

Telecommunications Regulation: Current Approaches with the End in Sight

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I. Introduction

Economic advice to regulators regarding the correct principles to set regulated prices has often been incorrect in that it does not recognize the underlying technology of the industry. Economists recognized early on that in the situation of privately owned utilities in the United States that the first-best prescription of price set equal to marginal cost could not be used because of the substantial fixed (and common) costs that most regulated utilities needed to pay for.² This realization typically accompanied the claim that the economies of scale of the regulated firm were so significant that competition could not take place because the regulated firm's cost function was significantly below new entrants. Nevertheless, the most common advice from economists was that prices should be set similar to the outcome of a competitive process.

What the competitive process would be was never specified with any detail, which was to be expected since economic theory had no well-accepted model of competition with a technology exhibiting strong economies of scale, especially in the multiproduct situation. In the United States, regulators following legal principles adopted the position that the regulated firm should cover its costs. However, regulators also adopted prices for certain services to attempt to meet social goals for these given services. For other services, regulators used arbitrary means to set prices while balancing competing claims from increasingly well organized groups of consumers, all of whom claimed they should receive low prices with other groups paying for the fixed and common costs.

This regulatory approach arguably did not do undue damage when no actual competition existed. So long as the regulated firm was (nearly) productively efficient,

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² See e.g. A. Kahn, The Economics of Regulation, vol. 1, New York, 1970.

the losses were essentially second-order social welfare losses.³ The regulated firm covered its total costs, at least approximately, although prices for individual services were often badly distorted from an economically efficient solution.

However, when actual competition appeared and was allowed to exist by the regulators, the economists' advice of setting prices as if they were the outcome of a competitive process soon led to a regulatory morass. Regulators could no longer depend only on cost factors in setting regulated prices. The outcome of a competitive process would also need to take into account demand factors and competitive interaction (oligopoly) factors, with the first set of factors difficult to measure and the competitive interaction factors unlikely to be agreed upon. While regulators had some imperfect information about costs, they typically had little or no information about demand and no well-developed idea regarding the effects of competitive factors.

A particularly difficult problem arose when a regulated firm wanted to decrease its prices for services subject to entrant competition. Economists recognized that price set above incremental (marginal) cost should be permitted. New entrants wanted the previously set regulator set prices to be maintained. New entrants typically entered because regulated prices were well above efficient levels, and the new entrants did not want these prices decreased. Furthermore, from a social welfare viewpoint the argument became first-order since inefficient new firms could be productively inefficient, causing a first-order loss of social welfare.

Regulators found it difficult to permit the regulated firm to decrease its prices, especially since under cost of service regulation other prices would need to increase. Even when cost of service regulation was replaced by incentive (price-cap) regulation in the 1980s and 1990s, regulators still found it extremely difficult to allow price decreases since they believed in "regulated competition" (an oxymoron) where the regulators could better manage competition than the market. Nevertheless, the regulated companies were not harmed too badly since competition did not proceed at such a rapid pace to cause extreme economic damage.

³ However, the approach did harm consumers to a significant degree by retarding new product innovation, which is a first-order loss to economic efficiency. See Hausman (1997) for estimates of consumer welfare loss.

Cost-based regulation of telecommunications (for example rate-of-return regulation in the United States) had significant negative effects on innovation while it was claimed that it led to excessive capital investment. Most economists conclude that cost-based regulation led to significant consumer harm. In the mid-1980s when the U.K. government privatized British Telecom (BT), it decided not to use the historic approach of cost of service regulation to set regulated prices as the United States and Canada had done. The U.K. government instead chose price caps, a new regulatory method proposed by Littlechild.⁴ Price caps regulated prices based on inflation and a productivity factor instead of regulated profits as in the U.S. cost of service based “rate of return” (ROR) regulation.

Price caps had a number of advantages over ROR regulation in terms of incentives for cost minimization (productive efficiency), innovation, and the ability of the regulated firm to rebalance its prices. In particular, the regulated firm could decrease its prices to compete. In 1989-90 the Federal Communications Commission adopted price caps in the United States. Other countries such as Australia had also adopted price caps. During the 1980s and 1990s price cap regulation was implemented instead of cost-based regulation in most countries when telephone companies and other utilities were privatized. In the majority of the states of the United States, rate-of-return regulation has been replaced by price cap regulation. The battle to banish cost-based regulation appeared to be largely over.⁵

During the late 1990s and the early 2000s cost-based regulation has reappeared because of the necessity to set price for unbundled network elements (UNEs) sold by incumbent firms to their competitors. A number of countries—including the United States, Australia, and Canada—adopted mandatory network unbundling for the incumbent local exchange carrier (ILEC). The most commonly used approach to set regulated network element prices based on costs is “total service long run incremental cost”, or TSLRIC. Unfortunately, the adoption of TSLRIC as a cost basis to set the

⁴ See Beesley and Littlechild (1989) for a description of the economic incentives under price caps.

⁵ State regulatory agencies in the U.S. set local prices for telecommunications. California adopted price cap in 1989 and by the mid-1990s the majority of states had adopted some form of incentive regulation.

prices for unbundled elements has negative economic incentive effects for innovation and for new investment in telecommunications networks as we have discussed in previous academic research. (Hausman 1997, 1998, 2003; Hausman & Sidak 1999)

How did network unbundling and a return to cost-based regulation become government policy? In 1996, the U.S. Congress passed the Telecommunications Act of 1996. As a tradeoff for being permitted to offer long distance service, the incumbent Bell operating companies agreed to unbundle their networks.⁶ The FCC adopted cost of service regulation to set the unbundled network element prices. Thus reappeared the well-known problems of cost of service regulation, with its inability to correctly treat economies of scale and economies of scope and its use of arbitrary allocations of fixed and common costs to prices. Even worse, the FCC adopted the approach of “total element long run incremental cost” (TELRIC), which assumes that all investments in telecommunications networks are fixed, but not sunk. This assumption is, of course, directly contradicted by the actual technology of telecommunications networks. Other countries have adopted a similar approach based on total service long run incremental costs. Similar problems arise.

In this paper we do not review these problems, which have been discussed in previous papers (e.g. Hausman 1997, 2003 and Pindyck 2004) but instead we consider the outcomes so far of the new regulatory approach to unbundling the incumbents’ networks. We concentrate on the outcome in three countries: the United States, the United Kingdom, and New Zealand. The United States first adopted unbundling and has taken the most aggressive approach. However, in February 2005 the FCC, acting in response to a decision of the U.S. Court of Appeals for the D.C. Circuit vacating the agency’s unbundling rules, decided to “sunset” its most intrusive form of unbundling.⁷ In response, the two most prominent local competitors, AT&T and MCI, announced they would exit the local market. Shortly thereafter, both companies announced that they would be acquired by RBOCs (SBC and Verizon). Thus, while much of the

⁶ The Bell Operating Companies had been not allowed to provide interLATA long distance service since the breakup of AT&T in 1984.

⁷ Order on Remand, In re Unbundled Access to Network Elements, 2005 FCC LEXIS 912, WC Docket No. 04-313, CC Dkt. No. 01-338 (FCC Feb. 4, 2005).

“competition” caused by the Telecommunications Act of 1996 was “artificial competition” (to borrow Justice Breyer’s characterization), the local market in the United States will benefit from facilities-based competition as cable television networks rapidly expand their offering of telephone service over their networks through voice over internet protocol (VOIP).

In the United Kingdom, the regulator initially favored facilities-based competition from the U.K.’s cable operators, which already had a substantial share of the local telephone market. However, the regulator subsequently changed direction, in part because of directions from the EU. We examine the effect of unbundling in the United Kingdom and its effect on the prospects for future facilities-based competition. Those prospects are all the most doubtful after the regulator (now, OFCOM) and BT announced in May 2005 that they had reached a compromise—in lieu of structural separation—that appears to “renationalize” BT insofar as governance of network unbundling is concerned.

Lastly, we consider New Zealand, where the regulator decided not to adopt network unbundling. New Zealand has an explicit consumer welfare test for regulation, the “long term benefit of end-users”, and bases regulatory decisions, in part, on an explicit cost-benefit analysis. Further, when the decision was made in New Zealand not to unbundle, the United States had over six years of experience of unbundling. We explore how this experience affected the regulator’s decision in New Zealand.

Our general conclusion is that in both the United States and the United Kingdom unbundling may have caused an increase in competition, if one measures competition by market share of entrants. However, adverse effects occurred in terms of investments by both incumbents and new entrants. Further, the “goals” put forward by regulators in terms of unbundling have not been met.

In the last section we consider whether, with increased facilities-based competition, especially in the United States, the “end of regulation” in telecommunications should occur. We explain that in an industry with high fixed costs and low variable costs, the incumbent will not be able to increase prices above competitive levels profitably if it loses a relatively small amount of business. Thus, absent price discrimination, the entry of cable television providers offering telephone service should serve to constrain incumbents from increasing prices above competitive

levels at a quite early stage. Although we do not harbor high hopes that most regulators will recognize this economic effect, legislators (and the courts) can take notice of it. Thus, no economic reason exists for the incumbent's share to fall to, say, 50% before price deregulation should follow. Emerging facilities-based competition should allow the end of price regulation and the regulatory burden that it creates for both consumers and the economy.

II. The Simple Model of Cost-based Regulation

The model of cost-based regulation is to use costs of production to set prices that would be the result of a "competitive" situation. These costs of production are used to set prices independent of demand factors. A very simple one good-one period Marshallian partial equilibrium model leads to the result, where competitive prices are independent of demand. We first describe this simple model and its inherent limitations.

A. Conditions for Prices Independent of Demand

Assume that a given regulated telecommunications service is produced by one or more input factors. No multi-period capital goods are present. The production technology exhibits constant returns to scale. In Figure 1 the result follows that the competitive price equal marginal cost, which in turns equals average cost, because of the assumption of constant returns to scale. As can be seen, the position and shape of the demand curve does not matter in setting the competitive price. Under these conditions, cost determines price, independent of demand. This interesting result depends very much on the assumptions of the economic model: partial equilibrium, so that demand for the product does not affect input factor prices; constant returns to scale, so there are no economies of scale; a single product, so there is no joint production and no economies of scope; and a single period, so there are no durable capital goods. We discuss later what happens when these assumptions do not hold. If any of the assumptions fails, the competitive price cannot be based on cost, independent of demand. Thus, the price-independent-of-demand result will turn out to be a very special result not applicable to the real world of telecommunications.

B. The Role of Fixed Costs and Economies of Scale

We will now generalize this model slightly. Suppose that marginal cost remain constant but that we allow for a fixed cost of production. However, a single service is still being produced. The cost function can be written as:

$$C(q, w) = F + wq \quad (2.1)$$

where F is the fixed cost, q is output quantity, and w is the constant marginal cost per unit of output. A regulator might conclude that in a competitive, free entry situation price would equal average cost, so that $p = (C/q) = (F/q) + w$. Since quantity demanded is a function of price, price is no longer independent of demand. However, setting price equal to average cost, AVC, seems to be the correct outcome if the regulated utility is to recover its costs.

