance arrangements, many countries have or are in the process of implementing a new model for their electricity industries. The new model has the following general features: generation would be fully separated from transmission and distribution; regulated distribution and transmission charges would be “unbundled” from generation and retail service charges; wholesale generation service prices would be deregulated; generators would compete de novo in regional markets both to supply distribution companies purchasing on behalf of their retail customers (full wholesale competition with exclusive retail supply) and to supply retail customers as well (“retail wheeling”) either directly or through financial

intermediaries (wholesale marketers and retail Energy Service Providers (ESPs)). This model of a restructured electric power sector which would reduce the expanse of regulated monopoly to transmission and distribution functions and rely on competition to supply generation and retailing services at wholesale and retail is depicted in Figure 1.

FIGURE 1

COMPETITIVE WHOLESALE + RETAIL MARKETS



The core of most electricity sector reforms is the creation of reasonably competitive wholesale spot and forward markets for electric energy, capacity, a variety of operating reserve services (also referred to as ancillary services), plus free entry of new generating capacity to make sales in these unregulated power markets. Competitive generation service (energy, capacity, network support and congestion management services) markets on electric power networks are most appropriately conceptualized as spatial markets with demand (or loads) and differentiated generators dispersed across the

⁶⁰ In all countries generation and transmission (G&T) were vertically integrated. Separate distribution companies existed in many countries, but they typically purchased all of their power supply needs from neighboring vertically integrated G&T companies under long term contracts.

network's geographic expanse. These demand and supply locations are generally referred to as "nodes" on the network. Though the generation suppliers produce more or less the same product -- electric energy (reserve services and differences in adjustment speeds complicate this) -- they are differentiated from one another along three major dimensions: (a) marginal costs of production, (b) transportation costs due to congestion and thermal losses, and (c) the speeds with which they can adjust their output from one supply level to another, including starting up from zero. The transportation costs in turn vary widely with system conditions -- supply and demand -- at all nodes on the network. In addition, generators can produce multiple services, consisting of both energy and various reserve services. So, the basic framework for thinking about competition among generators should be based on a fairly complicated spatial competition model with competing multiproduct firms at different locations which are "separated" by congestion costs and thermal losses. The suppliers of generation service are asymmetric, the costs of transportation vary widely over time as congestion varies, and the elasticity of supply around the competitive equilibrium varies widely over time as demand that must be met by just-in-time production fluctuates between very low and very high levels.

As in other commodity markets, these markets play the traditional role of balancing supply and demand and allocating supplies among competing generators in the short run and provide economic signals for entry of new suppliers in the long run. However, wholesale electricity market mechanisms also play another important role. They are relied upon to provide generation resources, and economic signals for using these resources efficiently, that the operator of an electric power transmission network must rely on for maintaining the reliability and power quality of the network (frequency, voltage, and stability) and to manage congestion and related network constraints at the same speed at which electricity supply and demand attributes change -- which is very fast. These resource allocation functions were traditionally performed within vertically integrated firms using internal scheduling, dispatch, and emergency response protocols that depended on a combination of computer optimization routines, marginal cost signals, and "band aids" applied by system operators to deal with unusual circumstances. The short run operating functions and the associated physical attributes of electric power systems that I just listed are perhaps the primary factors that led to vertical integration

between generation and transmission. They are also the most challenging resource allocation activities to mediate through market mechanisms.

All of the credible models for creating new competitive electricity markets, recognize that there must be a single network operator responsible for controlling the physical operation of a control area, coordinating generator schedules, balancing loads and resources in real time, acquiring ancillary network support services required to maintain reliability and coordinating with neighboring control areas. In most countries, organized auction markets have been created both to allow generators to trade energy with wholesale and retail buyers and with each other and to allow the network operator to purchase options on capacity to allow it to manage network congestion and other reliability and physical constraints. The performance of these auction markets depends critically both on there being robust competition among generation suppliers and the implementation of set of auction rules that are compatible with the physical operating constraints on the system and do not facilitate gaming and market power problems that may be engendered by these physical constraints.

