To the Graduate Council:

I am submitting herewith a dissertation written by Gary Lewis Hodgin entitled "Potential Competition and the Kennecott-Peabody Merger: A Critical Analysis." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Economics.

David L. Kaserman, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Provost
and Dean of The Graduate School

POTENTIAL COMPETITION AND THE KENNECOTT-PEABODY MERGER: A CRITICAL ANALYSIS

A Dissertation

Presented for the

Doctor of Philosophy

Degree

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Gary Lewis Hodgin

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DEDICATION

To my parents, James and Aline Hodgin, for their sacrifices and encouragement.

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ABSTRACT

This study examines the Federal Trade Commission's application of the potential competition doctrine in the Kennecott Copper Corporation and Peabody Coal Company merger case. The Commission's complaint alleged the merger violated Section 7 of the Clayton Antitrust Act by removing Kennecott as a potential entrant in the coal industry. The case is significant in terms of the doctrine's judicial development for two reasons. One is that it was the first invocation of the doctrine in an industry where concentration was relatively low. Second, it was the first application of the doctrine to a pure conglomerate merger. The primary objective of the study is to examine the consistency between these extensions and the economic theory upon which the doctrine is based.

In order to examine the Commission's application of the doctrine in Kennecott, it was necessary to collect a substantial amount of data from the coal industry. These data are used to analyze the structure of the coal industry over the 1954-1977 period. All data are from sources available to the general public.

The study also investigates the rationale between the Federal Trade Commission's and the Tenth Circuit Court of Appeals' reluctance to consider post-litigation--pre-compliance evidence that indicated two vital predictions made by the Commission were inaccurate. The study examines this evidence and finds this reluctance stems from a more general reluctance to consider either competitively neutral or pro-competitive post-acquisition evidence in Section 7 cases.

One policy implication of the study is that those responsible for antitrust implementation should exercise more caution in applying the doctrine in those cases where the economic preconditions are not satisfied. Specifically, the economic preconditions tend to restrict the doctrine's applicability in industries where concentration is relatively low as well as in pure conglomerate mergers. A second policy implication is that the judiciary might consider post-acquisition evidence on a case-by-case basis. Basic principles of decision-making under uncertainty suggest a benefit-cost approach to the admissibility of such evidence.

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CHAPTER I

INTRODUCTION

1. BACKGROUND

On March 17, 1967 a final agreement was reached between Kennecott Copper Corporation and Peabody Coal Company under which Kennecott was to acquire the assets of Peabody. The agreement, consummated in March 1968, required Kennecott to pay $285 million and assume liabilities of $36.5 million in exchange for the assets of Peabody.[1] At the time of acquisition, both were the largest firms in their respective industries. Kennecott's 1966 copper production accounted for approximately 33 percent of all domestic copper production in that year. Peabody accounted for approximately 10 percent of all domestic coal production in 1966. Kennecott ranked 55th in terms of assets and 111th in terms of sales on the Fortune 500 list of industrial companies, while Peabody ranked 186th in terms of assets and 317th in terms of sales.[2] Neither company had significant holdings outside their primary industries. Thus, the merger was between two firms in unrelated lines of commerce.[3]

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[1] "In the Matter of Kennecott Copper Corporation," 78 Federal Trade Commission Decisions 744 (January 1, 1971 to June 30, 1971), p. 745.

[2] Ibid., p. 748.

[3] The combined assets of Peabody and Kennecott would have been as great as the 44th largest industrial company in 1966. Ibid., p. 749.

On August 8, 1968, the Federal Trade Commission filed a complaint alleging the merger violated Section 7 of the Clayton Antitrust Act. The complaint alleged the merger lessened competition in the coal industry by removing Kennecott as a potential entrant. The ensuing hearing involved 48 hearing days and was heard by an FTC hearing examiner over the period January 27 through June 11, 1969. The trial record consisted of more than 6 thousand pages of transcripts and some 450 exhibits.[4] In March 1970, the hearing examiner issued his findings with the recommendation that the complaint be dismissed.

However, in May 1971, the FTC tribunal reversed the examiner's decision and ordered full divestiture of Peabody.[5] Table I presents a chronological history of the aforementioned as well as subsequent judicial events surrounding the merger. The table indicates a rather lengthy period between the tribunal's divestiture order and actual divestiture by Kennecott. A number of attempts were made by Kennecott to reopen the hearing to consider modification of the order. In 1977, Kennecott finally divested itself of Peabody under the threat of substantial fines for continued delay. The actual divestiture amounted to $1.2 billion and was the largest ever ordered by the FTC at that time.

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[4] Ibid., p. 752.

[5] Ibid,. p. 913.

TABLE I

CHRONOLOGICAL ORDER OF JUDICIAL EVENTS
SURROUNDING KENNECOTT CASE

Date	Event
August 1968	FTC files complaint alleging violation of Section 7.
January-June 1969	Hearing examiner listens to testimony.
March 1970	Hearing examiner issues findings and recommends dismissal of complaint.
May 1971	FTC tribunal overturnes hearing examiner and orders full divestiture.
October 1972	Kennecott's request for rehearing denied by Tenth Circuit Court of Appeals Court issues enforcement decree.
October 1973- October 1975	FTC tribunal denies three requests for reopening of hearing to consider modification of divestiture order.
June 1977	FTC approves purchase of Peabody by a consortium of buyers.

Sources: "In the Matter of Kennecott Copper Corporation," 78 Federal Trade Commission Decisions 745 (January 1, 1971 to June 30, 1971).

"In the Matter of Kennecott Copper Coporation," 78 Federal Trade Commission Decisions 913 (January 1, 1971 to June 30, 1971).

TABLE I (continued)

"In the Matter of Kennecott Copper Corporation," 84 Federal Trade Commission Decisions 92 (July 1, 1974 to December 31, 1974).

"In the Matter of Kennecott Copper Corporation," 86 Federal Trade Commission Decisions 315 (July 1, 1975 to December 31, 1975).

"In the Matter of Kennecott Copper Corporation," 86 Federal Trade Commission Decisions 1105 (July 1, 1975 to December 31, 1975).

Kennecott Copper Corporation v. Federal Trade Commission, 467 F.2d 67 (1972).

United States v. Kennecott Copper Corporation, 416 U.S. 909 (1974).

"Charting a New Course at Peabody Coal Company," St. Louis Post-Dispatch (September 4, 1977), p. 61.

Kennecott Copper Corporation v. Federal Trade Commission, Brief In Support of Motion for Modification, (10th Cir. 1975).

2. STATEMENT OF PURPOSE

The primary purpose of this study is to critically analyze the economic arguments used by the Federal Trade Commission in proscribing the Kennecott-Peabody merger. Specifically, three aspects of the case will receive primary attention.

Perhaps the most significant aspect of the case was the Commission's application of the doctrine of potential competition. Kennecott was distinctive in the judicial development of this doctrine for two reasons. One is that it was the first case in which the doctrine was invoked in an industry where concentration was relatively low. Second, it was the first case in which the doctrine had been applied to a pure conglomerate merger. All previous conglomerate applications had involved market extension or product extension mergers. This study will examine the consistency between the economic preconditions for the doctrine's applicability and these two extensions of the doctrine by the FTC in Kennecott.

A second aspect of the case to be examined will be the Commission's invocation of the incipiency doctrine of concentration in a potential competition case. The Commission satisfied one of the structural preconditions for the doctrine of potential competition by extrapolating a post-World War II trend in concentration. This study will analyze the Commission's extrapolation method and its reliability with respect to assessing the welfare implications of rising concentration.

A third aspect of the case to be examined will be the judiciary's treatment of post-litigation--pre-compliance evidence. As noted in

the introductory remarks, there was a substantial period of time between the FTC hearing and Kennecott's divestiture of Peabody. There were also several attempts by Kennecott to seek modification of the divestiture order. In each case Kennecott presented a substantial amount of evidence that indicated several vital predictions made by the Commission were grossly off the mark. Both the Commission as well as the Tenth Circuit Court of Appeals refused to give any weight to this evidence in denying Kennecott's request for modification. This study will examine the rationale behind the judiciary's apparent reluctance to consider this evidence and its implication in terms of Section 7 decisions.

3. SIGNIFICANCE

The primary significance of this study is in the application of the doctrine of potential competition in Section 7 cases. The doctrine can be used effectively by antitrust authorities in maintaining and promoting competition under certain conditions. However, it can also be applied so broadly as to deny merger under almost any condition. The objective of this study is to contribute to the existing body of knowledge on potential competition by identifying those circumstances under which the doctrine is applicable. The significance of the Commission's extensions in Kennecott has received very little attention. It is highly probable that these extensions will play a key role in future Section 7 cases, given the importance of precedent and the current dominance of the pure conglomerate form of merger. Hence, a careful examination of these extensions appears warranted.

4. OUTLINE OF INVESTIGATION

This study is organized in accordance with the overall objective of examining the FTC's application of the doctrine of potential competition in Kennecott. Chapter II presents a brief literature review of limit price theory and the judicial history of potential competition. Primary attention is devoted to the original contributions of Bain to limit price theory and major Supreme Court decisions in the judicial review.

Chapter III presents the arguments and evidence used by the FTC in support of its finding that the merger violated Section 7 by removing Kennecott as a potential entrant in the coal industry. Primary attention is devoted to the arguments and evidence used to satisfy the preconditions for the doctrine's applicability.

Chapters IV and V examine the evidence presented by the FTC as well as present additional evidence on the structure of the coal industry. Chapter IV presents a substantial amount of descriptive data on the coal industry. In Chapter V a simple econometric model is used to explain the post-World War II rise in coal concentration as well as examine the welfare implications of this rise. The emphasis in both chapters is upon the preconditions for the doctrine's applicability and the significance of the FTC's extensions in Kennecott.

Chapter VI deals with the issue of post-litigation--pre-compliance evidence in Kennecott. That evidence is first presented and then an attempt is made to explain the rationale behind the judiciary's

reluctance to consider it. The chapter includes a review of the judiciary's treatment of post-acquisition evidence in Section 7 cases. The issue of post-acquistion evidence is then examined within the context of a simple theoretical model of information and decision-making.

Chapter VII summarizes the study with respect to the objectives described in this chapter. It also points out areas of future research interests.

CHAPTER II

LITERATURE REVIEW

1. INTRODUCTION

The doctrine of potential competition has primarily been used to prosecute conglomerate mergers alleged to be in violation of Section 7 of the Clayton Act as amended by the Celler-Kefauver Act of 1950. Antitrust agencies and the courts have been engaged in the doctrine's development since it was first applied in 1964.[1] Its importance was enhanced by the fact that there was a dramatic increase in merger activity beginning in the late 1950s and reaching a pinnacle in the late 1960s.[2] A distinguishing characteristic of this merger movement was the ascendancy of conglomerate mergers. The significance of conglomerate mergers in the post-World War II era is documented in Table II. The table indicates that conglomerate acquisitions accounted for a successively higher proportion of total assets acquired from the 1948-1953 period through the 1963-1972 period. There was only a 1 percent decline during the 1973-1977 period. Conglomerate mergers have accounted for well over 50 percent of all assets acquired by merger since 1953. Thus, given this substantial rise in merger activity and in particular the growth of conglomerate mergers

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[1] U.S. v. El Paso Natural Gas Company, 376 U.S. 751 (1964).

[2] Fredrick M. Scherer, Industrial Market Structure and Economic Performance, 2nd ed. (Chicago: Rand McNally College Publishing Company, 1980), p. 120.

TABLE II

PROPORTION OF TOTAL ASSETS ACQUIRED IN MANUFACTURING AND MINING BY TYPE OF MERGER, 1948-1977

	Proportion of Total Assets Acquired in Period			
Merger Type	1948-53	1956-63	1963-72	1973-77
Horizontal	37%	19%	12%	15%
Vertical	13%	22%	8%	6%
Conglomerate[a]	50%	59%	80%	79%

[a]Conglomerate mergers includes product extension, market extension, and pure conglomerate mergers.

Source: F. M. Scherer, Industrial Market Structure and Economic Performance (Chicago: Rand McNally College Publishing Co., 1980), p. 558.

in recent years, there is little wonder as to why the doctrine of potential competition has become such an integral part of contemporary antitrust policy.

This chapter will present a brief review of the literature on the doctrine of potential competition. The objective is to provide both the economic and legal background necessary to analyze the Federal Trade Commission's application of the doctrine in Kennecott. The chapter is divided into three sections. The first section will briefly mention two other doctrines which have been successfully used by the FTC and the Department of Justice to prosecute conglomerate

mergers under the Section 7 amendment. The second section will review the economic theory upon which the doctrine is based. This section will emphasis the preconditions for the doctrine's applicability as well as point out a few criticisms of the theory. The third section will present a brief review of the doctrine's judicial history as it pertains to merger cases that have reached the Supreme Court.

2. CONGLOMERATE MERGER POLICY

It is generally accepted that mergers have been a primary cause of relatively high levels of concentration in many of the most highly concentrated industries.[3] Consequently, antitrust authorities express deep concerns over increased merger activity. The post-World War II merger movement was distinctive from two preceding movements in that conglomerates were the dominant merger form.[4] Generally, conglomerate acquisitions present antitrust enforcement agencies with a greater degree of difficulty than either horizontal or vertical acquisitions. The rationale behind a strong horizontal merger policy that proscribes mergers which significantly increase industry concentration has substantial support in economic theory. The potential for monopolistic output restrictions and corresponding inefficiencies is enhanced when there are fewer decision-making units, ceteris

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[3]Douglas F. Greer, Industrial Organization and Public Policy, 2nd ed. (New York: MacMillan Publishing Company, 1984), p. 121.

[4]Scherer, pp. 118-126.

paribus.[5] While the legal and economic arguments against vertical acquisitions are not quite as convincing as those against horizontal acquisitions, there is some basis in economic theory for proscription of those which create a likelihood of monopoly power extension into other industries linked to the production process as well as those which significantly raise entry barriers.[6] Since, by their nature, firms involved in conglomerate mergers are unrelated in any line of commerce, traditional antitrust reliance upon market concentration and barriers to entry is not as obviously relevant to conglomerate acquisitions. As Turner has pointed out: "Rules developed for determining the validity of horizontal and vertical mergers clearly will not do for conglomerate acquisitions generally" because the manner in which anticompetitive effects manifest themselves is different.[7]

Doctrine of Entrenchment

Antitrust authorities have successfully used three arguments in the prosecution of conglomerate mergers. One argument is that an

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[5]George J. Stigler, "A Theory of Oligopoly," Journal of Political Economy 72 (February 1964), pp. 44-61.

[6]For a survey of the literature on vertical integration and its implications for antitrust policy, see David L. Kaserman, "Theories of Vertical Integration: Implications for Antitrust Law," Antitrust Bulletin 23 (Fall 1978), pp. 483-510.

[7]Donald F. Turner, "Conglomerate Mergers and Section 7 of the Clayton Act," Harvard Law Review 78 (May 1965), p. 1313.

acquisition of a dominant firm by a potential entrant may allow for the entrenchment of a dominant firm. The entrenchment doctrine is usually invoked in cases where a large conglomerate acquires an established firm in an industry previously occupied by smaller independent producers. Proponents of this doctrine contend there are a couple of possible ways in which competition can be harmed. First, smaller firms may not compete as vigorously out of fear of possible retaliation from the larger well-financed conglomerate. This aspect of the doctrine contends that a large conglomerate may use the financial strength of its "deep pocket" to intimidate smaller firms into docility. A second contention of the doctrine is that the acquisition of an established firm by a large conglomerate may allow the acquired firm certain cost advantages over its smaller rivals. Sheer size may result in real or pecuniary economies which could possibly entrench the acquired firm as a dominant firm.

In Procter and Gamble,[8] the FTC alleged that Procter's acquisition of Clorox, a bleach retailer, would allow Clorox a cost advantage resulting from advertising volume discounts stemming from its association with Procter and thereby entrench Clorox's dominant position in the bleach industry. It was found that these discounts might ultimately harm competition in the bleach industry because smaller firms would not be able to take advantage of such discounts. In Reynolds Metals,[9] the FTC alleged that Reynolds' acquisition of Arrow Brands

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[8]Federal Trade Commission v. Procter and Gamble Co., 386 U.S. 568 (1967).

[9]Reynolds Metals Co. v. Federal Trade Commission, 309 F. 2d 223 (1962).

might give Arrow the power to sell at prices below those of its smaller rivals because of its access to Reynolds' enormous financial resources. The Commission found the ultimate impact of such power would be a substantial lessening of competition. In short, the entrenchment doctrine asserts that sheer size and financial strength of conglomerates may tend to lessen competition by either intimidating smaller rivals or by creating real or pecuniary economies.

The entrenchment doctrine has been criticized on at least three grounds. One is that the doctrine's application has tended to protect competitors rather than promote competition.[10] That is, an expectation of lower post-acquisition prices in a particular market based upon efficiency gains has been used to invalidate an otherwise legal merger under the doctrine. Second, the predatory acts hypothesized by the doctrine may be prosecuted under other antitrust laws. Predatory price cuts are a violation of the Sherman Act. Quantity discounts not based upon cost differences are illegal under the Robinson-Patman Act. Thus, critics contend allegations of predation should be subject to the standards established by the courts under the relevant antitrust law pertaining to the particular alleged violation rather than upon what might happen. A third criticism, related to the two previous, is that application of the doctrine

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[10]See, Robert H. Bork, The Antitrust Paradox (New York: Basic Books, Inc., 1978), pp. 246-262.

has been directed toward absolute size, per se. The alleged antitrust violations postulated under the doctrine are largely independent of the conglomerate's mode of entry. That is, the alleged anticompetitive consequences of a large conglomerate's entry into an industry occupied by many small producers could be forthcoming even if the conglomerate enters de novo. Many feel the antitrust laws are designed to protect and promote competition in a particular market and that absolute size, per se, is not (and should not be) illegal. Thus, critics contend that in some cases the antitrust enforcement agencies have attempted to extend their enforcement responsibilities beyond the statutory provisions of Section 7. Perhaps, as noted by Scherer, these criticisms are at least partially responsible for the decline in the entrenchment doctrine's application during the 1970s.[11] Furthermore, recent empirical work casts doubt on the doctrine's contention that large conglomerations tend to frighten smaller companies into docility.[12]

Doctrine of Reciprocity

The second doctrine that has been successfully used to proscribe conglomerate merger is that of reciprocity.[13] The central

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[11]Scherer, p. 560.

[12]Michael Gort and Eric V. Swanson, "Conglomerate Size and Competition Between Large and Small Firms," Antitrust Bulletin 28 (Summer 1983), p. 337-348.

[13]For a detailed discussion of reciprocity, see Turner, pp. 1386-1393.

focus of this doctrine is upon the opportunity for reciprocal purchasing arrangements that may arise from a conglomerate acquisition. For example, suppose firms (a), (b), and (c) are vertically related in some line of commerce which includes industries (A), (B), and (C), respectively. Next, suppose firm (a) in industry A acquires firm (c) in industry (C). The doctrine of reciprocity asserts that a possibility for market foreclosure exists in industry (A) due to the fact that (c) may coerce (b) to purchase from (a) since (b) sells its product to (c). Hence, the merger between (a) and (c) could lessen competition in industry (A) by foreclosing other firms in (A) from selling in (B).

The doctrine of reciprocity was used by the FTC in Consolidated Foods.[14] Consolidated Foods, a large wholesaler and retailer of food products, acquired Gentry, Inc., a manufacturer of dehydrated onion and garlic. The FTC successfully argued the merger would allow Consolidated to pressure food processors from whom it purchased to buy their dehydrated onion and garlic from Gentry. The merger was proscribed based upon the possibility of market foreclosure in the dehydrated onion and garlic industry.

Critics of the reciprocity doctrine draw upon two points. First, it is argued that one must distinguish between coercive and voluntarily purchasing arrangements. The firm in the middle of a

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[14] Federal Trade Commission v. Consolidated Foods Corporation, 380 U.S. 592 (1965).

reciprocal arrangement might find it profitable to purchase voluntarily from the conglomerate either because the conglomerate's price is lower than others or because it feels the conglomerate will respond by purchasing from it. In either case, voluntary reciprocity does not produce any long run adverse competitive effects because the firm in the middle has an incentive to withdraw from such an arrangement if it becomes profitable to do so. Moreover, it is generally not in the interest of a profit-maximizing firm to purchase from an imperfectly competitive industry. Therefore, any adverse competitive effects are not likely to result from the merger but rather from monopsony power of the firm purchasing from the middle firm. Hence, a distinction between voluntary and coercive reciprocity must be drawn in order to determine the effect on competition. Another criticism, related to the previous one, is that coercive reciprocity is not very likely. Generally, antitrust enforcement agencies and the courts have attacked conglomerate mergers if they simply present a possibility for reciprocal purchasing.[15] Turner has enumerated the necessary conditions for a conglomerate to profitably engage in the practice of reciprocity and finds them somewhat restrictive. Turner concludes that the possibility of market foreclosure is ". . . at best probable rather than actual," and if reciprocity develops, the practice could constitute a per se violation of the Clayton Act much like an illegal tie-in arrangement.[16]

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[15]See, Jerome L. Withered, "Reciprocity, Monopsony Power, and Section 7," Antitrust Bulletin 25 (Spring 1980), pp. 217-232.

[16]Turner, p. 1390.

Doctrine of Potential Competition

The doctrine of potential competition has been the primary argument invoked against conglomerate mergers. As such, it has performed an important role in antitrust policy since it was first applied in 1964. Kaplan has referred to the doctrine as ". . . perhaps the most substantive development in the evolution of Section 7 of the Clayton Act over the past fifteen years."[17] The doctrine has substantially more intellectual support than either of the two other arguments that have been successfully used against conglomerate mergers. The primary criticisms, and the one to which this study is devoted, have been aimed at the judiciary's inappropriate application of doctrine. The following two sections will be devoted to the theoretical basis of the doctrine and a brief discussion of the doctrine's history.

3. LIMIT PRICE THEORY

The doctrine of potential competition has its economic foundation in the conventional model of limit price theory developed by Bain.[18] Bain's original model was deterministic and described the

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[17]Lewis A. Kaplan, "Potential Competition and Section 7 of the Clayton Act," Antitrust Bulletin 25 (Summer 1980), p. 297.

[18]Joe S. Bain, "A Note on Pricing in Monopoly and Oligopoly," American Economic Review 39 (March 1949), pp. 448-464; id., Barriers to New Competition (Cambridge: Harvard University Press, 1956). For an excellent review of some of the earlier literature on limit price theory, see Franco Modigliani, "New Developments on the Oligopoly Front," Journal of Political Economy 66 (June 1958), pp. 215-232.

long run price-output decision of a dominant firm confronted with a threat of entry. A basic postulate of the theory is that firms on the periphery of an industry (potential entrants) exert an influence on firms in the industry (established firms).[19] In Bain's terminology, the "condition of entry"[20] determines the competitive relationship between established firms and potential entrants.[21] The condition of entry determines the extent to which established firms can set price above the competitive level without inducing entry. It measures the costs or demand disadvantage which potential entrants face relative to established firms. In Figure 1, let: AC_E represent the minimum attainable long run average cost curve for all potential entrants, AC_F represent the minimum attainable long run average cost curve for the dominant firm, D represent the dominant firm's demand curve, and MR represent the dominant firm's corresponding marginal revenue curve.[22]

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[19]While conceptually it is easier to envision a dominant firm, the model also applies to a market composed of a few relatively large sellers.

[20]Joe S. Bain, Industrial Organization, 2nd ed. (New York: John Wiley and Sons, Inc., 1968), pp. 254-255.

[21]Ibid., p. 31.

[22]Note the firm's demand and marginal revenue curves slope downward reflecting imperfect competition in the product market.

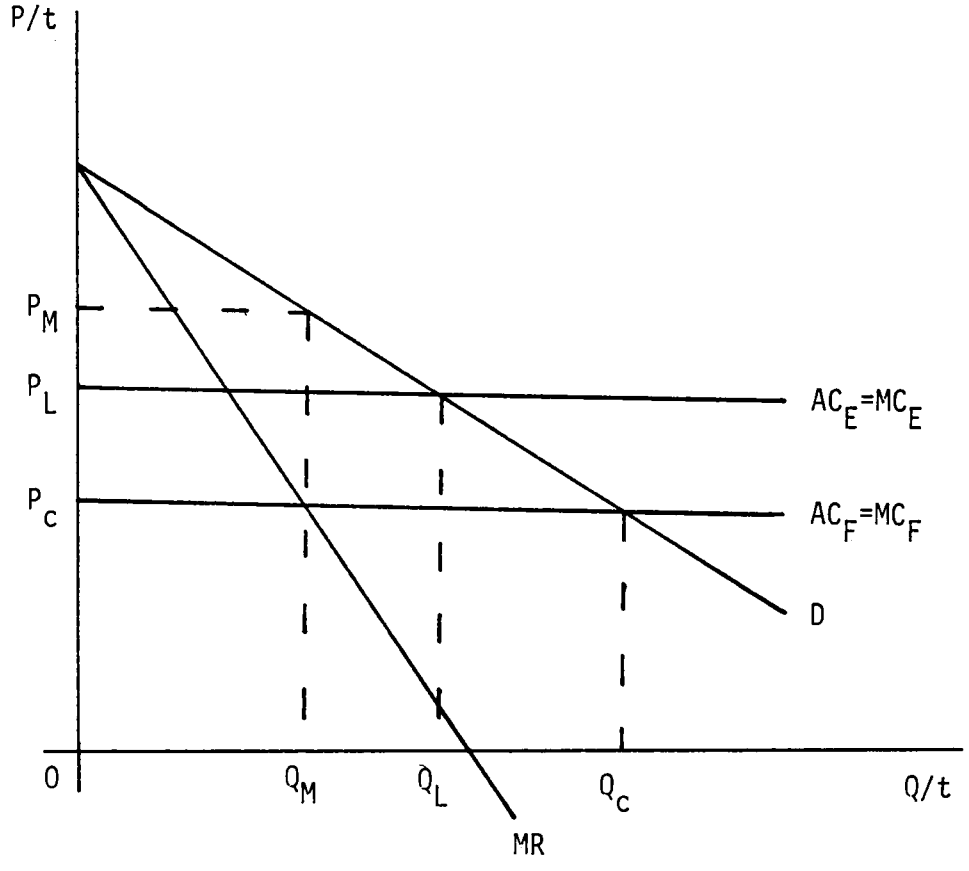

FIGURE 1

LIMIT PRICING WITH EQUALLY
DISADVANTAGED POTENTIAL ENTRANTS

Figure 1 indicates that the short run monopoly profit maximizing price (P_M) will induce entry causing both price and profits to fall in the long run. Alternatively, the firm may charge the price (P_L) and forestall long run entry. The price P_L represents the limit price and is the maximum price the dominant firm can charge without inducing entry. Note, the limit price strategy requires the dominant firm to expand output beyond the monopoly level. Therefore, the dominant firm facing potential competition is confronted with a dilemma. The firm chooses either a strategy of short run profit maximization or one of forestalling entry. The former strategy yields falling profits in the long run due to entry while the latter calls for a sacrifice of short run profits. Notice also that the ability of the dominant firm to persistently charge a price above the competitive level (P_c) depends upon the condition of entry. The condition of entry is depicted in Figure 1 as the vertical distance between AC_E and AC_F. Bain contends this difference is due to the existence of some entry barrier.[23] Hence, some barrier to entry is necessary for a dominant firm to successfully limit price.

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[23]Bain lists product differentiation, economies of scale, and absolute cost differences as barriers to new entry. Economics of scale and absolute cost differences are considered cost barriers, while product differentiation is a demand barrier to entry, see Bain, Industrial Organization, pp. 255-269. For a criticism of Bain's notion of barriers to entry, see George J. Stigler, The Organization of Industry (Homewood: Richard D. Irwin, Inc., 1968), pp. 67-70.

The conventional model can easily be expanded to take into account differences in costs disadvantages among potential entrants. Figure 2 describes a situation in which there are two unequally disadvantaged potential entrants. The model retains the assumption that the disadvantage is in costs rather than demand. The curves AC_{EL} and AC_{EH} represent the long run average cost curves for the least disadvantaged potential entrant and the most disadvantaged potential entrant, respectively. All other notation is identical to that in Figure 1.

The dominant firm in Figure 2 cannot charge a price higher than P_{L1} and without inducing entry. However, if the least disadvantaged firm is removed as a potential entrant, say by merger with the dominant firm, then the theory predicts the limit price will rise to P_{L2}. Therefore, removal of the least disadvantaged potential entrant tends to reduce output and raise price. Furthermore, the price rise does not induce entry due to the removal of the least disadvantage potential entrant.

Economic Preconditions

The above analysis suggests three minimal preconditions for the doctrine of potential competition to have economic relevance in merger cases. The first two are necessary conditions for firms to practice limit pricing. The third is necessary for the removal of a potential entrant to influence the price behavior of a dominant firm following a limit price strategy. First, the firm(s) engaged in limit pricing must possess monopoly power. In order to set price

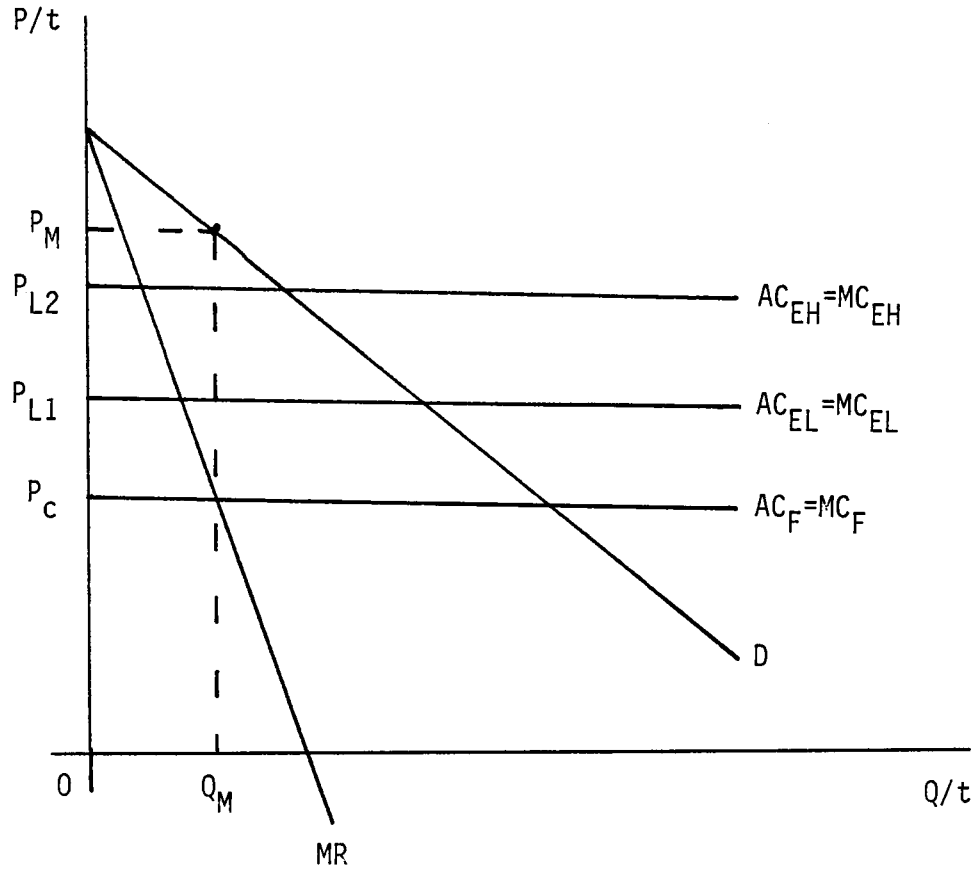

FIGURE 2

LIMIT PRICING WITH UNEQUALLY
DISADVANTAGED POTENTIAL ENTRANTS

at the limit price firms must have control over price. This requires that the relevant market be either dominant firm or tight oligopoly.[24] In the latter case, cost of collusion must be low so that firms can easily agree upon an entry forestalling price.

Second, the theory requires that entry barriers be substantial, but not blocked. If all firms, potential and established, confront identical demand and cost conditions, then there is no price above the competitive that will prevent entry. Conversely, if the long run average cost curve of the least disadvantaged potential entrant lies everywhere above the dominant firm's short run profit-maximizing price, then the dominant firm can charge the monopoly price and not induce entry. In this case, the dominant firm would not benefit by charging a price less than the monopoly price because entry is forestalled at the monopoly price.

Third, the number of least disadvantaged potential entrants must be limited to a few in order for the removal of one to raise the limit price. If the number of least disadvantage potential entrants is substantial, then the removal of one is not likely to change the perceived entry threat of established firms. Hence, for a merger of the dominant

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[24]While there is no one universally accepted definition, most observers infer that an industry is tightly oligopolistic if the four-firm concentration ratio exceeds 50 percent and the eight-firm ratio is from 75-80 percent. For a discussion, see Bain, Industrial Organization, pp. 137-144; and William G. Shephard, The Economics of Industrial Organization (Englewood Cliffs, New Jersey: Prentice-Hill, Inc., 1979), pp. 63-64.

firm and a potential entrant to have adverse consequences, the acquisition must involve one of a few least disadvantaged potential entrants.[25]

Criticisms

There have been several theoretical criticisms of the conventional limit price model as originally formulated.[26] First, the theory has been criticized because of its static nature. The firm's decision is strictly dichotomous: Either maximize short run profits and earn less later due to entry, or forego a portion of short run profits and forestall entry so that more might be earned later. Gaskins, in formulating a dynamic model, feels there is ". . . no analytic justification for this strategic dichotomy," and it would appear the dominant firm's optimal strategy would involve ". . . a balancing between current profits and future market share."[27] Dynamic limit pricing models begin by assuming the dominant firm will choose the price strategy that maximizes the net present value of its future profits stream. The short run profit maximization and limit price strategies are only two of many possibilities. For example, the

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[25]Again, as with the definition of tight oligopoly, there is no universally accepted definition of "few." The general consensus is that few means no more than three or four, see Turner, p. 1369.

[26]For a brief statement of the most common criticisms, see Stigler, Organization of Industry, pp. 19-22.

[27]Darius W. Gaskins, "Dynamic Limit Pricing: Optimal Pricing Under Threat of Entry," Journal of Economic Theory 3 (September 1971) p. 306.

firm's optimal strategy might involve pricing above the limit price but below short run profit maximization and allow its market share to gradually fall. The firm's optimal strategy will depend upon a number of factors such as its willingness to accept risk, the appropriate discount rate used to calculate the net present value of future profits, the rate of growth in market demand, and other factors.[28] The fundamental point is that a dominant firm may rarely find its most profitable strategy as either being short run profit maximization or a strict adherence to conventional limit pricing.

A second criticism of the conventional limit price theory concerns the model's assumption that potential entrants base their entry decision upon the pre-entry as opposed to the post-entry price of the dominant firm. For example, Spence has suggested the dominant firm might use excess capacity to deter entry.[29] The dominant firm could price above the average cost of potential entrants so long as potential entrants perceive that post-entry price will be lower than pre-entry price. This strategy requires the dominant firm to respond

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[28]For a discussion of these factors within the context of other dynamic limit price models, see David P. Baron, "Limit Pricing and Models of Potential Entry," Western Economic Journal 10 (September 1972), pp. 298-306; and Morton I. Kamien and Nancy L. Schwartz, "Limit Pricing and Uncertain Demand," Econometrica 39 (May 1971), pp. 441-454.

[29]A. Michael Spence, "Entry, Capacity, Investment, and Oligopolistic Pricing," Bell Journal of Economics 8 (August 1971), pp. 534-544.

by expanding output. In this case, the entry forestalling price will be higher and output lower than in the conventional limit price model. Similarly, other models have proposed that other strategic variables such as research and development expenditures and selling cost can be used to deter entry.[30]

A third criticism of the conventional model is that it is not so much a theory of long run price, but instead one of long run concentration.[31] Regardless of whether the firm adopts a short run profit maximization or a limit price strategy, the long run price will be at the limit price because under the former strategy entry will lower price to the limit price. Hence, barriers to entry alone explain the extent to which the dominant firm can price above the competitive level in the long run. Both long run price and output are independent of the firm's short run price strategy. Nevertheless, the firm's short run price strategy does determine industry concentration. The theory predicts concentration will be less under the short run profit maximization strategy due to entry at the monopoly price. This led Osborne to comment that limit

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[30]Richard Gilbert and David Newbery," Pre-emptive Patenting and the Persistence of Monopoly," American Economic Review 72 (June 1982) pp. 514-526; and Oliver E. Williamson, "Selling Cost as a Barrier to Entry," Quarterly Journal of Economics 77 (February 1963), pp. 112-128.

[31]Dale K. Osborne, "The Role of Entry in Oligopoly Theory," Journal of Political Economy 72 (August 1964), pp. 396-402.

pricing was ". . . not a theory of price, but rather a proposition in welfare economics."[32]

Welfare Effects

The conventional view is that limit pricing enhances consumer welfare since a dominant firm is constrained in its ability to exploit its market position because of the threat of entry. The argument that limit pricing enhances consumer welfare is based upon the fact that consumer surplus is greater under limit pricing than under pure monopoly. In Figure 3, let: MC_F represent the marginal cost curve of the dominant firm, MC_E represent the marginal cost curve for potential entrants, D represent the dominant firm's Hicksian income-compensated demand curve, and MR represent the dominant firm's corresponding marginal revenue curve. Consumer surplus is area aP_Mb under short run profit maximization strategy and area aP_Ld under a limit price strategy. Thus, the area P_MP_Ldb represents an increase in consumer surplus resulting from limit pricing. The limit price strategy results in a lower price and higher output (P_LQ_L) than the short run profit maximization strategy (P_MQ_M). Nevertheless, assuming some barrier to entry, resources are still underallocated under the limit price strategy. The competitive price (P_C) is lower and output (Q_C) is higher than under limit pricing.

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[32]Ibid., p. 398; see also id., "On the Rationality of Limit Pricing," Journal of Industrial Economics 22 (September 1973), pp. 71-80.

