price because of the necessity of a firm to cover its substantial fixed and common costs. Furthermore, the structural characteristics of modern telecommunications networks require substantial sunk costs. These substantial sunk costs create both a barrier to entry and a barrier to exit. However, once the competing network has been built, an incumbent firm cannot realistically believe that it can price to keep a competitor from re-entering the market if it raises its prices because the network will remain in place (since its value in alternative uses is near zero). Thus, barriers to re-entry are non-existent.

20. Economic predation is pricing below marginal (incremental) cost so that other competitors will leave the market, thereby allowing the predatory firm to then raise its price and restrict output. For predation to succeed, the firm attempting predation must be able to raise its prices to monopoly levels after competitors exit and to sustain those prices for a long period of time.[8] Barriers to re-entry of the former competitors must exist, and entry of new competitors must not occur. This lack of competition then allows the predating firm to earn back its losses from the predatory period.

21. The economic factor of high fixed to marginal costs makes a predatory pricing attempt against new entrants extremely unlikely to occur. At the onset of the attempted predation, the predating firm must drop its price low enough to make the marginal supply of a competitor unprofitable so that it will then exit the market. Given the very low marginal costs, the predating firm will be required to lose enormous sums of money while the predation is occurring. In fact, the competitor will remain in the market unless the price remains below costs for the foreseeable future. The higher

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[8] Predation occurs only if competitors are actually forced to exit the market. Antitrust concerns do not arise merely because a given price is temporarily below marginal cost. Indeed, because of "introductory specials" or because of learning by doing, marginal costs may exceed price for a short period of time when a new product or service is introduced.

than usual cost of predation in the case of high fixed cost markets makes predation even less likely than the typical case, where the Supreme Court has agreed with the widely accepted view of economists that predation is "rarely tried, and even more rarely successful".[9]

22. In telecommunications in particular, such a predatory strategy could not succeed. The fiber optic networks would remain in place since they are the essence of sunk costs.[10] Thus, if the BOCs attempted to raise their high capacity (e.g., DS1 or DS3) prices to supra-competitive levels, there would be no barrier to re-entry. In these economic circumstances, predation could not hope to succeed.

23. Predation rarely, if ever, happens in a modern economy where firms have access to well-developed capital markets. Indeed, I testified in Federal District Court last year that I was unaware of any successful cases of predation in the last 30-40 years.[11] The Department of Justice's economic expert was unable to put forward any recent examples of predation as the District Court Judge found: "However, significant barriers to exit the market, as testified to by Professor Hausman, and the fact that the Government could not cite one modern example of successful predatory pricing, indicate that the Government's fear is unfounded."[12] Thus, I believe that successful predation is extremely unlikely in telecommunications markets given their technological and economic structure.

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[9] Matsushita v. Zenith, 475 U.S. 574, 589 (1986).

[10] Sunk costs are costs which are not recovered if a firm subsequently decides to exit the industry. For their potential importance in entry and exit decisions see e.g. the 1992 Merger Guidelines, para. 3.0.

[11] Furthermore, most economists believe that in the last 30-40 years that perhaps only 1, or even zero, cases of successful predation exist; see e.g. P. Passell,"Air Fares: Poor Case, Good Verdict, NY Times, Aug. 15, 1993, Section 4, p. 14.

[12] U.S. v. Eastman Kodak: 853 F. Supp. 1454, 1478 (W.D.N.Y 1994), aff'd ___, F.3d (2d Cir. Aug. 4, 1995).

24. Elimination of rate of return regulation and its replacement by price caps also removes the ability of a regulated firm to cross subsidize a service to fund its predatory strategy. Cost misallocation from a competitive service to a non-competitive service can be a concern under rate of return regulation. However, allocation of costs ceases to have an economic role under price cap regulation. Thus, cross subsidy and the fear of predation should be greatly attenuated, or even eliminated, under modern price cap regulation.[13]

E. Conclusion on Price Flexibility for LECs

25. Price flexibility for LECs will allow them to move their prices closer to their costs. Economic efficiency will increase, as will consumer welfare. No anti-competitive effects will occur since predation is not a realistic outcome. No reason exists to limit the amount of LEC downward pricing flexibility because lower prices benefit consumers and benefit competition as output increases. Competitors will of course attempt to cause the Commission to limit the LECs' ability to decrease prices. Yet, on this point, the District Court judge in U.S. v. Kodak placed the issue in the correct perspective: "[w]e must always be mindful lest the Sherman Act be invoked perversely in favor of those who seek protection against the rigors of competition."[14] Similarly, regulation should not be used to keep telecommunications prices perversely high to protect competitors. Consumer welfare and economic efficiency should be the goal of regulation as the Second Notice recognizes. Maximum pricing flexibility is thus the appropriate policy of the Commission and should not depend on levels of competition.

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[13] The Second Notice does not refer to any actual problems with predation in modern telecommunications. The Second Notice refers to a paper by Joskow and Klevorick which it takes to support a possibility of predation in telecommunications. However, in my view, it misinterprets the paper because of the lack of barriers to re-entry that exist once a competing network has been constructed.

[14] Ibid., 1478.