A number of market performance problems have arisen in these new electricity markets. Several of them appear to be a consequence of the legacy of long-lived sunk investments made in the context of a vertically integrated system which create hold-up problems when the system is broken up and decentralized. Others relate to the coordination of generation and transmission operations and investments which are simply very difficult to decentralize effectively with spot market mechanisms. These coordination problems result from the difficulty of creating “enough” markets, getting them to clear quickly enough to allocate fast moving flows of electric power efficiently, temporary market power problems that arise from network congestion and related operating constraints, network externality problems, and problems associated with lumpy transmission investments, and the difficulty of defining meaningful property rights for using the transmission network which do not degrade the efficiency of the system (Joskow and Tirole (2000)). The implementation of electricity sector restructuring has sometimes ignored transactional attributes that can lead to such problems, with unfortunate results. Among the problems that have arisen are the following:

a. Local market power problems: Under certain supply and demand conditions specific generating plants or small groups of generating plants located at specific locations on the network must be operated to maintain the physical integrity of the network. This is the case because transmission networks have operating constraints which make it impossible to physically supply all demand at specific locations from remote generating plants under all supply and demand conditions.⁶¹ The network operator typically runs one or more auction markets in which generators submit bids to supply energy or reserves in response to calls from the network operator to manage network congestion or other physical operating constraints at particular locations on the network. If generators know that they must be called by the system operator to run regardless of the price they charge, they are in a position to bid very high prices into the auction markets run by the network operator, at least until new investments in generating and transmission capacity are made to increase sufficiently the number of competing supply sources available under these conditions. That is, these generators have "local market power" under certain system conditions and can "hold-up" the system operator and those who pay for its costs.

Industry restructuring initiatives have had problems identifying and dealing with these local market power problems. Some analysts have been surprised that these problems are so pervasive. They should not have been surprised. When transmission and generation were vertically integrated, investment and operating decisions involving generation and transmission assets were made jointly. When a vertically integrated electric utility considered investing more money in transmission import capability into an area it assumed that it would operate the transmission and generation facilities in an integrated fashion to minimize costs. It did not take "local market power" considerations into account when it made generation and transmission investments because it had no incentive to hold itself up. Restructured electricity sectors inherited the long-lived sunk transmission and generation investments of the past. However, with the separation of transmission and generation, unregulated generators located at such strategic locations on the network now had the incentive and ability to exercise local market power in the absence of mitigation mechanisms being introduced as part of the reform process.

⁶¹ Joskow (2000) contains a discussion of local market power problems in California.

Designing good local market power mitigation mechanisms has proven to be difficult and they have sometimes led to perverse results causing more costly problems than those they were supposed to fix.⁶²

b. Management of network congestion: As supply and demand condition on a transmission network change, equipment is forced out of service due to equipment failures or taken out of service for maintenance, competing generators may attempt to schedule more supplies at particular points on the network than the network is capable of accommodating without creating an unacceptably high probability of system failure. That is, a transmission network can become congested at a large number of different locations under certain supply and demand conditions. These supply and demand conditions, and the associated locations and magnitudes of network congestion, can change very quickly and the network operator must be prepared to manage any resulting congestion virtually instantly. This congestion management challenge arises in many situations other than those that are associated with the local market power problems discussed immediately above.

Some restructuring programs (e.g. PJM and New York in the U.S.) took the congestion management challenge very seriously and designed market mechanisms and network operating protocols around them. These market mechanisms effectively sought to replicate the way the system was operated when it was vertically integrated, replacing market-based bids for the marginal cost-based internal control signals historically utilized by vertically integrated forms. They also recognized the potential for local market power and included mechanisms to mitigate it. Other restructuring programs (e.g. New England and California) were built around the assumption that network congestion was not a serious issue and that the associated costs could be "socialized" (e.g. New England) or that congestion could be subsumed into a small number of large geographic zones (e.g. California). These latter restructuring initiatives are now being redesigned because network congestion has proven to be much more of a problem than had been assumed. These problems arise both because the incidence of network congestion is more frequent than had been assumed *and* because operating rules that ignored it create incentives for

⁶² Bushnell and Wolak (1999).

unregulated generators to behave strategically and to create congestion that would not otherwise exist.