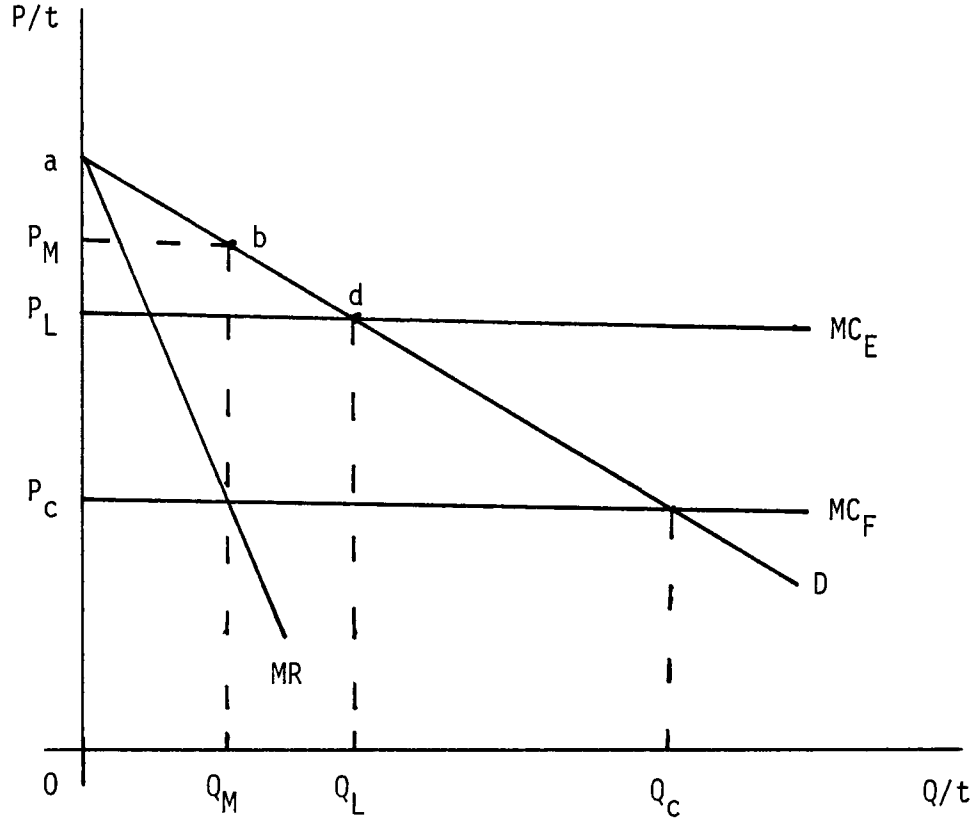

FIGURE 3

WELFARE EFFECTS OF LIMIT PRICING

The above analysis of the welfare effects of limit pricing and potential competition has been criticized for a couple of reasons. A primary criticism is that the conventional theory of limit price ignores the long run welfare effects of deconcentration. As mentioned in the previous section, the difference between the dominant firm's choice of price strategies is that concentration is lower under short run profit maximization. If price is set at the short run profit-maximizing level, then new firms will enter as long as some potential entrants have long run cost curves below price. New firms will continue to enter until price is driven down to the limit price. Thus, long run price and quantity and therefore consumer surplus are identical to that which would exist under limit pricing. However, concentration is less under the short run profit maximization strategy because of entry. Resource allocation might be improved if one considers that entry barriers generally are not insurmountable. That is, potential entrants might be able to overcome demand or costs disadvantages after entry and as a result price could possibly be driven down closer to the competitive level. The result would be a more efficient allocation of resources than if the dominant firm had followed a limit price strategy unless the dominant firm and potential entrants collude. However, as noted by Stigler, the costs of collusion generally rise as the number of firms

increases.[33] Therefore, the long run welfare effects of limit pricing are debatable at best and perverse at worse.

Stiglitz has suggested two reasons why welfare might be greater under simple monopoly than under monopoly with threat of entry.[34] First, a monopolist confronted with entry might find it profitable to excessively invest in research and development in order to deter entry. Stiglitz bases this proposition on the contention that the expected private returns from research and development may exceed the social returns. Specifically, if there is a high probability that an invention will be patented and thereby entry barriers raised, then the monopolist's expected returns may well exceed the social returns. The result would be an overallocation of resources devoted to research and development which could raise cost and price above the monopoly level.[35] A second, related, manner in which potential competition might reduce welfare is by perversely changing the behavior of the monopolist. The monopolist may take actions to ". . . pre-empt, deter, or delay entry."[36] For example, the monopolist might invest more in capital goods if an increase in their stock lowers the profitability of new entrants. The implication is that the threat of entry may induce monopolists to

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[33]Stigler, "A Theory of Oligopoly."

[34]Joseph E. Stiglitz, "Potential Competition May Reduce Welfare," American Economic Review 71 (May 1981), pp. 184-189.

[35]Stiglitz, p. 185-186.

[36]Ibid., p. 184.

overcapitalize. The result may be higher price than under simple monopoly since the excessive use of capital goods as a deterrance raises the costs of production. Hence, welfare may be lowered as a result of potential competition.

The above criticisms suggest the welfare benefits of limit price theory are at least questionable. This conclusion is somewhat surprising given the clear preference in antimerger policy for limit pricing and the maintenance of potential competition. Indeed, this preference is the foundation for the doctrine of potential competition. The following section will review the use of this doctrine in a few major Section 7 cases.

4. POTENTIAL COMPETITION AND SECTION 7

As noted earlier, the doctrine of potential competition has been the primary argument used to prosecute conglomerate mergers under Section 7 of the Clayton Act. The doctrine has experienced a complex evolution since it was first applied in 1964. It emerged largely as a result of a perceived failure, or at least a perceived inadequacy, of the antitrust laws to deal directly with increasing levels of aggregate concentration. The Celler-Kefauver amendment to Section 7 was apparently successful in deterring the growth of horizontal and vertical mergers.[37] Nevertheless, many industries remained highly concentrated and attempts to deal directly with the problem were generally unsuccessful.[38] Attention was

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[37]Scherer, p. 558.

[38]Richard A. Posner, Antitrust Law (Chicago: University of Chicago Press, 1976), Chapter 5.

then turned to potential competition and conglomerate mergers. In earlier years, conglomerate mergers were generally thought to have little if any adverse competitive consequences since they do not directly increase concentration nor usually pose a serious threat of market foreclosure. However, as a result of Bain's pioneering work in limit price theory, a theoretical justification consistent with the statutory limitations of Section 7 was provided which would allow antitrust authorities to deal with highly concentrated industries in an indirect manner. The antitrust premise for doctrine of potential competition is that at least the competitive effects of potential competition could be preserved by proscribing mergers between dominant firms and most likely potential entrants. The theory predicts that in those industries where dominant firms are confronted with a threat of entry potential competition restrains the behavior of the dominant firm and enhances the possibility of future competition.

Major Cases

The first potential competition case to reach the Supreme Court involved a market extension merger between Pacific Northwest Pipeline Corporation and El Paso Natural Gas Company.[39] The Court heard the case upon appeal from a lower court. El Paso and Pacific were the only two interstate natural gas suppliers in the highly concentrated area west of the Rocky Mountains. El Paso was the only out-of-state

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[39] U.S. v. El Paso Natural Gas Company, 376 U.S. 751 (1964).

supplier in California and sold approximately 50 percent of the natural gas in that state. Pacific had previously attempted to enter the California market but had been unsuccessful until it reached a tentative agreement with California Edison Company to supply the utility with natural gas. The Department of Justice alleged El Paso's acquisition of Pacific eliminated Pacific as a potential entrant in the California market. The case was unusual for a potential competition case because there was substantial evidence indicating that Pacific had a procompetitive effect on the market. After Pacific had reached the tentative agreement with California Edison, El Paso lowered its bid price and obtained the contract. The merger was alleged to have had an anticompetitive effect in two ways. First, the merger would have eliminated the effect of Pacific waiting outside the market. El Paso would likely be more restrained in its pricing just knowing Pacific was ready and willing to enter the market. Second, there was strong evidence that the merger would eliminate a future actual entrant into the California market. Although the Court mentioned both potential anticompetitive effects in describing how the merger reduced competition, it did not base its decision upon either one of the effects, specifically. The Court viewed potential competition as essentially an extension of actual competition.

The Court's next application of the doctrine involved a joint venture rather than a merger.[40] In the late 1950s, Pennsalt Chemicals

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[40] U.S. v. Penn-Olin Chemical Co., 378 U.S. 158 (1964).

Corporation and Olin Mathieson Company entered into an agreement to form a new company, Penn-Olin, and build a sodium chlorate plant in the Southeast. Although Pennsalt was one of only three producers in the highly concentrated sodium chlorate industry it did not operate a plant in the Southeast. The two other major producers each had plants in the region. As a result, Pennsalt's market share in the region was only 8.9 percent. Approximately 76 percent of its sales in the region were to Olin, a large diversified corporation which produced chemicals and chemical products that included sodium chlorate. Olin was to act as Pennsalt's sales agent under the joint venture. Within two years of Penn-Olin's formation in 1960, the company had obtained a 27.6 percent market share in the Southeast.

The Supreme Court heard Penn-Olin upon appeal from a lower court. The Court remanded the case on the basis of a finding of fact. Specifically, the Court found the lower court had failed to exhaust all aspects of the potential competition doctrine. The FTC's complaint alleged the joint venture removed Pennsalt as well as Olin as future de novo entrants into the Southeastern sodium chlorate market. The lower court found that both Pennsalt and Olin would not have entered. The Supreme Court did not agree with this interpretation of the doctrine. In its words:

> Certainly the sole test would not be the probability that both companies would have entered. Nor would the consideration be limited to the probability that one entered alone. There still remained for consideration the fact that Penn-Olin eliminated the potential competition of the

> corporation that might have remained at the edge of the market continuously threatening to enter.[41]

Thus, the lower court was asked to consider whether it was probable that either Pennsalt or Olin would enter de novo while the other remained on the edge of the market as an "independent source of potential competition."[42] Penn-Olin was significant in the development of the doctrine of potential competition because it introduced the Court's distinction between the competitive effects of a future actual entrant and a perceived potential entrant.

The Supreme Court's next potential competition case involved an acquisition of Clorox Chemicals Company, one of two major household bleach producers, by Procter and Gamble, a large diversified manufacturer of household products.[43] Although the product extension merger was primarily challenged on the basis of the entrenchment doctrine, the FTC also argued that the merger eliminated Procter and Gamble as a potential entrant in the household bleach industry. The decision was important because the Court identified the conditions under which the doctrine is applicable.[44] First, the household bleach industry was found to be oligopolistic since established firms took into account each other's reactions when making decisions. Second, barriers to entry were not so great that Procter and Gamble could not enter if established firms had priced at the profit-maximizing

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[41] Ibid., p. 173 (1964).

[42] Ibid.

[43] 386 U.S. 568 (1967).

[44] Ibid., p. 581.

level. Third, Procter and Gamble was one of only a few potential entrants and its removal would significantly lessen the impact of potential competition. Fourth, since Procter and Gamble was the most likely entrant, its removal would raise entry barriers further. It was on the basis of the above findings that the Court concluded Procter and Gamble's removal from the edge of the market would lessen competition in the household bleach industry. The Court's decision illustrated its reliance upon the perceived potential entrant effect of the doctrine of potential competition.

In Falstaff,[45] the Court made its reliance upon the perceived potential entrant effect of the doctrine of potential competition complete. Falstaff Brewing Corporation, the Nation's fourth largest brewer, acquired Narragansett Brewing Company, the largest beer distributor in the New England region with 20 percent of that market. Despite Falstaff's relatively large size, it did not have a distribution center in the New England region prior to the acquisition. The Department of Justice based its complaint on the contention that the market extension merger eliminated Falstaff as both a perceived potential entrant as well as an actual future entrant. Moreover, the complaint also alleged that Falstaff could have entered the New England market through a less offensive acquisition, or toe-hold acquisition.[46] This new spin-off of the future actual entrant part of the potential competition doctrine did not entirely foreclose merger as a valid means for Falstaff to enter.

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[45] U.S. v. Falstaff Brewing Corp., 410 U.S. 526 (1973).

[46] A toe-hold acquisition is the acquisition of a relatively small but viable company.

A lower court had found Falstaff would not have entered de novo, therefore, it could not be considered a potential entrant. The Supreme Court remanded the case back to the lower court on the basis of a finding of fact. Specifically, the Court held the lower court failed to consider the effect of Falstaff as a perceived potential entrant. However, the Court surprisingly chose not to consider the future actual entrant aspect of the FTC's complaint. In its words:

> We leave for another day the question of the applicability of [S]ection 7 to a merger that will leave competition in the marketplace exactly as it was, neither hurt nor helped, and that the company could, but did not, enter de novo or through "toe-hold" acquisition and that there is less competition than there would have been had entry been in such a manner.[47]

Hence, the Court relied entirely upon the perceived potential entrant aspect of the doctrine of potential competition. Furthermore, not only did the Court refuse to deal with the actual potential entrant effect, but it also refused to deal with the toe-hold doctrine.

Approximately one year later in Marine Bancorporation the Court reaffirmed its hesitancy to deny a merger on the basis of the future actual entrant argument.[48] National Bank and Commerce, a

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[47]410 U.S. 526 (1973), p. 537.

[48]U.S. v. Marine Bancorporation, Inc., 418 U.S. 602 (1974).

nationally chartered bank based in Seattle, acquired Washington Trust Bank, a state-chartered bank located in Spokane. National Bank was a subsidiary of Marine Bancorporation. The Department of Justice's complaint alleged the market extension merger removed National Bank as a potential entrant in the Spokane market. Specifically, the complaint alleged the merger removed National Bank as an actual potential entrant. Furthermore, the Department of Justice also contended that National Bank could have entered via toe-hold acquisition. Although the Court found for National Bank, the decision was based upon the fact that state banking regulations prohibited internal expansion of National Bank from the immediate Seattle area as well as branching from an acquired bank for 10 years after acquisition. Therefore, regulations prohibited National Bank from de novo entry as well as toe-hold entry. Obviously, National Bank was also removed as a perceived potential entrant due to expansion prohibitions imposed by state banking regulations.

The decision was significant, however, because the Court reiterated its Falstaff position: "The principal focus of the doctrine (potential competition) is on the likely effects on the premerger position of the acquiring firm on the fringe of the target market."[49] Nevertheless, the Court did set forth the conditions under which it might consider the actual potential entrant argument.[50] First, the target market must be substantially

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[49]Ibid., p. 624.

[50]Ibid.

concentrated. Second, the acquiring firm must have an "economic incentive" to render it a perceived de novo entrant. Third, the acquiring firm must have tempered the behavior of established firms.

Despite rejecting the Department of Justice's toe-hold argument, the Court also set forth two preconditions for its applicability.[51] First, the plaintiff must establish that the potential entrant has feasible means of toe-hold entry. Second, these means must offer a substantially likelihood of future deconcentration and significant procompetitive effects. Kaplan asserts that Marine Bancorporation was significant because ever since ". . . potential competition cases have been fought on the basis of these preliminary issues."[52] The toe-hold doctrine represents an advancement in merger policy since it does not entirely close merger as a means of entry in highly concentrated industries. It simply requires the firm to choose a more procompetitive route. The doctrine also offers a significant advantage to those prosecuting Section 7 cases because it does not require substantial evidence of de novo entry. Generally, this type of evidence is more difficult to obtain than evidence indicating the existence and availability of a suitable toe-hold acquisition.

Summary

The above section has reviewed five major potential competition cases that have reached the Supreme Court. The doctrine has evolved into three separate doctrines since it was first applied. First,

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[51]Ibid., p. 633.

[52]Kaplan, p. 318.

the perceived potential entrant argument contends that the acquisition of an established firm by a potential entrant may reduce competition by eliminating the competitive effect of the firm remaining on the edge of the market. This doctrine is based upon limit price theory as developed by Bain. The theory postulates that an outside firm may influence the price behavior of established firms through the threat of entry. Thus, in order for the doctrine to be invoked, potential entrants must be exerting some influence upon the price behavior of established firms at the time of acquisition.

The Supreme Court espoused the conditions under which the doctrine could be used to proscribe a merger in Procter and Gamble. One is that the target market must be tightly oligopolistic. Established firms must consider the reactions of potential entrants in setting price. Second, barriers to entry must be such that a potential entrant could profitably enter if established firms set price at the level which maximizes current profits. These two conditions are necessary conditions for established firms to engage in limit pricing. A third condition for the doctrine to be invoked is that the number of potential entrants be limited to a few. This condition is necessary for the removal of potential entrant to alter the perceived entry threat of established firms. The fourth condition, an extension of the third, is that the acquiring be one of a few most likely potential entrants. The perceived potential entrant is the only one of the three arguments that has been totally accepted by the Supreme Court as a valid argument in potential competition cases.

A second part of the doctrine of potential competition is the actual potential entrant argument. This argument holds that a dominant firm acquisition by a potential entrant eliminates the possibility of future de novo entry on the part of the potential entrant. The focus of this doctrine is upon future rather than present competition. In its purest form, the doctrine alleges that the anti-competitive effect of eliminating a potential competitor is independent of any effects on present competition.

Despite its popularity at the FTC and the Justice Department, the Supreme Court has declined to rule on the validity of this doctrine, preferring instead to require a present effect on competition. This position was announced in Falstaff Brewing Corp. and reiterated in Marine Bancorporation. However, in Marine Bancorporation, the Court did enunciate the preconditions for the doctrine's application. One is that the industry must be tightly oligopolistic. The removal of a future de novo entry will substantially lessen competition only if the industry is non-competitive. Second, the potential entrant must have an economic incentive to enter and must be perceived as having such by established firms. Third, the potential entrant must have influenced the present behavior of established firms. The fundamental distinction between the Court's view of the perceived potential entrant argument and the actual potential entrant argument is that evidence of intent to enter is required under the latter. Conceptually, the difference between the two doctrines is that the former emphasizes the present effect

on competition, while the latter focuses upon the future competitive effect of removing a potential entrant as a future actual entrant. Apparently, the Court is not willing to proscribe a merger under the potential competition doctrine solely on the basis of future anti-competitive effects.

The third doctrine used in potential competition cases is the toe-hold argument. This argument is essentially a spin-off of the actual potential entrant argument. It contends that a toe-hold acquisition represents a procompetitive alternative to dominant firm acquisition. The argument recognizes that the competitive effects of toe-hold and de novo entry are essentially the same. Thus, potential entrants are required to choose between toe-hold entry as opposed to dominate firm acquisition if de novo entry is unlikely. The effect of the toe-hold argument is that antitrust enforcement agencies, when unable to satisfy the conditions for the actual potential entrant argument, may use the toe-hold argument to require a potential entrant to enter in the most competitive manner. Generally, it is much easier to show the possibility of toe-hold entry than to show the likelihood of de novo entry.

The toe-hold doctrine is an innovative way to deal with the Court's reluctance to accept the actual potential entrant doctrine in its purest form. As with the actual potential entrant argument, the Court has declined to rule on the validity of the doctrine. Its position was stated in Falstaff Brewing Corp. and reiterated in Marine Bancorporation. However, in Marine Bancorporation the Court did state the conditions necessary for its application. These conditions

are the same as the actual potential entrant argument with the exception that instead of showing a likelihood of de novo entry the prosecution must only show a feasible means of toe-hold entry. The validity of these last two doctrines must await a further ruling beyond Marine Bancorporation.

CHAPTER III

FEDERAL TRADE COMMISSION'S ARGUMENTS AND EVIDENCE

The purpose of this chapter is to present a synopsis of the arguments and evidence used by the Federal Trade Commission to proscribe the Kennecott-Peabody merger. The first section will discuss the background of the merger. The background and circumstances surrounding a particular acquisition are perhaps more important in potential competition cases than in other types of mergers because a fundamental question in such cases is whether the acquiring potential entrant was perceived by established firms as a probable future entrant. Thus actions, as reflections of intent, prior to acquisition are often a vital part of such cases. The second section will present the FTC's arguments and evidence as they pertain to the essential elements of potential competition cases.

I. BACKGROUND

As mentioned in Chapter I, Kennecott Copper Corporation acquired Peabody Coal Company in 1967. Peabody had experienced a rather dramatic rate of growth in the decade preceding the acquisition. Peabody's annual production had increased from 19 million tons in 1955[1] to approximately 60 million tons in 1967.[2] Peabody alone accounted

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[1]U.S. Department of Justice, Comptroller General of the U.S., The State of Competition in the Coal Industry (Washington: U.S. Government Printing Office, December 1977), p. II-9.

[2]Keystone Coal Buyers Manual, U.S. Production by Company, 1967, (New York: McGraw-Hill Mining Publications, 1968), p. 2.

for approximately 46 percent of the total increase in coal production over that period. As a result, Peabody rose from the third leading producer to number one. Its market share rose from 4.2 percent to 10.7 percent. Consolidation Coal Company, the second largest domestic producer, had a market share of 10.2 percent in 1967.[3]

Peabody's substantial growth has been attributed to several factors. First, Peabody's management aggressively sought and obtained long-term utility contracts.[4] Approximately 77 percent of Peabody's 1967 sales were to this sector which was the only expanding sector of the coal industry from 1955 to 1967.[5] As a result of aggressive management, Peabody became the Nation's largest coal supplier to electric utilities. A second reason for Peabody's growth was its pioneering development of the unit train method which allows for the transportation of huge quantities of coal over vast geographic areas at relatively low costs.[6] This development allowed Peabody to expand its market

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[3]Ibid.

[4]Carol Loomis, "Down the Chute with Peabody Coal," Fortune, (May 1977), p. 232.

[5]"In the Matter of Kennecott Copper Corporation," 78 Federal Trade Commission Decisions 744 (January 1, 1971 to June 30, 1971), p. 761.

[6]A unit train is a train comprised of specially designed cars capable of carrying 100 tons of coal per car. The number of cars per train typically varies from 100-250. In a comparison of unit train rates and single-car rates, Moyer found unit train rates to be $1.45 per ton compared to $3.42 per ton for single-cars on shipments from Lynnville, Indiana to Hammond, Indiana. See, Reed Moyer, Competition in the Midwestern Coal Industry, (Cambridge: Harvard University Press, 1964), p. 138.

relative to its competitors. A third factor contributing to Peabody's growth was its acquisition of relatively large quantities of Mid-Western and Western strip reserves. In 1955, Peabody's management began to shut down all of its Eastern underground mines with the exception of the world's largest (in Illinois) and turn to surface mining. This gave Peabody a comparative advantage in providing low-cost high sulphur coal for electric utilities since per unit costs of surface mining are generally substantially lower than underground mining.[7] Finally, Peabody along with nearly every other major coal producer acquired several small coal companies over the period.[8] All of these factors were reflections of an aggressive management which allowed Peabody to experience a dramatic rise during a period of general decline in the coal industry.[9]

Despite Peabody's remarkable growth from 1955-1967, the company's ownership had decided to sell the company by the mid-1960s. Peabody negotiated with several other companies prior to its initial contact with Kennecott.[10] The Kelce family, Peabody's largest

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[7]U.S. Department of Justice, State of Competition in the Coal Industry p. II-9.

[8]Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends in the Energy Sector of the U.S. Economy (Washington: U.S. Government Printing Office, March 1974), p. 142.

[9]Ibid., p. 7. Coal consumption, as a percentage of total primary fuel consumption, fell successively from 40 percent in 1950, to 25 percent in 1960, to 20 percent in 1970. In terms of trillion Btu units of energy, coal consumption fell from 12,913 to 10,414 from 1950 to 1960, but rose from 10,414 to 12,922 from 1960-1970. Hence, there was zero net growth in coal consumption from 1950-1970.

[10]"In the Matter of Kennecott Copper Corporation," p. 759.

shareholders, had expressed both personal and business reasons for desiring to sell the company. Merle C. Kelce, chairman and chief executive officer of Peabody, was elderly and had made it known that he did not desire to remain active in the business. Also, the family had not been particularly satisfied with Peabody's recent stock performance and did not expect the future of the coal industry to be very bright. Peabody's price per share had fallen from $46 in 1965 to a low of $30 in 1966.[11] A primary reason for this drop was attributed to the threat posed by the nuclear power industry in satisfying the fuel needs for electric utilities. In response, Peabody pushed its long-term electric utility strategy even further by offering contracts ". . . virtually dictated by the utilities with Peabody merely standing by to sign on the dotted line."[12] Furthermore, Peabody was very concerned over pending legislation to limit the sulphur content of coal to 1 percent. Peabody's reserves averaged from 3.5 percent to 4.0 percent in sulphur content.[13] This was directly the result of its management's earlier decision to close its low sulphur Eastern underground mines and open high sulphur Midwestern and Western surface mining operations.

Kennecott's interest in coal dated back to early 1963. Kennecott had sought to diversify and investigated possibilities in

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[11]Ibid., p. 760.

[12]Loomis, p. 232. Specifically, these long-term contracts had little, or no, provisions for costs escalation. General inflationary pressures as well as increased costs due to regulation made the terms of the contracts quiet unattractive in later years.

[13]"In the Matter of Kennecott Copper Corporation," p. 760.

oil, aluminum, and fertilizer as well as coal. The copper industry had been on the decline as the result of increased competition from aluminum and plastics. A primary reason for the decline was that copper consumers often found it difficult to secure long-term uninterrupted supplies due to chronic labor disputes that had plagued the industry for some time. Foreign political instability had also hampered the import market for copper. Thus, aluminum and plastic had become attractive substitutes for copper. Furthermore, there had not been any major domestic copper discoveries for 50 years prior to Kennecott's diversification plan.[14] This was despite the fact that Kennecott had an annual budgetary allocation of approximately $7 million for exploration.[15] Kennecott had been conducting exploration on this scale for approximately 20 years with very little success. Consequently, Kennecott was a "liquidating company" with estimated future cash reserves in the range of $500 million to $1 billion.[16]

Kennecott sought diversification as a means to solve its excess cash problem. In so doing, management set forth four objectives.[17] First, it sought a sizeable investment opportunity of around $200 million to alleviate its cash reserve problem.[18]

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[14]Ibid., p. 809. It was estimated that approximately 80 percent of domestic copper production came from mines at least 50 years old.

[15]Ibid.

[16]Ibid., p. 811.

[17]Ibid.

[18]Ibid.

Second, it desired an opportunity that would yield an acceptable rate-of-return immediately. It was not interested in a plan that would take several years to materialize. Third, Kennecott sought an investment opportunity closely related to its basic concepts of management. It had expressed a preference to diversify into one of the extractive industries which were familiar to management. Therefore, it confined its investigation to extractive industries such as coal, oil, and aluminum along with fertilizer. Fourth, it sought an opportunity with strong growth potential as well as one without the cyclical earnings associated with the copper industry.

The first specific record of Kennecott's consideration of coal as a possible area of diversification was on April 13, 1963. On that date, Mr. Edmond Guggenheim, a former member of Kennecott's board of directors, sent a letter to Mr. Frank R. Milliken, president of Kennecott, suggesting the ". . . possibility that some of the Western coal deposits might be of interest to Kennecott."[19] However, from April 1963 through late 1965, Kennecott's primary investigative efforts were in the oil industry. It had considered the purchase of a medium-sized oil firm. Despite this fact, Kennecott purchased the reserves of Knight-Ideal Company, a Utah based coal firm, in July 1965.[20] The circumstances surrounding this purchase played

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[19]Ibid., p. 815.

[20]Ibid., p. 816.

a role in the FTC tribunal's decision to reverse a decision of a hearing examiner to dismiss the original complaint. This purchase was significant because the FTC later argued it represented evidence of intent on the part of Kennecott to enter the coal industry via internal expansion with the Knight-Ideal reserves serving as a base for further expansion. Since this aspect of the case played such an important role in the FTC tribunal's decision to reverse the earlier decision of the hearing examiner, and has been alluded to by others in reference to Kennecott as evidence of planned de novo entry,[21] the circumstances surrounding this purchase merit some attention.

First, it should be noted that Kennecott used coal, natural gas, and oil for electric power in its metal mining and processing operations. In 1965, it spent approximately $3 million on electric power. Some 30 percent of this expenditure was by its Western Mining Division which operates four copper mines.[22] In 1965, Western Mining Division purchased approximately 225 thousand tons of coal for its operations.[23] Kennecott's Utah Copper Division,

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[21]For example, Moyer states," In some respects the Kennecott case is unique because of evidence indicating Kennecott's prior involvement in the coal industry and its intent to enter the industry on a massive basis." See, Reed Moyer, "Price-Output Behavior in the Coal Industry," in Competition in the U.S. Energy Industry, edited by Thomas D. Duchesneau (Cambridge: Ballinger Publishing Co., 1975), p. 281.

[22]"In the Matter of Kenecott Copper Corporation," p. 745.

[23]Ibid., p. 945.

a part of Western Mining Division, had purchased natural gas from Mountain Fuel Supply Company for approximately 15 years prior to 1965. Utah Copper Division did not use coal although its generating plant had the capability to use either coal or natural gas. After Mountain Fuel increased the price of natural gas in 1960, Utah Copper Division began to search for an alternative supply of gas.[24] It soon began negotiations with Sinclair Oil and Gas Pipe Line Corporation. These negotiations took place during 1961 and 1962. However in May 1962, Mountain Fuel, out of fear of losing its contract with Utah Copper Division, purchased the reserves which were the subject of negotiations between Sinclair and Utah Copper Division. A few months later Mountain Fuel offered Utah Copper Division a more attractive contract and as a result kept its major customer. Despite the new contract, Utah Copper Division began a study into the feasibility of switching from natural gas to coal in September 1962. This study was completed in October 1963.[25] Kennecott contended that its purchase of the Knight-Ideal reserves was specifically designed to provide a hedge against future natural gas price increases and was the result of its September 1962 through October 1963 study by its Utah Copper Division.

The FTC's complaint, which argued the purchase of the Knight-Ideal reserves constituted intent of major planned de novo entry

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[24]Ibid., p. 823.

[25]Ibid., p. 824.

into the coal industry, was buttressed by correspondence between Kennecott's Vice-President of Mining and its General Manager of Western Mining Division.[26] At the same time the general manager was investigating coal as a possible alternative for natural gas fuel at its Utah Copper Division, the vice-president was requesting the study be broadened to include possible coal developed in the West as part of a major diversification effort. The general manager, whom had hired a part-time consultant to aid in the Utah Copper Division study, recommended that if Kennecott desired to become a major coal producer in the proximate future, then it should acquire a major coal producer "with good reserves, having low operating cost potential, and with effective marketing organization."[27] He also noted that an alternative would be to study the idea in much greater detail which would require considerable time and additional staff.

The vice-president was clearly dissatisfied with what he considered to be the localization of the general manager's attention and asked an engineer at Western Mining Division to hire several coal experts to study diversification possibilities. Despite the vice-president's insistence upon this broader diversification plan no such plan was prepared by anyone at Kennecott during the period 1963-1965. Furthermore, Kennecott was still considering

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[26]Ibid., p. 818-821.

[27]Ibid., p. 819.

the purchase of a medium-sized oil company as late as 1965. Moreover, Kennecott did not produce any coal from the Knight-Ideal reserves until it acquired Peabody. In fact, it had closed down the only operative mine. In the hearing examiner's opinion, the Knight-Ideal purchase did not constitute a "Utah-based coal operation" as contented by the FTC tribunal.[28] The examiner viewed the purchase as a result of Kennecott's Utah Copper Division's attempt to hedge against future natural gas price increases. In contrast, the FTC tribunal viewed the purchase as evidence of a major plan of de novo entry into the coal industry.

To summarize, Kennecott was a large copper corporation essentially in a liquidation process due to circumstances in the copper industry. Consequently, it sought to diversify on a relatively large scale. Peabody appeared to satisfy the objectives that it had set forth in its diversification plan. Indeed, Kennecott paid what appears to be a relatively high price for Peabody's stock. It paid $47.50 per share in April 1966 at a time when the stock was selling somewhere in the low $30s.[29] Whether Kennecott would have entered the coal industry on a large scale via internal expansion appears to be a matter of conjecture. On the one hand, purchase of the Knight-Ideal reserves could be viewed as an integral part of its diversification efforts. Some of Kennecott's management actively investigated the possibility of expansion into coal. On

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[28] Ibid., p. 884.

[29] Ibid., p. 760, 766.

the other hand, one certainly could view the purchase of the Knight-Ideal reserves as part of an attempt to hedge against rising natural gas prices at the Utah Copper Division. Clearly, Kennecott had not used the acquisition as a base for its broader diversification effort up until it acquired Peabody and there was no evidence that any proposal to use these reserves as a base for further expansion was ever accepted. Furthermore, evidence suggests that Kennecott continued to investigate the possibility of diversifying into oil as late as the latter part of 1965.

2. ARGUMENTS AND EVIDENCE

On May 5, 1971, the Federal Trade Commission issued an order which reversed an earlier decision by a hearing examiner that its complaint against Kennecott be dismissed. Despite the fact that it felt Kennecott was an actual potential entrant based upon the Knight-Ideal reserves purchase, the Commission proscribed the merger primarily because it removed the competitive effect of Kennecott remaining on the edge of the market. In the Commission's words:

> Specifically, respondent argues that in all likelihood it would not have entered the coal business had it not acquired Peabody. Even if we were to assume, which we do not, that such is the case, that fact would not affect the determination that Kennecott was a potential entrant nor would it bear upon the issue of whether or not the acquisition is in violation of Section 7.[30]

Thus, the Commission based its reversal upon the perceived potential entrant theory rather than the actual future potential entrant theory.

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[30] Ibid., p. 919.

From an antitrust perspective such cases involve four essential elements. First, as in all merger cases, the relevant market in which competition is alleged to be harmed must be properly defined. Section 7 requires both product and geographic aspects of the market be appropriately taken into account in such a definition. Generally, interpretation of Section 7 has allowed the prosecution substantial leeway in defining markets for antitrust purposes. The three remaining elements of the perceived entrant theory are the same necessary conditions for a merger to lessen competition under the theory of limit pricing. First, recall from Chapter II, the relevant market or industry market must be tightly oligopolistic. Only in industries where actual competition is absent does potential competition have significance. Second, entry barriers must be substantial. Potential entrants must face some cost or demand disadvantage in order for oligopolists to set price above long-run average cost. Third, the number of potential entrants must be limited such that elimination of one would alter the limit price. Thus, established firms' perceptions toward the likelihood of entry must be affected by the merger. Perceptions are unlikely to change if a substantial number of firms are considered equally disadvantaged as potential entrants. The existence of entry barriers and the limited number of potential entrants conditions are obviously related. The effect of entry barriers is to limit the number of firms capable of entering at the competitive price. Limited numbers

of potential entrants requires that the number of least disadvantage (most likely entrants) be limited to a few.[31]

Market Definition

The Commission found bituminous, sub-bituminous, and lignite coal constitued a relevant product market for Section 7 purposes.[32] These are three of the four major coal classifications. The basis for this distinction is that coal quality varies according to its carbon content, degree of volatility, heat content, and other factors.[33] Nevertheless, quality differences within the classifications are usually reflected in price differentials, and all three serve essentially the same function as loading fuel for electric utilities.[34] Moreover, each is similar with respect to the technology necessary for its production and distribution. Therefore,

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[31]Few means small enough to significantly influence established firms' perception of the threat of entry. Turner feels two or three would satisfy this condition, see Donald F. Turner, "Conglomerate Mergers and Section 7 of the Clayton Act," 78 Harvard Law Review (May 1965), p. 1369. The most recent 1982 Justice Department Merger Guidelines state; "the Department is unlikely to challenge a potential competition merger if the entry advantage ascribed to the acquiring firm (or another advantage of comparable importance) is also possessed by three or more firms," see U.S. Department of Justice, 1982 Merger Guidelines (Washington: Bureau of National Affairs, Inc., 1982), p. S-9.

[32]"In the Matter of Kenecott Copper Corporation," p. 915.

[33]For a discussion of the physical, chemical, and engineering properties of coal, see Richard A. Schmidt, Coal In America, (New York: McGraw-Hill Mining Publications, 1979), p. 132-143.

[34]Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November, 1978), p. 20.

the Commission found these three classifications together constitued a distinct line of commerce in accordance with Section 7.

The Commission rejected Kennecott's argument that coal competed with other fuels in a broader energy market. Kennecott contended that the relevant product market should include all fuels which compete with coal as a source of power for electric utilities. This argument was based upon the fact that 70 percent of bituminous, subbituminous, and lignite coal was consumed by electric utilities.[35] The Commission justified its stance by referring to a Supreme Court declaration that: "Reasonable interchangeability between substitute products does not preclude the existence of well-defined submarkets valid for antitrust purposes within the confines of the broader market."[36] As evidence of a well-defined coal submarket, the Commission noted the commercial and technological distinctiveness of coal and the fact that interfuel competition had not precluded rapid expansion of coal production as demand by electric utilities increased. Coal consumption by electric utilities had increased from 86 million tons to 272 million tons from 1947 through 1967. In 1967, 56 percent of electrical power was generated by coal.[37]

The Commission held that the Nation as a whole constituted the relevant geographic market. This definition was deemed appropriate

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[35]"In the Matter of Kennecott Copper Corporation," p. 916.

[36]Ibid.

[37]U.S. Department of Energy, Energy Information Administration, Coal Data: A Reference (Washington: U.S. Government Printing Office, July 1980), p. 11.

despite the fact that relatively high transportation costs, limited availability of water, natural reserve concentration, and other factors tend to limit the geographic market for coal. The justification for this unusually broad definition was that since Kennecott was a large-scale potential entrant, and therefore would be competing for reserves in several coal regions, the most appropriate market area would be the entire Nation.

Industry Concentration

The second element of potential competition cases requires the industry be tightly oligopolistic. Conventionally, tight oligopoly is inferred when four-firm and eight-firm concentration ratios exceed 50 percent and 70 percent, respectively.[38] The Commission's application of the doctrine of potential competition in Kennecott is distinctive because the coal industry was not highly concentrated by any standard of concentration at the time of acquisition. Table III provides various coal production concentration ratios in selected post-World War II years prior to the merger. The table verifies that production concentration was substantially lower than that typically associated with tight oligopoly. In contrast to

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[38]The 1968 Department of Justice Merger Guidelines suggest a cut-off at an eight-firm concentration ratio of 75 percent in potential competition cases, although the Justice Department as well as the FTC have challenged mergers below that level, see Department of Justice Guidelines, [1968] 1 Trade Reg. Rep. (CCH) Par. 4,510, p. 6,888.

TABLE III

COAL PRODUCTION CONCENTRATION, 1950-1967

Year	Production Concentration Ratio			
	Four-Firm	Eight-Firm	Twenty-Firm	Fifty-Firm
1950	13.6	19.4	30.4	45.2
1955	17.8	25.5	39.6	54.7
1960	21.4	30.5	44.5	59.9
1965	26.6	36.3	50.1	62.3
1967	29.2	39.7	51.3	66.1

Source: Keystone Coal Industry Manual, U.S. Coal Production by Company (New York: McGraw-Hill Mining Publications, annual).

Kennecott, Table IV presents concentration ratios in the six potential competition cases in which the Supreme Court has issued a decision. Although the Court has never specified what could be interpreted as a critical level of concentration, the table indicates that it has never applied, or sustained, the doctrine in a case where the four-firm ratio was less than 61 percent and the eight-firm ratio less than 81.2 percent. As indicated in Table III, the 1967 ratios in the coal industry were substantially less than those in Table IV. In fact, the fifty-firm production concentration ratio was only 5.1 percent higher than the lowest four-firm ratio used by the Supreme Court and was approximately 9 percent lower than the eight-firm ratio suggested in the 1968 Department of Justice's guidelines.