II. Treatment of New Services

26. New service introduction creates probably the greatest gains in consumers surplus and economic efficiency of any actions by telecommunications providers. Thus, the Commission should modify its rules to permit the introduction of new services without the regulatory delays which now exist, regardless of the level of competition in access of local exchange markets. I now demonstrate the economic methodology used to value new telecommunications services using well accepted economic theory.

A. Consumer Gains from New Telecommunications Services

27. How can economics be used to value new services? Consumer demand should provide the appropriate basis--consumers will not buy new services unless they are made better off by changing their purchasing behavior. Successful new services can be valued by using the economic theory of consumers surplus which forms one of the two elements of economic efficiency, along with producers surplus. To value new telecommunications services, I apply the method first introduced by the Nobel prize winning economist, Sir J.R. Hicks (1940). I have recently used this methodology to value new varieties of consumer goods and telecommunications services.[15] The basic idea of the economic approach to value new goods or services is to realize that in their absence, consumers are unable to purchase them, no matter how much they would like to buy them. Thus, in some sense, the price of the new good or service might as well be infinite since the new good cannot be purchased at any price. A more refined economic approach estimates the "virtual" or "reservation" price which sets demand of the new good or service to zero. At this virtual price, demand is zero so that a "virtual equilibrium" exists between demand and supply (which is zero). Estimation of the virtual price along with the expenditure function (demand curve) for the

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[15] J. Hausman, "Valuation of New Goods Under Perfect and Imperfect Competition", forthcoming in NBER book edited by T. Bresnahan and R. Gordon, and Jerry Hausman and Timothy Tardiff, "Valuation and Regulation of New Services in Telecommunications", submitted for publication.

new good or service gives the economic value to the consumer, or consumers surplus. The actual price of the new service will usually be well below the virtual price which sets demand to zero. The average difference between the virtual price and the market price is the fundamental gain in value, also called consumers surplus, from the new service. This economic approach uses market demand to value new goods and services since the market establishes what consumers are willing to pay.

28. In the paper valuing new telecommunication services, I find that introduction of new telecommunications services can lead to very large gains in consumer welfare. Hausman and Tardiff (1995) consider the introduction of voice messaging services by local telephone companies. These services were introduced in 1990. We estimate that the gain in consumer welfare from these new services through 1994 to be about $5 billion per year. Thus, the difference between the virtual price (setting demand to zero) and the actual price of voice messaging, adjusted for the demand elasticity of voice messaging, leads to the conclusion that small businesses and consumers receive great value from voice messaging services. Since the demand for voice messaging has increased rapidly up to approximately 7 million subscribers in 1994, the finding of high consumers value and a large increase in economic efficiency follows.

29. Introduction of a new telecommunications service (i.e., a service in a regulated industry) is typically much different from the introduction of a new good in an industry which is not regulated. If Kelloggs or General Mills wants to introduce a new brand of cereal, they manufacture the cereal and convince supermarkets to stock the new brand on their shelves. Consumers then decide whether the new brand will be successful by voting with their consumer expenditure. Because of regulation, introduction of new telecommunications services is much different. In the U.S., telecommunications companies typically must file applications with both the

Federal Communications Commission (FCC) and state regulators. Approval of these applications can take years and even decades, as we discuss in the paper. Potential competitors of the new service have economic incentives to attempt to stop or delay the new service.

30. The usual tactic of competitors is to claim that the regulated telecommunications company will "cross subsidize" the new service. That is, the regulated company will shift costs of the new service to the cost basis used to set prices for existing regulated services. Under this scenario, users of regulated services will be forced to finance the below cost production of new services. While regulators attempt to sort out these claims, the new services can be delayed for many years. Our approach to valuing new telecommunications services by estimating the consumers surplus from the introduction of new services allows the cost of the delays to be estimated because, during the delay period, consumers are not able to use the new service. Therefore, its price is implicitly set by regulators at the virtual price which causes demand to be zero. Thus, delays in introduction of new services lead to large losses in consumers surplus and large losses in economic efficiency during the period of regulatory delay. For instance, we concluded that the 8-10 year delay in the introduction of voice messaging caused by FCC- and MFJ-related delays cost consumers approximately $25 billion.

31. One of the main findings of our paper is that regulatory delays cost consumers billions of dollars per year. While the potentially adverse effect of regulation on "dynamic economic efficiency" is often mentioned, the literature on the effects of regulation has largely ignored the actual effects of the delays in new services because of regulation.[16]

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[16] See, e.g., P. Joskow and N. Rose, "The Effects of Economic Regulation," in R. Schmalensee and R. Willig, Handbook of Industrial Organization, vol. II (1989) for a review of the effects of regulation.

32. We then compare these lost benefits to the potential consumer welfare losses which might occur if competitors were correct that regulated services might be used to cross subsidize new services. We find the potential losses to consumers to be relatively small by comparison. For example, even if, say, 25% of the costs of voice messaging services were improperly shifted to basic exchange access services, the loss to consumers would be less than 0.01% of the gain in consumer welfare from the introduction of voice messaging.[17] With the potential for new services rapidly increasing because of the rapidly increasing functionality and rapidly decreasing cost of computing power and memory, the costs of this regulatory delay are becoming even larger than they were in the past. Policy makers should take these costs of lost consumer benefits into account. Otherwise public policy is being "unfair" to consumers as regulators attempt to create a regulatory framework which somehow makes competition "fair" to competing firms.