C. The Role of Common Costs and Economies of Scope

Now we consider common costs. A common cost arises when two (or more) services arise from a joint production process, but some of the cost is incremental to neither product. The term “fixed and common costs” arises often in discussion of regulated costs and prices because of the common occurrence of this type of cost. In terms of the cost function we will again assume constant marginal costs for each output:

$$C(q_1, q_2; w_1, w_2) = G + w_1q_1 + w_2q_2 \quad (2.2)$$

Note that in equation (2.2) the fixed cost G cannot be uniquely assigned to either output. Indeed, no measure of average costs for either output exists. Here regulators typically choose to use an allocation of the fixed cost G to each service. However, these allocations such as “fully allocated cost,” “equal allocation of cost,” and so on are inherently arbitrary.⁸ Nevertheless, the results of the allocations have very important

⁸ Indeed, the results of the allocations depend in important ways on the units in which the outputs, q_1 and q_2 , are measured.

consequences on the regulated prices. These regulated prices in turn have important effects on competition, economic efficiency, and consumer welfare.

In competitive markets, firms set price based on cost conditions, demand conditions, and competitive conditions. Regulators attempt to base prices on only the first of these three factors. Thus, regulators do not meet their goal of setting regulated prices in a manner similar to that of a competitive market. Furthermore, they cause billions of dollars per year of losses in economic efficiency and consumer welfare.⁹ Instead of using inherently arbitrary allocation procedures, regulators should either take account of demand and competitive conditions in setting regulated prices or adopt procedures such as global price caps, which will lead the regulated utility to take account of demand and competitive conditions.¹⁰

D. The Role of Sunk Costs

We now generalize the model one step more by considering sunk costs in addition to fixed costs. Sunk costs are costs that cannot be recovered if the economic activity ceases. Sunk costs are prevalent in telecommunications networks. Consider an investment in a (copper) loop to a residential customer. The customer has a unique loop that connects the residence to the central office switch. If the customer decides to use a competitive service, such as local access service offered by a competitive cable company or by a wireless company, the copper loop cannot be redeployed in another service. The investment in the loop is sunk. Now if a regulated telephone company faced no uncertainty over the future use of the loop and the cost and prices for the associated services provided with the loop, the distinction between a fixed cost, which arises from an asset which can be economically redeployed, and a sunk cost is not that important.

Indeed, in the “old days” of cost-based regulation for a monopoly provider, if an investment were deemed to be “used and useful” by the regulator, then the asset entered

⁹ For an example of regulators causing losses of billions of dollars per year in economic efficiency and consumer welfare see J. Hausman, "Taxation By Telecommunications Regulation," Tax Policy and the Economy, 12, 1998 and J. Hausman and H. Shelanski, "Economic Welfare and Telecommunications Welfare: The E-Rate Policy for Universal Service Subsidies," Yale Journal on Regulation, 1999

¹⁰ See Laffont and Tirole (2000) for a discussion of global price caps.

the regulatory cost base. Once the asset entered the regulatory cost base, the regulator, in principle, allowed the utility to recover the cost of the investment.¹¹

However, in the current situation of competition, where the utility's competitors are allowed to use the incumbent's network at regulated prices, the distinction between fixed costs and sunk costs can be important. The competitor typically pays for the facility it uses on a monthly basis. As we explain below, regulators universally use an approach that assumes that the investment costs are fixed but not sunk. In setting the regulated prices without taking into account the interaction of sunk costs and uncertainty, regulators give competitors a "free option" to use the incumbent's network without requiring a price that takes account of the sunk cost nature of much of the investment. The regulators thus subsidize the competitors at the expense of the incumbent and create an economic disincentive for the competitors to invest in their own competing facilities.¹² Furthermore, the regulators decrease the incentive for new services offered by the incumbent. New services often fail. Yet if successful new services must be resold to competitors at cost, the incentive to undertake the required risky investment is decreased.¹³ Thus, regulators are likely to decrease new service for consumers based on their approach to setting regulated prices.

III. Cost-Based Regulation: Economic Analysis with Cost But Not Demand

As we discussed above, in a simple one-period and one-good production model with constant returns to scale, a partial equilibrium Marshallian analysis demonstrates that the competitive price does not depend on demand. Marginal cost and average cost

¹¹ In practice, because of incorrect depreciation schedules and inflation, utilities often did not recover the true cost of their investments.

¹² See Figure 2, which demonstrates the effect of the free option is to decrease the expected return of a new investment because of truncation of the returns distribution. Justice Stephen Breyer of the U.S. Supreme Court *AT&T Corp. v. Iowa Utilities Board*, 119 S. Ct. 721 (1999), described how this outcome distorts and decreases the actual amount of competition. Regulators are actually causing decreased competition when one of their stated goals is to increase competition.

¹³ For estimates of the extremely large gain to consumer welfare that can arise from new telecommunications services see J. Hausman, "Valuation and the Effect of Regulation on New Services in Telecommunications," Brookings Papers on Economic Activity: Microeconomics, 1997.

are independent of quantity produced, so the position of the demand curve does not affect the price as demonstrated in Figure 1. However, the required description of technology does not describe accurately almost any industry in a modern industrial economy and certainly not the telecommunications industry. For example, telephone and wireless networks have a very large proportion of fixed and sunk costs. We now consider whether the “price independent of demand” result holds in a broader context to see whether it is (approximately) applicable to telecommunications.

To do so we consider “non-substitution” theorems, which demonstrate that under certain conditions an economy will have a unique price structure determined by the costs of production, independent of the structure of final demand. We will refer to these results as Samuelson-Mirrlees non-substitution theorems.¹⁴ We consider initially the simplest situation where labor is the only non-produced factor in the economy. Here a set of necessary conditions that would lead to a Samuelson-Mirrlees non-substitution theorem result:

Necessary Conditions for a non-substitution theorem:

1. Only one non-produced good exists: the good is usually assumed to be labor so that land or minerals do not exist.
2. The technology is constant returns to scale: a constant per unit requirement of inputs occurs regardless of the amount of output. This condition rules out economies of scale.
3. No joint production: a single production process cannot lead to two or more different outputs. This condition rules out economies of scope.
4. The economy is productive: the economy can produce a positive net vector of outputs where net output is gross output minus inputs.

With these (plus some additional technical) conditions, the product prices will be independent of final demand. The product prices will equal the cost of production, denominated in terms of the numeraire, which can be units of the non-produced good.

¹⁴ See Samuelson (1961) and Mirrlees (1969). An early version of this type of result is in Georgescu-Roegen (1951). A textbook treatment is found in Bliss (1975, Ch. 11).

Thus, in a Samuelson-Mirrlees non-substitution model, prices of the many products in the economy are independent of demand, as in the simple partial equilibrium single-product Marshallian model

B. Necessary Assumptions and Economic Reality: The “Regulatory Fallacy”

We now consider how realistic the necessary assumptions for the application of the non-substitution theorem are in the context of telecommunications. Could the regulatory goal of setting competitive prices independent of demand hold approximately true in a realistic economic situation? Since the assumption for the Samuelson-Mirrlees non-substitution theorems are necessary assumption, no weaker assumptions will do. Thus, to correctly set prices independent of demand, the four necessary assumptions must hold true. The first assumption of only a single unproduced factor cannot be correct in a modern economy. If labor and land (minerals) are both unproduced factors, their relative prices will affect input costs and final product prices. But their relative prices will depend on the pattern of demand for products that use both labor and land (silicon, copper, and silver). Since products will use in direct and indirect form different proportions of the non-produced products, the relative prices cannot be independent of demand. Then, neither the cost of production nor final product prices can be independent of demand. How important this departure from the necessary assumption is cannot be resolved easily. It may not be that important since, if we consider telecommunications as a separable sector of the economy (somewhat similar to partial equilibrium analysis), it might be claimed that the sector is small enough compared to a given regional economy for service and the world economy for capital goods, that is does not have a significant effect on the relative prices of the primary factors. The price of the Hicksian composite economy for the non-telecommunications sector might then be used as a numeraire without too much departure from reality. We will similarly dispose of the last assumption that the economy is productive with the remark that as an approximation likely departure (if any) would likely be unimportant.

We now turn to the two most important necessary assumptions for the current application: no economies of scale and no economies of scope. The presence of large economies of scale has traditionally been given as one of the primary reasons for

regulation.¹⁵ The old question of a “natural monopoly” is based on large economies of scale. Whether or not the claim of a natural monopoly is correct, modern telecommunications network regulation in the United States, United Kingdom, Australia, and Canada is based on the importance of economies of scale.¹⁶ The idea is that a new entrant cannot duplicate the telecommunications network, so that the incumbent provider is required to sell the use of its network to the new entrant at a regulated cost. The common terminology of “fixed and common” costs in telecommunications denotes the importance of economies of scale that arise from the “fixed costs” in modern telecommunications networks. As we discuss later, the regulated price typically ignores demand factors, which is inconsistent with the whole notion of economies of scale. The higher is demand, the lower is per unit cost, especially when fixed costs are taken into account.

The “no economies of scope” assumption of the Samuelson-Mirrlees non-substitution theorems is violated by all modern telecommunications networks. Economies of scope arise when it is less costly to produce two or more products jointly than by separate production processes. An example of joint production arises with modern telecommunications switches, which are combinations of computers and switch blocks.¹⁷ Switches route calls, but they also provide other services such as voice mail. The same computer is used to provide both services in a less costly manner than if switching and voice mail were provided separately. Again economies of scope are one of the stated reasons for required resale of network functions by incumbent telephone companies to their competitors. A further indication of the importance of economies of scope is the importance of “common costs” in debates over regulated prices. Common costs are typically defined to be costs that arise from two (or more) services, but the costs are not incrementally caused by either service alone. Regulatory bodies such as the Canadian CRTC and some state regulatory bodies have arbitrarily set a markup to the “direct” cost of 20 to 25% to account for common costs.

¹⁵ See e.g. A.E. Kahn (1988), vol. II, pp. 119. ff.

¹⁶ Economies of scale can often appear as economies of density in telecommunications, but the basic notion is the same.

¹⁷ For a further discussion of economies of scope with switches see Hausman and Kohlberg (1989).

Yet economists know that most modern competitive companies have joint production and common costs for the production of their outputs. These competitive companies base their prices on competitive conditions for their products. Competitive conditions take account of demand conditions that arise from overall market demand for the product as well as firm demand conditions that arise as a result of competition. Although regulators often say they want to replicate the outcome of a competitive process, they miss the obvious point that a competitive process involves cost factors as well as demand factors. Regulators, to the contrary, ignore the effect of demand factors on competitive outcomes. Instead, regulators use arbitrary markups over some measure of incremental (or variable) cost to account for economies of scale and economies of scope. These arbitrary markups decrease economic efficiency and consumer welfare significantly.