The Commission based its conclusion that the coal industry was tightly oligopolistic upon an extrapolation of two structural changes that were taking place during the post-World War II period. First, as can be seen in Table III, there was a substantial increase in production concentration over the period. Both the four-firm and eight-firm concentration ratios had slightly more than doubled. Second, there was also an upward trend in the percentage of coal produced by relatively large firms. Table V presents the number of firms in various size classifications for selected post-World War II years along with their respective percentage of total production. The table indicates the percentage of coal produced by relatively large firms (greater than one million tons per year) had increased from 62.41 percent to 70.20 percent, while their number had fallen from 79 to 68 during the twelve years preceding the

TABLE IV

CONCENTRATION RATIOS IN SUPREME COURT POTENTIAL COMPETITION CASES

Case	Concentration Ratios			
	Two-Firm	Three-Firm	Four-Firm	Eight-Firm
Marine Bancorp.[a]		92%		
Falstaff[b]			61.3%	81.2%
Ford-Autolite[c]		96%		
Clorox[d]	65%			
Phillips Pet.[e]			61%	
Penn-Olin[f]	over 90%	over 99%		

[a] U.S. v. Marine Bancorporation, 418 U.S. 602 (1974).

[b] U.S. v. Falstaff Brewing Corp., 410 U.S. 526 (1973).

[c] Ford Motor Co. v. U.S., 405 U.S. 562 (1972).

[d] F.T.C. v. Proctor and Gamble, 386 U.S. 568 (1967).

[e] U.S. v. Phillips Petroleum Co., 367 F. Supp. 1227 (1973).

[f] U.S. v. Penn-Olin Chem. Co., 378 U.S. 158 (1964).

Source: Lewis H. Kaplan, "Potential Competition and Section 7 of the Clayton Act," Antitrust Bulletin 25 (Summer 1980), p. 301.

TABLE V

NUMBER OF COAL FIRMS AND PERCENTAGE OF COAL PRODUCTION BY FIRM SIZE, SELECTED YEARS[a]

	Size Classification (Thousand Tons)				
Year	50-100[b]	100-200	200-500	500-1000	Greater Than 1000
1955	4691 (15.39%)	171 (5.03%)	136 (9.34%)	52 (7.83%)	79 (62.41%)
1960	6994 (12.45%	176 (6.09%)	139 (10.14%)	34 (6.04%)	66 (65.28%)
1965	6433 (9.37%)	202 (5.45%)	149 (8.69%)	64 (8.35%)	71 (68.14%)
1966	6438 (9.13%)	201 (5.31%)	162 (9.23%)	60 (7.39%)	72 (68.94%)
1967	4507 (7.50%)	242 (6.13%)	149 (8.55%)	63 (7.60%)	68 (70.20%)

[a]Percentages of total production are in parenthesis below the corresponding number of firms in each classification.

[b]The data source does not collect information on coal firms producing less than 50,000 tons per year.

Source: Keystone Coal Industry Manual, U.S. Coal Production by Company (New York: McGraw-Hill Mining Publications, annual).

merger. Furthermore, the percentage of coal produced by the smallest classification in 1967 had dropped by slightly over one-half from what it had been in 1955, while their number had dropped by 1,031 from the preceding year. The Commission's prediction of increased concentration was based upon a simple extrapolation of these changes in production concentration ratios and the size distribution of firms.[39]

The justification for extrapolating concentration trends was the legal doctrine of incipiency. The legal precedent was established in Von's Grocery[40] and Brown Shoe.[41] In effect, it extends Section 7 to mergers which are not necessarily anticompetitive in and of themselves but viewed in the overall context of industry trends could foster anticompetitive effects in the near future. However, its previous application had largely been confined to horizontal mergers which directly increase concentration and vertical mergers in which there is a likelihood of market foreclosure. Kennecott was distinctive because the doctrine was applied to a pure conglomerate merger in which neither of these anticompetitive effects were present.[42]

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[39]Ibid., p. 914.

[40]United States v. Von's Grocery Company, 384 U.S. 270 (1966).

[41]Brown Shoe Co., Inc. v. United States, 370 U.S. 294 (1962).

[42]In a later case the FTC invoked the doctrine of potential competition in a industry where the 8-firm concentration ratio was

Barriers To Entry and Limited Potential Entrants

As noted in the introductory remarks to this section, the third and fourth elements of potential competition cases are related. Recall from Chapter II that potential entrants must face some demand or cost barrier for the economic theory of limit pricing to have significance. Furthermore, the welfare effects of a dominate firm acquisition depend upon the height of the acquiring potential entrant's barrier relative to other potential entrants. For the limit price to rise, the acquisition must be made by one of only a few least disadvantaged (most likely) potential entrants. Thus, from an antitrust perspective, both the existence as well as the extent of entry barriers must be determined in order for the limited numbers necessary condition to be satisfied. The Commission's conclusion that entry barriers were substantial was primarily based upon increased capital requirements of large-scale entry into the industry.

Intuitively, one can think of coal as being sold in two separate markets. Coal is sold in a what is referred to as a spot market. The

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43.71 percent which was only slightly above the coal industry's 8-firm ratio at the time of Kennecott. The case was dismissed because the FTC failed to find a trend in concentration. Thus, incipient trends appear to be significant in applying the doctrine of potential competition when concentration is low or moderate, see Warner-Lambert Co., 87 F.T.C. 813, [1973-76 Transfer Blinder] Trade Reg. Rep. (CCH) Par. 21, 141 (1976). Also, it should be stated that the doctrine of incipiency as used here should not necessarily be confused with the incipient nature of Section 7. The doctrine of incipiency refers to an extension of incipiency as conventionally used to describe Section 7. The incipient nature of Section 7 refers to the fact that the statute requires a merger's legality be determined by that merger's probable effect on actual competition.

spot market is composed of many small firms which sell coal on a non-contractual or short-term contractual basis. Based upon the large numbers and fluctuations in the number of firms in the smallest product classification in Table V, it would be difficult to conclude that financial requirements, or any other entry requirement, constitutes a substantial entry barrier in this market. On the other hand most coal, 70 percent in 1967, is sold on a long-term contractual basis primarily to electric utilities.[43] These contracts generally vary from three to thirty years. Due to their long-term nature, firms must acquire large quantities of reserves in order to secure these contracts. Furthermore, entry into this market requires firms to adopt the most efficient means of producing and distributing coal in order to successfully compete for coal contracts. This requires the purchase of expensive continuous mining machinery for efficient production and the use of unit trains for efficient transportation. These techniques are inefficient for small firms in the spot market. These two post-World War II innovations in production and distribution as well as the substantial increase in the amount of coal consumed by electric

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Thus, it does not require actual damage to competition but does require evidence that if it is consummated it will cause actual damage. On the other hand, the doctrine of incipiency extends this notion to mergers which in and of themselves are not likely to cause an immediate lessening of competition, but when interpreted in the light of industry trends eventually could cause a lessening of competition. Hence, this notion of incipiency allows for the proscription of a particular merger even if the probable effect of that specific merger is not an immediate lessening of actual competition.

[43]Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends, p. 147.

utilities led to a significant increase in absolute capital requirements. Approximately 75 percent of the sales in this market were made by firms producing in excess of one million tons in 1960.[44] Thus, in contrast to the spot market, entry into the long-term contractual market requires a substantially greater financial investment. This was the basis for the Commission's conclusion that substantial entry barriers exist in the coal industry.

The Commission's finding that Kennecott's elimination as a potential entrant would be anticompetitive was based primarily upon three pieces of evidence. First, Kennecott had expressed an interest in the coal industry as evidenced by the diversification study mentioned in the background section of this chapter. In fact, the Commission viewed the purchase of the Knight-Ideal reserves as an expression of intent to enter de novo. Hence, in the FTC tribunal's opinion, Kennecott had expressed both and interest as well as intent to enter the coal industry on a large scale. This conclusion was buttressed by the fact that Kennecott was involved in one of the extractive industries and was a small consumer of coal. Thus, Kennecott's "proximity" to the market along with an expressed interest and intent to enter contributed to the finding that Kennecott was a perceived potential entrant.

A second piece of evidence dealt with Kennecott's sheer size. As mentioned in Chapter I, Kennecott was the 55th largest industrial corporation in terms of assets and 111th in terms of sales in 1966.

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[44] Kennecott Copper Corporation v. F.T.C., 467 F.2d 77 (1972).

Furthermore, Kennecott's huge cash reserves resulting from a liquidation process in the copper industry provided the financial means to enter the industry on a large scale. The Tenth Circuit Court of Appeals in its affirmation of the Commission's decision to proscribe the merger found that on the basis of the evidence it was obvious that it would be ". . . virtually impossible for a company with fewer resources than Kennecott to start a company by acquisition of reserves and equipment."[45] In fact, the Commission concluded that Kennecott's sheer financial strength would entrench Peabody's via its "deep pocket" of resources which could be used to ". . . acquire coal reserves, finance mining development, and aggressively compete for long-term utility contracts from a virtually unprecedented financial position."[46]

The Commission felt the evidence clearly established Kennecott's interest and intent as well as its means to enter the coal industry. Given these factors along with the existence of perceived barriers to entry and the finding of a trend toward tight oligopoly, the only remaining issue was whether Kennecott was one of only a few most likely potential entrants. In regard to this issue, the Commission found Kennecott was not only a potential entrant, but that it was

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[45]"In the Matter of Kennecott Copper Corporation," p. 924.

[46]Ibid., p. 945.

the most likely potential entrant.[47] In fact, the Commission could not identify any other potential entrants on the basis of the trial record despite testimony to the contrary.[48] This conclusion was based upon the exclusion of oil companies, natural gas companies, electric utilities, steel companies, and railroads despite the fact that many of these produced coal and others held coal reserves. The justification for the exclusion of steel companies, railroads, and electric utilities was that their production was captive. Natural gas and oil companies were excluded because the FTC felt ". . . their primary interest in acquiring coal reserves lies in converting coal into synthetic fuels, and that liquefaction and gasification rather than the sale of coal is their target."[49] Therefore, the FTC excluded several groups of firms from its list of potential entrants on the basis that their primary objective was not the commercial sale of coal despite the fact that some had substantial reserve holdings.

3. SYNOPSIS

This chapter has presented the key arguments and evidence used by the FTC to proscribe the Kennecott-Peabody merger. The Commission's proscription was based upon the perceived potential entrant

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[47] Ibid.

[48] Ibid., p. 804-808.

[49] Ibid., p. 945.

theory of potential competition which has its economic foundation in the theory of limit pricing. Three preconditions were necessary for the application of that theory in Kennecott. The Commission satisified these three conditions as follows. First, the Commission concluded that the coal industry, although not currently a tight oligopoly, was on its way to becoming so in the near future. Thus, the tight oligopoly precondition was based upon a trend toward tight oligopoly rather than an actual fnding of tight oligopoly. The legal precedent for this view of incipiency was cited as Brown Shoe and Von's Grocery. The idea is that the judiciary may base its assessment of a merger's probable effect on competition upon trends in industry structure rather than structure as it exists at the time of acquisition. Therefore, mergers in some industries with low concentration may be proscribed so long as an upward trend in concentration can be detected. Hence, the Commission's finding of tight oligopoly was based upon a prediction of a continuation of a post-World War II upward trend in production concentration.

Second, the Commission concluded that entry barriers were high and rising. The basis for this conclusion was that financial requirements had risen due to the increased importance of the electric utility sector as a consumer of coal and the fact that equipment costs had risen. Firms bidding for long-term utility contracts must purchase large quantities of reserves. The efficient extraction and transportation of these reserves requires firms to purchase more expensive equipment. In fact, the Commission

surmissed that financial requirements had become so high that no firm with the exception of Kennecott could be identified as possessing the financial ability as well as the economic incentive to enter the coal industry on a large scale. This conclusion was based upon the exclusion of a number of very large firms as potential entrants despite the fact that they were holding substantial quantities of reserves at the time Kennecott acquired Peabody. The rationale behind these exclusions was that these companies were not primarily interested in the commercial sale of coal. Thus, the Commission satisfied the third precondition for the applicability of the doctrine of potential competition by predicting that these firms would not enter the coal industry on a commercial basis. This prediction as well as the concentration prediction were therefore vital to the Commission's finding that Kennecott's acquisition of Peabody lessened competition by eliminating Kennecott as a perceived potential entrant.

CHAPTER IV

REBUTTAL OF FEDERAL TRADE COMMISSION'S ARGUMENTS AND EVIDENCE

1. INTRODUCTION

Chapter III presented the FTC's case against Kennecott's acquisition of Peabody. The case was distinctive in two respects. First, it was the first attempt to apply the doctrine of potential competition in a pure conglomerate case.[1] All previous conglomerate applications involved either market or product extensions. Second, the case represented the first successful application of the doctrine in a situation where the industry was not highly concentrated at the time of the complaint.[2] Instead, the FTC's complaint was based upon a prediction of higher future concentration in the coal industry. Kennecott represents a significant precedent in antimerger policy due to the current dominance of pure conglomerate mergers as well as these distinctive aspects of the case.

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[1] Kennecott Copper Corporation v. Federal Trade Commission, 467 F. 2d 67 (1972), pp. 74-75.

[2] Wilbur L. Tomlinson, "Potential Competition: Analysis of an Antitrust Case," Missouri Law Review 44 (Summer 1979), p. 498-99. It should not be noted that in a subsequent case the FTC invoked the doctrine in a situation where the eight-firm concentration ratio was 43.71 percent. However, the case was dismissed because there was not an upward "trend" in concentration. See Warner-Lambert Co., 87 F.T.C. 812 [1973-76 Transfer Binder] Trade Reg. Rep. (CCH) Par. 21,141 (1976).

This chapter has two objectives. The first is to critically analyze the evidence in Kennecott. This will require an investigation into the four essential elements of perceived potential entrant cases. Recall from Chapter III that these elements include: delineation of a relevant market, assessment of industry concentration, analysis of entry barriers, and identification of potential entrants. The second objective is to examine the problems in applying the doctrine of potential competition to pure conglomerate mergers in general and, particularly, in those situations where concentration and barriers to entry are relatively low. The primary usefulness in re-examining the case is that it is likely to serve as precedent in future applications of the doctrine of potential competition.[3]

2. MARKET DELINEATION AND ECONOMIC THEORY

The economic rationale behind market definition is to allow one to make meaningful predictions about price behavior in a particular market.[4] In order to formulate meaningful predictions it is first necessary to identify the relevant constraints present in buyer and seller interactions. Economic theory suggests that constraints upon any particular market participant's behavior may come from one of

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[3]Ibid.

[4]Much of the following discussion on delineating markets in antitrust cases is based upon Franklin M. Fisher, "Diagnosing Monopoly," Quarterly Review of Economics and Business 19 (Summer 1972), p. 7-33.

two sources. First, buyer's market power is restrained when there are a large number of buyers of a particular product. The greater the number of alternatives available to sellers, the less likely any particular buyer will be able to significantly influence the price received by sellers since they can sell their product to other buyers. Therefore, the buyers' side of a market should include all buyers of the product as well as its close substitutes since both influence the pricing behavior of firms in the market. Second, sellers' market power is restrained when there are a large number of sellers of a particular product. Similarly, the sellers' side of the market should include sellers of identical products as well as those of close substitutes since both influence price. Conceptually, then, one should include all buyers and sellers of identical products as well as close substitutes if a market is to be delineated in an economically meaningful manner.

Although economic theory provides a conceptual framework basis for delineating markets, it is usually necessary for one to use some degree of subjective judgment when defining actual markets for Section 7 purposes. There are three dimensions of a market that present difficulties in defining markets for such purposes. First, one must recognize that spatial separation of firms may affect the extent to which pricing behavior is restrained. Thus, a market's geographic dimension must be taken into account if buyers and sellers are spatially dispersed. Since dispersion may result in relatively high distribution costs and place distant buyers or

sellers at a disadvantage, one must establish some criteria from which those participants that do not restrain price behavior are excluded from the relevant market. This standard will necessarily involve some element of subjectivity since economic theory does not provide a strictly objective standard for determining precisely where to draw market boundaries. The key, however, to formulating an economically meaningful standard is to properly take into account the extent to which all buyers and sellers influence price.

A second dimension of a market that presents difficulty in Section 7 cases involves the consideration of which products to include in the relevant market. The difficulty arises because some products that are not physically identical may nevertheless influence the price of the product in question. Therefore, one must include these products if price behavior is to be adequately explained and predicted. Again, the problem is compounded by the fact that economic theory does not provide a strictly objective standard for this purpose. Conceptually, a high cross-elasticity of demand coefficient indicates a large degree of substitutability between two products. However, since the coefficient is only useful when evaluated at the competitive price of both products, its usefulness is extremely limited in Section 7 cases because the very purpose of market definition is to ascertain the status of competition in a relevant market. As is well-known, two products may exhibit a high

cross-elasticity at the monopoly price of one.[5] Under such circumstances the inclusion of the two in the same product market would obviously be misleading. The high cross-elasticity of demand may be a result of monopoly power rather than an indicator of competitiveness between two products. Consequently, the selection of those products to include in the same product market often requires an element of subjective judgment. The key determinant, however, is the extent to which the producers of one product are restrained by the behavior of its consumers and producers of similar products.

A third difficulty that arises in defining a relevant market for Section 7 purposes is the selection of an appropriate time period in which to consider substitution. This time dimension of markets has implications for both the product and geographic dimensions of markets. The degree to which two products differentiated spatially or physically are substitutable is sensitive to the time frame under consideration. This is due to the fact that the extent to which buyers and sellers can respond to price changes is largely dependent upon time. In the long run there tends to be greater opportunities for substitution. Again, economic theory does not provide much guidance in terms of selecting the most appropriate time period in which to assess the degree of substitutability, but merely suggests

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[5]For a discussion of the problems associated with using cross-elasticity of demand coefficients, see Kenneth D. Boyer, "Industry Boundaries," in Economic Analysis and Antitrust Law, edited by Terry Calvani and John Seigfried (Boston: Little, Brown, and Company, 1979), pp. 94-96.

that it is not independent of time. Thus, two products may not appear to be close substitutes in the short run, but exhibit a substantial amount of substitutability in the long run. This possibility has to be taken into account in Section 7 cases since market power, by definition, refers to the firm's ability to price above costs in the long run.

The above discussion of problems often encountered in defining a market for Section 7 purposes highlights the necessity of informed subjective judgments. There are nearly always a number of ways in which a market may be delineated. The "best" way depends entirely upon the specific purpose. Since market power has long been recognized in antitrust law and economics as the power to raise price above the competitive level, the justification for including and excluding firms from a market should always be based upon the degree to which they influence the price behavior of one another.

3. MARKET DELINEATION IN KENNECOTT

The FTC's justification for defining the relevant industry in Kennecott as the Nation's producers of bituminous, sub-bituminous, and lignite coal appears to have been deficient in two respects. First, the Nation does not appear to accurately reflect the commercial realities of buying and selling coal and thus does not reflect the degree of price restraint within certain regions. Second, the FTC's justification for excluding other fuels from its product market appears to have been

based more upon the fact that coal is physically and technologically distinctive rather than upon whether other fuels restrain the pricing behavior of firms in the coal industry. These two decisions played a very important role in the Commission's proscription of the merger since all of its subsequent structural variables such as industry concentration, barriers to entry, and the number of potential entrants were sensitive to the way the industry was defined. This section will critically analyze the Commission's choice of industry definition and examine some of the evidence in support of perhaps a more economically meaningful market delineation.

Geographic Market

In support of its finding that the Nation as a whole constituted a meaningful delineation of the coal industry, the FTC found that Kennecott was a potential entrant on a national scale. The Commission surmised that since Kennecott would likely sell coal and compete for reserves on a national scale, then the relevant market from which to assess the competitive effects of the merger would be the entire Nation. The problem with this as a justification for adopting a national definition of the coal industry is simply that high transportation costs, stemming from the geological concentration of coal deposits, tend to severely restrict the ability of some coal firms to sufficiently restrain the pricing behavior of others.[6] Although improved methods of distribution likely expanded geographic markets during the late 1950s and 1960s, the

[6]For a discussion on the location and extent of coal reserves, see Reed Moyer, Competition in the Midwestern Coal Industry (Cambridge: Harvard University Press, 1964), pp. 10-14.

fact remains that transportation costs constitute a substantial proportion of the delivered price of coal.[7] Therefore, supply prices are highly dependent upon the distance from buyer to seller. Consequently, one must consider spatial separation of buyers and sellers when delineating coal markets.

A number of studies have attempted to delineate geographic coal markets within the United States.[8] Although each study is somewhat unique in its method and consequently delineates geographic boundaries differently, there is a strong general consensus that relatively high transportation costs and geological concentration of coal reserves prohibit the buying and selling of coal on a national scale. For example, coal producers in Utah are not likely to have a significant influence upon West Virginia coal prices, and vice versa.

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[7]For example, in 1970 the average value per ton of bituminous or lignite at the mine was $6.26, and the average railroad charge for Class I railroads was $3.41. Therefore, transportation costs constituted 54.5 percent of the mine price of coal and 35.3 percent of the delivered price of coal, see U.S. Department of the Interior, Bureau of Mines, Minerals Yearbook (Washington: U.S. Government Printing Office, 1970), p. 328. Others have estimated transportation costs at 40 percent of the delivered price of coal, see U.S. Department of the Interior, Bureau of Mines, Mineral Facts and Problems (Washington: U.S. Government Printing Office, 1970), pp. 44-45.

[8]Kenneth Elzinga and Thomas Hogarty, "The Problem of Geographic Market Delineation Revisited: The Case of Coal," Antitrust Bulletin 23 (Spring 1978), pp. 1-18; Phillip E. Giffin and Joseph W. Kushner, "Geographic Submarkets in Bituminous Coal: Defining A Southeastern Market," Antitrust Bulletin 21 (Spring 1976), pp. 67-79; Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978), pp. 24-31; and U.S. Department of Justice, Competition in the Coal Industry (Washington: U.S. Government Printing Office, May 1978), pp. 44-45.

The FTC's broad geographic definition of the coal industry had two effects in Kennecott. First, the national production concentration figures used by the Commission were generally less than those found in most regions. In a 1978 study of the coal industry conducted by the FTC, the Nation was divided into three separate regions for the purpose of calculating production concentration ratios.[9] These figures are presented in Tables VI through IX. Table VI presents national production concentration ratios. Regional concentration figures are provided in Tables VII, VIII, and IV. A comparison of Table VI with Tables VIII and IX reveals that the national four-firm and eight-firm ratios are less than the corresponding ratios in both the Midwestern and Western regions, while Table VII indicates the converse is true in the Appalachian region. Also, the twenty-firm Appalachian ratios were less than the national ratios.

At first glance it would appear that the Commission's allegation that Kennecott's acquisition of Peabody diminished competition would have been bolstered if the FTC had chosen a narrower geographic definition of the coal market since regional concentration tends to be higher than national. In particular, one might wonder as to why the Commission did not chose the Western region as the appropriate geographic market. This delineation could have easily been justified for two reasons. First, it was a more appropriate reflection of the commercial realities

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[9]Federal Trade Commission, Bureau of Economics, Structure of the Nation's Coal Industry, pp. 35-46.

TABLE VI

NATIONAL COAL PRODUCTION CONCENTRATION RATIOS,
1964-1969

Year	Concentration Ratios			Production (Thousand Tons)
	4-Firm	8-Firm	20-Firm	
1964	23.8	33.7	46.6	486,998
1965	23.7	33.4	46.6	512,088
1966	24.8	34.7	48.8	533,881
1967	26.7	37.2	51.3	552,627
1968	27.6	38.0	53.1	543,245
1969	28.2	38.7	54.0	560,505

Source: Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978), p. 38.

TABLE VII

APPALACHIAN REGION COAL PRODUCTION CONCENTRATION RATIOS, 1964-1969[a]

Year	Concentration Ratios			Production (Thousand Tons)
	4-Firm	8-Firm	20-Firm	
1964	20.1	29.4	43.2	353,360
1965	20.5	29.8	43.4	371,415
1966	21.1	30.7	44.0	382,746
1967	23.5	33.5	46.8	393,423
1968	24.8	36.2	49.8	388,086
1969	25.7	37.3	50.5	394,928

[a]Includes: Pennsylvania, Ohio, West Virginia, Maryland, Virginia, Tennessee, North Carolina, Georgia, Alabama, and Eastern Kentucky.

Source: Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978), p. 41.

TABLE VIII

MIDWESTERN REGION COAL PRODUCTION CONCENTRATION RATIOS, 1964-1969[a]

Year	Concentration Ratios			Production (Thousand Tons)
	4-Firm	8-Firm	20-Firm	
1964	58.1	77.1	n.a.[b]	114,683
1965	56.4	76.3	n.a.	120,365
1966	58.5	81.9	n.a.	129,895
1967	60.7	83.5	n.a.	137,022
1968	59.0	82.2	n.a.	134,091
1969	60.7	82.7	n.a.	139,357

[a]Includes: Illinois, Indiana, Western Kentucky, Iowa, Kansas, Missouri, Oklahoma, Arkansas, and Texas.

[b]Not available.

Source: Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978), p. 42.

TABLE IX

WESTERN REGION COAL PRODUCTION CONCENTRATION RATIOS, 1964-1969[a]

Year	Concentration Ratios			Production (Thousand Tons)
	4-Firm	8-Firm	20-Firm	
1964	33.1	50.9	n.a.[b]	18,955
1965	35.4	53.1	n.a.	20,308
1966	31.3	50.1	n.a.	21,240
1967	33.2	51.4	n.a.	22,182
1968	32.3	53.6	n.a.	23,066
1969	33.6	55.8	n.a.	25,719

[a]Includes: North Dakota, South Dakota, Montana, Wyoming, Idaho, Colorado, Utah, Arizona, New Mexico, Alaska, Washington, Oregon, and California.

[b]Not available.

Source: Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978), p. 45.

of buying and selling coal than the national definition. Second, to the extent that Kennecott's purchase of the Knight-Ideal reserves established that Kennecott was a potential entrant, the Western region was the most appropriate region to assess the competitive impact of its removal as a potential entrant.

What appears to be the case at first glance, however, does not hold after one considers a second implication of the Commission's broad geographic definition. Specifically, the Commission eliminated many other coal firms as potential entrants via market extension by broadly defining the geographic market. Only five of the twenty-six coal firms producing in excess of three million tons in 1967 produced any coal in the Western region.[10] It would have been difficult to exclude these firms as potential entrants on the basis of their "proximity" to the market. Therefore, the effect of the FTC's broad geographic definition on market structure was to slightly lower production concentration but eliminate a relatively large number of other potential entrants.

Product Market

A second problem with the FTC's market definition was the rationale behind its exclusion of other fuels, such as oil, natural gas, and nuclear power from the product market. The previous discussion of product markets suggests the fundamental consideration

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[10] Keystone Coal Industry Manual, U.S. Production by Company, 1967 (New York: McGraw-Hill Mining Publications, 1968), pp. 7-9.

in any economically meaningful delineation is the extent to which consumers of any one particular product can easily substitute for other similar products. Therefore, the only meaningful justification for excluding oil, natural gas, and nuclear power from the relevant product market should have been that the producers of these products did not sufficiently constrain the pricing behavior of firms in the coal industry. The question as to whether these fuels should have been included in the product definition depends upon the degree of interfuel substitutability that exists between coal and each of these fuels. However, prior to directly considering interfuel substitutability, it is necessary to mention three significant post-World War II trends in the energy sector.

Energy consumption trends. One significant trend in the energy sector of the economy has been a continuous secular decline in the consumption of coal relative to other fuels. Table X indicates that in each successive decade from 1900 through 1970 there has been a relative decline in coal consumption. Coal's percentage of total fuel consumption fell from 93 percent to 20 percent over the period. The table also reveals that absolute coal consumption only slightly increased from 1910 through 1970 despite a quadrupling of total fuel consumption. Furthermore, over the 1950-1970 period, the period in which the FTC was considering trends in the coal industry, coal experienced a 41 percent to 20 percent relative decline in terms of fuel consumption. Moreover, in the early 1970s, it was expected that the development of nuclear power would hasten the decline of coal due to the expectation, and the

TABLE X

DISTRIBUTION OF FUEL CONSUMPTION, 1900-1970, SELECTED YEARS
(Trillion British Thermal Units)

Year	Coal	Crude Oil	Natural Gas	Nuclear Fuel	Total
1900	6,841	229	252	--	7,322
	(93%)	(3%)	(3%)	--	(100%)[a]
1910	12,714	1,007	540	--	14,261
	(89%)	(7%)	(4%)	--	(100%)
1920	15,504	2,634	813	--	18,993
	(82%)	(14%)	(4%)	--	(100%)
1930	13,639	5,652	1,923	--	21,468
	(64%)	(26%)	(9%)	--	(99%)
1940	12,535	7,487	2,665	--	22,960
	(55%)	(33%)	(12%)	--	(100%)
1950	12,913	12,706	5,969	--	32,371
	(41%)	(40%)	(18%)	--	(99%)
1960	10,414	18,599	12,736	Neg.[b]	41,749
	(25%)	(45%)	(31%)	(Neg.)	(100%)
1970	12,922	29,611	22,029	231	64,793
	(20%)	(46%)	(34%)	(Neg.)	(100%)

[a]Totals may not sum to 100% due to rounding.

[b]Negligible.

Source: Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends in the Energy Sector of the U.S. Economy (Washington: U.S. Government Printing Office, March 1974), p. 7.

eventual realization, of more stringent pollution standards on coal.[11] Nuclear power was foreseen as a viable and attractive alternative to dirty coal.

The dramatic decline in coal as a fuel source was obviously the consequence of its inability to compete with other fuels in the various subsectors of the energy sector. Table XI presents post-World War II trends in coal consumption by end-use sector. The table indicates declines in all consumption sectors with the exception of electric utilities. Coal was virtually displaced by oil and natural gas in the residential/commercial and the transportation sectors. The table also suggests the relative decline in coal documented in Table X undoubtedly would have been much greater had it not been for a substantial increase in consumption by electric utilities. Electric utilities' consumption rose by approximately 250 percent from 1950 through 1970, while their percent of total coal consumption rose from 19 percent to 61 percent. Total coal consumption nevertheless remained stagnant over the 1950-1970 period despite this huge increase in utilities' consumption. This increase was almost entirely offset by declines in other consumption sectors.

Although, as Table XI revealed, the absolute amount of coal consumed by electric utilities increased substantially over the

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[11]See "Pollution Curbs, Economic Lull Hits Coal Market," Wall Street Journal (March 20, 1972), p. 20; Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends in the Energy Sector of the U.S. Economy (Washington: U.S. Government Printing Office, March 1974), pp. 19-22.

TABLE XI

COAL CONSUMPTION BY END-USE SECTOR, 1950-1970, SELECTED YEARS[a]
(Million Tons)

	Sector					
Year	Electric Utilities	Coke Plants	Transportation	Residential and Commercial	Other	Total
1950	91.9 (19%)	104.0 (21%)	63.0 (13%)	114.6 (23%)	120.6 (24%)	494.1 (100%)
1955	143.8 (32%)	107.7 (24%)	17.0 (4%)	68.4 (15%)	110.1 (25%)	447.0 (100%)
1960	176.6 (44%)	81.4 (20%)	3.0 (Neg.)[b]	40.9 (10%)	96.0 (24%)	398.0 (98%)
1965	244.8 (52%)	95.3 (20%)	0.7 (Neg.)	25.7 (5%)	105.6 (22%)	472.0 (99%)
1970	320.2 (61%)	96.5 (18%)	0.3 (Neg.)	16.1 (3%)	90.2 (17%)	523.2 (99%)

[a]Percentages of total consumption are in parenthesis. Total percentage may not sum to 100% due to rounding.

[b]Negligible, less than 0.1%.

Source U.S. Department of Energy, Energy Information Administration, Coal Data: A Reference (Washington: U.S. Government Printing Office, July 1980), p. 11

post-World War II period, the amount of coal consumed by electric utilities relative to other fuels actually fell. Table XII presents the percentage of various fuels consumed by utilities during selected post-world War II years. The table indicates that coal's share of the electric utility market fell slightly from 47.3 percent to 45.5 percent over the 1947-1970 period, with a relatively large fall of 7.4 percent during the 1965-1970 period. Coal and hydropower lost shares to natural gas, oil, and nuclear fuels.

Summary of energy consumption trends. This overview of post-World War II fuel consumption revealed three significant trends. First, coal experienced a substantial decline in terms of its relative importance as a fuel source. Second, absolute coal consumption was secularly stagnant despite relatively large increases in consumption by electric utilities. Third, coal's share of the electric utility market remained relatively stable despite large increases in consumption. Although one must exercise extreme caution in inferring anything about interfuel substitutability strictly on the basis of consumption trends, there are a couple of points that can be made. First, it is fairly obvious that coal lost whatever competitive edge it might have had in the residential/commerical and transportation sectors. This is especially true in the transportation sector where developments of the automobile and diesel locomotive resulted in almost complete displacement of coal by petroleum products. Second, these trends suggest that to the extent that interfuel substitutability

TABLE XII

PERCENTAGE OF VARIOUS ENERGY SOURCES CONSUMED BY UTILITIES, 1947-1970, SELECTED YEARS[a]

	Energy Source					
Year	Coal	Natural Gas	Petroleum	Hydro	Nuclear	Total Sector Energy Input (Trillion Btu)
1947	47.3%	8.7%	10.6%	33.1%	--	4,397
1955	52.0%	17.8%	7.6%	22.3%	--	6,686
1961	51.5%	22.3%	6.8%	19.2%	0.2%	8,486
1965	52.9%	21.6%	6.7%	18.5%	0.3%	11,104
1970	45.5%	24.4%	12.7%	16.0%	1.4%	16,457

[a]Total percentages may not sum to 100% due to rounding.

Source: Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends in the Energy Sector of the U.S. Economy (Washington: U.S. Department Printing Office, March 1974), p. 10.

exists, it is most likely to be found in the electric utility sector. Moreover, consumption trends in this sector indicate that no one fuel is completely dominate. While this does not necessarily imply a high degree of interfuel substitutability between coal and other fuels, it does suggest that the future of the coal industry strongly depends upon its ability to remain competitive in the utility sector.

Interfuel substitutability. Conceptually, the degree of interfuel competition in the electric utility sector primarily depends upon two factors. First, the "state-of-the-art" in the generation of electricity defines the technological constraints with respect to substitutability. Second, the costs of switching fuels determines the economic feasibility of substitution. Thus, two fuels are relatively close substitutes if existing technology permits substitution and the economic costs of substitution are relatively low compared to the benefits.

One must distinguish between the long run and the short run when assessing the extent to which it is technologically possible for a utility to switch fuels. Clearly, the long run offers the greatest opportunities for fuel substitution since electricity may be generated by a number of methods.[12] The three most common are conventional

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[12]These methods and much of the following discussion on interfuel substitutability are based upon Richard L. Gordon, U.S. Coal and the Electric Power Industry (Washington: Johns Hopkins University Press, 1975), Chapter 7.

steam, nuclear, and hydropower. Table XIII presents the percentage of total electricity generated by energy source in selected post-World War II years. The table indicates that, by far, the most common method of generating electricity is the conventional steam method. The conventional steam method permits utilities to use either coal, natural gas, or oil as boiler fuel in generating electricity. Therefore, from a technological point of view a utility has the choice of designing a conventional steam power plant to accept either coal, natural gas, or oil, or to construct nuclear or hydropower plants. The cost-minimizing utility will choose the plant design with the lowest costs per unit of energy. These costs include not only the direct costs of fuel, but also storage, distribution, construction, and maintenance costs. Nevertheless, one would expect relative fuel prices to play an important role in design selection since fuel costs are a major operating expense of electric utilities.

A utility's ability to respond to relative price changes is somewhat more limited in the short run. In particular, alternative fuel sources are not available to conventional steam users due to the technological limitations. However, a utility may be able to substitute fuels within conventional steam plants depending upon boiler design. Although some plants are originally designed to accept either fuel, the ability to switch from coal to natural

TABLE XIII

PRODUCTION OF ELECTRICITY BY THE ELECTRIC UTILITY SECTOR BY TYPE OF GENERATION, 1952-1970, SELECTED YEARS
(Billion Kilowatt-hours)

Year	Conventional Steam[a]	Nuclear Power	Hydro Power	Other[b]	Total
1952	290 (73%)	0 (0%)	105 (26%)	4 (1%)	399 (100%)
1960	603 (80%)	1 (Neg.)[c]	146 (19%)	4 (1%)	754 (100%)
1965	851 (81%)	3 (Neg.)	194 (18%)	7 (1%)	1,055 (100%)
1970	1,240 (81%)	22 (1%)	248 (16%)	22 (1%)	1,532 (99%)[d]

[a]Includes coal, natural gas, and oil.

[b]Includes gas turbine, internal combustion, geothermal, wood, refuse, and other vegetal fuels.

[c]Negligible, less than 1%.

[d]Total percentage does not equal 100 due to rounding.

Source: U. S. Department of Energy, Energy Information Administration, 1982 Annual Energy Review (Washington: U.S. Government Printing Office, 1983), p. 152.

gas or oil is always technologically possible.[13] Thus, there is no technological justification for excluding natural gas and oil from coal when considering the question of interfuel substitutability in the electric utility sector.

Once it has been established that there are no technological reasons for excluding natural gas and oil in either the long run or the short run, the next aspect of interfuel substitutability that must be considered is economic feasibility. The economic feasibility of interfuel substitutability is strictly an empirical question since a number of factors influence the feasibility of substitution. However, there are two primary problems associated with empirically assessing the degree of interfuel substitutability. First, the degree of interfuel substitutability varies substantially from region to region. This is due to the fact that fossil fuels tend to be geologically concentrated, and that transportation and storage costs are usually significant. The implication, as previously discussed with specific reference to coal, is that regional markets are more economically meaningful than a national market since the purpose of delineation is to explain and predict price behavior. Any particular utility's fuel options depend upon the availability of alternative fuels in its market area.

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[13]The boiler design will only permit switching from gas to oil to coal. The reason is that coal boilers must be larger than oil boilers which in turn must be larger than gas boilers. Therefore, boilers originally designed for coal will accept gas or oil, but the converse is not true, see ibid., p. 144.