33. The deployment of advanced intelligent network technology by the LECs is likely to lead to a number of new access services in the near future. The combination of large computer data bases and telecommunications networks will likely lead to further new services, as will advanced switching features, especially if combined with increased transmission capacity, e.g. advanced teleconferencing features on PCs. Thus, removing regulatory delays to the introduction of new telecommunications services will lead to large gains in consumer welfare. New services will also create large gains in economic efficiency, as I now discuss.

B. Economic Efficiency Gains From New Services

34. I discussed the gains to consumers from the introduction of new services in the last section. However, the gains to economic efficiency are even larger than the gains to consumers. Gains in economic efficiency from

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[17] Under price cap regulation currently used by the FCC and increasing number of state regulators, the ability to shift costs is greatly attenuated or eliminated altogether.

new services take account of both the gain in consumers surplus plus the gain in producers surplus. The change in economic efficiency from the introduction of a new service is approximately: $dE = CS + PS = .5*(VP - P)*Q + (P - MC)*Q$ where CS is consumers surplus, PS is producers surplus, VP is the virtual price, and MC is marginal cost. In telecommunications, because of the relatively large size of fixed and common costs, the producers surplus component can be quite large.

35. For the example I discussed above of voice mail provided by the LECs, I estimated the gain in consumers surplus to be about $5 billion per year in 1994. Now adding in the gain in producers surplus, I find the overall gain in economic efficiency to be about $5.5 billion per year. That is, about another 1/2 billion dollar gain in economic efficiency arises from producers surplus. This result is to be expected with the introduction of most new services in telecommunications. The consumers will capture the vast majority of the gains in economic efficiency, but the providers will also make significant gains in producers surplus, which provides the economic incentive for the provision of the new services.

C. Terms and Conditions for the Introduction of New Services

36. Given the large expected gain in consumers surplus and economic efficiency from the introduction of new services, the Commission should remove all obstacles which retard their introduction. Furthermore, the LECs have an economic incentive to price new services efficiently because they are optional services that will not gain market demand if priced incorrectly. In particular, the required notice period for the introduction of a new service should be decreased to the shortest time possible and no cost support should be required. For the economic reasons I discussed above, predation is an extremely unlikely outcome. However, for new services predation is even more unlikely because the LEC begins with a 0% share and no subscribers for the new service. The LEC could hardly hope to predate and monopolize the market for

the new service when it is just introducing it. Thus, no cost support should be required unless a protest by a competitor is filed against the price of the new service.

1. Part 69 Waivers Should Not be Required

37. Similarly, Part 69 waivers should not be required for new services. As the Second Notice acknowledges, the Part 69 waiver procedure has the effect of delaying the introduction of new services, which decreases consumer welfare and also decreases economic efficiency as I discussed previously. New services instead should be presumed to be in the public interest. While price cap regulation is designed to provide the appropriate economic incentives for LECs to offer innovative services, the Part 69 waiver process directly decreases the incentives for innovation. Part 69 decreases dynamic economic efficiency because it retards the deployment of new technologies and the development of new services. Thus, Part 69 waivers should be eliminated for new services offered by LECs.

2. New Services Should be Given Track 2 Status

38. Current regulation and the Track 1 proposal of the Second Notice would require 45 days notice and detailed cost support. This level of regulation is unnecessary. It delays the introduction of new services, which harms consumers and decreases economic efficiency. The notice period should be reduced to 14 days and no cost support should be required, since predation is not a realistic threat as I discussed above. Since the LEC begins with a zero percent share for most new services, the fear of anti-competitive actions is extremely unlikely.

39. The Track 2 status framework described in the Second Notice should be used for the introduction of almost all new services. Most new services are discretionary to consumers so that a LEC cannot harm consumers by the introduction of a new service. Indeed, as I discussed above, consumers

benefit and economic efficiency increases with the introduction of new services. Thus, the Commission should give Track 2 status to all new services with the possible exception of mandated services, e.g. expanded interconnection. Given the replacement of outmoded cost of service regulation with price caps, the Commission's previous concern about anti-competitive behavior such as cross subsidy of new services is no longer relevant. The Commission should permit LECs to introduce new services, much as new services are introduced in the rest of the US economy. If a LEC believes that sufficient consumer demand exists and is willing to risk its shareholders' money, it should be permitted to offer the new service without the need to overcome unnecessary regulatory hurdles.

III. Streamlined Regulation: Criteria and Conditions

40. Many regulatory reforms such as downward pricing flexibility, expedited treatment of new services, and Track 2 status will ease unnecessary regulatory burdens as well as increase consumer welfare and economic efficiency. Thus, these regulatory reforms should be included in a "baseline" approach to regulation, regardless of the amount of competition in access or local exchange markets. As competition to LECs increases, further regulatory changes are appropriate. I consider these changes in two categories according to previous Commission policy: "streamlined" regulation and "non-dominance." The most important consideration is to remember why regulation is used--the purpose of regulation is to stop the exercise of market power by a dominant carrier. The goal is to have markets perform in a manner similar to a non-regulated market with imperfect competition, which is how competitive telecommunications markets will perform. I first consider the criteria for streamlined regulation.