When the industry was vertically integrated, utilities handled network congestion through their internal dispatching programs which generally took congestion into account internally when generators were scheduled and dispatched. They had no incentive to create congestion because there was no profit associated with doing so. Moreover, a great deal of potential congestion was not actually observed in the data because the congestion was anticipated by internal dispatch routines and it was not actually observed ex post. With vertical separation, the network operator must now always manage observed congestion which makes its incidence more visible and it must do so in a world where unregulated generators have an incentive to exploit any imperfections in the congestion management protocols to their advantage. Again, this is a legacy of long-lived investments in generating and transmission capacity made under different governance arrangements.

c. Market Performance Problems When Supplies of Generation Service Are Very Tight: The demand for electricity varies widely from hour to hour and day to day. The demand on a system during the peak hours of a year may be three times the lowest hourly demand on the system. Demand may vary by a factor of 2 from peak to trough on a given day. However, the short run elasticity of demand (day-ahead, hour-ahead, real-time) is very small (almost zero). The near zero short-run demand elasticity reflects both the inherent willingness to pay for electricity, given sunk investments in appliances and equipment that use electricity, and the fact that few retail consumers (presently) actually can see and react to short run price fluctuations because they do not have meters that give them these price signals⁶³ or the communications and control technology to react to them.

The short run competitive supply (marginal cost) curve for a typical thermal generation system rises very steeply as supply grows towards the capacity limits of the system. This reflects both the fact that electricity cannot be stored (ultimate in just-in

⁶³ Meters are typically read once a month and the consumer is billed based on a hypothetical load profile that allocates monthly consumption to specific hours during the previous month.

time manufacturing required) and the high marginal operating of the generating units that are called when supply is very high.

Wholesale electricity market performance problems are frequently observed under conditions when demand is very high and supply is very inelastic, so that the market attempts to clear at a point where a demand curve with near zero elasticity attempts to intersect a supply curve with near zero price elasticity. When these conditions occur, even relatively small generators perceive that their bidding behavior in spot markets can influence the market price.⁶⁴ The result is a market power problem which can lead to market clearing prices that are almost unbounded in the absence of administrative price caps.

This kind of problem was never observed when firms were vertically integrated monopolies. There were certainly situations when supply was very scarce and demand was very inelastic, but a regulated vertically integrated firm did not have the ability to exploit such market power opportunities in sales to its regulated retail customers because the prices these customers paid were fixed by regulation based on its supply costs. Vertically integrated utilities with excess capacity to sell to other utilities in the wholesale market may have had the incentive to charge high prices when supplies were tight, but these sales were subject to price caps and the vertically integrated utility buyers often could respond to high wholesale prices by running their own marginal generating capacity instead.⁶⁵ On the other hand, regulated vertically integrated electric utilities did not have incentives to use prices to ration scarce capacity efficiently and to install metering technology to facilitate rationing by price. Instead, non-price rationing (brown-outs and rolling blackouts) was used to manage excess demand.

One of the potential benefits of competitive wholesale and retail electricity markets is that they will stimulate competing electricity suppliers to offer consumers who

⁶⁴ To convince yourself that this is not a strange anomaly, write down a simple Cournot model with n symmetric firms producing a homogeneous product and a constant elasticity demand function for the product which has a very small demand elasticity (e.g. 0.1) You will see that price/cost margins can be quite high even with a relatively large number of generation suppliers. While electricity markets are probably not well described by a Cournot model, this exercise helps to make the point. See also, Wolfram (1998).

⁶⁵ The derived demand for wholesale power by a vertically integrated firm is much more elastic than is the final demand of their retail customers since they can substitute their own (more expensive) internal supplies as wholesale market prices rise.

can respond to price volatility, price sensitive contracts that provide the price signals, communications, and control systems which can facilitate consumer interaction with the wholesale spot market. Even a relatively small amount of price sensitive demand can significantly reduce generator market power under these conditions. Again, however, restructured electricity sectors inherited the stocks of metering and communications equipment from the past and often operate with transition pricing policies that mute the incentives consumers have to choose price responsive contracts. Accordingly, adaptations to respond to market power problems that arise during tight supply conditions have been slow to develop.

d. Coordination of transmission and generation investments. Most high voltage transmission investments were undertaken by vertically integrated firms in conjunction with investments in new generating capacity to meet growing electricity demand and to replace antiquated generating equipment. Transmission and generation are both complements (some transmission investment is needed to accommodate production from a new generator) and substitutes (a generator located close to a demand center requires less transmission investment than one located in a remote area with little local demand). Transmission investments can also be lumpy and require longer planning, permitting and construction times than new generating plants. The tradeoffs between the location of new generating facilities and investments in new transmission facilities are complicated by the physical interdependencies of demand and supply at different locations on a transmission network. A vertically integrated firm which spanned a large enough geographic area could both coordinate generating and transmission investment and internalize potential network externalities.