A second problem with assessing interfuel substitutability stems from a difficulty in empirically disentangling the effects of market power, regulation, and long term contracts on the incentive for utilities to respond to relative price changes. As previously mentioned, the true nature of the economic relationship between two products can only be accurately assessed at the competitive price of each. It is unlikely that relative prices accurately reflected the true competitive relationship between coal, natural gas, and oil over much of the post-World War II period since natural gas was regulated and oil may have been priced non-competitively. Furthermore, regulation of utilities themselves tends to dampen the incentive to switch fuels since most are regulated according to a specified rate-of-return on capital.[14] Consequently, a utility may pass a substantial portion of increased fuel costs along to consumers without experiencing a significant fall in profitability. The utility's capacity to do so is enhanced by the fact that most are regulated monopolists and several obtained automatic-fuel-adjustment clauses during the late 1960s due to rapidly rising fuel costs.[15]

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[14]For a discussion on the behavior of the firm subject to a rate-of-return constraint, see Harvey Averch and Leland Johnson, "Behavior of the Firm Under Regulatory Constraint," American Economic Review 52 (December 1962), pp. 1052-1069; and William J. Baumol and Alan K. Klevorick, "Input Choices and Rate-of-Return Regulation: An Overview of the Discussion," Bell Journal of Economics 1 (Autumn 1970), pp. 162-190.

[15]David L. Kaserman and Richard C. Tepel, "The Impact of the Automatic Adjustment Clause on Fuel Purchase and Utilization Practices in the U.S. Electric Utility Industry," Southern Economic Journal 48 (January 1982), pp. 687-700.

A likely impact of these clauses is to dampen the incentive to switch fuels during periods of rising fuel prices. Similarly, the likely effect of rate-of-return regulation may have been to dampen the incentive during periods of falling prices.

The fact that long-term contracts are a primary method of sales in the electric utility sector may also make it more difficult to assess the degree of interfuel substitutability.[16] By negotiating such contracts utilities may, in essence, insure themselves against sharp rises in fuel costs. Consequently, the amount of observed short run substitution may be less than it otherwise would have been because long-term contracts tend to mitigate the adverse effects of short run fuel price increases and therefore dampen the incentive to switch fuels.

Given the above caveats, a number of studies have investigated the question of interfuel competition within the electric utility sector.[17] The general consensus is that while the degree varies from region to region, there is at least some fuel competition within each region. In a 1972 study conducted by the FTC, fuels were classified as either actual or potential substitutes in several regions

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[16]For a detailed discussion on the use of long-term contracts in the electric utility sector, see Gordon, Chapter 3.

[17]Federal Trade Commission, Bureau of Economics, Interfuel Substitutability in the Electric Utility Sector of the U.S. Economy (Washington: U.S. Government Printing Office, February 1972); and Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends.

as well as the entire Nation.[18] The results of that study are presented in Table XIV. The study concluded that coal faced actual competition in six of the eight regions, and actual or potential competition in all eight regions. Thus, in contrast to the Commission's finding in Kennecott, the study suggests that an economically meaningful product market may encompass at least natural gas and oil if the relevant geographic market is the entire Nation. On the other hand, if the Commission had delineated the geographic market as the Mountain region, which includes Utah, the only alternative to coal might have been natural gas.[19] However, as previously mentioned, the number of potential coal entrants would have been substantially greater had this definition been chosen. The effect of including natural gas and oil in the product market probably would have lowered the already low concentration figures used by the Commission in Kennecott.

Critique of FTC's Market Definition

The above discussion suggests the Commission's choice of market definition was deficient with respect to both its product and geographic dimensions. Geographically, the regional nature of coal markets was ignored by the Commission. The primary effect of the Commission's broad geographic definition was to exclude a number of

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[18] Ibid., p. 81.

[19] Note in Table XIV that oil is only competitive in certain areas of Utah.

TABLE XIV

INTERFUEL COMPETITION AND MARKET BOUNDARIES IN THE ELECTRIC UTILITY SECTOR, 1970[a]

Region	Type of Interfuel Competition		
	Actual	Potential	Market Definition
Nation	Coal Oil Gas	Uranium	Coal Oil Gas Uranium
New England	Coal Oil	Uranium	Coal Oil Uranium
Middle Atlantic	Coal Oil Gas[b]	Uranium	Coal Oil Gas Uranium
East North Central	Coal	Gas Uranium	Coal Gas Uranium
West North Central	Coal Gas	Uranium	Coal Gas Uranium
South Atlantic	Coal Oil Gas	Uranium	Coal Oil Gas Uranium
East South Central	Coal	Gas Uranium	Coal Gas Uranium
West South Central	Gas	---	Gas

TABLE XIV (continued)

Region	Type of Interfuel Competition		
	Actual	Potential	Market Definition
Mountain	Coal Gas Oil[c]	---	Coal Gas Oil
Pacific	Oil Gas	Uranium	Oil Gas Uranium

[a]Market boundaries correspond to the nine census regions.

[b]Gas is competitive only in certain metropolitan areas.

[c]Oil is competitive only in certain areas in the State of Utah.

Source: Federal Trade Commission, Bureau of Economics Interfuel Substitutability in the Electric Utility Sector of the U.S. Economy (Washington: U.S. Government Printing Office, 1972), p. 81.

active coal firms as potential entrants in the Western region via market extension. The Commission's product definition ignored both the degree of short run substitutability between coal, natural gas, and oil as well as the long run nuclear power option. In fact, Peabody's two largest customers, the Tennessee Valley Authority and Commonwealth Edison of Illinois, had announced plans to utilize nuclear fuel on a relatively large scale in the late 1960s.[20] The effect of these exclusions was to raise concentration above what it otherwise would have been. Therefore, both the product and geographic choice of markets exaggerated the FTC's claim that Kennecott's acquisition of Peabody diminished competition by removing Kennecott as a perceived potential entrant into the coal industry.

4. INDUSTRY CONCENTRATION

Recall from Chapter II that the economic theory upon which the doctrine of potential competition is based requires an industry be tightly oligopolistic. Kennecott was distinctive in that the Federal Trade Commission's complaint did not allege the coal industry was highly concentrated at the time of acquisition, but rather that it was exhibiting a trend toward becoming so in the near future. As previously indicated in Table VI on page 81; the four-firm, eight-firm, and

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[20]At the FTC hearing it was noted that TVA had committed to over 10 thousand megawatts of additional nuclear capacity which amounted to approximately 50 percent of Peabody's 1967 production, see "In the Matter of Kennecott Copper Corporation," 78 Federal Trade Commission Decision 744 (January 1, 1971 to June 30, 1971), p. 799.

twenty-firm production concentration ratios had all exhibited an upward trend throughout the post-World War II period prior to Kennecott's acquisition of Peabody. Furthermore, the market share of firms producing in excess of one million tons annually had risen from 50 percent to 70 percent from 1947-1967, while their numbers declined from 124 to 68.[21] The Commission's prediction of tight oligopoly was based upon a simple extrapolation of these two trends.[22] The first part of this section will critically analyze the FTC's interpretation of these trends as evidence of diminished competition in the coal industry. The second part will argue that perhaps current production concentration is not the best indicator of future market power in the coal industry.

Demand, Supply, and Concentration

Secular upward trends in industry concentration are not necessarily indicative of enhanced market power. Economic theory suggests that concentration in competitive markets is determined by market demand and supply conditions. Therefore, long run trends in concentration will tend to reflect these changes in basic demand and supply conditions. Equation (1) describes the relationship between the efficient number of firms (N), market quantity demanded at the competitive price (Q^d), and the rate of output at which long run average costs are minimized (MES).

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[21] Ibid., p. 914.

[22] Ibid.

$$N = \frac{Q^d}{MES} \qquad (1)$$

Equation (1) indicates that changes in either product demand or long run average costs of production and distribution will result in subsequent adjustments in the efficient number of firms and industry concentration. Specifically, production concentration will tend to increase when either the efficient size firm rises relative to market demand, or when market demand falls relative to the efficient size firm. During the post-World War II period several changes took place in the coal industry that would lead one to predict a decline in the efficient number of firms and a subsequent rise in production concentration. The impact of increased concentration on competition in the coal industry must be evaluated in light of these changes.

Economies of Scale

One factor which likely increased economies of scale and thereby increased the efficient firm size in the coal industry was the development of the unit train method of transporting coal. The method involves devoting an entire train exclusively to the transportation of coal.[23] A typical train consists of approximately 250 individual cars each capable of transporting 100 or more tons of coal. The method was first utilized in the early 1960s and by the early 1970s

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[23]Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends, p. 144.

it was estimated that approximately one-third to one-half of the total volume of coal was shipped by this method.[24] The method offers a substantial cost advantage over single car distribution in transporting vast quantities of coal over relatively large geographic areas.[25] Moreover, its development greatly facilitated the use of long-term electric utility contracts by making it possible for utilities to contract with a single coal supplier for the lifetime of a utility plant. Long-term contracts tend to reduce transaction costs and make long run planning easier for utilities by reducing uncertainty of supply. However, efficient utilization of the method requires that a firm transport relatively large quantities of coal. Hence, smaller firms are relatively inefficient in terms of meeting the primary fuel demands of electric utilities. Consequently, given the demand for coal, the likely effect of unit trains was to increase the efficient size firm and thereby increase production concentration. One would expect smaller firms to either expand production to take advantage of economies of scale, or to have exited the industry due to cost disadvantages, or to have been acquired by other firms seeking to take advantage of greater economies of scale. Production concentration would have tended to increase in either case.

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[24] Ibid.

[25] In a 1964 study, Moyer found the typical single car rate of $3.42 per ton was relatively high compared to the unit train rate of $1.45 per ton in Indiana, see Reed Moyer, "Requirement Contracts and Energy Transportation in Coal," Southern Economic Journal 31 (April 1965), p. 338.

A second reason why economies of scale likely increased during the post-world War II period was the development of the continuous mining machine used in underground mining. Underground mining can be divided into four separate operations: undercutting, drilling, blasting, and loading.[26] The continuous mining method, as opposed to the older conventional method, combines these four operations in one continuous operation. The method reduces labor requirements and allows for higher recovery rates.[27] Table XV presents underground average labor productivity rates along with trends in the number of continuous miners and conventional mobile loaders used in underground mining. The table indicates a positive correlation between increased labor productivity and an industry trend toward greater utilization of continuous miners. This capital embodied technological improvement likely increased the relative efficiency of medium and large size coal mines since smaller mines do not find it technologically or economically feasible to utilize such equipment due to its high acquisition cost and their relative low levels of production. Therefore, the likely effect of this technological improvement was to increase the competitively efficient size coal mine and place smaller firms operating small mines at a substantial cost

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[26]Moyer, Competition in the Midwestern Coal Industry, p. 92.

[27]For a comparison of labor requirements between conventional and continuous mining, see Richard A. Schmidt, Coal in America (New York: McGraw-Hill Mining Publications 1979), p. 178.

TABLE XV

AVERAGE PRODUCTIVITY AND MINING EQUIPMENT
IN UNDERGROUND MINES, 1952-1967, SELECTED YEARS

Year	Continuous Miners	Mobile Loading Machines[a]	Average Tons Per Miner Per Day
1952	152	n.a.	6.37
1955	385	3,819	8.28
1960	879	2,952	10.64
1965	1,218	2,394	14.00
1969	1,571	2,466	15.61

[a]A principal element used in conventional mining. Data were not available for 1952.

Sources: U.S. Department of Energy, Energy Information Administration, Coal Data: A Reference (Washington: U.S. Government Printing Office, July 1980), p. 34; and Richard Schmidt, Coal in America (New York: McGraw-Hill Mining Publications, 1979, p. 137.

disadvantage relative to firms who operated larger mines. Consequently, one would expect an increase in production concentration, given the level of demand.

The above discussion suggests the impact of the trend toward greater capital intensity in underground mining as well as the development of the unit train method of transporting coal increased the productivity of large mines relative to small mines. Moyer and Moore have provided some evidence suggesting mine size and labor productivity are positively correlated in both underground and surface mining. Moyer's findings are presented in Table XVI and are based upon 1959 data from Illinois' mines. Moyer's results indicate substantially lower average labor productivity rates in mines producing from 10 thousand to 50 thousand tons annually than in those producing in excess of 500 thousand tons annually for both underground as well as surface mining.[28] Moore's findings, presented in Table XVII, are generally consistent with those of Moyer in that he also found a correlation between mine size and average productivity of labor, with one exception. For some unexplained reason, average productivity was lower in the 250 to 500 thousand tons class than in the 100 to 250 thousand tons class. Nevertheless, it is still quite clear from his findings that productivity tends to be

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[28]It should be noted that surface mining productivity is substantially greater than underground productivity due to relatively high capital intensity in surface mining. Furthermore, there were some technological improvements in surface mining methods over the post-World War II, see ibid., pp. 199-204, 230-235.

TABLE XVI

AVERAGE OUTPUT PER MAN-DAY BY MINE SIZE, 1959

Mine Size (Thousand Tons)	Underground Mines (Tons per man-day)	Surface Mines (Tons per man-day)
10 - 50	7.7	20.4
50 - 500	19.0	31.2
+500	19.2	37.7

Source: Reed Moyer, Competition in the Midwestern Coal Industry (Cambridge: Harvard University Press, 1964), p. 105.

TABLE XVII

LABOR PRODUCTIVITY IN COAL MINES
BY SIZE AND TYPE OF MINE,
1968 and 1970

Mine Size (Thousand Tons)	Underground Mines (Tons per man hour) 1968	1970	Surface Mines (Tons per man hour) 1968	1970
Less than 25	1.18	1.28	1.93	2.35
25 - 50	1.73	1.72	2.73	3.34
50 - 100	1.94	1.84	2.95	3.43
100 - 250	2.06	1.71	3.54	4.01
250 - 500	2.01	1.65	4.41	5.03
500 - 750	2.09	1.82	5.77	4.92
750 - 1,000	2.15	1.94	4.88	6.08
1,000 and over	2.51	2.24	7.76	7.17

Source: Thomas Gale Moore, "Economies of Scale of Firms Engaged in Oil and Coal Production" in Competition in the U.S. Energy Industry, edited by Thomas D. Duchesneau, (Cambridge: Ballinger Publishing Co., 1975), p. 221.

positively correlated with mine size. The differences are more pronounced in surface mining than in underground mining.

Another factor worthy of some note is that Moore found productivity to be lower in 1970 than in 1968 for all classifications with the exception of the smallest. This general decline in productivity, which has been detected by others, was attributed to the effects of the 1969 Coal Mining Health and Safety Act,[29] while the increased productivity in the smallest classification was explained by the fact that the number of firms in this classification fell from 2,715 to 1,955 between 1968 and 1970.[30] Apparently, an exodus of less efficient firms in this classification increased measured productivity of the classification as a whole despite the fact that productivity

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[29]The year 1969 was a watershed year in terms of labor productivity in coal mining. Underground labor productivity increased in each successive year from 1949-1969, while surface productivity increased in all but one. Over the period, underground productivity rose from 5.42 average tons per miner day to 15.61, while surface productivity rose from 15.33 to 36.00. Overall productivity rose from 6.43 to 19.90. However, from 1969 through 1979 underground productivity fell successively in each year from 15.61 to 7.90, while surface productivity fell in all but three years from 36.00 to 24.80 over the 1969-1979 period. Overall productivity fell from 19.90 to 13.50, see U.S. Department of Energy, Energy Information Administration, Coal Data: A Reference (Washington: U.S. Government Printing Office, July 1980), p. 34. For explanations of this fall and specifically the influence of the 1969 Coal Mining Health and Safety Act, see Joe G. Baker and Wayne Stevenson, Determinants of Coal Mine Labor Productivity Change (Washington: U.S. Government Printing Office, 1979); and General Accounting Office, Low Productivity in American Coal Mining: Causes and Cures (Washington: U.S. Government Printing Office, 1981).

[30]Thomas G. Moore, "Economies of Scale of Firms Engaged in Oil and Coal Production," in Competition in the U.S. Energy Industry, edited by Thomas D. Duchesneau (Cambridge: Ballinger Publishing Company, 1975), p. 223.

of the remaining firms in the classification may have been lower in 1970 than in 1968.

Changes In Coal Consumption

Another factor which likely contributed to the rise in production concentration over the post-World War II period was a dramatic change in the composition of coal consumption. Specifically, electric utilities' consumption of coal increased from 103.3 million tons annually in 1952 to 272 tons in 1967 even though total consumption only increased from 418.8 million tons to 480.6 million tons over the period.[31] An important aspect of the industry's increased reliance upon sales to the electric utility sector was the evolution of long-term sales contracts. Long-term contracts had accounted for approximately 70 percent of total sales to the electric utility sector in 1962 and by 1968 this figure was up to 76 percent.[32] The shift in coal consumption toward the electric utility sector combined with a greater reliance upon long-term contracts within this sector likely increased seller concentration since these contracts typically require a single seller to obligate itself to supply a substantial portion, if not all, of the fuel needs of a particular utility for the entire lifetime of a utility plant. Obviously, these contracts benefit both

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[31]U.S Department of Energy, Energy Information Administration, Coal Data, p. 33.

[32]Moyer, "Requirements Contracts and Energy Transportation Development in Coal," p. 130; and Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends, p. 147.

buyer and seller. The buyer benefits since future fuel needs are assured by the terms of the contract. The seller benefits since the contract assures sales will be of sufficient magnitude to justify investment in reserves, machinery and equipment, as well as a low cost transportation system. Consequently, contracts are typically awarded to large-scale producers with access to substantial quantities of reserves.

Moyer has estimated that 75 percent of long-term contracts negotiated in 1960 were awarded to firms whose annual production exceeded one million tons.[33] This amount is relatively large compared to the median firm size in the coal industry.[34] Hence, given that total coal consumption remained secularly stagnant over the period, one would have expected concentration to rise as electric utilities' share of total consumption rose. This proposition is supported by the information contained in Table XVIII. The table indicates the percentage of coal produced by firms whose annual production exceeded one million tons rose from 59.38 percent in 1954 to 70.20 percent in 1967, while their number fell from 69 to 68. Although technological improvements did play an indirect role by permitting coal firms to compete more

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[33] Ibid., p. 132.

[34] There were 522 coal firms (operating groups) whose production exceeded 100 thousand tons in 1967. Only 68 of these firms produced more than 1 million tons, see Keystone Coal Buyers Manual, U.S. Production in the U.S., 1967 (New York: McGraw-Hill Mining Publications, 1968), p. 5.

TABLE XVIII

FOUR-FIRM PRODUCTION CONCENTRATION AND PERCENTAGE OF TOTAL COAL PRODUCTION BY FIRMS PRODUCING IN EXCESS OF ONE MILLION TONS, 1954-1967

Year	Four-Firm Production Concentration[a]	Percentage of Total Production
1954	15.4%	59.38%
1955	16.6%	62.41%
1956	18.2%	63.13%
1957	20.4%	66.72%
1958	19.1%	64.39%
1959	20.7%	65.15%
1960	21.5%	65.28%
1961	21.6%	64.51%
1962	22.2%	65.01%
1963	25.4%	65.46%
1964	27.0%	68.51%
1965	26.5%	68.14%
1966	27.5%	68.94%
1967	30.3%	70.20%

[a]These concentration ratios differ slightly from those in Table VI on page 81 because each source used a different method to estimate total production. However, the differences are slight and the trend is almost identical.

Source: Keystone Coal Industry Manual, U.S. Production by Company (New York: McGraw-Hill Mining Publications, annual).

effectively with other sources of fuel for utilities, the primary thrust of the increase stemmed from allocative rather than technical efficiency. In other words, the large-scale, lumpy nature of utilities' demand for coal may have required some coal firms to be larger than that necessary for technical efficiency.

Evidence of Diminished Competition

The above analysis of economies of scale and changes in the composition of coal consumption suggest changes in basic demand and supply conditions took place over the post-World War II period prior to Kennecott's acquisition of Peabody. As previously mentioned, these changes ultimately influence production concentration even in competitive industries. Consequently, one must carefully distinguish those situations in which competitive adjustments lead to increased concentration, but do not adversely affect competition, from those in which increased concentration does diminish competition. This is particularly true in industries characterized by low to moderate concentration.

Although Chapter V will investigate the FTC's extrapolation of production concentration in greater detail, one might have viewed its finding that increased concentration was leading to enhanced market power with some suspicion. While the likely impact of both the shift in the composition of coal consumption as well the technological improvements was to increase concentration, the trends in coal prices and consumption did not suggest these changes were diminishing competition. Specifically, the real price of coal fell substantially over

the period while consumption rose slightly. Table XIX documents trends in real prices and consumption in the utility and non-utility sectors of the coal industry. The table reveals that while the real price of coal fell substantially in both sectors, coal consumption increased substantially in the electric utility sector and fell substantially in the non-utility sectors. On the basis of these price and consumption trends, one may make a couple of inferences with respect to market demand and supply changes pertinent to assessing the competitive effects of these changes on the coal market.

One inference is that the market supply of coal increased relative to market demand over the period. Figure 4 can be used to demonstrate this point. Let the initial demand and supply curves and equilibrium price and quantity in 1952 be denoted by D_o, S_o, P_o, and Q_o, respectively. The only plausible explanation as to why equilibrium price fell and quantity rose between 1952 and 1967 was that supply increased relative to demand as depicted in Figure 4. Unfortunately, as illustrated in Figure 4, one cannot determine exactly what happened to the demand curve. The observed fall in price and increase in consumption is consistent with an increasing, decreasing, or stable market demand curve.

A second inference which may be drawn on the basis of observed trends in prices and consumption is that the composition of coal demand likely changed over the period. Specifically, it is probable that the composition of demand shifted from the non-utility sectors

TABLE XIX

REAL COAL PRICES AND CONSUMPTION TRENDS IN THE UTILITY AND NON-UTILITY SECTORS, 1952-1969

Year	F.O.B.[a] Mines Price	Non-Electric Utility Consumption[b]	F.O.B.[a] Electric Utility Price	Electric Utility Consumption[b]
1952	$8.45	315.5	$11.40	103.3
1953	$8.36	314.5	$11.23	112.3
1954	$7.57	247.8	$10.57	115.2
1955	$7.38	282.8	$ 9.95	140.6
1956	$7.66	277.9	$10.05	155.0
1957	$7.81	256.3	$10.21	157.4
1958	$7.36	213.8	$ 9.96	152.9
1959	$7.06	200.5	$ 9.43	165.8
1960	$6.83	206.5	$ 9.12	173.9
1961	$6.61	194.8	$ 8.95	179.6
1962	$6.35	197.0	$ 8.75	190.9
1963	$6.13	200.2	$ 8.19	209.2
1964	$6.12	208.1	$ 7.89	223.2
1965	$5.97	216.5	$ 7.68	242.6
1966	$5.91	222.0	$ 7.50	264.3
1967	$5.85	208.6	$ 7.40	272.0
1968	$5.66	204.1	$ 7.18	295.6
1969	$5.75	198.8	$ 7.07	308.8

[a]Free on board. All prices are calculated using 1972 GNP implicit price deflators. Prices are in terms of dollars per ton.

[b]Consumption is expressed in million tons. The non-electric utility sector includes; coke plants, industry, transportation, residential, and retail dealer deliveries.

Source: Department of Energy, Energy Information Administration, Coal Data: A Reference (Washington: U.S. Government Printing Office, July 1980), p. 35.

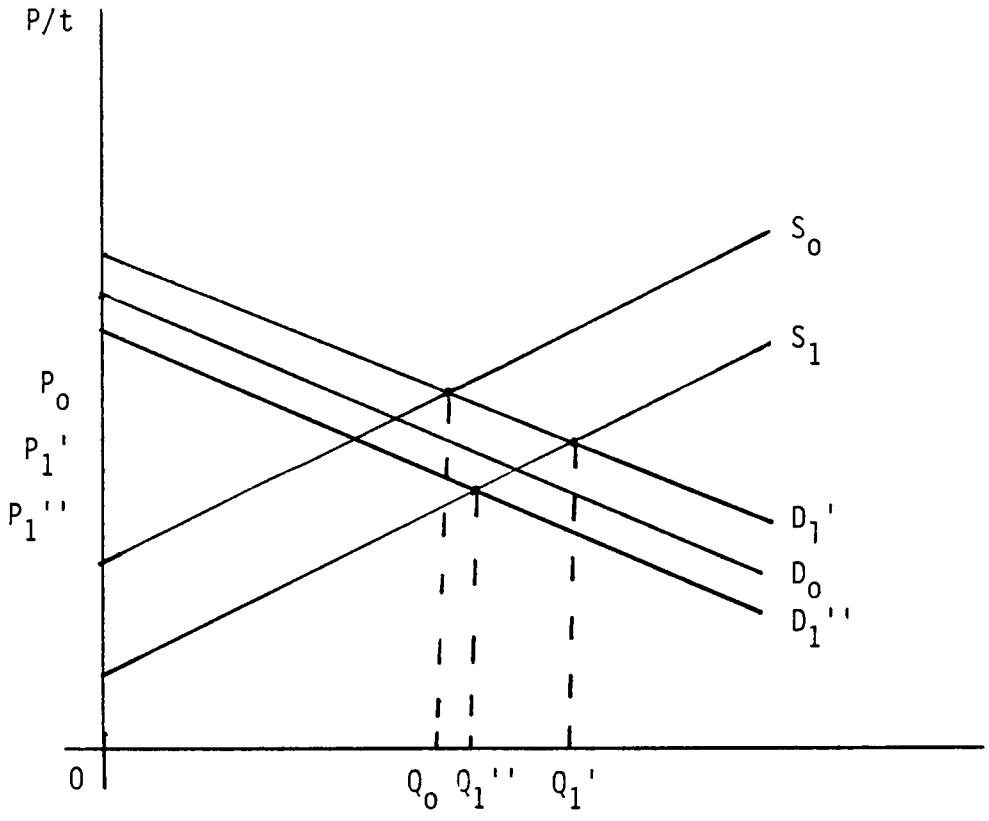

FIGURE 4

DEMAND AND SUPPLY CHANGES IN
THE COAL INDUSTRY, 1952-1969

toward the utility sector. A demand decrease in the non-utility sector is apparent since both price and consumption fell in this sector. Furthermore, given the magnitude of the price and consumption declines, it would be reasonable to assume that demand fell substantially. The only inference one can draw with respect to demand and supply changes in the electric utility sector is that supply increased relative to demand since price fell and consumption rose. However, given the fact that coal demand in the electric utility sector is a derived demand and the demand for electricity increased substantially during the 1950s and 1960s, then it would not appear unreasonable to presume that the demand for coal in this sector increased significantly. This price increasing effect was apparently offset by the technological improvements and subsequent increases in supply. Thus, to the extent that one is willing to accept this presumption concerning demand in the electric utility sector, it can be concluded that the composition of coal demand shifted from the non-utility sectors toward the utility.

These inferences concerning demand and supply changes in the coal industry during the post-World War II period prior to Kennecott's acquisition of Peabody lend support to the proposition that technolgoical improvements, along with a shift in the composition of coal demand, lead to an increase in the competitively efficient firm size and a subsequent increase in production concentration. The impact of this increase in production concentration upon competition in the coal industry depends upon whether these changes were

of such magnitude that the size of the market only permitted a few efficient size firms, or perhaps, upon some other entry barrier. These inferences cast doubt on the Commission's finding that the coal industry was becoming less competitive. As noted at the beginning of the section, secular increases in concentration, particularly at the relatively low levels in the coal industry, are entirely consistent with a competitive industry adjusting to changes in basic demand and supply conditions. The question of market power refers to whether price is above the competitive level after all adjustments (entry and exit) have occurred. Although available data do not permit one to directly compare actual coal prices to those which would exist in a competitive market, one can conclude that observed price and consumption behavior are more consistent with a competitive efficiency view of concentration in the coal industry than the traditional view of concentration. The observed price and consumption trends in the coal industry were in conflict with the traditional theory which posits a positive relationship between concentration and price. The available evidence suggests the declines in price arose from technological improvements and stagnant demand. These cost decreases appear to have been passed along to consumers as the competitive model predicts.

Reserve Concentration

Another aspect of the FTC's claim that the coal industry was trending toward tight oligopoly which deserves some attention is the variable used to measure concentration. Extractive industries

differ from manufacturing industries in that a firm must possess reserves in order to participate in future market transactions. Therefore, the best measure of future market power is concentration of uncommitted reserves rather than current production.[35] A firm without reserves obviously has little capacity to influence the future price of coal.

There are a number of problems associated with much of the published reserve data that prohibit an accurate assessment of reserve concentration.[36] Most of the readily available data are based upon geological surveys and do not list holdings by company. In situations where company holdings are provided, only major companies' holdings are disclosed and their reliability is questionable.[37] Moreover, most geological surveys ignore the economic aspect of extracting reserves at costs close to current price. Therefore, a substantial amount of reserves may be economically feasible to mine only at prices significantly higher than the current market price.

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[35]The distinction between uncommitted reserves and current production as a measure of future market power was recognized in General Dynamics, 415 U.S. 486 (1974). Nevertheless, this distinction was not recognized by the FTC, see "In the Matter of Kennecott Copper Corporation," 84 Federal Trade Commission Decisions 92 (July 1, 1974 to December 31, 1974), pp. 93-95.

[36]For a detailed discussion of these problems, see Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974, pp. 10-18.

[37]Firms are apparently reluctant to publicly reveal this information, see ibid., p. 4.

However, in 1978, the FTC conducted a study of the coal industry over the years 1964-1974 in which reliable reserve information was gathered.[38] The Commission utilized its Special Report data gathering powers to solicit detailed responses from several major reserve holders. The responses came from firms listed as top-fifty coal producers by the Keystone Coal Industry Manual in any year between 1964 and 1973. The reserve holdings were as of the year 1974. The survey also included 15 railroads and 23 oil and natural gas companies who were not listed in any of the various years but were known to possess substantial coal reserves. Reserve concentration was then calculated using a number of reserve bases. The most economically meaningful is the demonstrated reserve base since it does take into account the economic feasibility of mining reserves.[39]

Table XX presents the findings of the FTC study. High and low estimates of uncommitted reserve concentration ratios are provided on a national as well as regional basis. A comparison of Table XX with Tables VI through IX, pages 81-84, reveals that uncommitted reserves concentration is substantially lower than production concentration in all regions

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[38] Ibid.

[39] The demonstrated reserve base "refers to inplace coal that is technically and economically mineable at this time, and the criteria used for measuring bed thickness and depth correspond generally to the characteristics of coals currently being mined in the United States," see ibid., p. 13.

TABLE XX

UNCOMMITTED COAL RESERVES CONCENTRATION, 1974[a]
(Demonstrated Reserve Base Universe)

	Concentration Ratio			
	4-Firm		8-Firm	
Region	Low	High	Low	High
Nation	12.8%	15.9%	17.4%	21.6%
Appalachian	11.9%	19.3%	15.8%	25.7%
Midwestern	22.2%	25.6%	27.5%	31.7%
Western	13.2%	15.2%	18.6%	21.4%
Midwest and West	14.9%	17.1%	19.9%	22.9%

[a]The concentration ratios represent the percentage of uncommitted reserves accounted for by the largest 4 and 8 uncommitted reserve holders among the surveyed companies.

Source: Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978), pp. 94-96.

except the Appalachian, where it is only slightly lower. However, the Appalachian region has lower concentration in both uncommitted reserves and production than other regions. In any event, uncommitted reserve concentration ratios are everywhere substantially lower than those typically associated with tight oligopoly. Moreover, it should be noted that the Federal Government owns approximately 29 percent of the demonstrated reserve base, which makes it the largest reserve holder.[40] Most of these holdings are in the Midwestern and Western regions where production concentration tends to be higher. Therefore, the Federal Government has the ability to influence future competitive conditions in the coal industry through its coal leasing program. With respect to Kennecott, the FTC's use of production concentration ratios as a measure of future market power was highly misleading because it was inappropriate. The consequence was to exaggerate the relatively low levels of concentration in the coal industry.

5. ENTRY BARRIERS AND POTENTIAL ENTRANTS

The third and fourth essential elements of potential competition cases based upon perceived potential entrant theory (limit price theory) require barriers to entry to be such that only a small number

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[40]Department of Justice, Comptroller General of the United States The State of Competition in the Coal Industry (Washington: U.S. Government Printing Office, December 1977), p. II-13.

of potential entrants are capable of entering at prices slightly above the limit price. High entry barriers are a necessary but not sufficient condition for application of the perceived potential entrant theory. A merger must also decrease the perceived threat of entry from the viewpoint of established firms such that the limit price is likely to rise. This latter condition requires the number of potential entrants be limited to a few.[41] This section will first examine entry conditions in the coal industry and then investigate the question of limited number of potential entrants.

Entry Barriers

The FTC based its findings of high barriers to entry upon the fact that capital requirements for entering the coal industry had increased substantially over the post-World War II period.[42] At least two factors contributed to the increased financial requirements. Both resulted from the shift in coal demand toward the large-scale electric utility sector. First, increased mechanization in both underground and surface mining required relatively large expenditures on machinery and equipment. These requirements were not only high compared to earlier periods, but they were also rising.

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[41]Turner and the Department of Justice define few as three or less potential entrants, see Donald F. Turner, "Conglomerate Mergers and Section 7 of the Clayton Act," Harvard Law Review 78 (May 1965), p. 1386; and Department of Justice, 1982 Merger Guidelines (Washington: Bureau of National Affairs, Inc., 1982), p. S-9.

[42]"In the Matter of Kennecott Copper Corporation," 78, p. 922.

Table XXI presents a comparison of the GNP deflator and an index of mine machinery and equipment prices from 1950-1970. A comparison indicates that the machinery and equipment index rose by 62.6 percent, while the general price index rose by 47.7 percent over the period. Thus, prices of machinery and equipment rose at a slightly faster rate than the general level of prices.

Second, large-scale entry required firms to adopt more expensive methods of transporting coal as well as purchase large quantities of reserves. The FTC's finding that capital requirement constituted a substantial barrier was deficient in the sense that these factors in and of themselves do not represent entry barriers. Essentially, the Commission's argument was that to be technically efficient a firm must purchase relatively expensive mining equipment, and that this expense constituted a substantial barrier to entry.[43]

The FTC's argument could have been valid if either one of two conditions had existed in the coal industry. First, economies of

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[43]The Commission ignored a substantial decrease in labor costs which may have more than offset increased capital costs. From 1950 through 1969 the number of employed miners fell from 415,582 to 124,532 despite a slight increase in production from approximately 516.3 million tons to 560.5 million tons. Furthermore, average labor productivity rose from 6.77 ton per miner day to 19.90. As a result, the index of unit labor costs fell by approximately 42 percent from 1950 to 1969. See U.S. Department of Energy, Energy Information Administration, Coal Data, p. 29 for productivity and production figures. The unit labor costs index was calculated by dividing the index of average hourly production worker earnings in coal mining by an index of average labor productivity (1967 = 100 percent). The productivity index was derived from Coal Data: A Reference and the hourly earnings index was taken from Joe G. Baker, Causes and Effects of Escalating Prices for Deep Mining Machinery (Oak Ridge: Oak Ridge Associated Universities, February

TABLE XXI

PRICE INDEX FOR MINING MACHINERY AND EQUIPMENT, 1950-1970

Year	All Mining Machinery and Equipment Price Index[a]	GNP Deflator
1950	48.5	67.9
1955	64.8	77.2
1960	88.4	86.9
1961	89.6	87.7
1962	90.1	89.3
1963	90.1	89.3
1963	90.7	90.6
1964	91.9	92.0
1965	94.2	94.1
1966	97.1	97.2
1967	100.0	100.0
1968	103.4	104.5
1969	106.6	109.7
1970	111.1	115.6

[a]Index is in nominal terms, 1967 = base year.

Source: Joe G. Baker, Causes and Effects of Escalating Prices for Deep Mine Machinery (Oak Ridge: Oak Ridge Associated Universities, February 1983), p. 4.

scale arising from increased mechanization likely increased the efficient firm size. If economies of scale and market demand were such that only a few mines could efficiently produce the entire market output, then large size relative to market demand could present an entry barrier. Efficiency could have required a new entrant to lower price to a level which would make entry unprofitable. The entry barrier, however, would be economies of scale rather than high capital requirements. Second, high capital requirements could have presented an entry barrier only if potential entrants confronted disadvantages relative to established firms in obtaining funds necessary for entry. That is, capital market imperfections may have possibly retarded entry. This section will explore these two possibilities.

Economies of scale do not constitute an entry barrier unless a new entrant must be large relative to market demand. The evidence indicates that while economies of scale likely increased significantly during the post-World War II years, they do not appear to present a substantial entry barrier because of the relatively large size of coal markets. In a study based upon 1968 and 1970 data, Moore reached two important conclusions with respect to economies of scale.

1983), p. 4. Although it is true that machinery and equipment costs are generally fixed and labor costs variable, it is also true that these capital costs are not necessarily sunk. Baker notes: "There exists a well-developed secondhand market for used mining machinery," id., p. 6.

First, using the survivor method, he found that coal mines producing in excess of 500 thousand tons per year had a slight cost advantage over smaller mines.[44] Second, he found no evidence of multimine economies of scale in production. Economies of scale appear to be confined to the mine level. In a later 1975 study of twelve hypothetical mines, the Bureau of Mines estimated that mines producing between 3 million and 5 million tons per year had significantly lower average costs than smaller mines.[45] These higher estimates of optimal mine size would appear to be more reflective of the large-scale entry requirements that the FTC considered in Kennecott. However, they are perhaps higher than corresponding estimates would have been based upon mine operating costs in 1969 or 1970.[46]

Table XXII presents hypothetical national concentration ratios based upon both the Bureau of Mines' and Moore's estimates of the optimal mine size and actual production figures in 1968 and 1970. The table reveals that for even the largest size mine of 5

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[44]Moore, pp. 223-224.

[45]Sidney Katell, E. L. Hemingway, and L. H. Berkshire, Basic Estimated Capital Investment and Operation Costs for Coal Mines, U.S. Bureau of Mines Information Circulars 8689 (1975), 8682A (1976), and 8703 (1976).

[46]There were only 14 mines in 1969 and 15 in 1970 producing in excess of 3 million tons. Of these only 3 in 1969 and 4 in 1970 produced in excess of 5 million tons. However, in both 1969 and 1970 there were at least 4 thousand operative mines in the coal industry. Thus, it would appear that mines much smaller than 3 million or 5 million tons do not face substantial costs disadvantages. For the number of mines figures, see Keystone Coal Industry Manual, (1969 and 1970).

TABLE XXII

HYPOTHETICAL NATIONAL CONCENTRATION RATIOS FOR VARIOUS OPTIMAL SIZE COAL MINES, 1968 AND 1970[a]

	1968 Concentration Ratios	
Mine Size (Thousand Tons)	4-Firm	8-Firm
500	0.37%	0.74%
3,000	2.21%	4.42%
5,000	3.68%	7.36%
	1970 Concentration Ratios	
Mine Size (Thousand Tons)	4-Firm	8-Firm
500	0.33%	0.66%
3,000	1.99%	3.98%
5,000	3.32%	6.64%

[a]Hypothetical concentration ratios were calculated by dividing various estimates of optimal sized mines by national coal production figures in 1968 and 1970. That figure was then multiplied by 4 and 8 to calculate 4-firm and 8-firm concentration ratios, respectively.