A. Substantial Competition Should Lead to Streamlined Regulation

41. Demonstration of substantial competition should be sufficient to

trigger streamlined regulation for the LECs. If a LEC demonstrates that a CAP, for transport, or a competitive local exchange provider (CLEC), for switching and common line, is present in a geography, then streamlined competition is appropriate. While the exact definition of a geography is imprecise, an exchange or set of exchanges in an area where competition is present would comprise a geography where competitive services would have streamlined regulation. Not all services for a LEC would be streamlined at a given time; instead, selective services and geographies would come under streamlined regulation as competition is introduced.

42. No market share demonstration is appropriate to define streamlining. Both CAPs and CLECs will have extremely high supply elasticities given their underlying fiber technology. Thus, these providers will be able to supply new customers at a price well in excess of their marginal costs, given the high fixed and common cost component in a CAP or CLEC network. Substantial competition will be present given the high supply elasticity so long as customers find the services to be acceptable substitutes for the LEC services. Previous experience with CAPs in the US and with CLECs in other countries, e.g. the UK, lead me to expect that customers will find the competitive offerings to be good substitutes for the LEC services. The economic incentives present in these conditions make the use of market share determinations inappropriate. When a given service and geographic market have substantial competition, the LEC may need to lower its prices to meet competition. The LEC provider needs to able .o decrease its price in the affected geography to respond to competition. No market power will be exercised since the prices will be controlled by the market.

B. Regulatory Conditions under Streamlined Regulation

43. For streamlined services in a given geography, significant regulatory reductions are appropriate. First, those services should be removed from price caps. Since the LEC prices will decrease from their price

cap levels, no market power will be exercised. More importantly, if the services are not removed from price caps, the LECs will have "headroom," the ability to increase prices in non-competitive areas for services in the same basket with the streamlined services. Removing streamlined services from price caps solves the "headroom" problem and will lead to lower overall prices and greater economic efficiency.

44. Streamlined services should also be permitted in contract carriage. Large customers increasingly buy their telecommunications services from a single provider. These customers use their "buyer power" to obtain large discounts from IXCs, cellular providers, and CAPs. For LECs to compete successfully for these large customers, contract carriage is a necessary competitive option. Since the streamlined services will be removed from price caps, contract carriage will not lead to higher prices for other LEC customers. Lower prices to LEC customers will increase network utilization and increase economic efficiency for reasons that I discussed above.

45. Streamlined services should also face relaxed regulatory conditions. Tariff filings should be permitted on 1 day's notice with no cost support and should be presumed lawful. Asymmetric notice periods on new services create competitive problems which limit competition between LECs and their competitors. Predatory pricing is not a realistic concern as I discussed above, especially after a competitor has incurred the sunk cost of constructing a network. Predation cannot hope to succeed because costs of re-entry are minimal.[18] Furthermore, my research in cellular regulation has demonstrated that states that regulated cellular had higher prices, partly due to advanced notice filing requirements and the strategic use of protests by

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[18] With respect to the resale of exchange service, costs of re-entry again are minimal so that predation is not a viable strategy.

competitors.[19] In an imperfectly competitive market with few competitors, an outcome which is to be expected in telecommunications given the high proportion of fixed and sunk costs, tariff filings and the allowance of protests are likely to decrease competition. Thus, both LECs and their competitors should be able to change their prices with minimal regulation, similar to behavior in unregulated markets.

46. Part 69 requirements should be eliminated for streamlined services since the services will no longer be included in the price cap formulae. Part 69 rules create restrictions on rate structure and cause price averaging (e.g., study area average pricing) to occur. Part 69 also prohibits volume and term discounts for switched access. These access rate recovery rules were initiated in a post-divestiture environment that was moving towards equal access. Now that equal access has been achieved, the need for their use has long since expired. If the Commission's goal is to streamline the regulation of access markets that are subject to substantial competition, the Part 69 constraint should be removed from those markets. Under streamlined regulation, since the service will be removed from price caps, Part 69 rules are unnecessary. Streamlined regulation demonstrates that competitive market forces are the constraining influence on a LEC's behavior for streamlined services. Part 69 rules should be eliminated for streamlined services.

IV. Non-Dominance: Criteria and Conditions

47. Non-dominance should lead to the maximum relaxation of regulation permitted by law. Non-dominance is equivalent to a finding of an absence of market power by a LEC. Lack of market power eliminates the need for regulation. The correct definition of market power here is the ability to raise prices above the competitive level profitably for a significant period

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[19] J. Hausman, "The Cost of Cellular Telephone Regulation", MIT Working Paper, 1995.

of time for a given service and geographic market definition. This definition is the same as used in the DOJ and FTC Horizontal Merger Guidelines, (MG), April 2, 1992, ¶ 0.1. A non-dominant firm lacks significant market power, and competition constrains its prices. Thus, regulation is no longer needed and should be eliminated as soon as possible.