An additional necessary assumption for a non-substitution theorem to hold is that the economy is on a steady state growth path. This assumption allows for durable capital goods to enter the model. This assumption for an economy may be a reasonable approximation in certain circumstances, but for the telecommunications sector it departs from any approximation to economic reality. Economists agree that the telecommunications sectors are among the most dynamic in the economy. And since a substantial portion of the durable capital goods used in the telecommunications sector are closely connected to semiconductors and optical transmission, innovations in these sectors will directly affect investment in capital goods in telecommunications. Thus, the steady-state growth assumption is not a good assumption for telecommunications.

Thus, our evaluation is that modern telecommunications differ in many significant and quantitatively important ways from the necessary conditions for price to be independent of demand. Economies of scale and economies of scope are universally recognized to be important economic characteristics of modern telecommunications networks. The regulatory attempt to set prices as if they were the outcome of a competitive process but to ignore the importance of demand factors leads to what we call the "*regulatory fallacy*." No serious student of economics would claim that the necessary conditions for the non-substitution theorem hold in a telecommunication network environment. Yet the regulatory assumption that price would be based on cost

alone in a competitive market is wrong. Economic theory has developed precise condition when price is independent of demand, and they do not hold, even as an approximation, in telecommunications. Thus regulators are acting on an erroneous belief that, with competition, price equals cost, independent of demand. This erroneous belief leads directly to the resulting regulatory fallacy. The consequent use of arbitrary allocations and markups to regulated prices to take account of fixed and common costs—which are *exactly the costs that arise from economies of scale and scope*—leads to significant consumers harm. If regulators instead took account of demand factors in setting regulated prices, economic efficiency and consumer welfare could be increased significantly.¹⁸

C. Distortions to Competition

Why does incorrect regulation harm consumers more when competition exists? Let us consider an incumbent fixed line provider who decides to explore the economic potential of upgrading its network by increasing fiber penetration. This upgrade would likely cost in the billions of dollars and would be largely a sunk cost investment. The company would have an economic incentive to invest in the upgrade so it could provide higher speed DSL (broadband Internet) service to compete better with cable providers who until recently had a 67% market share of broadband Internet connections through cable modems, although DSL has now increased its share from about 33% to 40%. Cable modems typically provide both faster download speeds and faster upload speeds than current telephone DSL service.¹⁹ Cable companies typically charge a significant premium for their service, so incumbent investment would likely lead to increased competition and lower prices for consumers.

¹⁸ For a recent situation where the FCC disregarded demand conditions and caused billions of dollars in efficiency losses to the economy see Hausman (1998a), which demonstrates that if demand conditions had been taken into account, the efficiency losses to the economy could be reduced to approximately zero.

¹⁹ DSL speeds depend in part on the distance of the premise from the central office, but typically cable modems provide two to three times faster download speeds.

A potential larger benefit to consumers would arise if the incumbent decided to provide pay television service in competition with cable.²⁰ Thus, economies of scope would exist in the provision of two services, DSL and pay TV over the same network. Cable companies have exercised market power for many years. The FCC has reported that monthly cable rates in January 2004 were 15.7 percent lower in areas where incumbent cable operators face competition from a wireline overbuilder.²¹ Almost all of the cable competitors have suffered financial difficulties that have limited their ability to expand (for example, RCN in the United States), but an incumbent telecommunications company would have much greater financial resources. Thus, phone company entry into the pay TV market could lead to significant gains for consumers.

However, under the initial implementation of the 1996 Act incumbents would be required to allow competitors to utilize these new investments at TELRIC based prices, which did not recognize the sunk cost character of the investments.²² Further, because economies of scope that exist in the provision of DSL, some state regulators who set actual TELRIC rates (as did California), set the TELRIC rate for DSL elements at essentially zero. Unsurprisingly, incumbent companies made little investment in next generation networks in the United States. Since 2003, the FCC has begun to recognize the errors in its approach, in part at the direction of the D.C. Circuit, which by then had ruled three times that the FCC regulations on unbundling were inconsistent with the Telecommunications Act of 1996. In August 2005, the FCC finally exempted DSL from all unbundling requirements because of competition from cable networks (subject to a one-year phase-out).²³ However, by refusing for nearly a decade to recognize the role of competition and instead using cost-based regulation, the FCC has severely distorted competition and harmed consumers. First-order losses to social welfare occur in these types of situations when new products are not introduced to consumers.²⁴

²⁰ These developments are currently ongoing in both Canada and New Zealand.

²¹ Statistical Report on Average Rates for Basic Service, Cable Programming Service, and Equipment, MM Dkt. No. 92-266, 4 ¶ 12 (2005).

²² Indeed, regulators set TELRIC prices using the overall company cost of capital, rather than taking account of the much higher risk that arises with sunk cost investments. See Hausman (1997, 1998, 2003) and Pindyck (2004).

²³ [Cite to Aug. 2005 order, when available.]

²⁴ For a further explanation of the first-order effects see Hausman (1997, 2003).

IV. Has Unbundling the Network Achieved its Goals?

In the 1990s, mandatory unbundling became the proposed remedy of choice in telecommunications regulatory proceedings. In the United States, the Telecommunications Act of 1996 rests on the hypothesis that requiring a firm to share the use of its facilities with its competitors will enable the competitors eventually to build their own facilities, presumably to the eventual benefit of consumers. The mandatory sharing of facilities is thus the prelude to eventual competition between rival infrastructures or platforms. The corollary of this assumption is that, but for this exact form of regulatory intervention, natural market forces cannot be counted on to produce facilities-based competition.

Any firm may choose to unbundle or lease components of its network with a third party *at a voluntarily negotiated rate*. The firm is also able to decide the scope of unbundling it wants to undertake—how much of its network to resell. The term ‘mandatory unbundling’ describes an involuntary exchange between an incumbent network operator and a rival *at a regulated rate* where the scope of unbundling is determined by regulators. Determination of the access rate thus becomes the major bone of contention between incumbent and entrant, as a regulatory access rate that is equal to the voluntarily agreed-upon access rate cannot really be said to constitute ‘mandatory’ unbundling. When formulating that access rate, regulators have generally opted in favor of a measure of total element long-run incremental cost (TELRIC) or total service long-run incremental cost (TSLRIC) and against a measure of opportunity cost or option value.²⁵

Mandatory unbundling at a regulated rate may apply to various ‘network elements,’ which are defined by the U.S. Telecommunications Act of 1996 as ‘a facility or equipment used in the provision of a telecommunications service.’²⁶ The Act instructs the FCC to consider whether ‘the failure to provide access to such network elements

²⁵ For a detailed analysis of the scope of the unbundling decision and the access pricing decision by a telecommunications regulator, see Jerry A. Hausman & J. Gregory Sidak, A Consumer-Welfare Approach to Mandatory Unbundling of Telecommunications Networks, 109 Yale L.J. 417 (1999).

²⁶ 47 U.S.C. § 153(29).

would impair the ability of the telecommunications carrier seeking access to provide the services that it seeks to offer.’²⁷ Under the Act, prices for unbundled network elements (UNEs) are based on the cost of providing the interconnection or network element.²⁸ The FCC interpreted that pricing rule as ‘forward-looking, long-run, incremental cost.’²⁹ In practice, prices are ‘based on the TSLRIC [total service long run incremental cost] of the network element . . . and will include a reasonable allocation of forward-looking joint and common costs.’³⁰

As part of its *Triennial Review Order* of its unbundling regulations, the FCC explained that ILECs were required to provide access to network elements ‘to the extent that those elements are capable of being used by the requesting carrier in the provision of a telecommunications service.’³¹ The FCC ordered all ILECs to make available at regulated rates the following UNEs:

- (1) stand-alone copper loops and subloops for the provision of narrowband and broadband services,
- (2) fiber loops for narrowband service in fiber loop overbuild situations where the incumbent LEC elects to retire existing copper loops,
- (3) subloops necessary to access wiring at or near a multiunit customer premises,

²⁷ 47 U.S.C. § 251(d)(2)(B).

²⁸ 47 U.S.C. § 252(d)(1) (stating that ‘Determinations by a State commission of the just and reasonable rate for the interconnection of facilities and equipment for purposes of subsection (c)(2) of section 251, and the just and reasonable rate for network elements for purposes of subsection (c)(3) of such section—‘(A) shall be—‘(i) based on the cost (determined without reference to a rate-of-return or other rate-based proceeding) of providing the interconnection or network element (whichever is applicable), and ‘(ii) nondiscriminatory, and ‘(B) may include a reasonable profit.’).

²⁹ *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996; Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers*, CC Docket Nos. 96-98, 95-185, First Report and Order, 11 F.C.C. Rcd. 15499, ¶ 620 (1996) [*First Report & Order*].

³⁰ *Id.*, ¶ 672

³¹ Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, CC Dkt. No. 01-338, 20 August 2003, p. 42 ¶ 59 [*Triennial Review*], rev’d, *U.S. Telecom Ass’n v. FCC*, 290 F.3d 415, 428-29 (D.C. Cir. 2002).

- (4) network interface devices (NID), which are defined as any means of interconnecting the ILEC's loop distribution plant to wiring at a customer premises location,
- (5) dark fiber, DS3, and DS1 transport, subject to a route-specific review by the states to identify available wholesale facilities,
- (6) local circuit switching serving the mass market,
- (7) shared transport only to the extent that carriers are impaired without access to unbundled switching,
- (8) signaling network when a carrier is purchasing unbundled switching, and
- (9) call-related databases when a requesting carrier purchases unbundled access to the incumbent LEC's switching,
- (10) operations support systems (OSS) for qualifying services, which consists of pre-ordering, ordering, provisioning, maintenance and repair, and billing functions supported by an ILEC's databases and information, and
- (11) combinations of UNEs, including the loop-transport combination (enhanced extended link, or EEL).³²

Based on this exhaustive list, it is reasonable to conclude that, at least in the United States, virtually no component of an incumbent's network was immune from unbundling obligations eight years after the passage of the Telecommunications Act.

b. Line Sharing Versus Bitstream Access of Data Services

Bitstream access provides service-level (resale) entry to digital subscriber line (DSL) data provision. Under the bitstream approach, the entrant buys the complete service for a high-speed link to the consumer, and the service includes delivery to the first data switch in the incumbent's network. Unbundled network line sharing, by contrast, allows the entrant to acquire the high-frequency portion of the copper connection but requires it to make some investments in infrastructure.