Sources: Federal Trade Commission, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978). Sidney Katell, E. L. Hemingway and L. H. Berkshire, Basic Estimates of Capital Investment and Operation Costs for Coal Mines, U.S. Bureau of Mines Information Circulars 868 (1975), 868A (1976), and 8703 (1976).

million tons per year concentration figures are very low on a national level. National production concentration ratios are not highly sensitive to changes in the efficient sized mine because national coal production is so large. Thus, it does not follow that economies of scale, per se, constitute a substantial barrier to entry at the national level.

Tables XXIII through XV provide a more accurate view of the significance of economies of scale in coal mining based upon regional definitions of coal markets. These tables reveal that only in the Western Region do economies of scale appear to present some entry difficulty. In the 3 million and 5 million tons per year optimal size mine categories the concentration ratios are within the range of tight oligopoly. However, it can be argued these high level of concentration were as much the result of low demand as economies of scale.[47] In fact, due to a 115 percent increase in Western Region production between 1970 and 1974, the hypothetical four-firm and eight-firm ratios fell from 56.91 percent to 26.50 percent and from 100 percent to 53 percent, respectively. These figures are below those typically associated with tight oligopoly. Therefore, economies of scale do not appear to present a substantial entry

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[47]Production in the Western region is significantly lower than in other regions, see Table IX, on page 84.

TABLE XXIII

HYPOTHETICAL APPALACHIAN REGION CONCENTRATION RATIOS FOR VARIOUS OPTIMAL SIZE COAL MINES, 1968 AND 1970[a]

	1968 Concentration Ratios	
Mine Size (Thousand Tons	4-Firm	8-Firm
500	0.52%	1.04%
3,000	3.09%	6.18%
5,000	5.15%	10.30%
	1970 Concentration Ratios	
Mine Size (Thousand Tons)	4-Firm	8-Firm
500	0.48%	0.96%
3,000	2.87%	5.74%
5,000	4.79%	9.58%

[a]Hypothetical concentration ratios were calculated by dividing various estimates of optimal sized mines by Appalachian coal production figures in 1968 and 1970. That figure was then multiplied by 4 and 8 to calculate 4-firm and 8-firm concentration ratios, respectively.

Sources: Federal Trade Commission, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978). Sidney Katell, E. L. Hemingway and L. H. Berkshire, Basic Estimates Capital Investment and Operation Costs for Coal Mines, U.S. Bureau of Mines Information Circulars 868 (1975), 868A (1976), and 8703 (1976).

TABLE XXIV

HYPOTHETICAL MIDWESTERN REGION CONCENTRATION RATIOS FOR VARIOUS OPTIMAL SIZE COAL MINES, 1968 AND 1970[a]

	1968 Concentration Ratios	
Mine Size (Thousand Tons)	4-Firm	8-Firm
500	1.49%	1.98%
3,000	8.95%	17.90%
5,000	14.92%	29.83%
	1970 Concentration Ratios	
Mine Size Thousand Tons)	4-Firm	8-Firm
500	1.33%	2.66%
3,000	8.00%	16.00%
5,000	13.34%	26.68%

[a]Hypothetical concentration ratios were calculated by dividing various estimates of optimal sized mines by Midwestern coal production figures in 1968 and 1970. That figure was then multiplied by 4 and 8 to calculate 4-firm and 8-firm concentration ratios, respectively.

Sources: Federal Trade Commission, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978). Sidney Katell, E. L. Hemingway and L. H. Berkshire, Basic Estimates Capital Investment and Operation Costs for Coal Mines, U.S. Bureau of Mines Information Circulars 868 (1975), 868A (1976), and 8703 (1976).

TABLE XXV

HYPOTHETICAL WESTERN REGION CONCENTRATION RATIOS FOR VARIOUS SIZE COAL MINES, 1968 AND 1970[a]

Mine Size (Thousand Tons)	1968 Concentration Ratios 4-Firm	8-Firm
500	8.67%	17.34%
3,000	52.02%	100.00%[b]
5,000	86.71%	100.00%[b]
Mine Size (Thousand Tons)	**1970 Concentration Ratios 4-Firm**	**8-Firm**
500	5.69%	11.38%
3,000	34.14%	68.29%
5,000	56.91%	100.00%[b]

[a]Hypothetical concentration ratios were calculated by dividing various estimates of optimal sized mines by Western coal production figures in 1968 and 1970. That figure was then multiplied by 4 and 8 to calculate 4-firm and 8-firm concentration ratios, respectively.

[b]Hypothetical concentration ratios exceeds 100%. These ratios were truncated at 100% since the actual ratio can not exceed 100%.

Sources: Federal Trade Commission, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978). Sidney Katell, E. L. Hemingway and L. H. Berkshire, Basic Estimates Capital Investment and Operation Costs for Coal Mines, U.S. Bureau of Mines Information Circulars 868 (1975), 868A (1976), and 8703 (1976).

barrier in the coal industry on a regional basis with a possible exception in the Western Region.

Although the FTC did not present any evidence that new entrants faced substantial disadvantages in capital markets relative to established firms, its case for high absolute capital requirements was overstated for a couple of reasons. First, even considering the fact that capital requirements had increased, the costs of acquiring reserves and operating a coal mine were still within the means of a substantial number of companies, and particularly the oil companies holding coal reserves. Despite the fact that several difficulties are encountered in attempting to estimate initial capital costs of opening a coal mine,[48] the Bureau of Mines has provided some estimates based upon 1975 capital cost indexes. Table XXVI presents these estimates. The table indicates that capital costs vary depending on the physical characteristics of individual mines as well as mine location. The estimates are probably higher than capital costs would have been at the time Kennecott acquired Peabody because of machinery and equipment costs increases and more stringent health and safety standards.

One can also derive an estimate of 1970 initial capital costs for opening an efficient size mine on the basis of estimates of initial capital costs per ton of underground and surface coal provided by the

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[48]For an empirical study of how natural factors affects mine costs and productivity, see Martin B. Zimmerman, "Modeling Depletion in a Mineral Industry: The Case of Coal," Bell Journal of Economics 8 (Spring 1977), pp. 41-65.

TABLE XXVI

ESTIMATED INITIAL CAPITAL INVESTMENT
FOR COAL MINES, 1975

Mine Type and Annual Capacity	Initial Investment ($ Million)[a]
Underground mine[b] (72 inch coalbed)	
1.06 million tons	$20.8
2.04 million tons	$36.9
3.18 million tons	$54.9
4.99 million tons	$84.0
Underground mine[b] (48 inch coalbed)	
1.03 million tons	$26.5
2.06 million tons	$46.1
3.09 million tons	$67.2
Strip mines[c]	
4.80 million tons, Eastern province	$65.1
6.72 million tons, Interior province	$78.5
9.20 million tons, North Great Plains	$42.1

[a]Capital costs are based on 1975 indexes.

[b]Estimates include land acquisition costs of $2,500 per acre.

[c]Estimates exclude land acquisition costs.

Source: Sidney Katell, E. L. Hemingway, and L. H. Berkshire, Basic Estimated Capital Investment and Operating Costs, U.S. Bureau of Mines Information Circulars 868 (1975), 868A (1976), and 8703 (1976).

National Petroleum Council and an efficient mine size estimate by the Bureau of Mines. The National Petroleum Council estimated initial capital cost for underground and surface production in 1970 to be $7.15 and $6.39 per ton, respectively.[49] The Bureau of Mines estimated the efficient size mine to be approximately 3.8 million tons per year.[50] On the basis of these two estimates, one may estimate the costs of an optimal size underground and surface mine. These estimates are $27.2 million for underground mines and $24.3 million for surface mines, respectively. Of course, these estimates are extremely rough due to variances in physical characteristics of mines as well as the fact that optimal sized underground mines and surface mines are likely to be different. Nevertheless, it appears that even the higher initial capital costs estimates in the coal industry are well within the means of a substantial number of corporations.[51]

A second reason why higher capital requirements did not likely present a substantial barrier to entry is that medium-sized and

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[49]George Skaperdas, "Manufacture of Pipeline Gas from Coal," unpublished paper prepared for the Coal Task Group of the Other Energy Resources Subcommittee of the National Petroleum Council's Committee on U.S. Energy Outlook (April 5, 1971), p. 145, cited in Reed Moyer, "The Coal Industry" in Competition in the U.S. Energy Industry, p. 239.

[50]This was the point estimate of the optimal sized coal mine based upon the study reference in footnote 45 on page 128. The interval estimate was 3 million to 5 three to five million tons as noted.

[51]In contrast, an efficient sized petroleum refinery was estimated by Bain to require from $225 to $250 million in 1951 dollars. Thus, relative to other sectors of the energy industry, coal mine capital requirements are not substantial, cited in Moore, pp. 230-231.

large-sized coal firms often use project financing to obtain funds necessary for opening a mine.[52] A coal firm does not have to operate a mine in order to bid for long-term utility contracts. All that is usually necessary is for the firm to own reserves and have some knowledge of coal mining. After a contract has been agreed upon, then the contract itself allows firms to obtain necessary funds from financial institutions. In a few cases electric utilities themselves own the reserves and simply contract with coal firms to build and operate mines. Thus, long-term contracts and project financing are a potential means of overcoming high capital barriers.[53]

If any substantial barrier to entry in the coal industry exists it would be access to economically mineable reserves. As previously noted in this chapter, concentration in uncommitted reserves is quite low and, given the huge quantity of reserves owned both publicly and privately, it is apparent that the availability of reserves does not constitute a substantial entry barrier. This contention is reinforced by the fact that the amount of economically mineable reserves at any point in time is a function of coal prices. Thus, any attempt to raise coal prices and restrict output is difficult because at higher prices

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[52]For a discussion of project financing in the coal industry, see U.S. Department of Energy, Energy Information Administration, Financing Increased Coal Production (Washington: U.S. Government Printing Office, March 1981), pp. 14-17.

[53]For a discussion of the impact of contracts on the condition of entry, see Oliver E. Williamson, "The Economics of Antitrust: Transaction Cost Considerations," University of Pennsylvania Law Review 122 (May 1974), pp. 1439-1496.

there is a greater quantity of economically mineable reserves. This point has particular relevance in Kennecott as well as other potential competition cases. For as Stigler has noted: "The number of potential entrants is perhaps at a maximum in a declining industry."[54] Perhaps, those firms which exited the industry during periods of declining prices might be the most likely to return under more profitable circumstances. In terms of the effect on potential competition, the fact that a new firm may have entered de novo is irrelevant so long as ex-coal firms are likely to re-enter at slightly higher prices.

Potential Entrants

The FTC's decision to proscribe the Kennecott-Peabody merger was ultimately based upon a finding that Kennecott was only one of a few potential entrants in the Nation's coal industry.[55] Other findings such as an industry trend toward tight oligopoly and high barriers to entry are not sufficient to invoke the doctrine of potential competition. The final precondition is that the number of potential entrants be limited such that the removal of one diminishes the threat of entry to the extent that established firms find it profitable to raise the limit price. This section will

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[54]George J. Stigler, The Organization of Industry (Homewood: Richard D. Irwin, Inc., 1968), p. 22.

[55]In fact, the FTC tribunal, in contrast to the hearing examiner, found no evidence that any other firm was as likely to enter, see "In the Matter of Kennecott Copper Corporation," 78, p. 945.

critically analyze the Commission's finding that Kennecott was the "most likely" entrant as well as its finding that there was a dearth of potential entrants in the coal industry. The underlying premise of this analysis is that past entry of firms from particular industries is a logical method of identifying potential entrants. It would appear that if one could detect a tendency of firms from other industries to enter the coal industry then these types of firms should be considered as most likely candidates for future entry. Certainly, firms holding substantial amounts of coal reserves, though not currently mining coal, should be considered unless there is very strong evidence to the contrary. Needless to say, this is especially true in situations where past experience indicates a tendency for these types of firms to enter.

The FTC's finding that Kennecott was the most likely potential entrant was the result of its exclusion of a number of firms from particular industries whose firms had entered the coal industry on a substantial scale either by internal expansion or through acquisition during the 1950s and 1960s. Many of these firms, as well as others, were excluded as potential entrants despite the fact that they held substantial coal reserves and were not actively engaged in the production of coal. Specifically, the Commission excluded some major petroleum companies that had acquired large quantities of coal reserves in the decade or so prior to Kennecott's acquisition of Peabody even though other petroleum companies were among the leading coal producers at the time of acquisition. The basis

for these exclusions was the Commission's belief that these companies had acquired coal reserves for the purpose of manufacturing synthetic fuels and that the commercial sale of coal was only of secondary interest.[56] Moreover, the Commission also excluded other major reserve holders such as electric utilities, steel companies, and railroads. The basis for these exclusions was that their reserve holdings were for captive purposes.[57] Thus, in effect, the Commission excluded all coal reserve holders who were not actively engaged in the production and commercial sale of coal.

The economic rationale behind these exclusions is not clear. Economic theory suggests that whether an objective is primary or secondary depends upon relative profitability. Petroleum, oil, and natural gas firms would mine reserves for synthetic fuel purposes if expected profits from this use exceeded the expected profits from commercially selling coal. That is, these types of firms could have been expected to mine and sell coal on commercial basis if the relative profitability of doing so increased. Therefore, these firms would certainly appear to be potential entrants since their entry could have been expected if the coal industry became more profitable. A similar justification exists for including electric utilities and steel companies as potential entrants. There would be an incentive for electric utilities in particular to vertically integrate if there was a substantial increase in the price of coal. This possibility would tend to restrain the price behavior of established firms practicing limit pricing. Similarly, steel

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[56] Ibid.

[57] Ibid.

companies might have been expected to sell coal on a commercial basis if it became profitable to do so. Thus, intuitively, the Commission's justification for excluding these types of firms as potential entrants cannot be accepted. If one is to attach any economic meaning to the term potential entrant then it must take into account the firm's ability and incentive to enter an industry under slightly more profitable conditions. The FTC's "economic" arguments were thus predicated upon non-profit-maximizing (i.e., economically irrational) behavior.

Reserve Holdings, Diversification, and Potential Entrants

The above discussion suggests that a number of firms should have been considered as potential entrants along with Kennecott. Table XXVII lists the major firms that were mentioned at the FTC hearing as potential entrants. All of these firms either held large quantities of reserves, or were involved in long-term contract negotiations with electric utilities, or had otherwise announced plans to enter the coal industry.[58] Although later evidence revealed that most of these firms and several others entered the coal industry within a few years of the FTC's decision to proscribe the Kennecott-Peabody merger, there was substantial evidence that many petroleum firms apparently had the

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[58] Ibid., pp. 804-808.

TABLE XXVII

MAJOR COMPANIES MENTIONED AS POTENTIAL ENTRANTS AT HEARING

Companies
Exxon Corporation
Arch Minerals
Atlantic Richfield
AMAX
Kerr-McGee
Shell Oil
Sun Oil
Sinclair Oil
Sunray DX
Diamond Shamrock
Texaco
Standard Oil of Ohio
Standard Oil of California
Ashland Oil
El Paso Natural Gas
Texas Eastern Transmission

"In the Matter of Kennecott Copper Corporation," 78 Federal Trade Commission Decisions 744 (January 1, 1971 to June 30, 1971), pp. 804-805.

incentive as well as the ability to enter the coal industry at the time of the hearing.[59]

In the early 1960s, a number of petroleum companies began diversifying into the coal industry either through internal expansion or acquisition.[60] By the time of Kennecott, some of these companies were major coal producers. Tables XXVIII and XXIX indicate the heavy involvement of petroleum firms in the coal industry and the extent of diversification into the coal industry. Table XXVIII indicates that approximately 33.2 percent of the top-twenty coal firms' production, and 19 percent of total coal production, was accounted for by petroleum firms in 1970. Moreover, none of this production was for synthetic fuels purposes. Table XXIX indicates that a significant number of major producers were non-coal firms from a variety of industries.

The diversification of firms into the coal industry was part of a broader trend toward "energy companies." This was especially true of petroleum companies. Table XXX indicates the degree to which major petroleum companies had diversified as of early 1970. Firms were classified as diversified into a particular energy subsector if they were either active producers or simply reserve holders. Eleven of

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[59]In a recent study, Mayo's results suggest that energy diversification, particularly petroleum companies into coal, may have been motivated by multiproduct economies of scope, see John M. Mayo, "The Technological Determinants of the U.S. Energy Industry Structure," Review of Economics and Statistics 66 (February 1984), p. 55.

[60]See Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends, pp. 200-214.

TABLE XXVIII

PRIMARY INDUSTRY AFFILIATIONS OF THE TWENTY LARGEST COAL PRODUCERS, 1970

Industry	Number of Firms	Percentage Share of: Top 20 Production	Percentage Share of: Total Coal Production
Coal	8	31.5	13.5
Petroleum	4	33.2	19.0
Captive producers	4	13.2	19.0
Other non-coal firms	4	28.3	16.4

Source: Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends in the Energy Sector of the U.S. Economy (Washington: U.S. Government Printing Office, March 1974), pp. 203-204.

TABLE XXIX

MAJOR ACTIVITY OF THE TWENTY LARGEST COAL PRODUCERS
IN 1970, RANKED BY PRODUCTION

Operating Group	Bituminous and Lignite Coal Production (Tons)	Parent Firm	Primary Activity of Parent Firm
Peabody Coal	67,850,339	Kennecott Copper Corp.	Copper Mining
Consolidation Coal Co.	64,062,000	Continental Oil Co.	Petroleum
Island Creek Coal Co.	29,722,041	Occidental Petroleum Corp.	Petroleum
Pittston Co.	23,694,117	Pittston Co.	Coal
United States Steel	19,631,000	United States Steel Corp.	Steel
Bethlehem Mines Corp.	14,604,998	Bethlehem Steel Corp.	Steel
Eastern Associated Coal Corp.	14,538,990	Eastern Gas and Fuel Associates	Coal
Ayrshire Coal Co.	14,426,772	American Metal Climax, Inc.	Primary Metals
General Dynamics Corp.	14,092,297	General Dynamics Corp.	Aerospace
Old Ben Coal Corp.	11,687,056	Standard Oil Co. (Ohio)	Petroleum
Westmoreland Coal Co.[a]	11,346,979	Westmoreland Coal Co.	Coal
North American Coal Corp.	9,674,136	North American Coal Corp.	Coal
Pittsburgh Midway Coal Mining Co.	7,837,511	Gulf Oil Corp.	Petroleum
Utah Construction and Mining Co.	6,020,950	Utah Construction and Mining Co.	Diversified Mining
Southwestern Illinois Coal Corp.	5,715,067	Southwestern Illinois Coal Corp.	Coal
Valley Camp Coal Co.	5,533,699	Valley Camp. Coal Co.	Coal
Central Ohio Coal Co.	5,525,948	American Electric Power Co., Inc.	Electricity Generation

TABLE XXIX (continued)

Operating Group	Bituminous and Lignite Coal Production (Tons)	Parent Firm	Primary Activity of Parent Firm
Republic Steel Corp.	4,950,159	Republic Steel Corp.	Steel
Zeigler Coal and Coke Co.	4,760,255	Zeigler Coal and Coke	Coal
Rochester and Pittsburg Coal	4,707,327	Rochester and Pittsburgh Coal	Coal

[a]Penn Virginia Corp., a coal land lessor and chemical producer, controls approximately 25 percent of Westmoreland's outstanding shares.

Source: Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends in the Energy Sector of the U.S. Economy (Washington: U.S. Government Printing Office, March 1974), pp. 203-204.

TABLE XXX

DIVERSIFICATION IN THE ENERGY INDUSTRY BY THE TWENTY-FIVE LARGEST PETROLEUM COMPANIES, 1969, RANKED BY ASSETS

Company	1969 Assets ($ Thousand)	Energy Industry			
		Oil Gas	Shale	Coal	Uranium
Exxon	17,537,951	X	X	X	X
Texaco	9,281,573	X	X	X	X
Gulf	8,104,824	X	X	X	X
Mobil	7,162,994	X	X		X
Standard Oil (California)	6,145,875	X	X		
Standard Oil (Indiana)	5,150,677	X	X		X
Shell Petroleum	4,356,222	X	X	X	X
Atlantic Richfield	4,235,425	X	X	X	X
Phillips Petroleum	3,102,280	X	X		X
Continental Oil	2,896,616	X	X	X	X
Sun Oil	2,528,211	X	X	X	X
Union Oil of California	2,476,414	X	X		X
Occidental	2,213,506	X		X	
Cities Service	2,065,600	X	X		X
Getty	1,859,024	X	X		X
Standard Oil (Ohio)	1,553,591	X	X	X	X
Pennzoil United, Inc.	1,356,532	X			X
Signal	1,258,611	X			
Marathon	1,221,288	X	X		
Amerada-Hess	982,157	X			X
Ashland	846,412	X	X	X	X
Kerr-McGee	667,940	X		X	X
Superior Oil	494,025	X	X		
Coastal States Gas	490,190	X			
Murphy Oil	343,914	X			

Source: Bruce C. Netschert, Abraham Gerber, and Irwin M. Stelzer, Competition in the Energy Markets: An Economic Analysis (Washington: National Economic Research Associates, May 1970), p. 103.

the twenty-five firms either produced coal or held reserves in 1970. Only three had single energy holdings, and eight were completely diversified. Furthermore, of the eleven coal firms, only Gulf Oil, Continental Oil, Occidental Petroleum, and Standard Oil of Ohio were actively engaged in the production of coal in 1970.[61] Therefore, seven petroleum companies were holding reserves but not producing coal in 1970.

In fact, not only were petroleum firms holding reserves, they were the major holders of uncommitted reserves based upon a survey conducted by the FTC of 103 companies involved in the coal industry. Table XXXI presents uncommitted reserve holdings of various types of firms. Petroleum firms held over 50 percent of all uncommitted reserves in each major classification of steam coal in 1974. Thus, it would appear the FTC's findings that Kennecott was the "most likely" potential entrant was inconceivable, given the degree of energy diversification and the extent of petroleum firms' involvement in the coal industry.[62] Clearly, if these firms had been

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[61]Ibid., p. 476.

[62]To illustrate this point, consider one of several similar cases. Kerr-McGee is a highly diversified energy company. At the hearing, it was noted by an expert witness of Kennecott's that Kerr-McGee had acquired approximately one billion tons of steam coal reserves and had begun development of these reserves. Furthermore, Kerr-McGee, along with Ashland Oil and Atlantic Richfield (both also with reserves), had negotiated with Peabody prior to Kennecott's acquisition. This was also noted at the hearing. It would have appeared that Kerr-McGee had expressed an intent upon entering the industry on the basis of this evidence. However, the Commission refused to identify Kerr-McGee as a potential entrant. In contrast, Kennecott was found to be the "most likely" entrant because it had

TABLE XXXI

PERCENTAGE OF UNCOMMITTED COAL RESERVES CONTROLLED BY VARIOUS SURVEYED COMPANY GROUPS, 1974[a]

Reserve and Company Type	Percent of Survey Universe
Bituminous Coal	
Oil/gas	56.4
Independent coal	8.3
Railroads	3.6
Steel	3.5
Electric utilities	0.1
Other	28.2
Sub-bituminous Coal	
Oil/gas	54.0
Independent Coal	1.4
Railroad	7.9
Steel	0.0
Electric Utilities	6.8
Other	32.9
Lignite	
Oil/gas	51.2
Independent Coal	6.4
Steel	0.0
Electric Utilities	8.8
Other	3.5

[a]The surveyed companies include those companies listed in the Keystone Coal Industry Manual as one of the top fifty producers in any year between 1964 and 1973. The original list included 107 firms of which 69 were listed in the manual. In addition 23 oil/natural gas companies and 15 railroad companies known to possess large quantities of reserves were included. A total of 36 oil/natural gas companies, 8 electric utilities, 14 other companies, 12 steel companies, 15 railroads, and 22 independent coal companies were surveyed. The final list contained 103 firms due to mergers and closings. Kennecott (Peabody) was included under "other" companies.

Source: Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978), p. 117.

included, then the Commission would have failed to satisfy the limited number of potential entrants precondition for the doctrine of potential competition.

6. SUMMARY AND CONCLUSIONS

The two objectives of this chapter were to critically analyze the FTC's decision to proscribe the Kennecott-Peabody merger and to examine two distinctive aspects of the case with respect to future applications of the doctrine of potential competition. In terms of the first objective, primary attention was devoted to the four essential elements of perceived potential entry cases since this theory formed the basis of the FTC's decision to proscribe the merger. The conclusions were that the FTC's findings with respect to all four elements did not appear to be consistent with the evidence.

First, the FTC's finding that the Nation's coal producers constituted the most appropriate industry from which to assess the impact of the merger on competition failed to take into consideration the fact that relatively high transportation costs tend to limit the

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purchased a relatively small amount of reserves in Utah and promptly closed down the only existing mine a couple of years prior to its acquisition of Peabody. By 1975, Kerr-McGee had successfully negotiated long-term contracts with electric utilities amounting to 14 million tons annually. Although this topic is the subject of Chapter VI, it may be noted that this evidence, along with similar, was not considered in a post-hearing appeal for modification of the divestiture order by Kennecott. The justification for not considering this evidence was that the Commission correctly assessed a violation at the time of the hearing and this post-hearing evidence is inconsequential, see "In the Matter of Kennecott Copper Corporation" 78, pp. 806, 945; and Brief in Support of Motion for Modification, p. 13.

geographic size of coal markets, and that coal faces actual or potential competition from other fuels within a broader energy market. Thus, its product market definition excluded fuels which were competitive with coal, while its geographic definition included firms that did not directly compete. This resulted in higher concentration ratios than would have been the case had the product market been defined more broadly to include competitive fuels within the electric utility sector and eliminated other coal firms as potential entrants via market extension from other geographic regions.

A second conclusion was that the Commission's extrapolation of production concentration trends ignored the possibility that increased concentration may have stemmed from technical and allocative efficiency considerations, and these increases do not necessarily lead to enhanced market power. It was argued that technological improvements in coal production as well as distribution likely increased the efficient sized coal mine and that shifts in the composition of coal demand likely increased the size of coal firms. One would have expected production concentration to have risen under these conditions, given that coal demand in non-utility sectors was falling. The Commission never considered the possibility that those factors which lead to increased concentration may not have enhanced market power, but rather enhanced competition among coal firms themselves as well as interfuel competition within the broader electric utility sector. If increased concentration was leading to the enhancement of market power there should have been some corraborating evidence in terms of non-competitive

performance. The evidence presented on real price and consumption trends pointed in the opposite direction.

A third conclusion was that barriers to entry into the coal industry are generally low. While transportation economies and the large nature of electric utilities' demand may have required larger firms, the fact remains that entry is relatively easy since reserves are abundant and concentration is low. Moreover, other factors such as project financing, Federal ownership of reserves, and large secondary markets for reserves and machinery tend to reduce entry barriers and mitigate the effect of increased capital requirements. The Commission's claim of high capital barriers failed to consider any of these factors.

Finally, it was observed that a larger number of potential entrants besides Kennecott existed in the coal industry at the time of the hearing. Petroleum companies via product extension were perhaps the most obvious potential entrants. Past diversification trends and large reserve holdings by firms not actively engaged in coal mining established both the means as well as the incentive for these firms to enter the commercial coal business should the industry become more profitable. Furthermore, other firms holding reserves such as railroads, steel companies, and electric utilities possessed similar incentives to enter. Thus, even if one were to assume established firms were limit pricing, the removal of Kennecott would not have affected the limit price since established firms' perceived threat of entry likely would not have been affected. The

Commission's justification for excluding these firms was completely devoid of any economic reasoning.

The second objective of this chapter was to examine two extensions of the doctrine of potential competition in Kennecott. First, the case was unique in that the doctrine was applied to a pure conglomerate merger. The merger could not appropriately be described as either vertical or horizontal despite the fact that Kennecott was both a small consumer and held some coal reserves. Kennecott's primary line of commerce was clearly copper and the merger offered no possibility for vertical market foreclosure. Moreover, the merger did not raise any horizontal concerns since Kennecott did not produce coal and only held a small quantity of reserves. Similarly, the merger could not be described as product or market extension since coal and copper are unrelated in any market. Thus, the most appropriate classification for the merger is pure conglomerate.

In general, the primary difficulty in applying the doctrine of potential competition is the identification of potential entrants. This problem becomes acute in declining industries and industries with relatively low entry barriers. However, there is an additional problem in applying the doctrine to pure conglomerate mergers even in stable or expanding industries with relatively high entry barriers because the best method of separating potential entrants from other firms outside the industry is to look at the "proximity" of outside firms to the industry. In almost any merger, one will likely find firms which are either vertically linked to the target

market or are relatively close with respect to product or market extension. One may consider these firms as "most likely" potential entrants due to their incentive to enter vis à vis firms well outside the market boundary. Thus, the likelihood of finding an industry in which only three or four firms possess the incentives and means of entering at slightly higher prices, and one of these "most likely" potential entrants being a firm unrelated to the target industry, would appear to be relatively low. Of course, this does not suggest that an unrelated firm cannot be a potential entrant, but merely that in those cases in which it is there will generally be other at least as likely potential entrants. The doctrine is not applicable in those cases where there are several such firms.

A second extension of the doctrine of potential competition found in Kennecott was the Commission's extrapolation of concentration trends. A fundamental problem with this extension is that low and moderate concentration levels are generally not conducive to the type of price collusion necessary for established firms to set and maintain a limit price. This is precisely why high concentration is required for the doctrine's applicability. Hood has noted that the Commission's application of the doctrine in Kennecott might best be described as the "doctrine of potential, potential competition" since the Commission actually based its complaint upon the potential for potential competition to have relevance (potential entrants influence

price) in the future.[63] Such an economic theory has yet to be formulated.

In essence, the Commission extended the doctrine of incipiencey, as espoused in Von's Grocery[64] and Brown Shoe[65] to a conglomerate situation. While the doctrine may have some justification in horizontal and, perhaps, some vertical mergers, it is inconsistent with the economic theory upon which the doctrine of potential competition is based. Furthermore, conglomerate mergers would appear to be the least likely candidates for its invocation because they do not directly increase concentration. Thus, another conclusion of this chapter is that both FTC extensions of the doctrine of potential competition appear to be unwarranted and should be recognized as such in future applications.

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[63]Robert K. Hood, "Potential Competition," Antitrust Bulletin 21 (Fall 1976), pp. 502-503.

[64]United States v. Von's Grocery Company, 384, U.S. 270 (1966).

[65]Brown Shoe Co., Inc. v. United States, 370, U.S. 294 (1962).

CHAPTER V

COAL PRICE AND CONCENTRATION TREND

1. INTRODUCTION

It has been emphasized throughout this study that the three structural conditions necessary for application of the doctrine of potential competition are high seller concentration, substantial entry barriers, and a limited number of potential entrants. The Federal Trade Commission satisfied the first of these preconditions by extrapolating an upward trend in post-World War II coal industry production concentration ratios. Although concentration was relatively low at the time Kennecott acquired Peabody, the Commission felt a continuation of the trend ". . . foreshadows ominous developments in the coal industry."[1] The Commission also found capital requirements ". . . so great as to constitute a formidable barrier to entry into the coal business."[2] This conclusion was based upon the Commission's observation that ". . . operating large mines requires the use of correspondingly large, sophisticated mining equipment."[3] Therefore, the FTC's claim of high entry barriers was based primarily upon rising machinery costs. Moreover, the Commission also found no other firm to be as likely as Kennecott to enter the coal industry. This latter finding was based upon Kennecott's previous

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[1]"In the Matter of Kennecott Copper Corporation," 78 Federal Trade Commission Decisions 744 (January 1, 1971 to June 30, 1971), p. 914.

[2]Ibid., p. 938.

[3]Ibid.

Knight-Ideal reserves purchase as well as a feeling that several companies holding substantial reserves were not interested in the future sale of coal.[4]

The primary objective of this chapter is to investigate the FTC's finding that structural conditions in the coal industry were such that the removal of Kennecott as a potential entrant would likely pose a future competitive threat in the coal industry. In this chapter, a simple econometric model will be used to examine the effects of rising concentration on coal prices. The model differs from the conventional model of concentration, entry barriers, and price in that it treats concentration as an endogeneous variable. In so doing, one may consider both the direct effect of concentration on coal prices as well as the indirect effects of those factors which lead to higher concentration. It will be demonstrated that in cases where concentration is influenced by long run cost conditions such a model is superior in a theoretical sense.

The first section of this chapter will present a brief critique of the method used by the FTC to predict future concentration in the coal industry. The second section will present the theoretical basis for the empirical model used in this chapter. Since this model is simply a modification of the conventional model, almost exclusive attention will be

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[4]Ibid., p. 945.

devoted to the justification of the modifications. The third section will discuss the specification of the empirical model. The final section will present the empirical results along with a summary of the findings.

2. CRITIQUE OF FTC'S METHOD

The model proposed offers at least two advantages over the FTC's simple extrapolation method. First, the Commission's method did not take into account factors that influence concentration. The Commission's simple extrapolation method may be described in equation (1).[5]

$$CR_t = f\ (CR_{t-1},\ CR_{t-2},\ CR_{t-n}) \qquad (1)$$

where:

CR = four-firm production concentration ratio

t = current time period

The method treats current concentration as solely dependent upon past values of concentration. Consequently, future values may be predicted on the basis of the time trend in concentration. The simplest type of extrapolation model is the linear trend model. Equation (2) describes a linear trend model in which concentration is a function of time.

$$CR_t = \beta_o + \beta_1 t \qquad (2)$$

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[5]For a discussion of the extrapolation method and various models, see Robert S. Pindyck and Daniel Rubinfeld, Econometric Models and Economic Forecasts (New York: McGraw-Hill Book Company, 2nd ed., 1981), Chapter 15.

While there was no record of the FTC actually formulating such a model, the underlying premise of its method may be captured in such a model. Actual estimation of (2) by ordinary leasts squares yeilds an estimated value of β_1 equal to .99. Therefore, one would have expected an annual increase in the four-firm production concentration ratio of approximately one percent if the 1954-1967 trend had continued. Such an increase would have lead to "high" concentration within a decade or two.[6]

A primary shortcoming of the above model, and more generally the extrapolation method, is that it fails to account for the sources of change underlying concentration trends. A number of concentration theories have been put forth.[7] Most empirical specifications of concentration consider elements of one or more of these theories. A fundamental difference between these studies and the Commission's approach is in the treatment of concentration. As Winter and Nelson explain: "Industrial concentration is to be understood as a dynamic, historical phenomenon, endogenous to the market system in which it appears."[8] Hence, the alternative model proposed in this chapter will take into account the endogeneous nature of concentration.

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[6]The 1967 four-firm concentration ratio was 29.8 percent. A simple extrapolation of approximately 1 percent per year yields a predicted value of 39.8 percent in 1977 and 49.8 percent in 1987. The actual ratio in 1977 was 23 percent. The data used to estimate β_1 were taken from Keystone Coal Industry Manual, U.S. Production by Company (New York: McGraw-Hill Mining Publications, annual).

[7]For an excellent discussion of these various theories accompanied with some empirical evidence, see Stanley I. Ornstein, et. al., "Determinants of Market Structure," Southern Economic Journal 39 (April 1973), pp. 612-625.

[8]R. R. Nelson and S. G. Winter, "Forces Generating and Limiting Concentration Under Schumpeterian Competition," Bell Journal of Economics 9 (Autumn 1978), pp. 524-548.

A second shortcoming of the FTC's method is that it completely ignored the trend in industry price. Chapter IV revealed that coal prices fell significantly over the 1954-1967 period despite a rise in concentration. In fact, the simple correlation coefficient between the real price of coal and the industry four-firm production concentration ratio over that period was -.97. Although one must be careful not to confuse correlation with causation, there would appear to be a conflict between this observation and the theory upon which the Commission's complaint was based. Certainly, if either higher concentration or those factors leading to higher concentration also lead to lower prices, then the welfare consequences of rising concentration are just the opposite from those typically associated with concentration. The alternative model proposed in this chapter will take into account the influence of concentration as well as other factors on the price of coal.

3. THEORIES OF CONCENTRATION AND PRICE

The legal basis for the FTC's proscription of the Kennecott-Peabody merger was the doctrine of potential competition. The economic foundation of the doctrine is limit price theory which was discussed in Chapter II. Recall that the static version of limit price theory posits a functional relationship between market structure and market power with causality running from structure to market power. A testable hypothesis of the theory is that structural variables such as seller concentration and the condition of entry are primarily determinants of industry long run price-cost margins.

There have been numerous attempts to test this hypothesis.[9] The typical study begins by specifying a relationship between seller concentration, entry barriers, and long run price-cost margins in a general form similar to equation (3).

$$\Pi = f(CR, B, AC, D) \qquad (3)$$

where:

Π = industry long run price-marginal cost margin

CR = seller concentration

B = condition of entry

AC = industry long run cost conditions

D = market demand conditions

The theory predicts long run price-marginal cost margins will tend to be persistently higher in industries with high concentration and significant entry barriers, other things held constant. The theory is said to be confirmed if both the coefficients on concentration and the condition of entry are positive.

It should be noted that the vast majority of empirical studies which have used the above specification have been multiple industry studies using short time-series or cross-sectional data. Despite some exceptions and much criticism, most studies have failed to reject

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[9]For two excellent reviews of the empirical studies, see Paul A. Pautler, "A Review of the Economic Basis for Broad-Based Horizontal Merger Policy," Antitrust Bulletin 28 (Fall 1983), pp. 571-651; and Leonard W. Weiss, "The Concentration-Profits Relationship and Antitrust," in Industrial Concentration: The New Learning edited by Harvey J. Goldschmid et. al., (Boston: Little, Brown, and Company, 1974), pp. 184-233.

the theory with one noteworthy qualification. Most have found the hypothesized relationship to exist only after a threshold or "critical" level of concentration is reached. The most common critical levels are a four-firm concentration ratio of approximately 50 percent and an eight-firm ratio of approximately 70 percent.[10]

The public policy implication of high concentration is straightforward if one accepts the specification of the theoretical relationships which underlie equation (3). The traditional interpretation of a positive coefficient on concentration is as follows. Increases in concentration raise long run price-marginal cost margins by raising price. The rise in price requires a restriction of output which results in economic inefficiency. Consequently, the economic basis for a strong antitrust policy against concentration is that it leads to higher prices and economic inefficiency.

This traditionalist view of concentration can be easily demonstrated by reference to the classic textbook case of a market that is

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Weiss provides a brief description of 46 studies and footnotes 8 others. Pautler's review, while less exhaustive, contains a few more recent studies. For a in-depth review of the model's specification, see Weiss, "Quantitative Studies of Industrial Organization," in Frontiers of Quantitative Economics, edited by Michael D. Intriligator (London: North-Holland Publishing Company, 1971), pp. 362-411. For a critical review of the model's specification, see Almarin Phillips," A Critique of Empirical Studies of Relations Between Market Structure and Profitability," Journal of Industrial Economics 24 (June 1976), pp. 241-249.