A. Criteria for Non-Dominance

48. Lack of dominance follows from fundamental conditions of demand and supply in a market for a given group of services in a given geographic market. Demand conditions for non-dominance arise when customers find that the competitive services are good substitutes for the LEC service. The services need not be perfect substitutes, but they must be close enough substitutes so that the LEC cannot charge a significantly higher price for its service unless its quality is significantly better. Measurement of significant cross price elasticities is the best method for measuring the closeness of substitutes. Econometric techniques are being used increasingly in economics and antitrust to determine closeness of competitive services.[20] Alternatively, a demonstration that a LEC has lowered its price for a service significantly in response to competition demonstrates that the competitive service is a close substitute. A high supply elasticity of the competition will also constrain a LEC from charging an above competitive price because if the LEC attempts to restrict its supply to raise price, customers will be able to switch to the competition. Lastly, competitive conditions are important since competition takes place at the margin. All of these considerations demonstrate that market share is the incorrect criterion to evaluate possible market power.

(i) Demand Conditions

49. LEC customers typically have low switching costs that will lead to

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[20] See e.g. J. Hausman, G. Leonard, and D. Zona, "Competitive Analysis with Differentiated Products", Annales, D'Economie et de Statistique, 1994, and Testimony of J. Hausman and Decision by Judge Telesca in U.S. v. Eastman Kodak, 853 F. Supp. 1454 (W.D.N.Y 1994), aff'd ___, F.3d (2d Cir. Aug. 4, 1995).

high demand elasticities. No customer "lockin" is possible since similar technology is used by most competitors. Also, many customers are quite sophisticated and have already demonstrated the ability to use competitive suppliers. Indeed, the LECs' largest customers, IXCs who buy exchange access, are extremely sophisticated and have demonstrated the ability to choose among economic alternatives to reduce the prices they pay for access facilities. Residential customers in the UK have also demonstrated their ability to switch suppliers, as over 80% of cable TV customers in the UK have switched their telephone service from BT to their cable supplier.[21] Similar switching behavior can be expected to occur in the US as competition for local service increases.

50. Many LEC customers are also "power buyers." These customers can give a contract to a CAP to make it worthwhile for the CAP to extend its network profitably, see MG ¶ 2.12 for the importance of large buyers. Typically, the incremental profitability of a contract with a power buyer can be substantial given the relatively low marginal costs of CAPs.

(ii) Supply Conditions

51. A high supply elasticity is the other requirement for lack of market power. The economic theory of a dominant firm with a competitive fringe arises due to the low supply elasticity of the competing firms.[22] The competing firms are unable to supply a sufficient quantity of service at a competitive price to constrain the dominant firm from charging an above competitive price. The dominant firm is thus able to restrict output to charge a price above competitive levels. If the supply elasticity is sufficiently high for the competition, the dominant firms can no longer

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[21] UK Cable Communications Association, "The Case for Cable", April 1995, p. 8.

[22] W. Landes and R. Posner, "Market Power in Antitrust Cases", Harvard Law Review, 1981, apply the dominant firm model in an antitrust context.

profitably restrict output because customers will switch to the competition. The dominant firm will then be non-dominant because it no longer has market power. I expect supply elasticities to be high for competitive networks for CAPs and CLECs. Given the very high capacity of fiber optic networks, competitive providers will have a high economic incentive to increase their supply wherever they operate.

(iii) Competitive Conditions

52. Market share is an incorrect measure of competitive conditions. High market shares do not denote market power, especially given the supply and demand conditions in telecommunications. Even in the usual case the MG state that "market share and concentration data provide only the starting point..." (¶ 2.0). The MG state that one needs to assess "the other market factors that pertain to competitive effects, as well as entry, efficiencies and failure". (ibid.) Most importantly, the MG warn against using shares under "changing market conditions" (¶ 1.521) which are the essence of the situation when CAPs and CLECs enter markets to challenge LECs. Lastly, the MG also discuss the effect of changing technology (ibid.) which is an important consideration in telecommunications. Thus, the MG clearly recognize that market shares should not be used to judge market power, especially given the conditions likely to prevail with emerging competition to LECs.

53. Furthermore, both antitrust experts and the Federal Courts have increasingly recognized that market share should not be used to make decisions on market power. For instance, the Chairman of the FTC, Professor R. Pitofsky recently wrote that a firm with as high as a 90% share need not have market power.[23] Also, in a recent antitrust case in which I testified, U.S. v. Eastman Kodak, the District Court judge decided Kodak did not have market

[23] R. Pitofsky, "New Definitions of Relevant Market and the Assault on Antitrust", 90 Columbia Law Review 1805, 1810-1811.

power in film sales despite a 70% share.[24] Kodak's competitors have a very high supply elasticity because of the substantial fixed and sunk costs in film manufacturing and customers have demonstrated that they will switch to competitive brands, e.g. Fuji film, if Kodak attempts to raise prices above the competitive level.

54. The most important competitive factor to realize in judging potential market power is that competition takes place at the margin. It is this principle of economics that market share calculations miss. For instance, if BellSouth were to attempt to keep its price 5% above the competition, it would only need to lose about 7% of its traffic for this price difference to be unprofitable, given the low marginal costs of most telecommunications services.[25] Thus, only relatively small marginal share losses are required before a firm will be forced to lower its prices to competitive levels. Thus, competition at the margin, not market share, are the primary economic factor which determines prices.