Mandatory line sharing was attempted and then abandoned in the United States. In the FCC's *Line Sharing Order* released in 1999, the FCC directed ILECs to provide

³² Id., pp. 10-13

the high-frequency portion of the local loop (HFPL) to requesting carriers as a UNE.³³ The Commission found in the *Line Sharing Order* that ‘[t]he record shows that lack of access would materially raise the cost for competitive LECs to provide advanced services [such as DSL] to residential and small business users, delay broad facilities-based market entry and materially limit the scope and quality of competitor service offerings.’³⁴ In May 2002, however, the U.S. Court of Appeals for the D.C. Circuit vacated the *Line Sharing Order*, finding that the Commission had failed to give adequate consideration to existing facilities-based competition in the provision of broadband services, especially by cable systems.³⁵ In its August 2003 *Triennial Review Order*, the FCC decided not to reinstate the vacated line-sharing rules because it determined that ‘continued unbundled access to stand-alone copper loops and subloops enables a requesting carrier to offer and recover its costs from all of the services that the loop supports, including broadband service.’³⁶

The FCC rejected its prior finding that lack of separate access to the high frequency portion would cause impairment for four reasons. First, the FCC explained that its earlier impairment finding had been based on a notion that broadband revenues would not justify the cost of the whole loop. After considering revenues from voice and video, the FCC determined that such revenues would offset the costs associated with purchasing the entire loop.³⁷ Second, the FCC explained that CLECs interested only in broadband could obtain broadband frequencies from other CLECs through line-splitting, in which one CLEC provides voice service on the low frequency portion of the loop and the other provides DSL on the high frequency portion.³⁸ Third, the FCC noted that the difficulties of cost allocation for different portions of a single loop had led most states to price the high frequency portion of the loop at approximately zero, which distorted competitive

³³ Deployment of Wireline Services Offering Advanced Telecommunications Capability and Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, CC Dkt. Nos. 98-147, 96-98, Third Report and Order in CC Dkt. No. 98-147 and Fourth Report and Order in CC Dkt. No. 96-98, 15 F.C.C. Rcd. 3,696 (1999) [*Third Order*].

³⁴ *Id.*, 20,916 ¶ 5

³⁵ *U.S. Telecom Ass’n v. FCC*, 290 F.3d 415, 428-29 (D.C. Cir. 2003).

³⁶ See *Triennial Review*, supra note 31, p. 125 ¶ 199.

³⁷ *Id.*, ¶ 258

³⁸ *Id.*, ¶ 259

incentives.³⁹ Fourth, the FCC recognized the substantial intermodal competition from cable companies, which lessened any competitive benefits associated with line sharing.⁴⁰

In its March 2004 opinion, the D.C. Circuit upheld the FCC's decision to eliminate line sharing, concluding that the FCC 'reasonably found that other considerations outweighed any impairment.'⁴¹ With respect to the incentive problem raised by the FCC, the court opined: '[I]t is of course true that alternative cost allocations could have reduced the skew, but any alternative allocation of costs would itself have had some inescapable degree of arbitrariness.'⁴² The court added that 'intermodal competition from cable ensures the persistence of substantial competition in broadband.'⁴³

Regulators in other nations have chosen bitstream access over line sharing. For example, in December 2003, the New Zealand Commerce Commission recommended the designation of an 'asymmetric DSL bitstream access service.'⁴⁴ The agency defined ADSL bitstream access service as 'a high speed IP access service which provides good performance, but could not typically support extensive use of mission critical applications which require excellent real-time network performance or availability.'⁴⁵ The Commission defined bitstream access as a situation in which the incumbent's access link 'is made available to other operators, which are then able to provide high-speed services to end-consumers.'⁴⁶ The agency concluded the net social benefits from bitstream access exceeded the net social benefits of line sharing due to the lower total cost of providing the

³⁹ Id., ¶ 260

⁴⁰ Id., ¶ 263. Interestingly, the chairman of the FCC, Michael K. Powell, did not agree with the decision to terminate line sharing, arguing that 'the continued availability of line sharing and the competition that flowed from it likely would have pressured incumbents to deploy more advanced networks in order to move from the negative regulatory pole to the positive regulatory pole, by deploying more fiber infrastructure.' Separate Statement of Chairman Michael K. Powell, Dissenting in Part, 20 February 2003, p. 1 (available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-231344A3.doc).

⁴¹ United States Telecom Association v. FCC, 359 F.3d 554, 585 (D.C. Cir. 2004).

⁴² Id., p. 46

⁴³ Id.

⁴⁴ New Zealand Commerce Commission, Section 64 Review and Schedule 3 Investigation into Unbundling the Local Loop Network and the Fixed Public Data Network, Final Report, December 2003 (available at <http://www.comcom.govt.nz/telecommunications/llu/finalreport.PDF>).

⁴⁵ Id., Appendix 5

⁴⁶ Id., p. 117

unbundled service (collocation costs are avoided in bitstream access).⁴⁷ The Commission reasoned that, under bitstream access, entrants face a lower risk of investing in network components such as DSLAMs that might not be fully utilized.⁴⁸ We discuss the New Zealand experience in greater detail in a later section.

In February 2005, the FCC released a new unbundling order that, most significantly, eliminated UNE-P as a separate network element entitled to mandatory unbundling.⁴⁹ The Commission found that the ability of CLECs to compete would not be impaired if they did not have access to unbundled switching at TELRIC prices. The FCC also established new unbundling rules for mass market local circuit switching, high-capacity loops, and dedicated interoffice transport. With switching removed from the list of UNEs, it followed that UNE-P could no longer be mandated at regulated TELRIC prices—although ILECs obviously could still offer UNE-P to CLECs at commercially negotiated rates. The FCC also found that the Telecommunications Act of 1996 did not require that the agency mandate ILECs to offer UNE-P.

The FCC, however, was unwilling to end mandatory UNE-P immediately. In the belief that the immediate termination of mandatory UNE-P might disrupt service, the FCC established a twelve-month transition period, with accompanying transition pricing, so that CLECs could attempt to move their “embedded customer base” from UNE-P to another method of delivering local service. It is doubtful that the capital markets cared about the transition period: a regulation-based business model destined for extinction is a poor investment. CLEC business plans predicated on UNE-P immediately became financially indefensible, just as funding for business plans predicated on exploiting reciprocal compensation rules disappeared several years earlier when the FCC signaled its decision to eliminate that particular distortion in access pricing.

Despite the reasonable prospect that it could eventually be thrown out by the D.C. Circuit, mandatory UNE-P at TELRIC rates had become the cornerstone of the business plan for AT&T and MCI in the local market. In the case of AT&T, the company had

⁴⁷ *Id.*, p. 20

⁴⁸ *Id.*, p. 21

⁴⁹ Order on Remand, *In re Unbundled Access to Network Elements*, 2005 FCC LEXIS 912, WC Docket No. 04-313, CC Dkt. No. 01-338 (FCC Feb. 4, 2005).

abandoned its facilities-based strategy for local markets by selling off its cable television assets at an enormous loss of approximately \$40-50 billion, and it spun off AT&T Wireless, which soon merged with Cingular, the joint venture of SBC and BellSouth. With the commercial and regulatory demise of mandatory UNE-P, and with its long distance revenues under increasing pressure from Bell company entry following the completion of the section 271 approval process for the RBOCs in all states and the District of Columbia, AT&T was rapidly becoming a brand name in search of a product. Although AT&T embarked on yet another non-facilities-based strategy by negotiating with Sprint PCS to rebrand wholesale wireless minutes as an AT&T cellphone product, the highest priority for AT&T's management (and, similarly, the prize for the managers who took MCI through Chapter 11 reorganization) was to concentrate on readying the company for sale to one of the three financially stable RBOCs. Thus, AT&T with its symbol "T" (telephone) on the NYSE and its long history as the primary company in US telecommunications, lacked an economic rationale for its continued existence.

A. Rationales for Network Unbundling

We examine the theoretical underpinnings of mandatory unbundling. We also survey the rationales offered by regulatory agencies in support of mandatory unbundling. In general, mandatory unbundling was believed to, among other items, (1) generate competition in retail markets through greater innovation and investment and lower prices, (2) generate greater competition in wholesale markets, and (3) encourage entrants to migrate from unbundling to facilities-based approach. Because our focus is on the benefits of mandatory unbundling, we do not consider its regulatory costs, such as the difficulties in implementation or compliance costs for operators. When considering unbundling, a regulator also should take account of a full range of efficiency considerations, including allocative (consumer welfare gains associated with greater penetration at lower prices), productive efficiency (producer surplus associated with reductions in marginal costs), and dynamic efficiency (how welfare is generated and distributed over time).

1. Rationale 1: Competition in Retail Markets Is Desirable

In a static model that does not consider investment in future periods, consumers benefit from mandatory unbundling to the extent that such regulation lowers retail prices.

In a dynamic model, mandatory unbundling at regulated rates runs the risk of decreasing investment by both incumbent ILECs (by truncating returns by granting a ‘free option’ to new entrant CLECs)⁵⁰ and CLECs (by increasing the relative return of UNE-based entry). Despite these factors, proponents argued that the net of effect of mandatory unbundling was to increase investment by both ILECs and CLECs.

a) Innovation and Investment

According to its proponents, mandatory unbundling at regulated rates encourages innovation and investment on behalf of both incumbents and entrants. In its *Third Order* implementing the Telecommunications Act, the FCC explained that a positive by-product of mandatory unbundling at TELRIC was greater innovation on behalf of entrants and incumbents:

Unbundling rules that encourage competitors to deploy their own facilities in the long run will provide incentives for both incumbents and competitors to invest and innovate, and will allow the Commission and the states to reduce regulation once effective facilities-based competition develops.⁵¹

The more competitors in the market, the FCC reasoned, the greater the incentive to introduce a new technology to gain a technological edge. With the correct incentives in place, the need for wholesale regulation would disappear:

The unbundling standards we adopt in this Order . . . seeks [sic] to create incentives for both incumbents and requesting carriers to invest and innovate in new technologies by establishing a mechanism by which regulatory obligations to provide access to network elements will be reduced as alternatives to the incumbent ILECs’ network elements become available in the future.⁵²

With greater facilities-based investment, the FCC reasoned, the market could one day be relied upon to discipline ILEC prices for local services.

⁵⁰ See Jerry A. Hausman, ‘Valuation and the Effect of Regulation on New Services in Telecommunications’, *Brookings Papers on Econ. Activity: Microeconomics* (1997).

⁵¹ See *Third Order*, supra note 33, ¶ 7.

⁵² *Id.* ¶ 9 n. 12

Although it was aware of arguments that mandatory unbundling at regulated rates might discourage ILEC investment, the FCC believed that other factors in the marketplace would mitigate these negative effects:

We acknowledge that the incumbent LEC argument that unbundling may adversely affect innovation is consistent with economic theory, but events in the marketplace suggest that other factors may be driving incumbent LECs to invest in xDSL technologies, notwithstanding the economic theory.⁵³

For example, investment by cable companies in cable modem service was believed to be sufficient motivation for ILECs to invest in DSL facilities. Although the negative investment effects might not overcome these other factors, it is not clear how mandatory unbundling at regulated rates actually *increases* investment by ILECs. One theory is that an ILEC would have to respond to greater competition from CLECs by investing in new facilities. But to the extent that those new investments would be subject to unbundling rules, those investments might not be undertaken.⁵⁴ Another theory is that the ILEC will invest in new access technologies that potentially will not be subject to unbundling rules.

b) Prices and Retail Margins

When a CLEC obtains an access line at incremental cost, it is free to charge the end user an amount anywhere between the incremental cost and the retail price. A CLEC can charge below incremental cost if it can bundle the access line with other services such as vertical services or long distance. Competition among CLECs is predicted in theory to discipline CLECs in their pricing behavior. If competition among CLECs is intense, then the retail price offered by CLECs should equal the access price for the unbundled loop plus the incremental cost of other inputs. Finally, ILECs must respond to price cuts by CLECs with their own price cuts. The equilibrium outcome of that game is lower prices.