[10]James W. Meehan, Jr. and Thomas D. Ducheseau, "The Critical Level of Concentration: An Empirical Analysis," Journal of Industrial Economics 22 (September 1973), pp. 21-36.

exogeneously transformed from competition to monopoly.[11] Figure 5 describes such a market. The demand curve and the monopolist's marginal revenue curves are denoted by D and MR, respectively. The long run industry average and marginal costs are denoted by AC and MC, respectively. Constant returns to scale are assumed for diagrametical simplicity. The transformation of industry structure from competition to monoply raises long run price-marginal cost margins from $\frac{P_c - MC}{MC}$ which is zero to $\frac{P_m - MC}{MC}$ which is positive. This increase is solely the result of the rise in price from P_c to P_m. Moreover, the rise in price requires output be restricted to Q_m. The impact of the output restriction and price increase on economic efficiency is strictly negative. The loss stems from the underallocation of resources for which there is no offsetting gain in production efficiency. This loss is depicted by the familiar deadweight loss triangle, abc. A strict interpretation of equation (3) is that both higher prices as well as allocative inefficiency can be inferred from a positive coefficient on concentration.

The above interpretation of a positive relationship between concentration and long run price-marginal cost margins is based entirely upon the assumption that concentration is independent of long run cost conditions. Figure 6 may be used to demonstrate this point.[12] Assume

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[11]William J. Baumol and Alan S. Blinder, Economics: Principles and Policy, 2nd ed. (New York: Harcourt, Brace, Jovanovich, Inc., 1982), pp. 474-476.

[12]The following analysis is closely related to that of Williamson, see Oliver E. Williamson, "Economies as an Antitrust Defense," American Economic Review 58 (March 1968), pp. 18-36; and id., "Economies as an

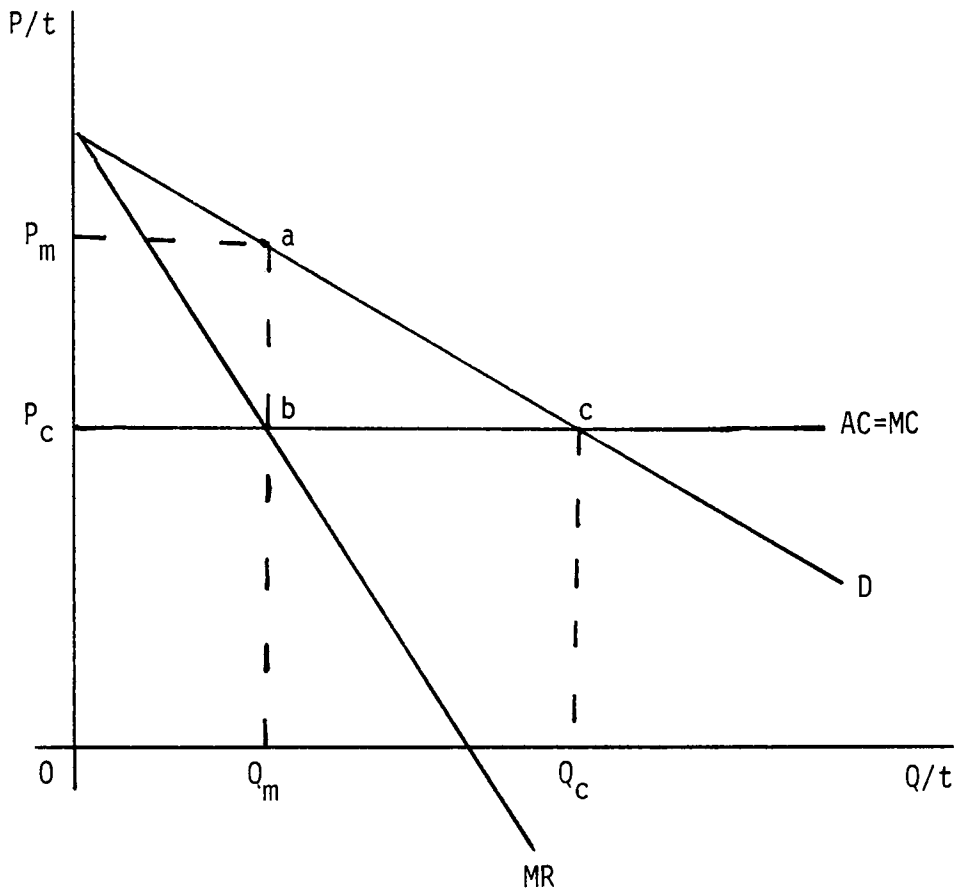

FIGURE 5

TRADITIONAL COMPETITION-MONOPOLY MODEL

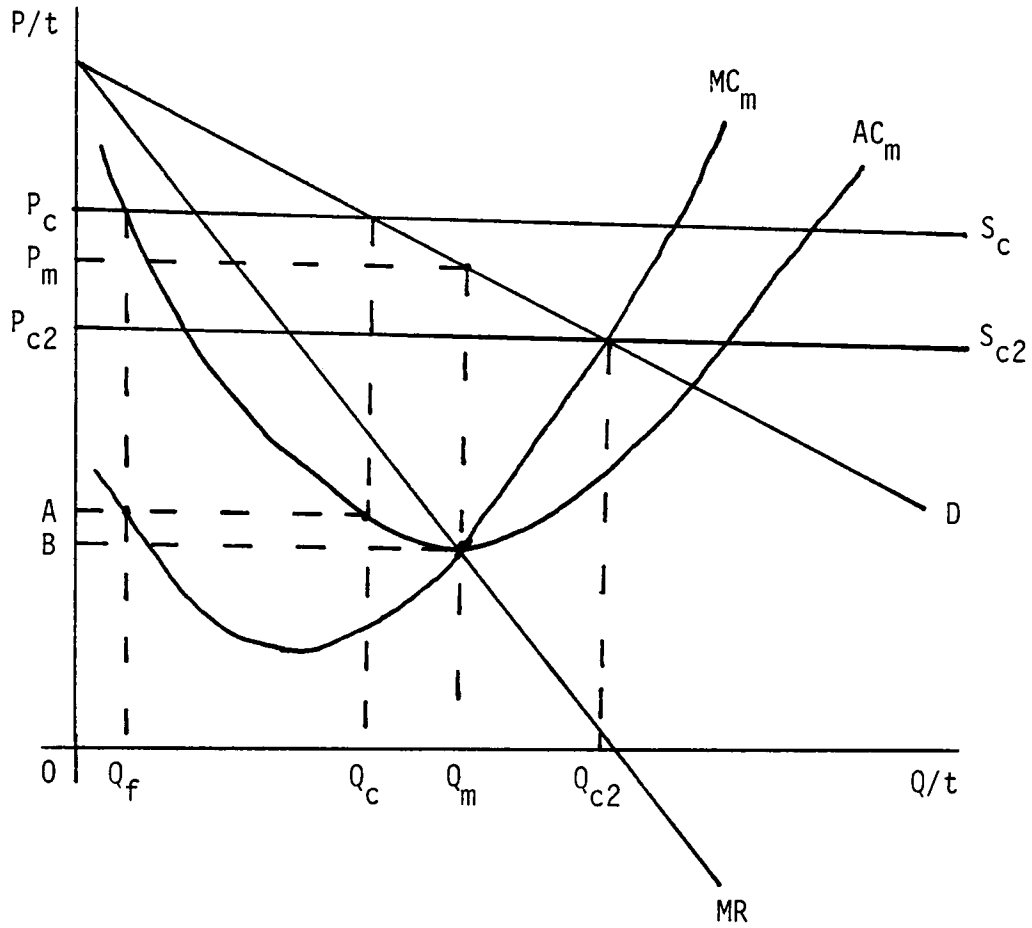

FIGURE 6

MONOPOLY WITH ECONOMIES OF SCALE

industry structure is intially competitive and S_c represents the long run supply curve for a constant-cost competitive industry. Given this assumption, equilibrium price is P_c, quantity is Q_c, firm size is OQ_f, and the industry long run price-marginal cost margin is zero. Next, suppose a technological improvement occurs that generates substantial economies of scale. The new long run average and marginal cost curves are depicted as AC_m and MC_m, respectively. Assume further that the industry is monopolized as a result of the technological improvement's impact on costs. The relevant question in terms of interpreting the relationship between concentration and price-cost margins is whether the post-transformation long run price-marginal cost margin accurately describes the impact of higher concentration on price and economic efficiency.

There are actually two possibilities described in Figure 6. One is that the long run competitive supply curve remains at S_c. In this case the effect of the transformation on industry structure is to lower price and increase output from P_c to P_m and Q_c to Q_m, respectively. Clearly, the transformation's impact on long run price-marginal cost margins is misleading with respect to the transformation's impact upon price as well as efficiency. Price fell despite a rise in long run price-marginal cost margins. Hence, it can not be argued that consumers

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Antitrust Defense: Correction and Reply," American Economic Review 58 (December 1968), pp. 1372-1376. See also, Frederick M. Scherer, Industrial Market Structure and Economic Performance, 2nd ed., (Chicago: Rand McNally College Publishing Company, 1980), pp. 21-24.

were harmed as a result of the rise in the industry price-marginal cost margin. Society has also gained because costs are lower. These cost savings are $(P_c - A)(Q_c)$ at the original competitive output and $(P_c - B)(Q_m)$ at the monopolist's output. Thus, the overall gain in efficiency is strictly positive.

A second possibility is that the long run competitive supply curve shifts downward to S_{c2}. In this case the competitive price (P_{c2}) is lower and output (Q_{c2}) is greater than that of the monopolist. However, as Williamson has shown, the impact of monopolization on economic welfare is ambiguous in this case because of two offsetting effects. First, consumers are clearly worse off due to the higher price and lower output. The loss in consumer surplus is $\frac{1}{2}(P_m - P_{c2})(Q_m - Q_{c2})$. However, there is an offsetting gain in terms of production efficiency. This gain is due to the monopolist's lower cost. The gain is equal to $(P_{c2} - B)(Q_m)$. Therefore, the impact on economic welfare of a technologially induced increase in concentration cannot be determined a priori so long as the technological change is dependent on market structure.[13]

The above analysis suggests two conflicting explanations of industrial concentration and its overall impact on economic efficiency. The traditional view emphasizes concentration's impact on established firms' ability to raise price and restrict output. In contrast, the efficiency

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[13]In fact, Williamson demonstrates the impact on price must, in general, be relatively large for a small decrease in cost to have a net adverse impact on overall efficiency, see Williamson, "Economies as an Antitrust Defense," p. 23.

view sees concentration as a product of a dynamic process in which the number of firms and relative firm size depend upon market demand-supply conditions as well as intraindustry firm efficiency differences. Clearly, the welfare implications of rising concentration depend very much upon which view is accepted.

A fundamental contention of this study is that neither of the above views provide an adequate foundation upon which to base a particular antitrust decision. As Figures 5 and 6 demonstrated, rising concentration may or may not result in adverse welfare consequences. Consequently, any a priori judgements based solely upon concentration should be interpreted with caution.

The question as to whether the upward trend in coal concentration had lead, or was leading, to inferior performance is strictly empirical. As discussed in Chapter IV, there were fairly good reasons to believe that such factors as technological improvements and shifts in coal demand toward utilities influenced concentration in a positive manner. Small size coal firms, a hallmark of the industry prior to the 1950s, faced pressures on both demand and supply sides of the market to either grow internally, exit, or merge. To the extent that concentration was a consequence of improved technology and shifts in demand, the net effect on welfare was probably beneficial. Had the industry not responded to these changes, coal prices may have been higher and, consequently, the industry may have experienced an even greater decline relative to other electric utility fuel sources. Therefore, on the one hand, it would appear the upward trend may have been the result of

efficiency considerations and the impact was beneficial. However, on the other hand, the rise in concentration could have facilitated oligopolistic pricing. This coupled with the possibility that rising machinery and equipment costs were erecting an entry barrier could have signaled diminished competition in the industry. Consequently, one must consider both market power as well as overall efficiency in assessing the welfare effects of rising concentration. This conclusion follows whether the goal of antitrust policy is to maximize overall social welfare or just consumer welfare.

4. MODEL SPECIFICATION

The primary difficulty in assessing the effect of concentration on overall economic efficiency is to disentangle the market power effect of higher concentration on price from the efficiency effect of lower costs on concentration. This can be accomplished by modifying equation (3), page 161, in two respects. First, concentration must be treated as an endogeneous variable. This allows one to consider the indirect effects of such factors as economies of scale, market size, and other determinants of concentration on price as well as possible feedback of price on concentration. Empirically, this modification requires an additional equation explaining concentration. A second modification is the use of price rather than long run price-marginal cost margins as the dependent variable in the industry-specific equivalent to equation (3) on page 161. An inherent difficulty with price-cost margins is

their inability to distinguish between high price and low cost.[14] The harmful effects of concentration on market power and economic efficiency stem from high price, not low cost. As Figure 6 demonstrated, long run price-marginal cost margins may be misleading with respect to the impact on efficiency when costs and concentration are functionally dependent. The use of price avoids part of the interpretation problem since a positive coefficient on concentration indicates rising concentration leads to higher prices.

The general form of the model used to examine the relationship between concentration, entry barriers, and price in the coal industry is described by equations (4a) and (4b).

$$CR_t = f\ (P_{t-1},\ MC_t,\ ULC_t,\ PCE_t) \qquad (4a)$$

$$P_t = f\ (CR_t,\ MC_t,\ ULC_t,\ P_{ot},\ P_{gt}) \qquad (4b)$$

where:

CR_t = production concentration in time t

P_t = price of coal in time t

P_{t-1} = lagged price of coal in time t-1

MC_t = total machinery and equipment cost in time t

ULC_t = unit labor in time t

PCE_t = percentage of coal consumed by electric utilities in time t

P_{ot} = price of oil in time t

P_{gt} = price of natural gas in time t

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[14] A major shortcoming of cross-sectional industry studies is the inability to use price as the dependent variable and, thereby, directly test for this influence of concentration on price.

Equations (4a) and (4b) constitute a two equation recursive model. The recursive nature of the model is due to the appearance of P_{t-1} rather than P_t in equation (4a). The justification for this specification is the time lag between plans to enter or exit and actual entry or exodus. A one period lag allows for partial adjustment. An advantage of the recursive model is that both (4a) and (4b) may be estimated separately using ordinary least squares.[15]

The specification of equation (4a) is based upon a dynamic view of concentration.[16] Current concentration is influenced not only by current cost and demand conditions but also by past prices. An increase in price with constant or declining costs could be expected to lead to lower concentration in a future period due to entry. Thus, during periods of falling prices one would expect to find rising concentration, ceteris paribus. The expected sign of $\frac{\partial CR_t}{\partial P_{t-1}}$ is therefore negative. The basis for including MC_t in (4a) is the FTC's finding that rising machinery and equipment costs were erecting an entry barrier in the coal industry and leading to higher concentration. Therefore, a necessary condition for the FTC's argument to hold is that $\frac{\partial CR_t}{\partial MC_t}$ be positive. Labor cost per unit of output represent a proxy variable for the influence of technological improvements on cost and economies of scale. Chapter IV discussed the nature of these improvements and their likely influence on

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[15] Pindyck and Rubinfeld, p. 322-323.

[16] A similar specification for the concentration equation is used by Martin, see Stephen Martin "Advertising, Concentration, and Profitability: The Simultaneity Problem," Bell Journal of Economics 10 (Autumn 1979), pp. 639-647.

productivity and concentration. The expected sign of $\frac{\partial CR_t}{\partial ULC_t}$ is negative. The percentage of coal consumed by electric utilities was included to take into account the shift in coal consumption that took place over the period. In Chapter IV it was noted that a typical utility contract involves a single seller supplying a substantial portion of a utility's fuel requirements. Hence, the expected sign of $\frac{\partial CR_t}{\partial PCE_t}$ is positive.

The specification of (4b) is in the same spirit as the conventional empirical model of concentration and price. It is the industry-specific equivalent to equation (3) with long run price-cost margins replaced by price. A necessary condition for firms to limit price is that $\frac{\partial P_t}{\partial CR_t}$ be positive. The variables MC_t and ULC_t are included to reflect the influence of costs on price. The expected sign of both $\frac{\partial P_t}{\partial MC_t}$ and $\frac{\partial P_t}{\partial ULC_t}$ is positive. It should be noted that, unlike the conventional specification of the concentration-price relation, a positive coefficient on $\frac{\partial P_t}{\partial MC_t}$ should not be interpreted as a signal of high entry barriers. The influence of MC_t as an entry barrier is examined in (4a). The variables P_{ot} and P_{gt} are included as exogeneous demand variables. To the extent that coal and other fossil fuels' demand are interrelated, one would expect coal prices to be affected by changes in the prices of oil and natural gas. Therefore, the expected signs of $\frac{\partial P_t}{\partial P_{ot}}$ and $\frac{\partial P_t}{\partial P_{gt}}$ are both positive.

An advantage of the above model is that one may examine the link between concentration and price changes more clearly than in a single equation model. For example, one can examine the total effect of a technological improvement on coal prices by taking the total derivative of price with respect to ULC_t. Equation (5) presents this result.

$$\frac{dP_t}{dULC_t} = \frac{\partial P_t}{\partial ULC_t} + \frac{\partial P_t}{\partial CR_t}\frac{\partial CR_t}{\partial ULC_t} \qquad (5)$$

Equation (5) indicates both the direct as well as the indirect influence of a decline in unit labor costs on price. The first term of the right hand side indicates the direct effect. One would expect a decline in ULC to decrease price. The indirect effect of the technological improvement is indicated by $\frac{\partial P_t}{\partial CR_t}\frac{\partial CR_t}{\partial ULC_t}$. The expected sign of this term is negative since that of $\frac{\partial P_t}{\partial CR_t}$ is positive and that of $\frac{\partial CR_t}{\partial ULC_t}$ is negative. Hence, the total effect of a decline in unit labor cost on price depends upon the relationship between price and concentration as well as that between concentration and unit labor costs. Price may rise, fall, or remain the same depending upon the magnitude of $\frac{\partial P_t}{\partial CR_t}\frac{\partial CR_t}{\partial ULC_t}$ relative to $\frac{\partial P_t}{\partial ULC_t}$. The direct effect may be totally offset if the decline in ULC is sufficient to increase CR to the point where monopolistic pricing is facilitated. This case was previously illustrated in Figure 6, page 166, where price rose as a result of monopolization of a competitive industry. The same procedure may be used to determine the total effect of other concentration determinants on price.

5. DATA

Most of the data used to estimate equations (4a) and (4b) was discussed in Chapter IV. Therefore, only brief attention is devoted to a description of these data here. Concentration was measured by the four-firm industry production concentration ratio. These data were taken from the Keystone Coal Industry Manual which is published annually.[17] The figures are based upon surveys of all coal firms producing in excess of 100 thousand tons per year. Smaller coal firms' production is estimated. The figures are for bituminous and lignite coal which is the exact product delineation made by the FTC in Kennecott.[18]

Coal price data and the percentage of coal consumed by electric utilities were taken from Coal Data: A Reference.[19] These data represent average retail prices per ton of coal sold to electric utility powerplants. The prices include transportation and insurance costs. Therefore, the influence of improved transportation methods on concentration is indirectly taken into account in this measure of price.

Data on machinery and equipment cost were taken from Causes and Effects of Escalating Prices for Deep Mine Machinery.[20] The data were

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[17] Keystone Coal Industry Manual, (1954-1977).

[18] "In the Matter of Kennecott Copper Corporation," p. 915.

[19] U.S. Department of Energy, Energy Information Administration, Coal Data: A Reference (Washington: U.S. Government Printing Office, July 1980), p. 35.

[20] Joe G. Baker, Causes and Effects of Escalating Prices for Deep Mine Machinery (Washington: U.S. Government Printing Office, February 1983), p. 4.

originally in the form of a nominal cost index with 1967 serving as the base year. This index was adjusted for price changes by dividing the value of the index in each year by 1972 base year Gross National Product price deflators. The index includes all mining machinery and equipment. Although more specific indices were available, this index was deemed most appropriate since much machinery and equipment used in one type of mining may often be used in others.[21]

Labor cost per unit of output was calculated by dividing an index of average hourly production worker earnings (1967 = 100 percent) by an index of average labor productivity per unit of output (1967 = 100 percent). The earnings data were taken from Causes and Effects of Escalating Prices for Deep Mine Machinery.[22] Again, this index was in nominal terms and was adjusted by dividing each year's value by 1972 base year GNP price deflators. Average productivity figures were taken from Coal Data: A Reference.[23] The productivity data were measured as the average tons of coal per miner per day in each year.

Oil and natural gas price data were taken from the 1982 Annual Energy Review.[24] Prices were expressed in cents per million British

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[21]It should be noted that the trend in specific equipment costs such as shuttle cars and continuous mining equipment was almost identical to the trend in all mining equipment, see ibid.

[22]Ibid.

[23]U.S. Department of Energy, Energy Information Administration, Coal Data, p. 34.

[24]U.S. Department of Energy, Energy 1982 Annual Energy Review (Washington: U.S. Government Printing Office, 1982), p. 21.

Thermal Units (Btu) at the point of production. These prices were expressed in real terms using 1972 base year GNP price deflators. The fact that these data do not include transportation cost is somewhat offset by the fact that transportation costs are not as large as a percentage of delivered oil and natural gas prices as they are of coal prices. Furthermore, technological improvements in transportation were not as significant in these industries as in the coal industry.

It should be added that all variables were indexed using 1967 as the base year. The primary reason for this was simply that data on capital and labor costs were originally indexed. Therefore, this standardization simplifies interpretation of the coefficients. Indexation is not likely to distort the results and may even be more in line with the purpose of the model which is to explain the trend in concentration and price.

6. ESTIMATION

Model

The model described by equations (4a) and (4b), page 170, was estimated in log-linear form using data from the 1954-1977 period. The functional form is written out in equations (6a) and (6b).

$$CR_t^* = \alpha_o + \alpha_1 P_{t-1}^* + \alpha_2 MC_t^* + \alpha_3 ULC_t^* + \alpha_4 PCE_t^* + U_{1t} \quad (6a)$$

$$P_t^* = \beta_o + \beta_1 CR_t^* + \beta_2 MC_t^* + \beta_3 ULC_t^* + \beta_4 P_{ot}^* + \beta_5 P_{gt}^* + U_{2t} \quad (6b)$$

where:

$$CR_t^* = \ln CR_t - \ln CR_{67}$$

$$P_t^* = \ln P_t - \ln P_{67}$$

$$P_{t-1}^* = \ln P_{t-1} - \ln P_{67}$$

$$MC_t^* = \ln MC_t - \ln MC_{67}$$

$$ULC_t^* = \ln ULC_t - \ln ULC_{67}$$

$$PCE_t^* = \ln PCE_t - \ln PCE_{67}$$

$$P_{ot}^* = \ln P_{ot} - \ln P_{o67}$$

$$P_{gt}^* = \ln P_{gt} - \ln P_{g67}$$

Since the above model is in an indexed log form, equations (6a) and (6b) explain percentage changes in concentration and price relative to their 1967 values.

Results

Table XXXII contains ordinary least squares estimates of the parameters in equations (6a) and (6b). The results for the concentration equation are in column (I). Both unit labor cost and the percentage of coal consumed by electric utilities were significant at the 1 percent level. Both have the expected sign. The coefficients indicate that a 1 percent rise in the index of PCE and a 1 percent fall in the index of ULC results in a .48 and .59 percent increase in the concentration index, respectively. The concentration index was not influenced by either the index of lagged prices or machinery and equipment cost. This latter finding casts doubt on the FTC's finding that the high machinery

TABLE XXXII

ESTIMATION OF RECURSIVE MODEL

	Dependent Variables		
	CR_t^* (I)	P_t^* (II)	P_t^* (GLS) (III)
Intercept	6.07 (6.02)[a]	-.05 (.03)	.50 (1.15)
P_{t^*-1}	.07 (.30)	--	--
MC_t^*	-.24 (1.09)	-.66 (2.51)[b]	-.60 (2.07)[c]
ULC_t^*	-.59 (2.55)[a]	.44 (2.93)[a]	.30 (2.03)[c]
PCE_t^*	.48 (6.84)[a]	--	--
CR_t^*	--	.25 (2.00)[c]	.15 (1.15)
P_{ot}^*	--	.73 (5.63)[a]	.81 (6.67)[a]
P_{gt}^*	--	.26 (2.26)[b]	.24 (2.05)[c]
$\bar{R}^2$	.93	.95	.94
F-ratio	73.3[d]	90.1[d]	85.7[d]
D.W.	1.95	1.47[e]	--

[a]t-statistic is significant at 1 percent level.

[b]t-statistic is significant at 5 percent level.

[c]t-statistic is significant at 10 percent level.

[d]F-ratio is significant at 1 percent level.

[e]Durbin-Watson test for autocorrelation is within inconclusive range

and equipment costs were an entry barrier in the coal industry. At least, these costs did not significantly affect concentration.

The adjusted R^2 value of .93 indicates that 93 percent of the percentage change in the concentration index was explained by the regression equation. Although the Durbin-Watson test for first-order autocorrelation indicates no autocorrelation, an examination of partial correlation coefficients suggests multicollinerity may have been a problem, particularly with respect the significance of P_{t-1}. The matrix of partial correlation coefficients is provided in Table XLI of the Appendix. While it is recognized that low correlation coefficients do not necessarily imply absence of multicollinearity, a high coefficient suggests it may have been a problem. The model was estimated under alternative lags and consistently the same results were obtained.[25] Therefore, it appears the trend in concentration was primarily influenced by technological improvements and the shift in coal consumption toward large utility users.

Overall, these empirical results appear to be consistent with the intuitive findings in Chapter IV. A shortcoming of the model, however, is its apparent inability to explain the fall in concentration that began in 1972 and became more pronounced after the OPEC oil embargo in 1973-1974. This shortcoming may stem from the model's assumption that lagged prices rather than current or expected future prices influence

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[25]The model was estimated using as much as a 5 year lag in price.

entry decisions. The model does not consider the impact of optimistic expectations on the part of potential entrants during the 1970s nor pessimestic outlooks during the 1950s and 1960s.

Column (II) in Table XXXII presents regression results for the price equation. All variables were statistically significant at the 10 percent level or higher. The coefficient on concentration indicates that a 1 percent increase in the concentration index resulted in a .25 percent increase in the price index. The relatively high negative correlation coefficient between price and concentration previously mentioned was apparently misleading. Once the influence of other factors was taken into account the influence of concentration on price was positive. All other variables possess the expected signs with the exception of machinery and equipment costs. There is no apparent reason for the negative sign other than possible collinearity with the price of natural gas. Table XLII in the Appendix indicates a high correlation coefficient between the price of natural gas and machinery and equipment cost. Estimation of the price equation without natural gas price resulted in an insignificant coefficient on MC, only a slight drop in adjusted R^2, and a significant reduction in the standard error of the coefficient on MC. Hence, the negative sign on may have been the result of multicollinearity.[26]

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[26]Adjusted R^2 fell from .95 to .94 and the standard error of the coefficient decreased from .26 to .15. The standard errors of other coefficients were basically unaffected.

The Durbin-Watson statistic for the price equation was in the inconclusive range. Hence, one cannot reject the presence of first-order autocorrelation. Therefore, equation (6b) was estimated using the generalized least squares method assuming first-order autocorrelation. These results are presented in column (III) of Table XXXII. The results are somewhat different from those obtained from ordinary least squares. In particular, all of the t-values fell with exception of that for the price of oil. Furthermore, the coefficient on the four-firm concentration ratio became insignificant. The t-values for ULC*, P_g*, and MC* were all significant at the 6 percent level.

The empirical results presented above assumed the relationship between price and concentration was recursive. The model was also estimated simultaneously using two-stage least squares and the current index of coal prices rather than the lagged. These results are presented in Table XXXIII. Column (1) presents results for the concentration equation. These results are almost identical to those of the recursive model. Unit labor costs and the percentage of coal consumed by electric utilities were both significant at the 1 percent level. The coefficient on lagged price and current machinery costs were both insignificant.

Column (II) of Table XXXIII presents the two-stage least squares estimates of the price equation. These results are slightly different from those obtained from ordinary least squares estimation of the recursive model. Specifically, the t-value for concentration is substantially higher and that for natural gas is lower. However, the negative sign on MC

TABLE XXXIII

TWO-STAGE LEAST SQUARES ESTIMATION

	Dependent Variables			
	CR_t^* (I)	P_t^* (II)	CR_t^* (III)	P_t^* (IV)
Intercept	5.82 (8.74)[a]	-2.02 (1.22)	5.86 (8.74)[a]	-4.45 (3.53)[a]
P_t^*	-.05 (.31)	--	-.03 (.21)	--
MC_t^*	-.15 (1.00)	-.60 (2.07)[c]	-.15 (1.00)	-.30 (1.63)
ULC_t^*	-.50 (2.85)[a]	.68 (3.69)[a]	-.51 (2.92)[a]	.80 (3.96)[a]
PCE_t^*	.51 (5.44)[a]	--	.51 (5.34)[a]	--
CR_t^*	--	.50 (3.10)[a]	--	.64 (3.80)[a]
P_{ot}^*	--	.72 (5.05)[a]	--	.80 (5.66)[a]
P_{gt}^*	--	.18 (1.36)	--	--
$\bar{R}^2$	.94	.94	.94	.93
F-ratio	93.6[d]	75.3[d]	92.53[d]	74.84[d]
D.W.	1.79	1.87	1.80	1.77

[a] t-statistic is significant at 1 percent level.

[b] t-statistic is significant at 5 percent level.

[c] t-statistic is significant at 10 percent level.

[d] F-ratio is significant at 1 percent level.

remains. Columns (III) and (IV) provide the two-stage least squares estimates of the model with the price of natural gas excluded. Again, the index of machinery and equipment cost is insignificant when the price of gas is dropped from the price equation. Hence, in general, the original empirical results were not particularly sensitive to this alternative (fully simultaneous) specification.

Findings

The empirical results presented in the previous section identified two underlying causes for the rise in concentration. These were increased economies of scale resulting from capital embodied technological improvements and the shift in coal consumption toward large-scale utility consumers. The results indicate that the net effect of the former was to decrease price despite the fact that concentration rose. This finding may be demonstrated by examining the coefficients in Table XXXII and recalling equation (5) on page 173. Equation (5) indicated that a decline in unit labor cost may have two offsetting effects on price and efficiency. The indirect effect refers to the increase in price which results from a rise in concentration. This effect may be estimated by multiplying the coefficient on ULC^* in the concentration equation by the coefficient on CR* in the price equation. The coefficient on ULC^* indicates that a 1 percent rise in the ULC^* index causes a .59 percent rise in the concentration index. In turn, this .59 percent rise in CR^* causes a .25 percent times .59 percent rise in the price index. Hence, the indirect effect of a 1 percent decline in ULC^* is for the price index to rise by .15 percent. However, the direct effect of 1 percent

decline in ULC^* is a .44 percent decrease in the price index. Therefore, the net effect of a 1 percent decline in unit labor cost is an approximately .33 percent decline in the price index. Consequently, if one only considers the effect of concentration on price, $\frac{\partial P_t}{\partial CR_t}$, a distorted picture of economic efficiency emerges. One also has to consider the underlying causes of concentration and their impact on price and efficiency.

The effect of the rise in the percentage of coal consumed by utilities on economic efficiency is somewhat different from that of economies of scale. This effect can be seen by differentiating P_t in equation (4b), page 170, with respect to PCE_t.

$$\frac{dP_t}{dPCE_t} = \frac{\partial P_t}{\partial CR_t} \quad \frac{\partial CR_t}{\partial PCE_t} \tag{7}$$

The sign of $\frac{dP_t}{dPCE_t}$ is positive since both $\frac{\partial P_t}{\partial CR_t}$ and $\frac{\partial CR_t}{\partial PCE_t}$ were positive. However, the fact that $\frac{dP_t}{dPCE_t}$ is positive does not suggest anything with respect to economic efficiency. Such an inference would be very similar to saying that demand increases cause inefficiencies because price rises. The most likely explanations for the increase in PCE were that demand for energy rose and the demand for coal in non-utility sectors fell over the post-World War II period. To the extent that these factors caused PCE to rise, the subsequent rise in coal concentration was simply a response to changed demand conditions. Hence, one can not unequivocally state that the impact on efficiency was perverse.

A second finding was that rising capital cost did not significantly influence concentration. This finding is based upon the insignificance of MC* in the concentration equation in both the recursive model as well as the fully simulataneous model. It was emphasized in Chapters III and IV that the FTC's allegation of high entry barriers was based upon rising capital costs. The empirical results presented in this chapter are in conflict with that allegation. This might help explain why so many new firms entered the coal industry during the 1970s as coal prices rose. The insignificance of MC* also casts doubt upon the accuracy of the Commission's finding that no other outside firm besides Kennecott could be identified as a potential entrant. The doubt stems from an obvious difficulty in rationally formulating criteria to exclude most any firm as a potential entrant in an industry were entry barriers are low.

A third finding was that oil and natural gas prices had a significant influence on the price of coal. Although this finding is certainly subject to the criticism that the Nation does not constitute a meaningful geographic market delineation, the findings do suggest that if the FTC's geographic delineation is adopted then its exclusions of natural gas and oil from the product market appear to be economically unwarranted.

7. CONCLUSIONS

The most obvious conclusion of this chapter is that the preconditions upon which the Commision based its doctrine of potential

competition argument do not appear to have been satisfied. This conclusion generally confirms the descriptive analysis of Chapter IV. The acquisition of Peabody by Kennecott probably did not enhance market power nor, for that matter, efficiency in the coal industry. This conclusion is based upon the fact that the merger did not directly increase concentration nor did it likely generate cost savings. Moreover, the merger likely did not affect future concentration since entry barriers appear to be relatively low in the coal industry.

A second conclusion is that extreme caution should be exercised in proscribing a merger simply on the basis of a trend in concentration. Unfortunately, the economic theory of market structure has not advanced to the point where any relatively simple industry index such as concentration can be justifably substituted for detailed industry analysis of the relationships between concentration, costs, entry barriers, and efficiency.

CHAPTER VI

POST-LITIGATION--PRE-COMPLIANCE EVIDENCE

1. INTRODUCTION

Chapter I mentioned that a substantial amount of time elapsed between the Federal Trade Commission's decision to proscribe the merger and Kennecott's actual divestiture of Peabody.[1] An issue concerning post-litigation--pre-compliance evidence arose when Kennecott filed three post-hearing briefs with the Federal Trade Commission for the purpose of reopening the hearing to consider modification of the divestiture order. Kennecott's final brief was filed almost two years prior to its actual divestiture of Peabody.[2] In each instance the Commission denied these requests despite a substantial amount of evidence indicating two vital predictions made on the basis of pre-litigation evidence had turned out to be inaccurate. Each request for modification was denied by a three to two margin. A subsequent appeal to the Tenth Circuit Court of Appeals, whom had previously upheld the divestiture order, was also denied.[3]

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[1]The FTC over-ruled the hearing examiner and ordered divestiture on May 13, 1971. Kennecott complied to the divestiture order in June 1977, see Table I, p. 3.

[2]"In the Matter of Kennecott Copper Corporation," 84 Federal Trade Commission Decisions 92 (January 1, 1971 to June 30, 1971), pp. 92-95; "In the Matter of Kennecott Copper Corporation," 86 Federal Trade Commission Decisions 315 (July 1, 1975 to December 31, 1975), pp. 315-318; and "In the Matter of Kennecott Copper Corporation," 86 Federal Trade Commission Decisions 1105 (July 1, 1975 to December 31, 1975), pp. 1105-1107.

[3]Kennecott Copper Corporation v. Federal Trade Commission, Brief in Support of Motion for Modification, (10th Cir. 1975).

The primary purpose of this chapter is to examine the rationale behind the Commission's apparent reluctance to consider post-litigation--pre-compliance evidence in Kennecott. It is felt that this reluctance stems from a more general reluctance on the part of the judiciary to consider either procompetitive or competitively neutral post-acquisition evidence in Section 7 cases. Although there is a substantive difference between these two considerations the rationale behind this reluctance in each case is similar. The first section of this chapter will examine the post-litigation--pre-compliance evidence as it pertained to the predictions made by the Commission in Kennecott. The second section will analyze the key issues involved in the Commission's apparent reluctance to consider this type of evidence.

2. POST-LITIGATION--PRE-COMPLIANCE EVIDENCE IN KENNECOTT

The fact that the FTC's proscription of the Kennecott-Peabody merger was based upon two predictions concerning the future market structure of the coal industry has been emphasized throughout this study. First, the Commission predicted that the coal industry was trending toward tight oligopoly. This prediction was based upon a simple extrapolation of an upward trend in post-World War II concentration. Second, the Commission limited the number of potential entrants by predicting that oil companies, gas companies,

electric utilities, and several other firms holding coal reserves at the time of the hearing would not mine their reserves for commercial purposes. Both of these predictions were vital to the application of the doctrine of potential competition since the doctrine's invocation generally requires higher concentration than that which existed at the time of hearing and that the number of potential entrants be limited to a few. This fact was recognized by both the FTC and the Tenth Circuit Court of Appeals.[4] This section will examine the post-hearing--pre-compliance evidence as it pertains to these two predictions.

Concentration Prediction

Table XXXIV presents various production concentration ratios in the coal industry from 1954-1977. The Commission's prediction that the industry was trending toward tight oligopoly was based upon an upward trend in the pre-1969 ratios.[5] However, an examination of post-1968 concentration figures reveals a trend reversal beginning in 1970, one year prior to the FTC's divestiture order. In fact, all of the concentration ratios at the time of divestiture

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[4]"In the Matter of Kennecott Copper Corporation," 78 Federal Trade Commission Decisions 744 (January 1, 1971 to June 30, 1971), pp. 922, 944-945, and Kennecott Copper Corporation v. Federal Trade Commission, 467 F. 2d 67 (1972), pp. 75-77.

[5]"In the Matter of Kennecott Copper Corporation," 78, pp. 914.