55. A high market share is sometimes indicative of the ability to raise price above the competitive level if the supply elasticity of the competition is low. Thus, if the dominant firm restricts its output to increase its price, the competitive firms may not be able to increase their supply sufficiently in a profitable manner to constrain the price increase. However, this situation will typically not be present in telecommunications because of the large wedge between price and marginal cost created by the large fixed and sunk costs of a telecommunications network and the high capacity of modern fiber optic networks. Thus, market share calculations are less determinative than usual in a telecommunications context. However, even in a non-

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[24] 853 F. Supp. 1454 (W.D.N.Y 1994), aff'd ___, F.3d (2d Cir. Aug. 4, 1995).

[25] This calculation follows from the price increase on the remaining customers minus the lost revenue from the customers who shift to a competitor plus the incremental cost savings from those customers who switch.

telecommunications context, market shares are typically the wrong way to attempt to assess possible market power.

B. Regulatory Conditions under Non-Dominance

56. Since a finding of non-dominance signifies lack of market power, elimination of regulation is the correct policy response. No need for regulation exists if a firm is non-dominant. Under current law I understand that elimination of regulation may not be possible. However, 1 day notice for tariffs with no required cost support and with tariffs presumed lawful will decrease regulatory requirements to the extent allowed. When allowed by law, the Commission should undertake forbearance from regulation which would eliminate the requirement of tariff filings altogether.

J. A. Hausman 6 Dec 1995

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PUBLICATIONS:

I. Econometrics

"Minimum Mean Square Estimators and Robust Regression," Oxford Bulletin of Statistics, April 1974.

"Minimum Distance and Maximum Likelihood Estimation of Structural Models in Econometrics," delivered at the European Econometric Congress, Grenoble: August 1974.

"Full-Information Instrumental Variable Estimation of Simultaneous Equation Models," Annals of Economic and Social Measurement, October 1974.

"Estimation and Inference in Nonlinear Structural Models," Annals of Economic and Social Measurement, with E. Berndt, R.E. Hall, and B.H. Hall, October 1974.

"An Instrumental Variable Approach to Full-Information Estimators in Linear and Certain Nonlinear Econometric Models," Econometrica, May 1975.

"Simultaneous Equations with Errors in Variables," delivered at Winter Econometric Meetings, San Francisco: December 1974; published in Journal of Econometrics 5, 1977, pp. 389-401.

"Social Experimentation, Truncated Distributions, and Efficient Estimation," delivered at the World Econometric Congress, Toronto: August 1975; Econometrica, with D. Wise, June 1977.

"A Conditional Probit Model for Qualitative Choice," delivered at World Econometric Congress, Toronto: August 1975; MIT Working Paper 173, April 1976; Econometrica, with D. Wise, March 1978.

PUBLICATIONS cont.:

"Specification Tests in Econometrics," MIT Working Paper 185, June 1976; Econometrica, 1978.

"Non-Random Missing Data," with A.M. Spence, MIT Working Paper 200, May 1977.

"Attrition Bias in Experimental and Panel Data: The Gary Income Maintenance Experiment," with D. Wise, J.F. Kennedy School Working Paper, May 1977; Econometrica, January 1979.

"Missing Data and Self Selection in Large Panels," with Z. Griliches and B.H. Hall, Harvard Economics Department Working Paper, August 1977; delivered at INSEE conference on Panel Data, Paris: August 1977; Annales de l'INSEE, April 1978.

"Stratification on Endogenous Variables and Estimation," with D. Wise, J.F. Kennedy School Working Paper, January 1978; delivered at CME Conference, April 1978; in The Analysis of Discrete Economic Data, ed. C. Manski and D. McFadden, MIT Press, 1981.

"Les models probit de choix qualitatifs," ("Alternative Conditional Probit Specifications for qualitative Choice.") (English Version), September 1977; EPRI report on discrete choice models, presented at INSEE Seminar, Paris: May 1978; Cahiers du Seminar d'Econometrie, 1980.

"The Econometrics of Labor Supply on Convex Budget Sets," Economic Letters, 1979.

"Panel Data and Unobservable Individual Effects," with W. Taylor, MIT Working Paper 225; Econometrica 49, November 1981.

"Comparing Specification Tests and Classical Tests," with W. Taylor, August 1980, Economic Letters, 1981.

"The Effect of Time on Economic Experiments," invited paper at Fifth World Econometrics Conference, August 1980; in Advances in Econometrics, ed. W. Hildebrand, Cambridge University Press, 1982.

"Sample Design Considerations for the Vermont TOD Use Survey," with John Trimble, Journal of Public Use Data, 9, 1981.

"Identification in Simultaneous Equations Systems with Covariance Restrictions: An Instrumental Variable Interpretation," with W. Taylor, December 1980; Econometrica, 1983.

"Stochastic Problems in the Simulation of Labor Supply," presented at NBER conference, January 1981; in Tax Simulation Models, ed. M. Feldstein, University of Chicago Press, 1983.

"The Design and Analysis of Social and Economic Experiments," invited paper for 43rd International Statistical Institute Meeting, 1981; Review of the ISI.

"Specification and Estimation of Simultaneous Equation Models," in Handbook of Econometrics, ed. Z. Griliches and M. Intriligator, vol. 1, 1983.