⁵³ Id. ¶ 315

⁵⁴ See *AT&T Corp. v. Iowa Utilities Bd.*, 525 U.S. 366 (1999) (Breyer, J., concurring in part and dissenting in part) ('a sharing requirement may diminish the original owner's incentive to keep up or to improve the property by depriving the owner of the fruits of value-creating investment, research, or labor.').

The FCC believed that the Telecommunications Act encouraged the agency to promote retail price competition through mandatory unbundling:

[T]he 1996 Act set the stage for a new competitive paradigm in which carriers in previously segregated markets are able to compete in a dynamic and integrated telecommunications market that promises lower prices and more innovative services to consumers.⁵⁵

Even if the mandatory unbundling at TELRIC never led to facilities-based competition, the FCC reasoned, consumers would be better off to the extent that prices for local services declined:

National requirements for unbundling allow [sic] requesting carriers, including small entities, to take advantage of economies of scale in network. Requesting carriers, which may include small entities, should have access to the same technologies and economies of scale and scope available to incumbent LECs. Having such access will facilitate competition and help lower prices for all consumers, including individuals and small entities.⁵⁶

Because ILECs enjoyed a cost advantage vis-à-vis CLECs, the FCC argued, it was preferable from a social welfare perspective for retail prices to be based on the ILECs' costs and not on the CLECs' costs. Because ILECs are subject to state-sponsored price regulation, it was not clear that prices would decrease absent subsidized UNE rates. Although the FCC was concerned about stimulating retail competition for local telephone and broadband access services, most European regulators focused exclusively on stimulating retail competition in broadband markets.

2. Rationale 2: Competition in Retail Markets Cannot Be Achieved Without Mandatory Unbundling

Even if competition in retail markets is desirable, it is still necessary to show that competition would not occur in the absence of mandatory unbundling. In this section, we explain the reasoning articulated by unbundling proponents as to why natural market forces cannot deliver the benefits of competition in local services.

⁵⁵. See Third Order, supra note 33, ¶ 2.

⁵⁶. Id. ¶ 507

a) A Vertically Integrated Firm Generally Prefers Its Own Downstream Affiliate

In general, a vertically integrated firm prefers retail sales by its affiliated retail division to sales by an unaffiliated retailer. This preference can be reversed, however, if the access price exceeds the retail margin. Much academic work has been dedicated to analyzing the incentives of vertically integrated firms to deny access to key inputs to unaffiliated downstream rivals.⁵⁷ If a vertically integrated firm can solidify its market power in future periods by refusing to deal with rivals in a downstream market, then that firm has an anticompetitive reason for such a refusal to deal.⁵⁸ A vertically integrated firm might also refuse to deal with other unaffiliated firms in the downstream market as a means to acquire market power in that market.⁵⁹

Although no ILEC prefers unbundling its network elements *at a regulated rate* to selling its services through its own retail division, some ILECs have voluntarily unbundled their network elements to rivals at a commercially negotiated rate. For example, in January 1995, Rochester Telephone implemented its own ‘Open Market Plan’ for unbundling network services in New York.⁶⁰ Under the Open Market Plan, Rochester restructured itself into a network services company, which retained the Rochester name, and a competitive company, Frontier Communications of Rochester, which the New York Public Service Commission regulated as a non-dominant carrier. Rochester provided on an unbundled, non-discriminatory basis the local loop, switching, and transport functions as a wholesaler, at discounted (yet voluntary) prices lower than its standard retail rates.

More recently, during a period of regulatory uncertainty due to litigation in the D.C. Circuit, several U.S. ILECs entered into voluntary agreements with CLECs for

⁵⁷ See, e.g., Michael H. Riordan and Steven C. Salop, ‘Evaluating Vertical Mergers: A Post-Chicago Approach’, 63 *Antitrust L. J.* 513 (1995); J. Gregory Sidak and Robert W. Crandall, ‘Is Structural Separation of Incumbent Local Exchange Carriers Necessary for Competition?’, 19 *Yale J. Reg.* 335 (2002).

⁵⁸ Dennis W. Carlton, ‘A General Analysis of Exclusionary Conduct and Refusal to Deal: Why Aspen and Kodak Are Misguided’, 68 *Antitrust L. J.* 669 (2001).

⁵⁹ *Id.*

⁶⁰ FCC News Release, *Rochester Telephone Corporation Granted Rule Waivers to Implement its Open Market Plan*, 7 March 1995 (available at http://www.fcc.gov/Bureaus/Common_Carrier/News_Releases/1995/nrcc5030.txt).

unbundled access. In April 2004, BellSouth announced that it had signed commercial agreements with Dialogica Communications, Inc., International Telnet, and CI2 for pricing of and access to BellSouth's incumbent network.⁶¹ In the same month, AT&T offered its own proposal for voluntary agreements.⁶² AT&T suggested that the commercial rates be based on AT&T's average UNE-P per-line cost in a particular state as of March 1, 2004.⁶³

BellSouth's May 2004 offer to CLECs would provide that the top end for UNE-P rates would not increase by more than \$7 per month above rates then in place.⁶⁴ In April 2004, SBC offered all CLECs access to the unbundled network element platform (UNE-P) in its 13-state incumbent region for a fixed rate of \$22 per month through the end of 2004.⁶⁵ In the same month, Verizon offered all CLECs a rate of \$20 to \$24 per line per month, which exceeded its then-regulated average monthly rate by \$1.50 to \$5.50.⁶⁶ These voluntary negotiations were largely in response to the regulatory vacuum created by the D.C. Circuit's vacatur of the FCC's *Triennial Review Order*, which remained in effect until June 15, 2004. In addition, federal regulators and the Bush administration urged the RBOCs and such rivals as AT&T to negotiate access rates on their own.⁶⁷ On August 20, 2004, the FCC released a set of stop-gap rules that required the RBOCs to continue leasing their lines to CLECs at regulated rates for six months.⁶⁸ In February 2005 the FCC is issued new rules for governing access to local phone networks, which should encourage facilities-based entry over UNE-based entry. On October 12, 2004, the Supreme Court declined to hear cases filed by AT&T Corp., MCI Inc., and an association of state utility regulators seeking to reinstate the original unbundling rules.⁶⁹ If the FCC could not meet the six-month deadline, the RBOCs would be free to increase access rates

⁶¹ *TR Daily*, 29 April 2004, *1

⁶² *Id.*

⁶³ *Id.*

⁶⁴ *TR Daily*, 5 May 2004, *1

⁶⁵ *TR Daily*, 20 April 2004, p. *1.

⁶⁶ *Comm. Daily*, 22 April 2004, *1

⁶⁷ See, e.g., James S. Granelli, *L.A. Times*, 4 May 2004, C1

⁶⁸ See, e.g., Yuki Noguchi, *Wash. Post*, 21 August 2004, E2

⁶⁹ See, e.g., Hope Yen, *Wash. Post*, 12 October 2004, *1

by as much as 15 percent for existing customers who purchase their service through CLECs.

b) Entry Barriers Prevent Natural Competition

In the United States, a CLEC is considered ‘impaired’ when lack of access to an incumbent LEC network element poses a barrier to entry that is likely to make entry into a market ‘uneconomic.’⁷⁰ In its *Triennial Review Order*, the FCC offered the following factors that contribute to entry barriers in the provision of local telephone service: (1) scale economies, (2) sunk costs, (3) first-mover advantages, (4) absolute cost advantages, (5) and barriers within the control of ILECs.⁷¹ The FCC’s explanation of sunk costs provides some insight as to the regulator’s decision-making:

Sunk costs increase a new entrant’s cost of failure. Potential new entrants may also fear that an incumbent LEC that has incurred substantial sunk costs will drop prices to protect its investment in the face of new entry. In addition, sunk costs can give significant first-mover advantages to the incumbent LEC, which has incurred these costs over many years and has already had the opportunity to recoup many of these costs through its rates.⁷²

According to its proponents, mandatory unbundling is necessary to overcome such barriers. The corollary of this proposition is that, without mandatory unbundling, facilities-based investment cannot occur. In its May 2002 decision vacating certain portions of the *UNE Remand Order*, the D.C. Circuit concluded that the Commission had failed to adequately explain how a uniform national rule for assessing impairment would help to achieve the goals of the Act, including the promotion of facilities-based competition. In particular, the Court stated that ‘[t]o rely on cost disparities that are universal as between new entrants and incumbents in *any* industry is to invoke a concept too broad, even in support of an *initial* mandate, to be reasonably linked to the purpose of the Act’s unbundling provisions.’⁷³

Opponents of mandatory unbundling also cite the large sunk cost of the ILEC’s network, but for different reasons. They argue that sunk costs imply that regulators

⁷⁰ See *Triennial Review*, supra note 31, p. 9.

⁷¹ *Id.*

⁷² *Id.*

⁷³ See USTA, supra note 31, p. 427 (emphasis in original).

should abstain from appropriating the quasi-rents of ILECs, which undermines the incentive of ILECs to invest in new technologies.⁷⁴ They also argue that, to the extent that network investment cannot be directed toward other uses in the event of low market demand, large sunk costs require that access prices are set higher than what would otherwise be necessary to induce investment under a standard present discounted value calculation.⁷⁵

3. Rationale 3: Mandatory Unbundling Enables Future Facilities-Based Investment

Access-based competition is supposedly the stepping stone to facilities-based competition. This proposition, or hypothesis, lies at the heart of regulatory decisions on unbundling and access pricing that the FCC and its counterparts in other nations have made since the mid 1990s. In the telecommunications industry, the examples of the stepping-stone hypothesis are numerous. For example, MCI successfully made the transition from reseller of long-distance services to facilities-based carrier. The leasing of selected unbundled elements at regulated prices is vigorously defended by CLECs and regulators as a complement to subsequent facilities-based entry, not a substitute for it. Within the strata of regulated access-based entry options, regulators may consider UNE-P to be a stepping stone to a CLEC's subsequent investment in its own switches and its more limited reliance on unbundled local loops.⁷⁶

In implementing the unbundling rules, the FCC sought to follow the intent of Congress by creating an intermediate phase of competition, during which some new companies would deploy their own facilities to compete directly with the incumbents:

Although Congress did not express explicitly a preference for one particular competitive arrangement, it recognized implicitly that the purchase of unbundled network elements would, at

⁷⁴ For a description of the role of sunk costs in access pricing and unbundling, see generally Hausman & Sidak, *supra* note 25.

⁷⁵ *Id.*

⁷⁶ Similarly, regulators may consider mandatory roaming at regulated prices to be a stepping stone to a wireless carrier's eventual investment in base stations and spectrum in another geographic region. However, a component of the relevant infrastructure is radio spectrum, the allocation of which is controlled by the government (at least in the primary market). Consequently, it is not clear where the stepping stone of mandated access leads in wireless.

least in some situations, serve as a *transitional arrangement* until fledgling competitors could develop a customer base and complete the construction of their own networks.⁷⁷

The FCC thus sought to force the incumbents to allow others to access their systems, in the hope that mandatory unbundling would create competitors who would later invest in their own facilities.