TABLE XXXIV

COAL INDUSTRY PRODUCTION CONCENTRATION RATIOS, 1954-1977

Year	4-Firm	8-Firm	15-Firm	50-Firm	Production (Million Tons)
1954	15.8	23.6	32.3	54.0	392
1955	16.6	24.2	33.0	54.7	465
1956	18.2	26.1	35.1	55.9	500
1957	20.4	29.8	38.0	58.9	490
1958	19.1	28.2	37.5	59.5	405
1959	20.7	29.9	39.2	59.5	410
1960	21.5	30.6	39.8	60.2	413
1961	21.6	30.6	39.8	59.9	400
1962	22.2	31.1	40.6	60.5	423
1963	25.4	34.2	42.6	60.9	452
1964	27.0	37.0	45.6	62.8	482
1965	26.5	36.2	44.9	62.4	515
1966	27.5	37.3	47.1	63.7	535
1967	29.3	39.8	50.0	66.2	551
1968	30.3	40.7	52.2	68.6	545
1969	30.8	41.2	52.7	68.9	556
1970	30.2	40.7	52.3	67.4	596
1971	27.8	37.6	48.5	65.5	548
1972	30.2	39.9	51.1	67.7	590
1973	29.1	39.2	50.5	69.2	591
1974	27.2	37.6	46.6	65.5	601
1975	26.5	36.2	45.9	65.5	640
1976	25.1	34.3	44.6	64.5	665
1977	23.0	30.7	40.6	60.9	688

Source: Keystone Coal Industry Manual, U.S. Production by Company (New York: McGraw-Hill Mining Publications, annual).

in 1977 were approximately the same as those which existed in 1962. This trend reversal was clearly at odds with the Commission's 1971 prediction of higher future concentration.

The Commission also expressed concern over two additional aspects of concentration in the coal industry. First, there was a rise in the percentage of coal produced by firms whose annual production exceeded one million tons per year. This rise was accompanied by a slight fall in their number. Second, the Commission feared Peabody's access to Kennecott's "deep pocket" of financial resources would eventually entrench Peabody as the dominant firm in the coal industry.[6]

Tables XXXV and XXXVI provide pre-litigation as well as post-litigation evidence on the size distribution of firms in the coal industry from 1954-1977. Column (9) in Table XXXV indicates an increase in the number of firms in the one million tons per year class from 64 in 1968 to 87 in 1977. There was also an increase in the number of firms in each size classification with the exception of the smallest, with the largest increases in the 100-500 thousand tons per year classes. Moreover, there were 174 additional firms producing in excess of 100 thousand tons per year in 1977 than in 1968. In addition, the number of firms in these classes exceeded the number in any pre-litigation year by at least 165.

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[6]"In the Matter of Kennecott Copper Corporation," 78, pp. 914, 923-924.

TABLE XXXV

NUMBERS OF FIRMS IN VARIOUS SIZE CLASSIFICATIONS IN THE COAL INDUSTRY, 1954-1977

	Size Classifications (Thousand tons)								
(1) Year	(2) 50-100	(3) 100-200	(4) 200-500	(5) 500-1000	(6) 1000-3000	(7) Greater than 3000	(8)[a] T_1	(9)[b] T_2	(10)[c] T_3
1954	4437	119	134	57	47	22	379	69	4816
1955	4691	171	136	52	48	31	438	79	5129
1956	4853	197	146	59	46	30	478	76	5331
1957	4784	220	127	43	47	31	368	78	5252
1958	6956	178	126	47	38	27	416	65	7372
1959	6964	203	125	39	44	25	436	69	7400
1960	6994	176	139	34	41	25	415	66	7409
1961	7034	163	121	32	46	22	384	68	7418
1962	6497	172	127	40	40	26	405	66	6902
1963	6500	179	133	39	43	24	418	67	6918
1964	6440	233	128	51	51	21	484	72	6924
1965	6433	202	149	64	47	24	486	71	6919
1966	6438	201	162	60	46	26	495	72	6933
1967	4507	242	149	63	42	26	522	68	5029
1968	4411	243	152	54	39	25	513	64	4924
1969	4424	219	168	58	35	26	506	61	4930
1970	3386	224	182	57	45	24	532	69	3918
1971	3377	211	219	61	46	25	562	71	3939

TABLE XXXV (continued)

(1) Year	(2) 50-100	(3) 100-200	Size Classifications (Thousand tons) (4) 200-500	(5) 500-1000	(6) 1000-3000	(7) Greater than 3000	(8)[a] T_1	(9)[b] T_2	(10)[c] T_3
1972	3413	207	181	53	51	25	517	76	3930
1973	3398	212	184	53	49	31	529	80	3927
1974	3321	262	203	59	42	31	597	73	3918
1975	2299	279	176	69	46	35	605	81	2904
1976	2793	259	197	67	48	34	603	82	3396
1977	2801	319	212	69	51	36	687	87	3488

[a] T_1 is the total number of firms producing in excess of 100,000 tons annually.

[b] T_2 is the total number of firms producing in excess of 1,000,000 tons annually.

[c] T_3 is the total number of firms producing in excess of 50,000 tons annually.

Source: Keystone Coal Industry Manual, U.S. Production by Company (New York: McGraw-Hill Mining Publications, annual).

TABLE XXXVI

PERCENTAGE DISTRIBUTION OF COAL PRODUCTION BY FIRM SIZE, 1954-1977

	Size Classifications (Thousand tons)						
(1) Year	(2) 50-100	(3) 100-200	(4) 200-500	(5) 500-1000	(6) 1000-3000	(7) Greater than 3000	(8)[a] P_1
1954	15.52	4.19	10.51	10.40	21.39	37.99	59.38
1955	15.39	5.03	9.34	7.83	17.09	45.32	62.41
1956	13.86	5.45	9.09	8.47	16.23	46.90	63.13
1957	12.06	6.41	8.36	6.45	16.41	50.31	66.72
1957	11.76	6.13	9.18	8.54	15.85	48.54	64.39
1959	11.94	6.96	9.33	6.62	17.19	47.96	65.15
1960	12.45	6.09	10.14	6.04	16.46	48.82	65.28
1961	14.33	5.91	9.53	5.72	18.36	46.15	64.51
1962	13.73	5.85	9.29	6.12	15.04	49.96	65.01
1963	14.04	5.56	9.09	5.85	15.41	50.05	65.46
1964	9.48	6.73	8.18	7.10	18.12	50.39	68.51
1965	9.37	5.45	8.69	8.35	16.22	51.92	68.14
1966	9.13	5.31	9.23	7.39	14.09	54.85	68.94
1967	7.50	6.13	8.55	7.60	12.76	57.44	70.20
1968	7.22	6.04	8.44	6.73	11.98	59.59	71.57
1969	6.87	5.48	9.04	7.14	11.09	60.38	71.47
1970	6.23	5.43	9.60	6.43	13.32	58.99	72.31
1971	5.50	5.34	11.72	7.18	14.17	56.09	70.26
1972	5.14	4.92	9.50	5.84	15.51	59.09	74.06
1973	3.10	5.04	9.68	6.16	14.60	61.42	76.02
1974	5.47	6.15	10.76	6.77	13.05	57.80	70.85

TABLE XXXVI (continued)

(1) Year	(2) 50-100	(3) 100-200	Size Classifications (Thousand tons) (4) 200-500	(5) 500-1000	(6) 1000-3000	(7) Greater than 3000	(8) P_1[a]
1975	5.85	5.84	8.28	7.42	12.96	59.65	72.61
1976	7.43	5.39	8.83	6.82	12.94	58.59	71.53
1977	8.27	6.51	9.28	7.06	12.77	56.11	68.88

[a] P_1 is the percentage of coal produced by firms wgise oridyctuib exceeded one million tons.

Source: Keystone Coal Industry Manual, U.S. Production by Company (New York: McGraw-Hill Mining Publications, annual).

Although it is difficult to document given a dearth of ownership information on firms in the smallest category, it is likely that their declining numbers can be attributed to either increased production moving them into higher production classes, horizontal acquisitions by larger firms, or the particularly adverse effects of more strigent health and safety standards on smaller firms.[7] In any event, the fact that there were more firms in the larger classes suggests an increase in the degree of competition despite the decreased number of smaller firms.

Table XXXVI presents the corresponding percentage of total coal production of firms in the various size classifications in Table XXXV. The table indicates that, to the extent there was a change in the percentage of coal produced by various sized firms, this change was in the opposite direction from that predicted by the Commission. The largest increase was in the smallest classification and the largest decline was in the largest size classification, despite a decrease in the number of firms in the smallest size class and an increase in the number of firms in the largest size class.

In terms of the feared domination of the coal industry by Kennecott, Table XXXVII reveals that Peabody's share remained stable

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[7]The Keystone Coal Industry Manual lists only the names of companies producing in excess of 100 thousand tons annually. Only aggregate production data are available for firms producing between 50 thousand and 100 thousand tons per year.

TABLE XXXVII

PEABODY'S PRODUCTION AND SHARE OF PRODUCTION, 1954-1977

Year	Peabody's Production (Million tons)	Peabody's Share of Total Production	Peabody's Rank
1954	7.0	2%	8
1955	13.7	3%	3
1956	21.7	4%	3
1957	23.2	5%	2
1958	22.2	5%	2
1959	25.7	6%	2
1960	28.7	7%	2
1961	29.6	7%	1
1962	32.7	8%	2
1963	39.2	8%	2
1964	46.7	10%	1
1965	49.1	10%	1
1966	54.0	10%	1
1967	59.4	11%	1
1968	59.8	11%	2
1969	60.9	11%	2
1970	67.9	11%	1
1971	56.0	10%	1
1972	71.6	12%	1
1973	69.9	12%	1
1974	68.1	11%	1
1975	73.1	11%	1
1976	70.5	11%	1
1977	65.4	10%	1

Source: Keystone Coal Industry Manual, U.S. Production by Company (New York: McGraw-Hill Mining Publications, annual).

throughout the period falling slightly from 11 percent to 10 percent. Moreover, Peabody held only 3.6 percent of total recoverable reserves in 1974.[8] Hence, neither the size distribution changes nor the predicted domination of the industry by Kennecott-Peabody had manifested themselves by the time of compliance.

Future Entry Prediction

The Commission's second important prediction was that several firms holding substantial quantities of coal reserves at the time of acquisition would not enter the commerical segment of the coal industry. Specifically, oil and gas companies were the primary exclusions as potential entrants. The Commission stated that these companies ". . . are primarily interested in acquiring coal reserves for synthetic fuels and the sale of coal is a secondary objective."[9] It was on this premise that the Commission surmissed that Kennecott was the "most likely entrant" and concluded: "The hearing record

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[8]This figure was submitted by Exxon Corporation to a Subcommittee of the House Judiciary Committee on September 11, 1975. Peabody ranked fourth behind Continental Oil Company, Union Pacific Railroad, and Burlington Northern Railroad. The figure was cited in Kennecott's Brief in Support of Motion for Modification, p. 17, and appears to be consistent with two estimates of four-firm uncommitted reserve concentration in an FTC's study, see Federal Trade Commission, Bureau of Economics, The Structure of the Nation's Coal Industry 1964-1974 (Washington: U.S. Government Printing Office, November 1978), p. 94.

[9]467 F.2d 67 (1972), p. 77.

was devoid of evidence to show that there were any other potential entrants possessing the necessary financial resources to build a substantial coal business"[10] Hence, the removal of Kennecott as a perceived potential entrant would substantially lessen competition in the coal industry. This prediction as to the "primary" interests of oil and gas companies was made despite the fact that oil and gas affiliated coal producers accounted 44.6 percent of total production of the ten leading producers in 1968.[11] Moreover, Consolidation Coal Company, the leading coal producer in 1968 and 1969, was owned by Continental Oil Company, a major oil and natural gas producer.[12] At the time of Kennecott's second post-trial brief in 1975 not a single company had mined coal for synthetic fuels purposes, although many were producing substantial quantities of coal for commercial purposes.[13] In fact, 20 percent of the coal production in 1975 was produced by firms who were not producing coal, or only negligibly so, at the time of litigation.[14]

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[10]Ibid.

[11]Keystone Coal Industry Manual, U.S. Production by Company, 1967 (New York: McGraw-Hill, Inc., 1968), p. 4. Consolidation, Island Creek, Eastern, and Old Ben were top ten coal companies and owned by Continental Oil Company, Occidental Petroleum Corporation, Eastern Gas and Fuel Associates, and Standard Oil Company of Ohio, respectively.

[12]Continental ranked 12th in crude oil production and 13th in natural gas production in 1970, see Federal Trade Commission, Bureau of Economics, Concentration Levels and Trends in the Energy Sector of the U.S. Economy (Washington: U.S. Government Printing Office, March 1974), p. 400.

[13]Brief In Support for Modification, p. 14.

[14]Ibid., p. 9.

Table XXXVIII lists those firms whose production exceeded one million tons of coal in 1977 and the industry affiliation of their parent companies. The table includes eleven companies whose primary industry affiliation was in oil. Moreover, the table actually understates the involvement of oil companies because some coal firms' parent affiliations are listed as something other than oil yet there is some oil ownership of the coal firm.[15] The table also includes several public utilities excluded by the FTC. Several of these utilities were involved in the commercial sale of coal. For example; NERCO, Texas Utilities, and Washington Irrigation and Development Company each listed 50 percent or less of their 1977 production as captive.[16] Thus, many companies excluded by the FTC as having little commercial interest in the coal industry were among the leading producers by 1977.

Table XXXIX presents perhaps a clearer picture of the types of firms most likely to be substantial producers of coal in the future.

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[15]The source of this information is the Keystone Coal Industry Manual. In most cases the manual only specifies the industry affiliation of the parent company with controlling interest in the coal firm. The only specific industry affiliation classifications are coal, utility, steel, oil, and chemical. All others are designated as "other". Thus, the classification scheme does not consider all coal firms that are partially owned by oil companies. An example is Westmoreland Resources. Westmoreland is classified as "other", but is partially owned by Kewannee Industries. Kewannee Industries owns Kewannee Oil Company. Therefore, the classification scheme does not take into account the fact that Westmoreland's ownership includes some oil interest.

[16]Keystone Coal Industrial Manual, U.S. Production by Company, 1977 (New York: McGraw-Hill Mining Publications, 1978), pp. 8-40.

TABLE XXXVIII

COAL FIRMS WITH ANNUAL PRODUCTION OF ONE MILLION TONS OR MORE IN 1977

Coal Operating Group	Parent Company	Industry Affiliation	Total Production (Million tons)
Peabody Coal Company	Peabody Holding Company	Other	65.4
Consolidation Coal Company	Continental Oil Company	Oil	48.0
AMAX Coal Company	AMAX, Inc.	Metal	28.1
Island Creek Coal Company	Occidental Petroleum Corp.	Oil	16.7
Pittson Company	Pittson Company	Other	14.3
U.S. Steel Corp.	U.S. Steep Corp.	Steel	14.0
Arch Mineral Corp.	Ashland Oil Company	Oil	12.6
NERCO	NERCO	Utility	12.1
Texas Utilities	Texas Utilities	Utility	12.0
Bethlehem Mines Corp.	Bethlehem Steel Company	Steel	10.6
Peter Kiewit Sons Mining Division	Peter Kiewit Sons Co.	Other	10.3
Central Ohio Coal Company	American Electric Power Service Corp.	Utility	10.2
Western Energy Company	Montana Power Company	Utility	9.8
Old Ben Coal Company	Sohio Petroleum Company	Oil	9.7
North American Coal Corp.	North American Coal Corp.	Coal	8.9
Pittsburg and Midway Coal Mining Co.	Gulf Oil Company	Oil	8.2
Utah International Inc.	General Electric Company	Metal	6.9
Freeman-United Coal Mining Co.	General Dynamics Corp.	Other	6.7
Eastern Associated Coal Company	Eastern Gas and Fuel Ass.	Other	6.7

TABLE XXXVIII (continued)

Coal Operating Group	Parent Company	Industry Affiliation	Total Production (Million tons)
Westmoreland Coal Company	Gulf Resources and Chemical Company	Chemical	5.5
Rochester and Pittsburg Coal Company	Rochester and Pittsburg Coal	Coal	5.3
Falcon Coal Co., Inc.	Falcon Seaboard, Inc.	Other	5.2
Washington Irrigation and Development Company	Pacific Power and Light Washington Water Power	Utility	5.0
Knife River Coal Company	Montana Dakota Utility Company	Utility	4.7
Zeigler Coal Company	Houston Natural Gas Corp.	Other	4.7
Drummond Coal Company	Drummond Company	Other	4.6
Westmoreland Resources	Westmoreland Coal Co., Penn-Vir. Corp. Morrison-Knudsen Co., Kewannee Industries	Other	4.5
Mapco, Inc.	Mapco, Inc.	Coal	4.5
Kemmerer Coal Company	Lincoln Corp.	Coal	4.4
Energy Fuels Corp.	N.R.[a]	N.R.	3.9
Monterey Coal Company	Exxon Corp.	Oil	3.7
Alabama By-Products Corp.	Alabama By-Products Corp.	Other	3.6
Rand F. Coal Company	Shell Oil Corp.	Oil	3.3
Virginia Iron Coal & Coke Co.	Bates Mfg. Co., Inc.	Other	3.1
Valley Camp Coal Company	Quaker State Oil Refining Corp.	Oil	3.1
Republic Steel Corp.	Republic Steel Corp.	Steel	3.0
Pennsylvania MInes Corp.	Pennsylvania Light and Power	Utility	2.8
American Industries & Rs. Corp.	American Industries and Res. Corp.	Other	2.7
Armco Steel Corp. Mining Div.	Armco Steel Corp.	Steel	2.5

TABLE XXXVIII (continued)

Coal Operating Group	Parent Company	Industry Affiliation	Total Production (Million tons)
National Mines Corp.	National Steel Corp.	Steel	2.5
Midland Coal Co.	ASARCO, Inc.	Other	2.4
Martin County Coal Corp.	St. Joe Minerals, Inc.	Other	2.4
Western Coal Corp.	Public Service Co. of New Mexico, Tucson Gase and Electric Company	Utility	2.2
Baukol-Noonan, Inc.	Baukol-Noonan, Inc.	Coal	2.2
Jones and Langlin Steel Corp.	LTV Corp.	Steel	2.2
Benjamin Coal Co.	Benjamin Coal Co.	Coal	2.2
Sunoco Energy Development Co.	Sun Oil Corp.	Oil	2.1
American Coal Co.	Utah Power and Light	Utility	2.1
Kaneb Services, Inc.	Kaneb Services, Inc.	Other	2.1
Lykes Resources, Inc.	Lykes-Youngstown Corp.	Steel	2.0
Blue Diamond Coal Company	Blue Diamond Coal Company	Coal	2.0
Carbin Fuel Company	ITT Corp.	Other	1.9
Eastover Mining Company	Duke Power Company	Utility	1.9
Cannelton Coal Company	Algoma Steel Corp. Ltd.	Steel	1.9
Bridger Coal Company	NERCO and Idaho Power Company	Utility	1.9
Pyro Mining Company	N.R.	N.R.	1.8
Addington Brothers Mining, Inc.	Ashland Oil Co.	Oil	1.8
Barnes and Tucker Company	Alcoa Standard Corp.	Chemical	1.7
Youghiogheny and Ohio Coal Company	Panhandle Eastern Pipeline Co.	N.R.	1.7
M.F. Fetterold Coal Co., Inc.	Cerro-Marmon	Metal	1.7
Sahara Coal Company	Sahara Coal Co.	Coal	1.6
Mountain Drive Coal Company	Mountain Drive Coal Company	Steel	1.6

TABLE XXXVIII (continued)

Coal Operating Group	Parent Company	Industry Affiliation	Total Production (Million tons)
Zapata Coal Corp.	Zapata Corp.	N.R.	1.6
Sovereign Coal Corp.	Sovereign Pocahontas Coal Company	Coal	1.6
Kaiser Steel Corp.	Kaiser Steel Corp.	Steel	1.5
Green Coal Company	N.R.	N.R.	1.5
Brown Badgett, Inc.	Natomas Company	Oil	1.5
Rapaco Energy Corp.	N.R.	N.R.	1.5
Bradford Coal Company, Inc.	Bradford Coal Co., Inc.	Coal	1.4
Energy Development Company	Iowa Public Service Company	Utility	1.4
Cimmaron Coal Company	Cimmaron Coal Corp.	Coal	1.4
Amherst Coal Company	Amherst Coal Company	Coal	1.4
Coastal States Energy Company	Coastal States Gas Corp.	N.R.	1.3
South-East Coal Company, Inc.	South-East Coal Company, Inc.	N.R.	1.4
General Energy Corp.	General Energy Corp.	N.R.	1.3
King Knob Coal Co.	King Knob Coal Co.	Coal	1.2
Shamrock Coal Co.	Jewell Coal and Coke Co.	Coal	1.2
Cherokee Coal Co.	N.R.	N.R.	1.2
Marietta Coal Co.	N.R.	N.R.	1.1
Barbour Coal Co.	Barbour Coal Co.	Coal	1.1
Paramount Mining Corp.	Barber-Paramount Coal Co.	Coal	1.1
Ohio River Collieries Co.	N.R.	N.R.	1.1
South Hopkins Coal Co.	N.R.	N.R.	1.3

TABLE XXXVIII (continued)

Coal Operating Group	Parent Company	Industry Affiliation	Total Production (Million tons)
River Processing Inc.	Pargas, Inc.	N.R.	1.0
Resource Exploration and Mining Co.	N.R.	N.R.	1.0

[a]N.R. = not reported.

Source: Keystone Coal Industry Manual, U.S. Production by Company, 1977 (New York: McGraw-Hill Mining Publications, 1978).

TABLE XXXIX

OWNERSHIP OF MAJOR COAL MINES OPENED BETWEEN 1968 AND 1976

Company	1977 Production (Millions tons)	Rank in Top 50	Parent Company Affiliation	Date Opened
AMAX Coal Company	13.3	1	Metals	1972
Decker Coal Company	10.4	2	Utility	1972
Western Energy Company	9.8	3	Utility	1968
Peabody Coal Company	6.9	5	Metals	1974
Bridger Coal Company	5.4	6	Utility	1973
Washington Irrigation and Development Co.	5.0	7	Utility	1970
Westmoreland Resources	4.5	8	Other	1974
Peabody Coal Company	4.4	10	Metals	1970
Arch Minerals Corp.	2.8	22	Oil	1975
Arch Minerals Corp.	2.8	23	Oil	1971
Monterey Coal Company	2.5	25	Oil	1970
Old Ben Coal Company	2.4	27	Oil	1975
Peabody Coal Company	2.4	30	Metals	1970
Peabody Coal Company	2.3	31	Metals	1970
AMAX Coal Company	2.3	32	Metals	1971
Arch Minerals Corp.	2.3	33	Oil	1971
Island Creek Company	2.2	36	Oil	1972
Western Coal Company	2.2	37	Utility	1974
Sunedco Coal Company	2.1	39	Oil	1976
AMAX Coal Company	2.1	40	Metals	1969
Consolidation Coal Company	2.0	44	Oil	1973
Peabody Coal Company	2.0	45	Metals	1971
Peabody Coal Company	1.9	48	Metals	1971

Source: Keystone Coal Industry Manual, U.S. Production by Company, 1977 (New York: McGraw-Hill Mining Publications, 1978).

The list includes companies along with their primary industry affiliation that opened new mines which were listed in the Keystone Coal Industry Manual as being among the 50 largest coal mines in 1977. The table reveals that six different oil companies opened eight new mines during the 1968-1976 period. Several of these companies were not actively producing coal in 1968.

Furthermore, Table XL lists a few of the major new entrants in the coal industry between 1969 and 1975 along with their amount of added or announced capacity.[17] Several of these companies had already signed long-term contracts with electric utilities even though they had not begun production.[18] These firms' total capacity was slightly over three times as great as Peabody's 1975 production. A casual glance at the list reveals that a variety of firms from various industries had either entered or planned to enter the coal industry prior to Kennecott's compliance with the divestiture order.

Critique of Predictions

The post-litigation evidence on concentration and new entry into the coal industry indicates that the two fundamental predic-

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[17] In Kennecott's Brief in Support of Motion for Modification some fifty actual and potential entrants were identified on the basis of a sworn affidavit by Leonard B. Rahn. The information was taken from company annual reports and filings with the securities and Exchange Commission. This list only contains the major new entrants.

[18] A couple of major utilities that had formerly produced only captive coal are on this list. Montana Power as well as Pacific Power and Light had each announced long-term contracts of approximately 13 million tons per year by 1975.

TABLE XL

SUBSTANTIAL NEW ENTRANTS INTO THE COAL INDUSTRY, 1969-1975

Company	Capacity added or announced (Million tons)
AMAX	41
Arch Minerals	22
Atlantic Richfield	20
Exxon	20
Falcon Seaboard	4
W. R. Grace	4
Gulf Resources	2
Houston Natural Gas	5
Kerr-McGee	14
Kewanee Oil and Others	6
McCulloch Oil	7
Mapco	5
Montana Power	13
Moore McCormack	5
Pacific Power and Light	13
Shell Oil	8
Sun Oil	6
Union Pacific	7
Jim Walter	7
Total	209

Source: Kennecott Copper Corporation v. Federal Trade Commission, Brief In Support of Motion for Modification, (10th Cir. 1975), p. 15.

tions upon which the Commission based its potential competition case turned out to be grossly inaccurate. Both predictions were vital to the application of the doctrine and were proven wrong by the post-litigation evidence. As mentioned in Chapter IV, Kennecott was distinctive because the necessary precondition of relatively high concentration was not present at the time of acquisition. The sole basis for high concentration was the prediction. Furthermore, the Commission satisfied the third precondition of limited number of potential entrants only by excluding a relatively large number of firms who later entered the industry. The case was somewhat unusual from other potential competition cases because some of the potential entrants who later entered the industry were actually specified in name by an expert economic witness for Kennecott.[19] Nevertheless, the Commission refused to reopen the case for the limited purpose of considering modification of the divestiture order. The next section will examine the rationale behind the Commission's reluctance to modify its divestiture order on the basis of this later evidence.

3. POST-ACQUISITION EVIDENCE AND SECTION 7

The evidence presented in the above section indicated that over the period of judicial review the structure of the coal industry

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[19]For example, Sun Oil, Kerr-McGee, Atlantic Richfield, and Shell Oil were all named at the hearing as potential entrants. There were several others who are not listed in Table XL, but were mentioned at the hearing who also entered. See "In the Matter of Kennecott Copper Corporation," 78, pp. 804-808," and Keystone Coal Industry Manual, 1977, pp. 38-40.

never exhibited the anticompetitive proclivities predicted by the Commission in 1971. Subsequent events resulted in structural changes that certainly cast doubt upon whatever credibility one could have placed upon the Commission's assertion that Kennecott's acquisition of Peabody would lessen competition by removing the most likely potential entrant.

One may consider two possibilities as to why the Commission's prediction of tight oligopoly turned out to be inaccurate. One possibility is that the Commission erred in its initial assessment of the merger's probable effect on competition because its structural analysis of the coal industry was incorrect. This possibility was explored in some detail in Chapter IV and Chapter V. That analysis suggested the Commission's production concentration prediction was flawed in two respects. Neither the Commission's use of production concentration as an indicator of future market power nor its simple extrapolation of concentration in a declining industry have substantial support in economic theory. Furthermore, the Commission's exclusion of a large number of coal reserve holders on the basis of "primary" and "secondary" objectives was also unjustified on economic grounds. One may have interpreted the subsequent fall in production concentraton and new entry on the part of excluded potential entrants as evidence of an incorrect initial probability assessment in 1971.

A second possibility is that the Commission's initial assessment of the merger's probable effect was correct at the time it was formulated. That is, both the Commission's finding that the merger would likely lessen competition as well as its order requiring divestiture were completely justified on the basis of evidence available at the time of acquisition. However, subsequent events such as the 1973 OPEC oil embargo resulted in significant changes in basic demand and supply conditions which completely offset the anti-competitive effect of the merger. In this case, the probable effect of the merger never manifested itself into an actual lessening of competition because of the impact of these exogenous changes on industry structure. This possibility concedes that barriers to entry may have been substantial and Kennecott may have been the most likely potential entrant at the time of trial, but the magnitude of subsequent events was such that entry barriers were overcome and new firms entered the industry on a large scale.

Both of these views are entirely consistent with the economic theory of market structure. That theory posits that changes in basic demand and supply conditions are primary determinants of changes in industry structure. Although in both cases industry structure was influenced by unforeseeable events, in neither did the structure of the coal industry ever remotely resemble that which one typically associates with non-competitive conduct and performance. In the former case, the initial probability of a lessening of

competition was simply incorrectly assessed at the time of acquisition. In the latter case, the initial probability was correctly assessed at the time of acquisition, however, the probability of anticompetitive effects decreased substantially as a result of subsequent events.

A review of the judiciary's judicial treatment of post-acquisition evidence reveals that in neither of the above cases is it likely that either the FTC or the courts will reverse a decision by validating a merger or modifying a divesture order strictly on the basis of post-acquisition evidence. This finding applies not only to cases such as Kennecott where the acquisition and litigation periods were only a couple of years apart, but also applies to cases where there has been a substantial amount of time between acquisition and litigation. However, if anticompetitive post-acquisition evidence is found, then that evidence is almost certain to be used as a basis for either proscribing a merger or reopening a case which had been previously litigated. One must review the judicial history of post-acquisition evidence in order to understand this treatment.

Legislative Intent

The primary objective of Section 7 is to proscribe those mergers whose effects ". . . may be to substantially lessen competition, . . . or tend to create monopoly . . . ."[20] Both the statute's language

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[20] 38 Stat. 731, 15 U.S.C. 18 (1946ed).

as well as its legislative history clearly indicate that Congressional intent was to thwart monopoly trends in their incipient stages.[21] The primary reason for Congressional focus upon incipiency was the apparent inability of the Sherman Act to deal with anticompetitive conduct and performance in highly concentrated industries prior to an actual lessening of competition. Moreover, it was found to be virtually impossible to restore competitive conditions to what they might have been had it not been for the cumulative structural effects mergers may have on overall industry competitiveness. In other words, since diminished competition may occur over time, and any one particular merger may in and of itself not be considered offensive because of its relatively small impact on structure, it is desirable from an antitrust standpoint to take dynamic structural changes into account when evaluating the effects of a particular merger. Hence, one considers industry structure in both a dynamic as well as a comparative static sense when evaluating a merger's probable effect on competition. Consequently, Section 7 is intended to prevent harm to competition by proscribing those mergers whose "probable" effect will be to lessen competition rather than those

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[21]See Robert P. Krauss, "Postacqusition Evidence and Section 7 of the Clayton Act: A Study in Judicial Legislation," University of Cincinnati Law Review 36 (1967), p. 434-435.

whose "actual" effect is to lessen competition. The latter mergers are considered under the purview of the Sherman Act.

Although Section 7 is clear in terms of its preventive nature, two related difficulties have evolved with respect to its implementation. First, the statute does not specify what constitutes a sufficient "lessening" or "tendency" for its invocation. Second, the statute does not specify the exact time at which a merger's probable effect on competition must be assessed. Thus, the judiciary has been left with little statutory guidance in establishing standards for either of these elements of implementation other than the fact that whatever standards are adopted must consider the incipient or preventive intent of the statute.

Pre-DuPont Treatment

The formulation of consistent standards governing the admissibility and weight to be attached to post-acquisition evidence has been difficult. This difficulty stems from the fact that the probability of a merger lessening competition may depend upon the time period at which that probability is assessed. The question of what point in time is appropriate to assess the probable effects is a central issue in the debate over the admissibility of post-acquisition evidence in Section 7 cases. The question naturally arises in cases where the probability of a merger lessening competition at the time of acquisition differs qualitiatively from that which could be assessed at a subsequent point in time considering post-acquisition along with pre-acquisition evidence. Since neither a critical

level of probability nor a specific time at which this probability is to be assessed was clearly specified in Section 7, the courts have been confronted with a dilemma in cases were these probabilities diverge qualitatively. Consequently, a variance of opinions has evolved over the issue, and inconsistencies permeate its judicial application.

Post-acquisition evidence first became an issue within the context of Section 7 in the Supreme Court's Du Pont decision.[22] The Court found Du Pont's acquisition of General Motors' stock over the 1917-1920 period violated Section 7 by foreclosing a substantial portion of the automotive finishes and fabrics market to Du Pont's competitors. The Department of Justice's complaint was issued in 1949. The complaint was based upon approximately thirty years of post-acquisition evidence. Du Pont was significant because the Court's treatment of post-acquisition evidence vastly enlarged the scope of Section 7 by permitting the Department of Justice and the Federal Trade Commission to admit post-acquisition evidence. This "backward sweep" extension of Section 7 allows antitrust authorities to attack acquisitions which might not have been considered illegal at the time they were consummated, so long as some causal

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[22] United States v. E. I. du Pont de Nemours and Co., 353 U.S. 586 (1957).

relationship can be established between the acquisition and a probable future anticompetitive effect.[23]

Prior to Du Pont, the traditional view was that Section 7 violations were to be established on the basis of pre-acquisition evidence. This is based upon the language of Section 7 which reads:

> That no corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital of another corporation engaged also in commerce where the effect of such acquisition may be to substantially lessen competition between the two firms or to restrain such commerce in any section or community or tend to create a monopoly of any line of commerce,

as well as the stated purpose of the Clayton Act which was to thwart monopoly in its incipient stages.[24] The traditional view of "incipiency" referred to the time at which the acquisition was consummated. Consequently, it was felt that violations were to be based upon the probability that a merger will lessen competition at the time of acquisition. Subsequent evidence was believed to have no value whatsoever in Section 7 cases since the fact that a future event actually occurs has no bearing on the probability that it was likely to occur. Viewed from this perspective, the probability assessment at the time of acquisition is all that matters.

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[23]ABA Antitrust Section Subcommittee on Section 7, "The Backward Sweep Theory and the Oligopoly Problem," Antitrust Law Journal 32 (1967), p. 309.

[24]Senate Report No. 698, to accompany H.R. 15,657, 63rd Cong., 2nd sess., 1914, p. 1.

The majority opinion in Du Pont attached a somewhat different meaning to "incipiency". Justice Brennan, expressing the majority's opinion, stated:

> Incipiency in this context denotes not the time the stock was acquired, but any time when the acquisition to ripen into a prohibited effect. . . To accomplish the congressional aim, the Government may proceed at any time that an acquisition may be said with reasonable probability to contain a threat that it may lead to a restraint of commerce or tend to create a monopoly of a line of commerce.[25]

Thus, the majority flatly rejected the notion that Section 7 contained a "statute of limitations," and thus broadened its scope to include any period at which a merger may pose a threat to competition. In so doing, the Court established a precedent that Section 7 violations may be found at the time of suit on the basis of all available evidence up to that time. Du Pont had apparently shifted the reference point from which Section 7 probabilities were to be assessed from a strict adherence to the time of acquisition standard to one which permits an assessment at any time competition is threatened.

Justice Burton, however, did not agree with the time of suit standard adopted by the majority. Although Burton agreeded Du-Pont's acquisition violated Section 7, he did not accept the majority's opinion that a Section 7 violation can be assessed at the time of suit as opposed to the time of acquisition. Burton was willing

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[25]353 U.S. 586 (1957), p. 597.

to accept post-acquisition evidence only to the extent that it could be used to establish that in fact a violation had occurred at the time of acquisition. Burton felt Section 7 required probable effects to be assessed at the time of acquisition, but that post-acquisition evidence may be used to ". . . support an inference that such effects were reasonably probable at the time of acquisition."[26]

As noted by Krauss, the distinction between Burton's view and the view of the majority is largely metaphysical.[27] It is difficult to see how a probability assessed at the time of suit on the basis of all available evidence will differ fundamentally from one assessed at the time of acquisition and revised with respect to its reasonableness on the basis of post-acquisition evidence. The same evidence is used in both cases either to formulate or revise the probability of competitive damage. While a substantive distinction may be drawn with respect to the statute, it is basically a distinction without a difference in terms of assessing the probable effects of an acquisition. The distinction being the designated time at which a violation occurs.

Post-DuPont Treatment

Although Du Pont clearly established the admissibility of post-acquisition evidence, there remained a question concerning the weight to be attached to it. In some cases probative weight was attached

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[26]Ibid., p. 625

[27]Krauss, p. 438.

to the evidence while in others little or no weight was attached. In order to distinguish between these cases, one must first classify post-acquisition as either being anticompetitive, competitively neutral, or procompetitive. As will become apparent, the weight attached to post-acquisition evidence depends upon its respective classification.

Anticompetitive post-acquisition evidence. The judiciary has generally attached considerable weight to anticompetitive post-acquisition evidence. In Reynolds Metals, an FTC complaint alleged Reynolds' acquisition of Arrow Brands violated Section 7 because Arrow's access to Reynolds' financial strength gave it a potential advantage over Arrow's smaller competitors in the retail florist industry.[28] Upon appeal, an appellant court attached significant weight to the fact that Arrow's market share had risen relative to five of its seven competitors during the post-acquisition period. The appellant court's attitude toward the informational content of this evidence was indicated in its statement:

> . . . [T]he truer picture of anticompetitive effects emerges from even the most cursory consideration of the post-acquisition competitive postures. . . It is sufficient if the Commission shows the acquisition had the potentiality to lessen competition. . . But the Commission on substantial evidence has additionally provided us with a finding of actual anticompetitive effects. . . The necessary probability of anticompetitive has thus been shown."[29]

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[28] Reynolds Metals Co. v. F.T.C., 309 F. 2d 223 (1962).

[29] Ibid., pp. 229-230.

Similarly, in Von's Grocery the Supreme Court attached significant weight to the informational content of post-acquisiton evidence in proscribing a merger between Von's Grocery and Shopping Bag.[30] The Department of Justice's complaint was based upon a trend toward fewer independent retail grocery stores in the Los Angeles market. In justifying its proscription, the Court concluded:

> . . .[M]ergers in the Los Angeles retail market have continued at a rapid rate since the merger. These facts alone are enough to cause us to conclude . . . that the Von's-Shopping Bag merger did violate Section 7.[31]

Hence, in both Reynolds Metals and Von's Grocery the judiciary attached a substantial weight to the informational content of post-acquisition evidence in predicting the competitive effects of the mergers.

Competitively neutral post-acquisition evidence. In contrast, the judiciary has expressed a general reluctance to consider post-acquisition evidence in either initially assessing the probable effects or revising a prediction in light of latter evidence when such evidence points to competitive neutrality or procompetition. In fact, as noted by Horowitz, the judiciary has taken a more cordial view

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[30] U.S. v. Von's Grocery Co., 384 U.S. 270 (1966).

[31] Ibid., 274.

toward competitively neutral post-acquisition than than toward procompetitive evidence.[32] In Phillips Petroleum, the Court stated: "While post-acquisition evidence is relevant in determining whether a merger violates Section 7, it must not be given conclusive weight or allowed to over-ride all probabilities."[33] Similarly, the Court found competitively neutral post-acquisition evidence in General Foods to be ". . . inconclusive and susceptible of diverse inferences. . . and certainly does not compel the conclusion that the market will become competitive."[34] Thus, the informational content of competitively neutral post-acquisition evidence is not considered as great as that of anticompetitive evidence. Evidently the Court feels the "truer picture" is either fuzzy or not yet developed when the evidence points to neutrality.