"Full-Information Estimators," in Kotz-Johnson, Encyclopedia of Statistical Science,vol. 3, 1983

"Instrumental Variable Estimation," in Kotz-Johnson, Encyclopedia of Statistical Science, vol. 4, 1984

PUBLICATIONS cont.:

"Specification Tests for the Multinomial Logit Model," with D. McFadden, October 1981; Econometrica, 1984.

"Econometric Models for Count Data with an Application to the Patents R&D Relationship," with Z. Griliches and B. Hall, NBER Working Paper, August 1981; Econometrica, 1984.

"The Econometrics of Nonlinear Budget Sets," Fisher-Shultz lecture for the Econometric Society, Dublin: 1982; Econometrica, 1985.

"The J-Test as a Hausman Specification Test," with H. Pesaran, November 1982; Economic Letters, 1983.

"Seasonal Adjustment with Measurement Error Present," with M. Watson, May 1983; Journal of the American Statistical Association, 1985.

"Efficient Estimation and Identification of Simultaneous Equation Models with Covariance Restrictions," with W. Newey and W. Taylor, October 1983; Econometrica, 1987.

"Technical Problems in Social Experimentation: Cost Versus Ease of Analysis," with D. Wise, in Social Experimentation, ed. J. Hausman and D. Wise, 1985.

"Errors in Variables in Panel Data," with Z. Griliches, Journal of Econometrics, 1986.

"Specifying and Testing Econometric Models for Rank-Ordered Data," with P. Ruud; Journal of Econometrics, 1987.

"Semiparametric Identification and Estimation of Polynomial Errors in Variables Models," with W. Newey, J. Powell and H. Ichimura, 1986, Journal of Econometrics, 1991.

"Flexible Parametric Estimation of Duration and Competing Risk Models," with A. Han, November 1986, revised January 1989, Journal of Applied Econometrics, 1990.

"Consistent Estimation of Nonlinear Errors in Variables Models with Few Measurements," with W. Newey and J. Powell, 1987.

"Optimal Revision and Seasonal Adjustment of Updated Data: Application to Housing Starts," with M. Watson, Journal of the American Statistical Association Proceedings, 1991.

"Seasonal Adjustment of Trade Data," with R. Judson and M. Watson, ed. R. Baldwin, Behind the Numbers: U.S. Trade in the World Economy, 1992.

"Nonparametric Estimation of Exact Consumers Surplus and Deadweight Loss," with W. Newey, 1992, Econometrica, 1995.

"Misclassification of a Dependent Variable in Qualitative Response Models," with F. Scott-Morton, mimeo December 1993.

"Nonlinear Errors in Variables: Estimation of Some Engel Curves," Jacob Marschak Lecture of the Econometric Society, Canberra 1988, Journal of Econometrics, 65, 1995.

PUBLICATIONS cont.:

II. Public Finance

"The Evaluation of Results from Truncated Samples," with D. Wise, Annals of Economic and Social Measurement, April 1976.

"Discontinuous Budget Constraints and Estimation: The Demand for Housing," with D. Wise, J.F. Kennedy School Working Paper, July 1977; Review of Economic Studies, 1980.

"The Effect of Taxation on Labor Supply: Evaluating the Gary Negative Income Tax Experiment," with G. Burtless, October 1977; Journal of Political Economy, December 1978.

"AFDC Participation -- Permanent or Transitory?," delivered at NBER-NSF Conference, August 1978; in Papers from the European Econometrics Meetings, ed. E. Charatsis, North Holland: 1981.

"The Effect of Wages, Taxes, and Fixed Costs on Women's Labor Force Participation," March 1979; presented at SSRC-NBER Conference on Taxation, Cambridge, England: June 1979; Journal of Public Economics, October 1980.

"The Effect of Taxes on Labor Supply," presented at Brookings Conference, October 1979; published in How Taxes Affect Economic Behavior, ed. H. Aaron and J. Pechman, Brookings: 1981.

"Income and Payroll Tax Policy and Labor Supply," presented at St. Louis Fed. conference, October 1980; in The Supply Side Effects of Economic Policy, ed. G. Burtless, St. Louis: 1981.

"Individual Retirement Decisions Under an Employer-Provided Pension Plan and Social Security," with G. Burtless, Journal of Public Economics, 1982.

"Individual Retirement and Savings Decisions," with P. Diamond, October 1981; presented at SSRC-NBER Conference on Public Economics, Oxford: June 1982; Journal of Public Economics, 1984.

"Retirement and Unemployment Behavior of Older Men," with P. Diamond, presented at Brookings Conference on the Aged, November 1982; in H. Aaron and G. Burtless, Retirement and Economic Behavior, Brookings: 1984.

"Tax Policy and Unemployment Insurance Effects on Labor Supply," May 1983; in Removing Obstacles to Economic Growth, ed. M. Wachter, 1984.

"Family Labor Supply with Taxes," with P. Ruud, American Economic Review, 1984.

"Social Security, Health Status and Retirement," with D. Wise, in Pensions, Labor, and Individual Choice, ed. D. Wise, 1985.

"The Effect of Taxes on Labor Supply," January 1983; in Handbook on Public Economics, ed. A. Auerbach and M. Feldstein, 1985.

"Choice Under Uncertainty: The Decision to Apply for Disability Insurance," with J. Halpern, Journal of Public Economics, 1986.