In the long run, the FCC expected that entrants would build their own facilities because doing so would enhance the entrants' ability to compete more effectively with incumbents:

We fully expect that over time competitors will prefer to deploy their own facilities in markets where it is economically feasible to do so, because it is only through owning and operating their own facilities that competitors have control over the competitive and operational characteristics of their service, and have the incentive to invest and innovate in new technologies that will distinguish their services from those of the incumbent.⁷⁸

Thus, mandatory unbundling would allow entrants to derive revenue from offering services over the unbundled network elements, and then use that revenue to construct their own networks once the technology shifted. Of course, if the access rate were set too low, the transition to facilities-based competitor would not occur, as CLECs would never find it in their interests to invest in their own facilities. If access rates were set just right, this transition to facilities-based competition would generate additional social benefits, which are described in the next section.

4. Rationale 4: Competition in Wholesale Access Markets Is Desirable

Competition in the input markets was, by itself, desirable. In this section, we review how input-level competition can, in theory, generate technological innovation and incentives for gains in productive efficiency and can eventually lead to regulatory withdrawal.

⁷⁷ See Third Order, *supra* note 33, ¶ 6 (emphasis added).

⁷⁸ *Id.*, ¶ 7

a) A Network of Networks

Facilities-based entry by CLECs in the current period meant that future entrants would not have to depend exclusively on ILECs to obtain network elements. The FCC believed that mandatory unbundling would expedite this process:

Moreover, in some areas, we believe that the greatest benefits may be achieved through facilities-based competition, and that the ability of requesting carriers to use unbundled network elements, including various combinations of unbundled network elements, is a necessary precondition to the subsequent deployment of self-provisioned network facilities.⁷⁹

In theory, facilities-based entry generates ‘greater benefits’ than UNE-based entry because the former signals a credible commitment to stay in the market. If an entrant has not made sunk investments in infrastructure, it cannot use sunk costs to make that signal. Nor will the incumbent face the prospect of durable capacity that survives the demise of the company that invested to create it. Moreover, facilities-based competition leads to technological diversity, which increases choice and may provide newer and better services because the CLEC does not depend on a legacy network.

The FCC envisioned that facilities-based entrants would spawn a new generation of UNE-based entrants, who in subsequent periods would become facilities-based entrants:

In order for competitive networks to develop, the incumbent LECs’ bottleneck control over interconnection must dissipate. As the market matures and the carriers providing services in competition with the incumbent LECs’ local exchange offerings grow, we believe these carriers may establish direct routing arrangements with one another, forming a network of networks around the current system.⁸⁰

Thus, the FCC believed that mandatory unbundling at TELRIC would evolve into voluntary access arrangements. Under this scenario, some facilities-based entrants might choose to become a pure wholesaler of network elements, leaving the retail component to other CLECs.

⁷⁹ Id., ¶ 5

⁸⁰ Id., ¶ 7 n. 12 (quoting *Promotion of Competitive Networks in Local Telecommunications Markets*, Notice of Proposed Rulemaking and Notice of Inquiry in WT Dkt. No. 99-217 and Third Further Notice of Proposed Rulemaking in CC Dkt. No. 96-98, FCC 99-141, ¶¶ 4, 23 (rel. 7 July 1999)).

b) Regulatory Withdrawal

Competition among facilities-based providers to supply network elements to future generations of CLECs would decrease the price of those network elements. The next generation of CLECs would, in turn, pass those savings along to end users in the form of lower retail prices. At some point in the process, the regulator could, in theory, withdraw and allow a competitive market for inputs to discipline the price of retail service. In practice, however, regulators are reluctant to relinquish their power to control entry and allocate rents in a given market. This vision of mandatory unbundling also ignores the strategic use of regulation by competitors. Given the large rents at stake, it is not realistic to believe that the regulatory machinery could be dismantled very easily. Indeed, in the United States, the degree of regulation has increased since the passage of the Telecommunications Act of 1996.⁸¹

In summary, mandatory unbundling was based on the following rationales: (1) competition in retail markets is desirable, (2) competition in retail markets cannot be achieved without mandatory unbundling, (3) mandatory unbundling promotes future facilities-based investment, and (4) competition in wholesale access markets is desirable. Fortunately, there is testable hypothesis associated with each rationale.

V. The Unbundling Experience in the United States, United Kingdom, and New Zealand

The previous section considered how mandatory unbundling should work *in theory*. With the benefit of several years of experience, we turn now to an evaluation of the extent to which the rationales for mandatory unbundling were substantiated *in practice*. We focus on the unbundling experience in the United States, the United Kingdom, and New Zealand. For each country, we examine whether any of the four primary rationales for mandatory unbundling at TELRIC was substantiated in practice. We rely on data from the relevant regulatory agency that implemented the unbundling regime. For example, we discuss why regulators in New Zealand did not adopt

⁸¹See, e.g., J. Gregory Sidak, 'The Failure of Good Intentions: The WorldCom Fraud and the Collapse of American Telecommunications After Deregulation', 20 Yale J. Reg. 207 (2003) (showing that the average FCC appropriations increased from \$158.8 million per year in 1981-1995 to \$211.6 million per year in 1996-2001 in real terms).

mandatory unbundling. Each section concludes with a review of the state of facilities-based competition for local telephone service as of early 2004.

In compiling the country surveys, we observed a large variation in the degree to which economic analysis informed the regulator’s decision-making process. In the United States, for example, the process was informed by legal interpretation of specific language (such as the meaning of ‘impaired’) or by engineering measures of hypothetical operating costs. In New Zealand, by contrast, the process was informed largely by economic analysis and by international experience with mandatory unbundling. Using economic methods, the New Zealand regulator literally assigned net welfare gains to each regulatory option and selected the path with the greatest net welfare gain. New Zealand had the benefit of studying the experience of other nations before it decided on the optimal regulatory approach. The FCC still has not used economic analysis when modifying its rules, despite the fact that the United States now has more than six years of unbundling experience.

A. United States

The Telecommunications Act of 1996 ordered the FCC to introduce competition into the local services market by forcing ILECs to provide entrants access to the ILECs’ existing facilities at regulated rates. In 1999, the FCC explained that Congress did not provide the agency much flexibility in the exact form of managed competition: ‘Congress directed the Commission to implement the provisions of section 251, and to specifically determine which network elements should be unbundled pursuant to section 251(c)(3).’⁸² Hence, the FCC did not have the discretion to reject or embrace any of the rationales for mandatory unbundling. The only decisions left to the FCC concerned the *extent* of mandatory unbundling—namely, which elements would be included in the list of UNEs and the appropriate pricing of those elements.

1. Retail Competition

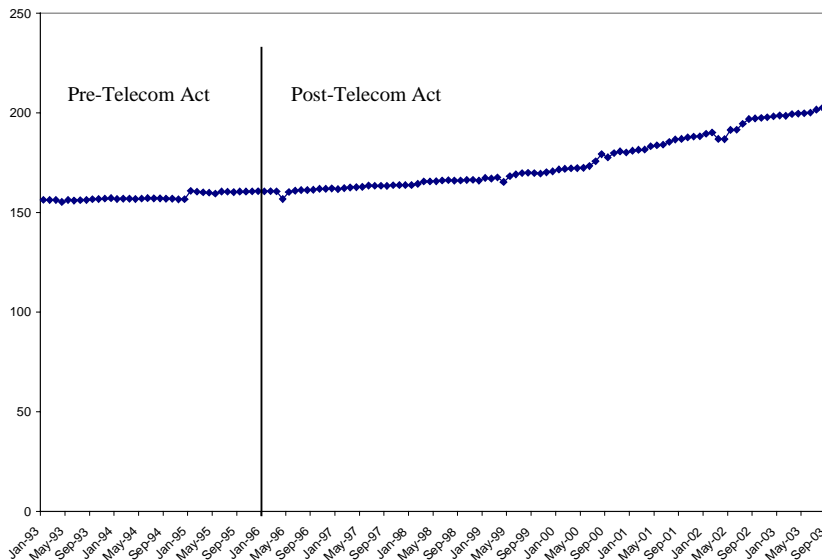
In this section, we review the unbundling experience in the United States with respect to retail pricing and investment.

⁸². See Third Order, *supra* note 33, ¶ 3.

a. Pricing

Retail competition triggered by mandatory unbundling should manifest itself in terms of lower retail prices. Even if price regulation of local services by state PUCs were binding, the introduction of UNE-based competition could still reduce price. In the United States, however, mandatory unbundling does not appear to have decreased local service prices measurably—despite the fact that CLECs had more than 13 percent of the nation’s access lines by 2003. Figure 3 shows the Bureau of Labor Statistics’ (BLS) Consumer Price Index for local telephone services from 1993 through 2003.

FIGURE 3: CONSUMER PRICE INDEX OF LOCAL TELEPHONE SERVICES
1993-2003



Source: Bureau of Labor Statistics, Consumer Price Index, All Urban Consumers, Telephone Services, Local Charges (available at <http://data.bls.gov/labjava/outside.jsp?survey=cu>).

Note: Prices normalized to 1984 dollars.

As Figure 3 shows, prices of local telephone services offered by *all carriers* in urban areas grew at a slower annual rate on average before passage of the Act (1.21 percent versus 2.96 percent).

It bears emphasis that such price comparisons do not control for other changes in the price of local service. For example, since the passage of the Telecommunications Act, the subscriber line charge (SLC) was increased and long-distance access prices were

decreased. Hence, a small part of the BLS' CPI price increase might be attributable to regulatory tax shifting. According to the FCC, the average residential rate for local service provided by ILECs in urban areas *before taxes, fees, and miscellaneous charges* increased from \$13.71 in 1996 to \$14.55 in 2002.⁸³ Hence, mandatory unbundling does not appear to have decreased retail prices in the way the FCC intended.

b. Investment

Many scholars have examined the effect of mandatory unbundling on ILEC investment. For example, in work performed for AT&T (the largest CLEC) and submitted to the FCC, Robert D. Willig, William H. Lehr, John P. Bigelow, and Stephen B. Levinson examined the relationship between UNE-P wholesale rates and Bell companies' capital expenditures.⁸⁴ They attempted to distinguish between the 'competitive stimulus hypothesis' that UNE-P creates competition that induces increased ILEC network investment and the 'investment deterrence hypothesis' that UNE-P diminishes the return on network investment by ILECs and causes them to invest less. Willig et al. hypothesized that TELRIC-based UNE-P rates encourage entry by CLECs, which forces Bell companies to invest more in their networks to protect market share. They therefore expected to find that ILEC capital expenditures are inversely related to UNE-P prices.