In many countries that have implemented electricity sector reforms of this nature, it has proven to be difficult to stimulate adequate transmission investments in the right locations to accommodate the entry and exit of generators and to promote competition among existing generators over large geographic areas. That is, the design and implementation of decentralized mechanisms to coordinate the behavior of competing generators and a regulated independent transmission owner (or owners) has been a difficult challenge. The problems associated with stimulating appropriate transmission

investments in turn undermine the performance of the competitive generation markets that rely on it.

Many policymakers and fellow travelers have been surprised by how difficult it has been to create competitive wholesale electricity markets that are not plagued by these and other problems. However, had policymakers viewed the restructuring challenge through using a TCE framework, these potential problems are more likely to have been identified and mechanisms adopted *ex ante* to fix them. Instead, the restructuring programs have often gone forward (a) assuming that there were no economic efficiency reasons for why vertical integration between generation and transmission was the way electricity sectors evolved everywhere on earth and (b) ignoring the configuration of long-lived sunk investments in the existing system and its implications for competitive market behavior in physical (spot) electricity wholesale markets. Had these factors played a more central role in the reform process, some of the most serious problems could have been avoided or their costs reduced.

The application of TCE analysis also leads to suggestions for improving performance. It is becoming increasingly clear that unregulated wholesale electricity markets work best when transmission congestion and constraints do not place significant limitations on the number of generators which can compete to serve demand and provide reliability to the network at specific locations. This suggests that the successful development of competitive wholesale electricity markets requires “overinvestment” in transmission capacity compared to a governance structure that relies on vertically integrated monopolies subject to regulation. The costs of “overinvestment” in transmission is a cost that must be paid to create competitive electricity markets that (we hope) will lead to lower cost outcomes in other dimensions in the long run than did the institution of vertically integrated monopoly.⁶⁶

⁶⁶ The potential long run cost saving opportunities and other potential benefits of electricity sector restructuring are discussed in Joskow (1997).

CONCLUSION

TCE clearly provides theoretical tools and a large body of empirical research that can be very helpful in the formation of competition policies, whether they involve antitrust policy or industry restructuring to promote competition in sectors that were previously occupied by regulated monopolies. However, it still appears to me that TCE is not being utilized nearly as much as it should be in these policy arenas. It would be useful to understand better why this is the case.

Let me conclude with a hypothesis of one factor that may be a contributing factor to this state of affairs. Academic economists do not make public policy directly. They contribute to public policy through their writing, through their participation in public policy formation as commentators and consultants, and through their effects on the education of lawyers, judges, business people, and politicians who have a stake in and are directly involved in policy formation and application. Few of these people have graduate degrees in economics. Many of them took some economics as undergraduates and may have taken intermediate microeconomics and industrial organization courses as well in law or business school.

TCE has certainly matured to the point where it is widely taught to PhD students in economics, political science, management and other disciplines. And it has clearly had an impact on the way scholars in these and other areas (e.g. law) think and write about markets and organizations for wider audiences. I was curious to see, however, whether TCE had yet made its way into mainstream undergraduate education, recognizing that it can take decades for new intellectual developments to make their way into mainstream "orthodox" undergraduate education. I have performed a casual survey of leading contemporary economics textbooks used to teach undergraduate principles, intermediate microeconomics, and industrial organization courses in the U.S. I was surprised to find that there is hardly a trace of TCE theory or empirical analysis in these texts. Indeed, it is striking how little the teaching of undergraduate microeconomics has changed in the last 30 years. Firms are still production functions seeking to minimize costs given input prices. Market transactions are anonymous spot market trades. The leading undergraduate industrial organization textbooks do cover some issues of concern to TCE

and incorporate some theoretical and empirical research drawn from TCE, especially regarding vertical integration. However, TCE's presence in these texts is certainly not overwhelming. The primary focus is on traditional topics of monopoly, oligopoly, price discrimination, natural monopoly and relatively superficial treatments of antitrust and regulatory policy. My hypothesis is that the failure of TCE to as yet become better integrated into mainstream undergraduate economics education is one of the reasons why its contribution to competition policy and other public policy areas has not been greater. It seems to me that one of the challenges for those of us who work in the TCI tradition, especially now that it has become a mature and widely diffused area of academic research, is to find ways to bring this learning into the mainstream of undergraduate and professional school education in economics.

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