PUBLICATIONS cont.:

"Household Behavior and the Tax Reform Act of 1986," with J. Poterba, October 1986; Journal of Economic Perspectives, 1987, also published in French in Annales D'Economie et de Statistique, 1988.

"Involuntary Early Retirement and Consumption," with L. Paquette, ed. G. Burtless, Economics of Health and Aging, 1987.

"Income Taxation and Social Insurance in China," in Sino-U.S. Scholars on Hot Issues in China's Economy, 1990.

"On Contingent Valuation Measurement of Nonuse Values," with P. Diamond, in Contingent Valuation: A Critical Appraisal, ed. J. Hausman, 1993.

"Does Contingent Valuation Measure Preferences? Experimental Evidence," with P. Diamond, G. Leonard, M. Denning, in Contingent Valuation: A Critical Appraisal, ed. J. Hausman, 1993.

"Contingent Valuation: Is Some Number Better than No Number?" with P. Diamond, December 1993, Journal of Economic Perspectives, 8, 1994.

"A Utility-Consistent Combined Discrete Choice and Count Data Model: Assessing Recreational Use Losses Due to Natural Resource Damage," with G. Leonard and D. McFadden, October 1992, Journal of Public Economics, 56, 1995.

"The Cost of Cellular Telephone Regulation," mimeo, 1995.

"Contingent Valuation Measurement of Nonuse Values," with P. Diamond, ed. R.B. Stewart, Natural Resource Damages: A Legal, Economic, and Policy Analysis, 1995.

III. Applied Micro Models

"Project Independence Report: A Review of U.S. Energy Needs up to 1985," Bell Journal of Economics, Autumn 1975.

"Individual Discount Rates and the Purchase and Utilization of Energy Using Durables," MIT Energy Laboratory Working Paper, January 1978; Bell Journal of Economics, Spring 1979.

"Voluntary Participation in the Arizona Time of Day Electricity Experiment," with D. Aigner, May 1978; delivered at EPRI Conference on Time of Day Pricing, June 1978; in EPRI Report, Modeling and Analysis of Electricity Demand by Time of Day, 1979; Bell Journal of Economics, 1980.

"A Two-level Electricity Demand Model: Evaluation of the Connecticut Time-of-Day Pricing Test," delivered at EPRI Conference on Time of Day Pricing; with D. McFadden, in EPRI Report, Modeling and Analysis of Electricity Demand by Time of Day, 1979; Journal of Econometrics, 1979.

"Assessing the Potential Demand for Electric Cars," with S. Beggs and S. Cardell, presented at EPRI Conference, November 1979; Journal of Econometrics, 1981.

"Assessment and Validation of Energy Models," presented at EIA-NBS conference on Energy Models, May 1980; in Validation and Assessment of Energy Models, ed. S. Gass, Washington: Department of Commerce, 1981.

PUBLICATIONS cont.:

"Exact Consumer Surplus and Deadweight Loss," working paper 1979, American Economic Review, 71, 1981.

"Appliance Purchase and Usage Adaptation to a Permanent Time of Day Electricity Rate Schedule," with J. Trimble, August 1983; Journal of Econometrics, 1984.

"Evaluating the Costs and Benefits of Appliance Efficiency Standards," with P. Joskow, MIT Energy Lab Working Paper, MIT-EL82005WP; American Economic Review, 72, 1982.

"Information Costs, Competition and Collective Ratemaking in the Motor Carrier Industry," presented at Conference On Consensual Decision Making, American University, August 1982; American University Law Review, 1983.

"An Overview of IFFS," presented at EIA-NBS Conference on Energy Models, August 1982; in Intermediate Future Forecasting System, ed. S. Gass et al., Washington: 1983.

"Choice of Conservation Actions in the AHS," November 1982; in Energy Simulation Models, ed. R. Crow, 1983.

"Patents and R&D: Searching for a Lag Structure," with B. Hall and Z. Griliches, in Actes du Colloque Econometrie de la Recherce, Paris: 1983.

"The Demand for Optional Local Measured Telephone Service," in Adjusting to Regulatory, Pricing and Marketing Realities, East Lansing: 1983.

"Patents and R&D: Is There a Lag?," with B. Hall and Z. Griliches, 1985; International Economic Review, 1986.

"Price Discrimination and Patent Policy," with J. MacKie-Mason, Rand Journal of Economics, 1988.

"Residential End-Use Load Shape Estimation from Whole-House Metered Data," IEEE Transactions on Power Systems, 1988 (with I. Schick, P. Vsoro, and M. Ruane).

"Competition in Telecommunications for Large Users in New York," with H. Ware and T. Tardiff, Telecommunications in a Competitive Environment, 1989.

"Innovation and International Trade Policy," Oxford Review of Economic Policy, 1988 (with J. MacKie-Mason).

"The Evolution of the Central Office Switch Industry," with W. E. Kohlberg, 1987; in ed. S. Bradley and J. Hausman, Future Competition in Telecommunications, 1989.

"Future Competition in Telecommunications," 1987; ed. S. Bradley and J. Hausman, Future Competition in Telecommunications, 1989.

"Joint Ventures, Strategic Alliances and Collaboration in Telecommunications," presented at International Conference on Joint Ventures in Telecommunications, October 1989, Regulation, 1991.