Willig et al. measured the cross-sectional variation in UNE-P rates and ILEC investment behavior across 48 states. They used state investment data provided by RBOCs to the FCC in their ARMIS reports and UNE-P estimates from a variety of sources, although they relied primarily on internal AT&T data. Willig et al. calculated that, *ceteris paribus*, the growth of Bell expenditures from 1996 to 2001 varied inversely with June 2002 UNE-P rates. They calculated that the elasticity of ILEC investment to

⁸³ Trends in Telephone Service, FCC Industry Analysis Division, 2003 Report, p. 13-1 (rel. Aug. 2003) (available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/trend803.pdf).

⁸⁴ Robert D. Willig/William H. Lehr/John P. Bigelow/Stephen B. Levinson, *Stimulating Investment and the Telecommunications Act of 1996*. Paper filed by AT&T in FCC Docket 01-338, 11 October 2002. [Willig et al.]

UNE-P prices was between -2.1 and -2.9, meaning that a 1 percent decrease in the UNE-P rate generated between a 2.1 and 2.9 percent increase in ILEC investment.

In a book published by the Brookings Institution, Robert W. Crandall explained that the loss of end-user subscribers to CLECs reduces ILECs' revenues by more than their costs.⁸⁵ Crandall found that, whereas ILECs lose roughly 60 percent of the revenues associated with a given line when provisioned on an unbundled, rather than retail, basis, the avoided costs of customer service and marketing are only about 10 percent of the Bell companies' total costs.⁸⁶

Crandall also examined the relationship between the FCC's state-by-state capital expenditure data and the various measures of state UNE-P rates used by Hassett, Ivanova, and Kotlikoff,⁸⁷ Kovacs and Burns,⁸⁸ and Gregg.⁸⁹ Crandall hypothesized that the UNE-P rate should not have a significant negative effect on capital expenditures because it is not logical to invest more if the ILEC receives less revenue under mandatory unbundling. In some regressions involving 1996-99 capital expenditures, the UNE-P rate variable did have a significant, negative coefficient on ILEC investment. Yet that coefficient became insignificant for 2000-01 capital spending when applying the UNE-P rates used by Hassett, Ivanova, and Kotlikoff, by Kovacs and Burns, and by Gregg (2001). Crandall noted that although Gregg's data for 2002 and 2003 produce increasingly significant negative coefficients for the effect of UNE-P on 1996-99 and 2000-01 capital spending by the Bell companies, one cannot draw conclusions from reverse application of UNE-P data. Crandall concluded that none of the studies considered provides support for the theory that UNE-P rates have influenced capital spending by Bell companies.

⁸⁵ Robert W. Crandall, *Competition and Chaos: The U.S. Telecommunications Sector Since 1996* (Washington, DC: Brookings Press 2004). [*Competition and Chaos*]

⁸⁶ *Id.*, pp. 9-10 (manuscript).

⁸⁷ Kevin A. Hassett/Zoya Ivanova/Laurence J. Kotlikoff, *Increased Investment, Lower Prices—the Fruits of Past and Future Telecom Competition*, Sept. 2003.

⁸⁸ Anna Maria Kovacs/Kristin Burns, 'The Status of 271 and UNE Platform in the Regional Bells' Territories', *Commerce Capital Markets*, Apr. 2002.

⁸⁹ Billy Jack Gregg, 'A Survey of Unbundled Network Element Prices in the United States', *National Regulatory Research Institute* (2001, 2002, 2003). Crandall notes that there does not seem to be academic agreement as to what, exactly, the regulated UNE-P rates are for each state at any point in time.

Crandall further demonstrated that Bell companies scaled back their capital expenditures in 2002 and 2003, and that the decline in capital expenditures was greatest in those states that reduced their UNE-P rates.⁹⁰ Crandall found that a simple regression of the UNE-P rate in 2002 on the FCC's measure of costs, the state regulatory variables (such as price cap and rate freeze dummies, and the Bell company's 1996-99 capital spending in that state) provides a statistically significant negative coefficient on the 1996-99 capital spending.⁹¹ He concluded that greater capital expenditures by Bell companies between 1996 and 1999 were associated with lower UNE-P rates in 2002.⁹² Crandall observed that this finding may be an indication that regulators 'punish' investment by simply reducing the rate at which the investing company is obligated to lease its platform to competitors.⁹³

The fact that RBOC revenue and investment has been reduced relative to historic averages implies that mandatory unbundling in the United States did not achieve its intended effect. We turn to the question of CLEC investment in the next sections on entry barriers and the stepping stone hypothesis. Investment activities during the late 1990s were undoubtedly affected by exceptional capital market conditions. But capital expenditure by CLECs was modest even when considered in terms of the way in which the CLECs have applied their resources. For example, an analysis of financial statements of EarthLink and Covad, two data CLECs, suggests that the ratio of capital expenditure to sales was 5 to 6 percent in 2001 and 2002, compared to a ratio of 20 to 25 percent for ILECs such as Verizon, SBC, and BellSouth.⁹⁴ Z-Tel and Citizens Communication, two voice CLECs, spent \$55 million and \$270 million, respectively, on renting unbundled loops in 2003, but incurred less than \$20 million in capital expenditure between them during the same period.⁹⁵

2. Entry Barriers

The second rationale for mandatory unbundling is that, without that particular form of regulatory intervention, market forces cannot deliver facilities-based competition.

⁹⁰ See Competition and Chaos, supra note 85, pp. 4-15, 17-18 (manuscript).

⁹¹ Id., p. 20 (manuscript)

⁹² Id.

⁹³ Id.

⁹⁴ Sales and capital expenditure data were taken from company annual reports.

⁹⁵ Capital expenditure data were taken from company annual reports.

In the United States, cable telephony appears to disprove that proposition. According to the National Cable Television Association (NCTA), the number of cable telephony subscribers in the United States increased from 180,000 in the first quarter of 2000 to 2.5 million by September 2003.⁹⁶ In addition to the deployment of circuit-switched telephony, many companies have begun trials or are launching voice over Internet protocol (VoIP) service. For example, in 2003 Cablevision launched Optimum Voice VoIP throughout its New York City service area of four million homes.⁹⁷ As of April 2004, Cablevision's customers received unlimited local and long-distance service, caller ID, call waiting, call return, three-way calling, call forwarding, and emergency 911 service for \$34.95.⁹⁸ Other forms of platform competition, such as wireless local loop (WLL), were still in a nascent state in the United States as of May 2004. Although fixed wireless connections increased from 50,000 in December 1999 to 309,000 in June 2003 (an increase of 600 percent), fixed wireless connections accounted for only 1.3 percent of total high-speed connections in the United States.⁹⁹

In its *Third Report* in 1999, however, the FCC dismissed the emergence of cable telephony as a substitute for the ILECs' fixed-line networks:

We also disagree with the incumbent LECs' argument that cable television service offers a viable alternative to the incumbent's unbundled loop. Cable service is largely restricted to residential subscribers, and generally supports only one-way service, not the two-way communications telephony requires. Moreover, we conclude that declining to unbundle loops in areas where cable telephony is available would be inconsistent with the Act's goal of encouraging entry by multiple providers. Given that neither mobile nor fixed wireless can yet replace wireline service, if we were to take the incumbents' approach, consumers might be left to a choose [sic] between only the cable company and the incumbent LEC.¹⁰⁰

⁹⁶ National Cable Television Association, Statistics & Resources (available at <http://www.ncta.com/Docs/PageContent.cfm?pageID=86>).

⁹⁷ *Id.*

⁹⁸ *Id.*

⁹⁹ See FCC, High-Speed Services for Internet Access: Status as of 30 June 2003, p. 6 (tbl. 1) (rel. 22 December 2003) (available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1203.pdf) [hereinafter *FCC High-Speed Services*]

¹⁰⁰ See Third Order, *supra* note 33, ¶ 189.

The FCC's reasoning is unpersuasive. If two facilities-based carriers offer a similar service, and if the first carrier is not compelled to share its network with rivals, then consumers would no longer be subject to monopoly prices for local services. Moreover, the FCC's suggestion that cable infrastructure supports only one-way service is outdated given that, as of June 2003, cable modems accounted for nearly two-thirds of all residential broadband subscriptions,¹⁰¹ which is clearly a two-way service. Cable networks are now rapidly upgrading their service offerings to provide telephone service use VOIP technology. (cites)

When the availability of cable telephony was on the verge of ubiquity in late 2003, the FCC was forced to offer a different explanation for why the threat of cable telephony should be discounted:

As a general matter, while these [cable] systems are increasingly being used for the delivery of retail narrowband and broadband services (e.g., telephony and high-speed Internet access services), the record indicates that such systems are not being used currently to provide wholesale local loop offerings that might substitute for access to incumbent LECs' loop facilities. Some cable companies also have augmented their networks to enable the provision of two-way voice telephony services. For such services, the cable infrastructure serves as a replacement for loops. At this time, however, deployment of voice telephony by cable companies has been substantially exceeded by the deployment of cable modem service.¹⁰²

Hence, the FCC argued that unbundling of the ILECs' network is necessary because cable operators were not inclined to share their own network with rivals at marginal cost. It bears emphasis that the D.C. Circuit rejected this very rationale for mandatory sharing of broadband in its May 2002 decision, explaining that competition removes the reason for mandatory sharing.¹⁰³ To date, the FCC has refused to recognize the effect of inter-

¹⁰¹ See FCC High-Speed Services, *supra* note 99, p. 10 (tbl. 3).

¹⁰² Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Deployment of Wireline Services Offering Advanced Telecommunications Capability, CC Dkt. Nos. 01-338, 96-98, 98-147, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 F.C.C. Rcd. 16,978, 16,979 ¶ 229 (2003) [*Section 251 Review*].

¹⁰³ See USTA, *supra* note 31, p. 428.

platform competition to fixed line telephony despite the D.C. Circuit's repeated admonitions that such competition cannot be ignored.

In May 2004, Comcast, the nation's largest cable company, announced that it planned to offer phone service to half of the households reached by the company's cable systems by the end of 2005 and to all 40 million of them by the end of 2006.¹⁰⁴ Verizon perceives the threat posed by cable telephony to be significant. Verizon plans to begin selling video over fiber optic lines to homes and businesses in 2005, which is 'part of a long-term strategy to fight cable companies on their own turf before they erode too much of Verizon's traditional telephone business.'¹⁰⁵ Verizon has already applied for licenses for cable franchises in several states.¹⁰⁶

Wireless phone service also constrains the ability of ILECs to raise the price of voice services. There is a growing evidence of 'wireless substitution' in the United States, which documents the degree to which consumers perceives wireless phones to be substitutes for fixed line connections.¹⁰⁷ Figure 4 shows the combined lines for cable and wireless through 2008.