Procompetitive post-acquisition evidence. In stark contrast to anticompetitive post-acquisition evidence, the judiciary has been extremely reluctant to either validate a merger or modify a divestiture order strictly on the basis of evidence indicating the post-acquisition status of competition may be greater than the pre-acquisition status. In Consolidated Foods, an appellant court overturned an FTC divestiture order on the basis of ten years of

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[32]Ira Horowitz, "A Baynesian View of Post-Acquisition Evidence and Antitrust," Antitrust Bulletin 22 (Winter 1977), p. 762.

[33]U.S. v. Phillips Petroleum Co., 367 F. Supp. 1226 (1973), p. 1260.

[34]General Foods Corp. v. F.T.C., 386 F. 2d 936 (1967), p. 946.

procompetive evidence.[35] The appellant court, espousing what it perceived as the Du Pont doctrine of post-acquisition evidence, concluded:

> Probability can best be gauged by what the past has taught. We are convinced that the Commission has mistakenly rejected what the record demonstrates as to the past in favor of a future probability based upon conjecture and speculation.[36]

In rebuking and reversing the appellant court, the Supreme Court attenpted clarified its position on post-acquisition evidence by drawing a distinction between post-acquisition--pre-violation evidence and post-acquisition--post-violation evidence:

> The Court of Appeals was not in error in considering the post-acquisition evidence in this case. . . No group acquiring a company with reciprocal buying opportunities is entitled to a "free trial" period. To give it such would be to distort the scheme of Section 7. . . If the post-acquisition evidence were given conclusive weights or allowed to over-ride all probabilities, then acquisition would go forward willy-nilly, the parties biding their time until reciprocity was allowed fully to bloom. It is, of course, true that post-acquisition conduct may amount to a violation of Section 7 even though there is no evidence to establish probability in limine. . . But the force of Section 7 is still in probabilities not in what later expired. That must necessarily be the case, for once two companies are united no one knows what the fate of the acquired company and its competitors would have been but for the merger.[37]

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[35] F.T.C. v. Consolidated Foods Corp., 329 F. 2d 623 (1964).

[36] Ibid., p. 627.

[37] F.T.C. v. Consolidated Foods Corp., 380 U.S. 592 (1965).

In essence, the Supreme Court's position is that if a violation can be found at the time of acquisition then post-acquisition evidence is irrelevant. However, if a violation is not found at the time of acquisition then post-acquisition evidence may be used to establish one at a later date.

The Court again expressed its apprehension toward procompetitive post-acquisition evidence in General Telephone.[38] The Court reiterated its previous stance by stating:

> . . . [E]ven if the evidence might show that competition may have remained vigorous after the acquisition, the fact that post-acquisition evidence might establish some increased competition does not validate an acquisition because once the two companies are united, no one knows what the fate of the acquired companies and their competitors would have been but for the merger, and even though subsequent events may show that future competitive conditions are not as anticipated, this would not make legal that which was illegal. . .as of the time of trial."[39]

Thus, for all practical purposes the judiciary's attitude is that post-acquisition evidence can only be used to establish a violation. The violation may occur at any time including the post-litigation period.[40] Procompetitive evidence may not

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[38] International Telephone and Telegraph Corp. v. General Telephone and Electric Co. 351 F. Supp. 1153 (1972).

[39] Ibid., p. 1194.

[40] F.T.C. v. Union Carbide, 58 F.T.C. 12 (1961), p. 16. The FTC stated: "If this competitive picture should at any time in the future alter in a manner which would indicate that our decision here is in error, a new complaint based upon the new facts inherent in the changed situation can be speedily issued."

be used at any time for if evidence points to increased competition the judiciary will invoke the "probabilities not actual outcomes" and the "no one knows the fate" arguments. Hence, the informational content of procompetitive post-acquisition evidence is considered nil either because Section 7 deals strictly with probabilities or because it is impossible to compare the post-state of competition to that which would have existed if there had not been a merger. This treatment has been described as one of "heads I win-tails you lose" since anticompetitive evidence will always be used to proscribe a merger, but procompetition evidence will never be used to show the converse.[41]

The inconsistencies between the judiciary's treatment of procompetitive and anticompetitive post-acquisition evidence has generated much confusion in the implementation of Section 7. While the confusion began in Du Pont, it was perhaps best illustrated in Procter and Gamble. Although some of this confusion was undoubtedly the result of a change in the FTC tribunal. The first Commission over-ruled a hearing examiner's finding that Procter's acquisition of Clorox Bleach violated Section 7. The basis for the tribunal's reversal was that the record did not offer the Commission ". . . an informed hindsight upon which it can act" and that it placed ". . . too

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[41]Horowitz, p. 764.

much reliance upon trecherous conjecture."[42] The first Commission, therefore, remanded the case back to the hearing examiner to consider post-acquisition evidence. However, upon review, a second Commission found a violation based upon the same record the first considered as not offering "informed hindsight" and, thus following the DuPont doctrine, concluded post-acquisition evidence was irrelevant.[43] However, upon appeal the Sixth Circuit Court found that post-acquisition evidence did not support the second Commission's finding of a violation. In justifying its consideration of post-acquisition evidence, the appellant court held: "[A]ny relevant evidence must be considered in a Section 7 case," and ". . . the extent to which inquiry may be made into post-merger conditions may well depend on the facts of the case, and where the evidence is obtained it should not be ignored."[44] Moreover, the Sixth Circuit Court was in agreement with the first FTC tribunal as it described the complaint against Procter and Gamble as "pure conjecture."[45] However, upon further appeal, the Supreme Court reversed the Sixth Circuit's decision. Justice Harlan noted in his concurring opinion

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[42] F.T.C. v. Procter and Gamble, 58 F.T.C. 1263 (1961), p. 1207.

[43] [1963-1965 Transfer Blinder] Trade Reg. Rep. Paragraph 16, 673, p. 21,587.

[44] F.T.C. v. Procter and Gamble, 386 U.S. 569 (1966), p. 592.

[45] Ibid.

that the primary difference between the Sixth Circuit's dismissal of the case and the Supreme Court's decision to proscribe the merger was the weight given to post-acquisition evidence.[46] The Court felt the appellant court attached too much weight to post-acquisition evidence. Therefore, it was not the Sixth Circuit Court's consideration of post-acquisition evidence that provoked the Supreme Court but rather the "weight" attached to it.

Summary

The judiciary's treatment of post-acquisition evidence has been inconsistent and generated much confusion in the implementation of Section 7.[47] In terms of implementation, the issue has not been one of admissibility since Du Pont, but rather one of the judiciary's method of "weighting" the evidence. On the one hand, anticompetitive evidence has been assigned what might be considered probative weight. As noted by Horowitz, anticompetitive post-acquisition has been viewed as being consistent with only one hypothesis: A merger lessened competition.[48] On the other hand, procompetitive and competitively neutral post-acquisition evidence does not influence Section 7 decisions. These types of evidence have been viewed as being consistent with a number of diverse inferences: One being that the merger was

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[46] Ibid.

[47] By "inconsistent", it is meant that the courts have treated competitively neutral and procompetitive post-acquisition evidence differently than anticompetitive evidence.

[48] Horowitz, pp. 760-761.

anticompetitive but the evidence simply does not yet show it. Thus, the judiciary has recognized the informational value of post-acquisition only in those cases where it has been anticompetitive.

The judiciary has justified this treatment on four grounds. First, it has argued that since Section 7 was intended to deal with monopoly in its incipient stages violations must be based upon probable effects rather than actual effects. The problem with this argument is that it has only been used in cases where procompetitive or neutral evidence is involved. The judiciary has justified its use of anti-competitive evidence on the basis that it must not ignored a lessening of competition whenever it occurs. Consequently, a prior probabilities may be revised in the light of later evidence. Consistency, however, requires the judiciary either similarly recognize evidence indicating that a lessening of competition has not occurred or ignore post-acquisition evidence completely. The current judicial treatment toward post-acquisition evidence appears inconsistent with ideals of fairness and consistency in jurisprudence.

The second justification for the asymmetric treatment of post-acquisition evidence is that one can never infer increased competition from post-acquisition evidence since it is impossible to compare this state of competition to that which would have existed had the merger never been consummated. It is difficult to understand the rationale behind this argument since Section 7 proscribes only

those mergers that lessen competition, where this is usually interpreted as less competition after the merger than before. When this view is contrasted to the judiciary's view that anticompetitive post-acquisition evidence is only associated with an illegal merger, the inconsistency between these views is apparent. That is, procompetitive evidence does not accurately indicate the effects of the merger, while anticompetitive evidence always presents the "truer picture" of the merger's effect.

The third justification for the current treatment post-acquisition evidence is that procompetitive and competitively neutral evidence is subsceptible to diverse inferences or may even be subject to manipulation by the defendent. The argument is that a defendant may simply restrain from behaving non-competitively if there is a probability that such an action will be rewarded by case dismissal. While it is true that anticompetitive effects may not show up for some time, it is also true that antitrust authorities may bring suit whenever they do.[49] Thus, a per se rule against accepting neutral evidence does not appear to be entirely justified on the basis that it is inconclusive. Section 7 does not proscribe competitively neutral acquisitions. While one might be concerned with the possibility of evidence manipulation, a distinction may be drawn between those cases where it is likely and those where it is not. In cases where substantial structural changes have taken

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[49]See 58 F.T.C. 12 (1961), p. 16.

place it is much less likely that manipulation has occurred than in those cases in which the evidence refers to a lack of anticompetitive conduct or behavior. For example, it is unlikely that Kennecott purposely induced substantial entry into the coal industry in order to fool the courts and the FTC. Entry was much more likely to have been the result of increased profitability stemming from increased demand after the oil embargo in 1973.

In fact, post-litigiation--pre-compliance evidence may present the "truest picture" of a merger's probable or actual effect on competition, given the fact that modification of a divestiture order is unlikely and the firm's incentive to enhance the value of its assets by exploiting whatever monopoly exists during the the post-litigation period. The firm confronted with a divestiture order could increase its present profits and, perhaps, the value of its divestiture by exploiting market power during the post-litigation period.[50] The incentive to "hold back" would be present only if the firm deemed it likely that the divestiture order would be modified or dismissed as a result. Furthermore, anticompetitive post-acquisition evidence is capable of a similar type of manipulation by the merged firms' competitors. This is particularly true in

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[50]Clearly, a conglomerate firm that has acquired a firm with market power may increase both present profits as well as the value of future divestiture since partial divestiture is unlikely. In horizontal and vertical mergers the present profits incentive for exploiting market power is probably greater than the value of the divestiture incentive since market power is more likely to be reduced as a result of divestiture. Therefore, the present profits incentive is always in effect as long as dismissal is unlikely, whereas, the value of the divestiture incentive depends upon what is actually divested.

private treble damage suits.[51] There may be an incentive for competitors whose financial positions are likely to be damaged by a procompetitive merger to request antitrust authorities investigate the matter. As noted by Elzinga and Breit,[52] treble damages increase this incentive because the likelihood of reward for such behavior is enhanced by the fact that the judiciary often associates damages to competition with damages to competitors.[53] Hence, all types of evidence are susceptible to manipulation. This suggests a rule of reason approach might be preferable to what essentially amounts to per se rules governing the weighting of post-acquisition evidence.

A fourth justification for the judiciary's asymmetric treatment of post-acquisition evidence is that defendants may purposely delay the judicial process. Defendants who have acquired market power through an illegal merger might find it in their interest to delay the process for a couple of reasons. First, such delays may increase the liklihood of dismissal since industry structure may change in a manner favorable to the defendant. In the case of unlawful mergers and the absence of significant private costs, the defendant may have "nothing to lose" by prolonging the process. Second, the defendant may reap the benefits of enhanced monopoly power throughout the litigation process. Such behavior would not

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[51]Kenneth G. Elzinga and William Breit, The Antitrust Penalties: Study In Law and Economics (New Haven: Yale University Press, 1976), pp. 81-96.

[52]Ibid.

[53]For example, see 368 U.S. 569 (1966), p. 597.

only increase the direct litigation costs of Section 7 cases, but also increase the social costs associated with monopoly.

This justification for the current treatment of post-acquisition (and post-litigation) evidence is similar to the third justification in the sense that both have merit. Clearly, a general rule admitting favorable post-acquisition evidence will likely alter the behavior of some firms involved in Section 7 proceedings in a perverse manner. However, as will be discussed shortly, one must also consider any offsetting benefits of admitting favorable post-acquisition.

This section has shown that the current treatment of post-acquisition evidence by the judiciary has been inconsistent and therefore should be reconsidered. The more difficult question is whether or not post-acquisition evidence of any type should be admissible in Section 7 cases. On the one hand, its acceptance may involve a compromise on the apparent statutory responsibility of the judiciary to deal with probable rather than actual effects of merger and the practical consideration of increased costs arising from prolonged litigation. On the other hand, its acceptance may also provide valuable information necessary for an informed assessment of a merger's impact on competition. In particular, benefits of the additional information would be greatest in those cases where there is little information at the time of acquisition upon which to base a decision. The following section presents a simple model of information which takes into account the benefits and costs of admitting post-acquisition evidence in Section 7 cases.

4. POST-ACQUISITION EVIDENCE IN PRINCIPLE

In principle the economic analysis behind the issue of post-acquisition evidence in Section 7 cases is relatively simple and straightforward. Section 7 requires the judiciary to decide whether a particular acquisition is likely to lessen competition by assessing its "probable" effect at some point in time. The judiciary assesses this probable effect by formulating a prediction as to the merger's effect on market performance on the basis of limited information. Generally, this prediction is based upon the effect of the acquisition on market structure since Section 7 was intended to prevent the development of those types of market structures typically associated with non-competitive conduct and performance. Thus, the emphasis in Section 7 cases tends to be upon market structure rather than conduct or performance. However, jurisprudence requires this prediction be justifiable in the sense that it be based upon a reasonable interpretation of the information available at the time it is formulated. Viewed within this context, Section 7 decisions do not present any significant conceptual difficulties beyond those normally encountered in other areas of decision-making under uncertainty. The objective of the decision-maker is to utilize any information relevant to a decision in an efficient manner. That is, the objective is to formulate the best possible prediction taking into consideration both the benefits and costs of information pertinent to the decision. The economic analysis of decision-making under uncertainty may be used

to specify a couple of basic principles essential to the accomplishment of this objective. The "goodness" or "reasonableness" of a decision can be evaluated in terms of whether these principles were properly incorporated into the decision-making process.

One basic principle relevant to the collection of information used in decision-making under uncertainty is that all information whose expected benefits exceed its expected costs should be incorporated in the decision-making process.[54] In incremental or marginal terms, this principle requires that information be collected up to the point where the last unit of information contributes just as much to decision-making process as it costs. In Figure 7, let MB represent the incremental benefits of additional units of information and MC represent the incremental costs of additional units of information. The primary incremental benefits of additional information is the reduction in uncertainty surrounding the decision that results from its incorporation into the decision-making process. Assuming the decision-maker is competent and therefore capable of identifying the most relevant information necessary for the decision, one would expect the MB to decline as additional information is collected. The MB curve slopes downward because the probability of discovering an additional unit of information more valuable than the previous tends to fall as the intensity of

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[54]Evan J. Douglass, Managerial Economics: Theory, Practice, and Problems (Englewood Cliffs: Practice-Hall, Inc., 1983, 2nd ed.), p. 66-71.

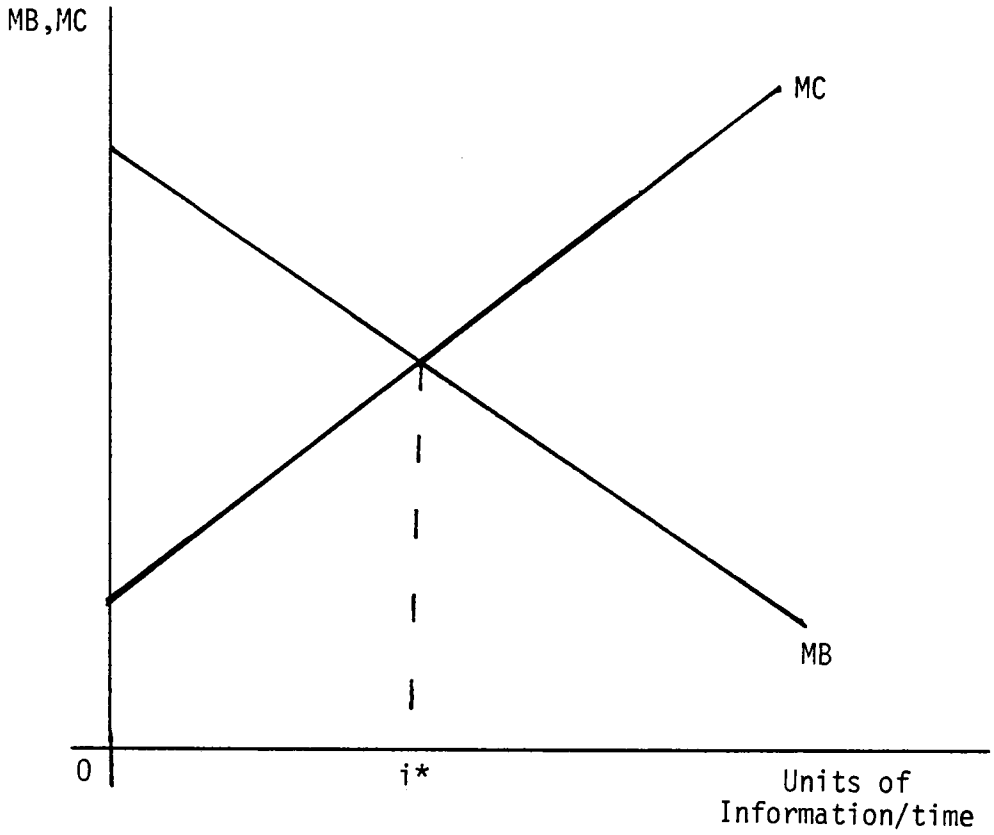

FIGURE 7

BENEFITS AND COSTS OF INFORMATION
AND DECISION-MAKING UNDER UNCERTAINTY

search for relevant information increases, ceteris paribus. In Section 7 cases, the MB of additional information would be the decreased likelihood of either proscribing competively neutral and procompetitive mergers or validating anticompetitive mergers.[55] The primary incremental costs of admitting post-acquisition evidence are those additional costs associated with incorporating the additional information into the decision-making process. In Section 7 cases, these costs refer primarily to search costs as well as any other additional costs associated with prolonged litigation arising from less timely execution of the statute. These costs are likely to rise because of diminishing returns in information collection.

Given the MB and MC curves in Figure 7, the optimal information necessary for decision-making is i*. The value of the i*th unit's additional information in terms of reducing uncertainty is just equal to its additional costs in terms of collection and dissemination. Fewer units are inefficient because these units' additional benefits exceed their additional costs. Similarly, units beyond i* are inefficient because their additional costs exceed additional benefits. It should be noted that the exact loction of the MB and MC curves are determined by the initial amount of uncertainty surrounding a particular decision. Decisions made under greater (lesser) uncertainty relative to the one in Figure 7 will require a larger (smaller) amount of information for given a degree of confidence.

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[55]Statistically, one can think of the marginal (incremental) benefits of additional evidence as the reduction in the probability of Type 1 or Type 2 errors.

In order to directly focus upon the issue of post-acquisition evidence, one must recognize that another principle of decision-making under uncertainty is that a decision should not be irrevocable prior to the time at which it must be made.[56] Thus, one must incorporate time into the above model so long as the value and costs of information vary with time. This slight modification of the above model will allow us to focus directly upon the key issues in the debate over post-acquisition evidence.

Post-acquisition evidence represents a source of additional information in Section 7 cases. So long as there is no "statute of limitations" imposed on Section 7 decisions, this additional information may have value in terms of reducing the degree of uncertainty surrounding predictions. Whether it should be included depends upon its incremental benefits and incremental costs. The same principle of considering benefits and costs of additional information in decision-making at a point in time applies to the consideration of information in subsequent time periods.

Figure 8 illustrates the principle behind the decision to consider post-acquisition evidence. Assume t_0 denotes the time of acquisition and t_1 denotes the time of litigation. The decision to consider post-acquisition evidence depends upon a weighing of the incremental reduction in uncertainty derived from the evidence against

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[56] Ibid.

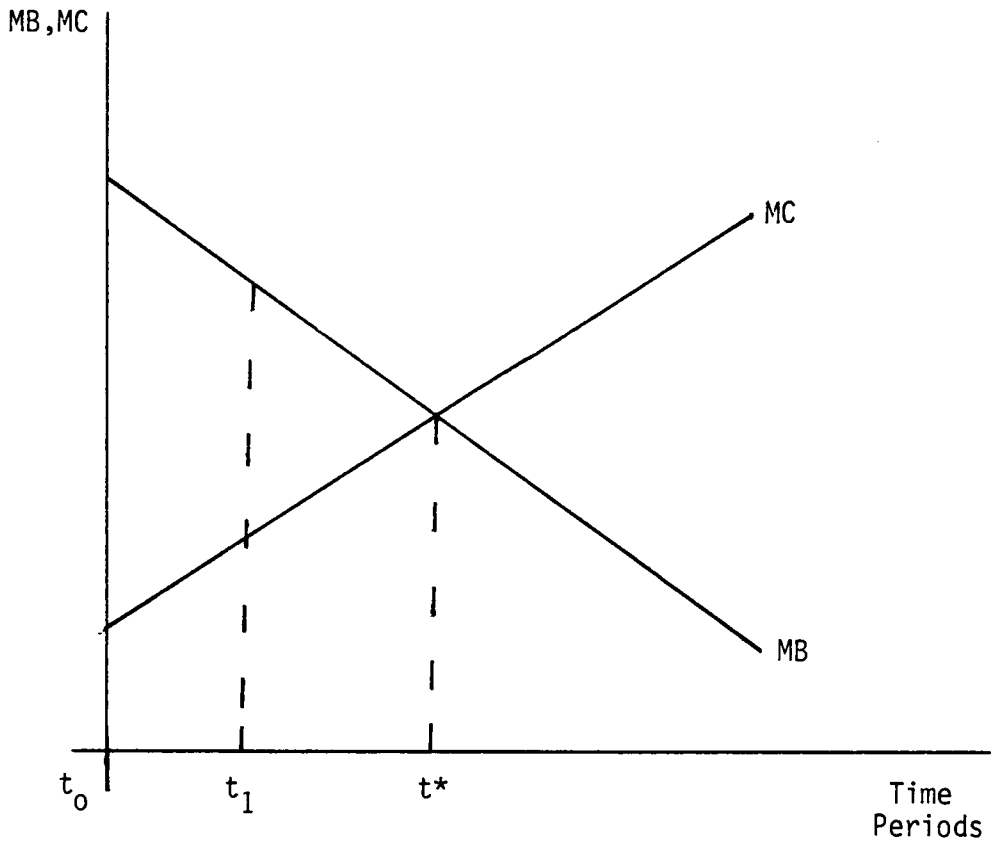

FIGURE 8

TIME, BENEFITS, AND COSTS AND
DECISION-MAKING UNDER UNCERTAINTY

the increased costs associated with its incorporation into the decision-making process. In this case, principles of good decision-making require the judiciary to include this evidence. Similarly, additional evidence available during the process of judicial review should be considered on the same basis. Thus, in principle, there is no difference between post-acquisition--pre-litigation evidence and post-litigation--pre-compliance evidence. Furthermore, the "weighting" of evidence should be based upon the degree to which the evidence reduces uncertainty, not upon the time period at which it is collected. Basic principles of decision-making require evidence most relevant to a particular decision be weighted more heavily than other evidence.

The above model suggests that if the judiciary seeks to incorporate principles of decision-making under uncertainty into Section 7 decisions, then a case-by-case approach might be preferrable to the current treatment. Such an approach might treat post-acquisition evidence in manner similar to that of circumstantial evidence.[57] The primary factors governing its use in any particular case would be the initial degree of uncertainty surrounding the merger, the expected benefits and costs of the additional information, and a satisfactory level of confidence. The first two factors are likely

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[57]That is, post-acquisition evidence might be treated as indirect evidence from which principal facts may be reasonably inferred. Under such a rule, either party requesting the admittance of post-acquisition evidence would carry the burden of showing that pre-acquisition evidence is insufficient or misleading in terms of assessing a Section 7 violation.

to vary from case to case. However, a fundamental question which remains is whether there is a statutory mandate to base Section 7 violations strictly upon pre-acquisition evidence. The cost of such inflexibility is increased uncertainty surrounding Section 7 decisions.

5. ECONOMIC THEORY AND POST-ACQUISITION EVIDENCE

The above analysis suggests that if post-acquisition evidence is permissible under Section 7 then its value depends upon the degree to which it reduces uncertainty in Section 7 cases. Economic theory further suggests that there are certain cases in which uncertainty will tend to be greater than in others. Specifically, the economic theory of market structure suggests a greater degree of uncertainty surrounding the competitive effects of vertical and conglomerate mergers than horizontal.[58] The reason is the former types generally do not directly influence market structure in an easily discernible manner. The influences are often indirect and complex. Thus, the predictive power of economic theory is generally less than in horizontal cases. Consequently, post-acquisition evidence is likely to have higher incremental benefits in these cases than in horizontal cases.

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[58]Perhaps this is one reason why controversies over post-acquisition evidence arise most often in conglomerate mergers, see "The Treatment of Postacquisition Evidence Under Section 7 of the Clayton Act: Significance of the Reference Point in Predicting the Effect of a Merger on Competition" 70 Northwestern University Law Review (1976), pp. 821-822.

The doctrine of potential competition, and its particular application in Kennecott, may be used to illustrate this point. Perhaps, the most questionable aspect of the Commission's application of the doctrine was it exclusion of a number of other firms as potential entrants. Although the Commission's justification for exclusions was particularly weak in Kennecott, it still illustrates a more general difficulty in applying the doctrine. The major difficulty stems from the fact that economic theory simply does not provide a strong basis for excluding firms as potential entrants unless there are extenuating circumstances such as legal or other sources of substantial entry barriers. This is particularly true in an industry experiencing declining profitability such as the coal industry over the decade or so prior to Kennecott's acquisition of Peabody.[59] The most meaningful method of identifying potential entrants, or the lack of, is to observe an industry during a period of rising profitability. Otherwise, the key variables necessary for excluding firms as potential entrants, such as future intent or the condition of entry, are often immeasurable or very complex. Consequently, the degree of uncertainty surrounding a priori exclusions is generally great in potential competition cases. Hence, the value of post-acquisition evidence will tend to relatively high in such

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[59]A study conducted by the Department of Energy concluded coal industry profits during the 1950s and 1960s were ". . . cyclical and lower than those in other sectors of the economy," see U.S. Department of Energy, Energy Information Administration, Financing Increased Coal Production (Washington: U.S. Government Printing Office, March 1981), p. 7.

cases. It was particularly high in Kennecott since market conditions changed and a truer picture of the condition of entry and potential entrants was available during the post-litigation--pre-compliance period. To ignore this evidence as the FTC did in Kennecott appears to be a clear waste of relevant information.

6. SUMMARY AND CONCLUSIONS

The primary objective of this chapter was to present the post-litigation--pre-compliance evidence in Kennecott and explain the reluctance of the Commission to modify its divestiture order in light of this additional evidence. The evidence indicated that two important predictions upon which the FTC's doctrine of potential competition was based turned out to be highly inaccurate. Concentration decreased and new firms entered on a large scale contrary to the Commission's predications. Despite the availability of this information the Commission refused to modify its divestiture order. This inflexibility appears to stem from a more general reluctance on the part of the judiciary to weight competitively neutral or procompetitive post-acquisition evidence in its decision-making process. The current treatment is inconsistent since anticompetitive post-acquisition evidence receives substantial weight in Section 7 cases. Furthermore, it appears that to ignore this evidence is an inefficient use of information because it may provide valuable information in terms of reducing the uncertainty surrounding Section 7 decisions. This

is especially relevant to mergers that do not significantly alter market structure in a direct and easily identifiable manner.

The chapter concluded by examining the relevant factors involved in the issue of post-acquisition evidence in Section 7 cases. A case-by-case approach was suggested wherein the judiciary weighs the benefits of reduced uncertainty against the costs of prolonged litigation in deciding whether post-acquisition evidence can be efficiently incorporated into the decision-making process. The acceptance of post-acquisition evidence may involve a trade-off between a statutory responsibility, if one exists, of assessing the validity of a merger at the time of acquisition and basic principles of decision-making. These trade-offs should at least be recognized if the judiciary wishes to approach the issue in meaningful manner. Obviously, this area of Section 7 decision-making deserves much more attention than it has received in the past.

CHAPTER VII

SUMMARY AND CONCLUSIONS

The primary objective of this study was to examine the Federal Trade Commission's application of the doctrine of potential competition in Kennecott. Three aspects of the case were given primary attention. This chapter will summarize the findings on each.

1. STRUCTURAL PRECONDITIONS

Chapter II reviewed the economic theory of limit price upon which the doctrine of potential competition is based. The theory requires two structural preconditions. These conditions are high seller concentration and substantial entry barriers. From an antitrust perspective, the doctrine of potential competition further requires that a merger remove one of only a few potential entrants.

The FTC "satisfied" the first precondition by mis-defining the product market and by extrapolating a post-World War II trend in production concentration. The evidence in Chapter IV indicated the rise in concentration was primarily a result of dynamic changes in basic demand and supply conditions. The empirical analysis is Chapter V supported this conclusion. The evidence suggested the rise in concentration was primarily the result of economies of scale and the shift in coal demand toward large utility consumers. The evidence further suggested the net effect of the rise in concentration was to lower coal prices because the negative influence on price of those factors which lead to higher concentration offset the positive influence of the rise

in concentration on price. Hence, the precondition of high concentration was not satisfied in the conventional sense. That is, the economic argument against high concentration is that it leads to higher prices and lower output. There is no economic argument against rising concentration in situations where such increases are the result of lower costs.

The second precondition of high entry barriers also did not appear to have been satisfied. The Commission's allegation that rising capital costs were erecting an entry barrier was not substantiated by the empirical model in Chapter V. This was not surprising since the inflation adjusted index of mining machinery and equipment cost did not significantly increase over the period of rising concentration. Furthermore, absolute capital costs would not seem to be a significant deterrent to entry considering the size and financial strength of those firms who were holding reserves although not actively producing coal at the time Kennecott acquired Peabody. Similarly, the availability of project financing lessened the impact of whatever barrier high capital costs might have presented. One other factor that possibly could have presented a barrier to entry was the availability of economically mineable coal reserves. However, the evidence presented in Chapter IV suggested this was not likely considering the diversity of ownership and the Federal Government's indirect control of reserve concentration through its coal leasing program.

The third precondition of a limited number of potential entrants was satisfied only by excluding a large number of firms holding re-

serves but not actively involved in the commercial sell of coal at the time of the merger. A large number of firms including oil and gas companies, electric utilities, steel companies, and railroad companies were excluded as potential entrants despite substantial reserve holdings. The economic rationale behind these exclusions can only be described as dubious. The Commission's justification for excluding oil and gas companies was that they were only interested in coal for future liquefaction and gasification purposes. The justification for excluding other reserve holders was that those firms were producing and holding reserves for captive purposes. Neither argument represents a good justification for excluding these firms as potential entrants. One point is that several major coal producers at the time of acquisition had parent affiliation in the oil industry. Many had either entered the industry de novo or had purchased reserves in the decade or so preceding Kennecott's acquisition of Peabody. Oil companies that had acquired reserves but were not actively producing coal should have been included as potential entrants based upon previous diversification patterns. A second, more fundamental, point is the rationale behind these exclusions ignored the incentives of all firms holding reserves. These firms could have been expected to enter in the event of a rise in coal industry profitability. The exclusion of captive producers not only ignored these firms' incentive to enter but also the fact that captive production affects coal prices the same manner as commercially produced coal. The significance of these two points was illustrated

during the 1970s when those firms excluded as potential entrants entered the industry on a large scale.

To summarize, none of the three preconditions necessary for the application of the doctrine of potential were satisfied in Kennecott. Hence, one explanation for the discrepancies between the Commission's predictions and subsequent events in the coal industry was that industry structure was not conducive to the type of anticompetitive behavior alleged.

2. EXTENSIONS

A second aspect of the case addressed in this study was the two extensions of the doctrine of potential competition. One extension was the extrapolation of high concentration in contrast to high concentration at the time of acquisition. Chapter V presented two related arguments against this method of predicting concentration and its impact on economic efficiency. First, the method ignores the underlying causes of concentration changes over time. In terms of predictive accuracy, the method can only be justified in situations where it can reasonably be assumed that those factors influencing concentration will continue to exert the same influences. The dynamics of market structure impose severe restrictions upon such a method's usefulness in examining complex economic phenomenon such as industry concentration. A second problem with the Commission's extrapolation method was that it completely ignored the complex interrelations between concentration, costs, price, and economic efficiency. The empirical

results presented in Chapter V suggests extreme caution in inferring rising prices and economic inefficiency simply on the basis of rising concentration at low to moderate levels. It was found that the net effect of those factors which caused the rise in concentration was to reduce price and enhance economic efficiency.

A second extension of the doctrine of potential competition in Kennecott was its application to a pure conglomerate merger. The problem with this extension is that the third precondition for the doctrine's applicability will seldom be satisfied. To the extent that one can rationally formulate criteria for excluding potential entrants, this criteria must include some provision for incentives. The most likely potential entrants would therefore be those firms in related industries or markets. In the coal industry, this would have at minimum included producers of oil and gas as well as electric utilities. Hence, even though Kennecott had expressed an interest in the coal industry and possessed the financial means to enter, there were a number of other firms with a much greater "proximity" to the market who possessed similar financial capabilities and apparently greater incentives to enter the industry. The primary difficulty in applying the doctrine to pure conglomerate acquisitions is not so much in identifying one particular firm as a potential entrant, but rather in deciding which firms are not potential entrants. Consequently, if the doctrine is applied so broadly as to include pure conglomerate acquisitions then the presumed criterion for determining violations of Section 7 is likely to be rendered meaningless since violations require a lessening of competition. Potential competition mergers involving a pure

conglomerate firm are not likely to lessen competition because the precondition of only a few potential entrants will seldom, if ever, be satisfied.

To summarize, neither of the FTC's two extensions of the potential competition doctrine appear warranted. Both are generally inconsistent with the doctrine's theoretical foundation.

3. POST-LITIGATION EVIDENCE

The final aspect of the case addressed was the rationale behind the judiciary's reluctance to reopen the hearing to consider post-litigation evidence. Chapter VI presented a substantial amount of evidence that indicated two vital predictions based upon pre-acquisition evidence turned out to be grossly inaccurate. The entire foundation of the Commission's complaint was based upon these predictions. A puzzling aspect of the case was the judiciary's reluctance to consider this evidence despite several appeals by Kennecott.

A review of the literature found the judiciary's reluctance to consider post-litigation evidence in Kennecott seems to stem from a more general reluctance to consider post-acquisition evidence in Section 7 cases where such evidence is either competitively neutral or procompetitive. The stated rationale behind this reluctance is that since Section 7 is preventive in nature violations are to be based upon the probability of competitive damage rather than actual competitive damage. However, the actual judicial treatment of post-acquisition

evidence in Section 7 cases was described as inconsistent. The judiciary has adopted what amounts to a "heads I win-tails you lose" attitude toward the weighting of post-acquisition evidence. The basis for this conclusion is that post-acquisition evidence is only denied, or not given any weight, when that evidence is either competitively neutral or procompetitive. The judiciary has accepted and given probative weight to anticompetitive post-acquisition evidence.

The judiciary has used four arguments to justify this seemingly inconsistent treatment. Although each argument may justify the exclusion of postacquisition evidence all together, none of the arguments provide an adequate explanation as to why such evidence it is always used to proscribe mergers, but never used to validate mergers. This treatment is difficult to understand in terms of normal standards of fairness and equity. Generally, it seems in other areas of law, defendents are permitted to use all available evidence pertinent to their defense. Of course, some evidence may be recognized as self-serving and therefore not permitted. But this exception does not justify what amounts to a per se rule governing the reliability of post-acquisition evidence. Surely, the FTC and others responsible for antitrust policy can within limits distinguish between self-serving evidence and that which is not likely to have been manipulated.

A more fundamental question is whether post-acquisition evidence of any type should be a determining factor in Section 7 cases. Clearly, the statutory mandate of Section 7 is to deal with monopoly trends in their incipient stages. Nevertheless, does this mandate require pertinent information on the competitive effects of a merger be suppressed

solely in the interest of preserving the probabilistic nature of the statute? If so, then it should be recognized at the outset that an undue amount of uncertainty may surround Section 7 decisions. The consequence of this uncertainty is an increased liklihood of proscribing that which is not illegal as well as the liklihood of not proscribing that which is illegal. The analysis in the latter part of Chapter VI suggests these costs should be weighed against the benefits of timely compliance in determining the admissibility of post-acquisition evidence in Section 7 cases. A case-by-case rule of reason approach appears more in line with elementary principles of decision-making than a per se rule governing the admissibility of such evidence.

4. FUTURE RESEARCH

Two topics included in this study are of particular interest with respect to future research. This first is in the application of the doctrine of potential competition to pure conglomerate mergers. Specifically, very little attention has been given to the inconsistency between the doctrine's limited number of potential entrants precondition and the doctrine's application in pure conglomerate cases.

A second area of future research interest involves expanding the economic analysis on post-acquisition evidence in Chapter VI. Economic analysis may be helpful in identifying those circumstances in which additional evidence is likely to be most valuable. Two likely candidates are pure conglomerate mergers and situations where a violation is based upon trend in concentration. Predictions as to the competitive effects of mergers in such cases are likely to involve a substantial

amount of uncertainty. Therefore, the benefits of additional evidence are likely to be high. However, other factors such as additional cost of prolonged litigation must also be considered. Clearly, there has not been very much work in this area of Section 7 decision-making.

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APPENDIX

TABLE XLI

PARTIAL CORRELATION COEFFICIENTS FOR
VARIABLES IN CONCENTRATION EQUATION

	CR_t^*	P_{t-1}^*	MC_t^*	ULC_t^*	PCE_t^*
CR_t^*	1.00				
P_{t-1}^*	-.54	1.00			
MC_t^*	.34	.54	1.00		
ULC_t^*	-.82	.88	.02	1.00	
PCE_t^*	.82	.83	.67	-.42	1.00

TABLE XLII

PARTIAL CORRELATION COEFFICIENTS FOR VARIABLES IN PRICE EQUATION

	P_t^*	CR_t^*	MC_t^*	ULC_t^*	P_{ot}^*	PCE_t^*
P_t^*	1.00					
CR_t^*	-.39	1.00				
MC_t^*	.42	.34	1.00			
ULC_t^*	.78	-.82	.02	1.00		
P_{ot}^*	.96	-.39	.48	.74	1.00	
P_{gt}^*	.67	.20	.91	.24	.69	1.00

VITA

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