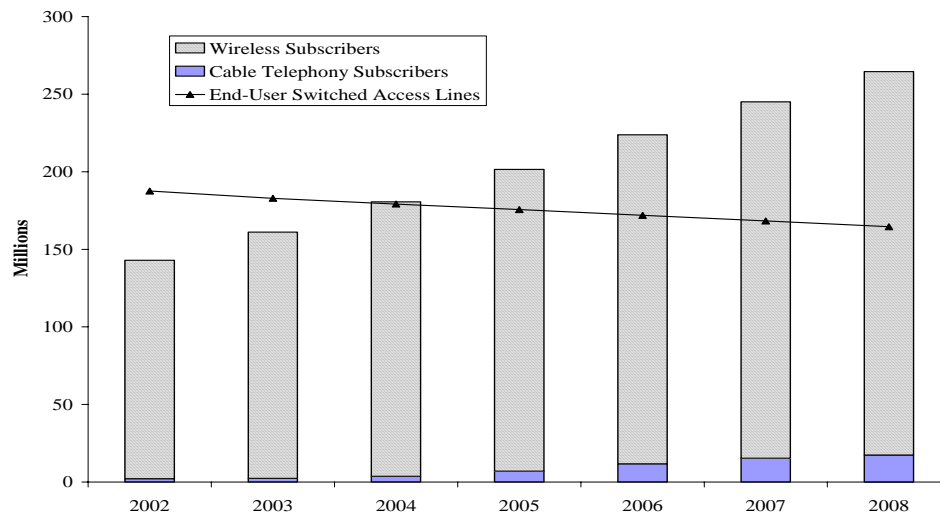
¹⁰⁴ Peter Grant, *Wall St. J.*, 26 May 2004, p. A3.

¹⁰⁵ Justin Hyde, *Reuters News*, 19 May 2004, *1

¹⁰⁶ Id.

¹⁰⁷ See, e.g., Cannon Carr/Gregor Dannacher, 'Can Wireline Cannibalization Save Wireless ARPU in 2003?', CIBC World Markets, 11 December 2002, p. 8 (estimating that wireless minutes in the United States have now displaced roughly 30 percent of total wireline minutes). See also *Health of the Telecommunications Sector: A Perspective from Investors and Economists, before the House Subcommittee on Telecommunications and the Internet*, 108th Cong. (5 February 2003) (statement of Blake Bath, Managing Partner, Lehman Brothers); *Health of the Telecommunications Sector: A Perspective from Investors and Economists, before the House Subcommittee on Telecommunications and the Internet*, 108th Cong. (5 February 2003) (statement of Robert Crandall, Senior Fellow, The Brookings Institute); Linda Mutschler *et al.*, *The Next Generation VII*, Merrill Lynch, Equity Research, 21 February 2003, pp. 28-29, 38-42.

Figure 4: Projected Growth of Cable Telephony & Wireless and Projected Decline of End-User Switched Access Lines Through 2008



Sources: Bernstein Research, U.S. Telecom and Cable: Faster Rollout of Cable Telephony Means More Risk for RBOCs, Faster Growth for Cable (9 January 2004) at Exhibit 1; Cellular Telecommunications & Internet Association (CTIA), CTIA's Semi-Annual Wireless Industry Survey Results, at 3 (rel. Mar. 2004); FCC, Local Telephone Competition: Status as of 30 June 2003, at 5 (tbl. 1) (rel. 22 December 2003).

Notes: Wireless and cable telephony subscribers for 2004-2008 are estimates. End-user switched access lines for 2003-2008 are estimates. Forecasts for wireless subscribers are based on OLS regression coefficient estimates using semi-annual wireless subscriber data from June 1997-December 2003. Forecasts for end-user switched access lines are based on regression estimates using actual semi-annual switched access lines data from December 2000-June 2003.

As Figure 4 shows, the combined number of wireless and cable telephony subscribers as of 2004 *exceeds* the number of end-user switched access lines. Wireless substitution is not unique to the United States. A recent JD Power and Associates survey in May 2004 revealed that 53 percent of U.K. 'contract customers use mobile as main method of communication.'¹⁰⁸ The emergence of facilities-based competition for voice customers implies that the rationale for mandatory unbundling based on insurmountable barriers to entry is not substantiated in the United States.¹⁰⁹

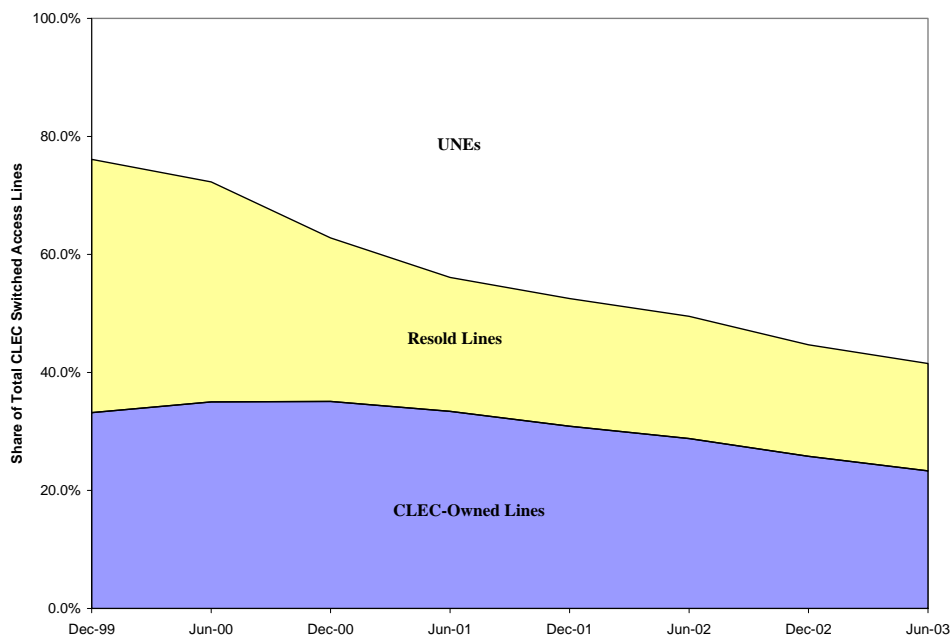
¹⁰⁸. JD Power and Associates, Consumer Survey, May 2004.

¹⁰⁹. Indeed, AT&T has recognized the displacement effect of wireless service on its long distance business. See, e.g., AT&T Corp., 2003 SEC Form 10-K, filed 15 March 2004 ('For example, consumer long distance voice usage is declining as a result of substitution

3. Stepping-Stone Hypothesis

The stepping-stone hypothesis implies that CLECs will migrate toward facilities-based entry over time as they gain market share. One way to measure the effect of mandatory unbundling on the method of CLEC entry is through time-series analysis. Figure 5 demonstrates that, contrary to the stepping-stone hypothesis, CLECs are, in the aggregate, increasingly relying on UNE-P as their preferred mode of entry.

Figure 5: CLEC Lines by Type, 1999-2003



Source: FCC, Local Telephone Competition: Status as of 30 June 2003, at 6 (tbl. 3) (rel. 22 December 2003).

Note: UNEs include UNE-loops and UNE-platform.

The vertical axis is the share of total CLEC switched access lines: the sum of the shares across all types is 100 percent. Whereas CLECs relied on UNEs for 23.9 percent of their lines in December 1999, by June 2003, UNE lines accounted for 58.5 percent of all CLEC lines.¹¹⁰ Of all UNE lines in December 2002, 70.5 percent were acquired in

to wireless services, internet access and e-mail/instant messaging services, particularly in the 'dial one' long distance, card and operator services segments.')

¹¹⁰ See FCC, Local Telephone Competition: Status as of 30 June 2003, tbl. 3 (rel. 22 December 2003) (available at

combination with the ILEC's switch.¹¹¹ The availability of wholesale access appears to have discouraged CLECs from investing in their own facilities (including switches) over time.

The increasing share of UNEs might be attributable to entry by new CLECs, which rely on UNEs extensively in their early stages. Stated differently, it is possible that mature CLECs have, in fact, made the transition to facilities-based lines but entry by new UNE-based CLECs is artificially inflating the share of CLEC lines that are UNEs. To examine this hypothesis, we charted the progress of 17 specific CLECs from the first quarter 2000 through the fourth quarter 2000. If the stepping stone hypothesis were valid, then one would expect to observe the share of facilities-based lines *for a given CLEC* to increase over time.

http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/lcom1203.pdf) [hereinafter *FCC Local Competition Report 2003*].

¹¹¹ Id., table 4

TABLE 2: SHARE OF FACILITIES-BASED LINES BY QUARTER

CLEC	1Q00 (Percent)	2Q00 (Percent)	Change in Percentage Points	4Q00 (Percent)	Change in Percentage Points
Electric Lightwave	66	66	0	68	2
Focal	0	0	0	0	0
Frontier	0	0	0	0	0
GST	47	47	0	Bankrupt*	NA
Adelphia Business					
Solutions	42	42	0	39	-3
ICG	65	55	-10	Bankrupt*	NA
Intermedia	19	19	0	22	3
McLeodUSA	2	5	3	6	1
Nextlink	25	26	1	50	24**
RCN	30	35	5	42	7
Teleport	80	80	0	80	0
Teligent	100	100	0	100	0
US LEC	0	0	0	0	0
Winstar	38	42	4	52	10
MCI (Brooks & MFS)	60	60	0	60	0
ATT	20	20	0	20	0
Sprint	0	0	0	0	0
<i>Average</i>			0.17%	2.93%	
<i>Fraction of CLECs That Increased Their Share of Facilities-Based Lines</i>			4 of 17 (23.5%)	5 of 17 (29.4%)	

Sources: Credit Suisse-First Boston, Telecom Services—CLECs, 5 June 2000, tbl. 14; Credit Suisse-First Boston, Telecom Services—CLECs, 12 September 2000, tbl. 14; Credit Suisse-First Boston, Telecom Services—CLECs, 11 April 2001, tbl. 14;

Note: *Bankrupt before Credit Suisse-First Boston produced final report in April 2001. ** The facilities-based lines of XO Communications account for half of facilities-based share. Nextlink and Concentric merged to become XO Communications. Therefore, Nextlink increased its facilities-based share merely by buying a facilities-based CLEC.

As Table 2 shows, a very small share of CLECs that were covered by Credit Suisse-First Boston in 2000 increased their share of facilities-based lines before the telecommunications meltdown of 2001. Roughly one-quarter of the firms in the sample increased their share of facilities-based lines in 2000. Many of the CLECs continued to

rely on UNEs to the same extent during that time period—the share of facilities-based lines was unchanged for nearly half (8 of 17) firms in the sample. Two CLECs, Adelphia and ICG, allowed their share of facilities-based lines to decrease during 2000. The increase in facilities-based share across all 17 firms was only 0.17 percentage points from the first quarter 2000 through the second quarter 2000 and only 2.93 percentage points from the second quarter 2000 through the fourth quarter 2000. Several of the firms covered by Credit Suisse-First Boston, such as Teligent and Winstar, filed for bankruptcy in the first and second quarters in 2001. To the extent that CLECs that embraced a facilities-based approach were more likely to be successful¹¹² and therefore more likely to be covered by Credit Suisse-First Boston, our results are likely biased toward greater facilities-based investment.

Other empirical analyses support the position that mandatory unbundling does not provide a stepping-stone to facilities-based investment. For example, Crandall, Ingraham, and Singer find that the share of CLEC lines that are facilities-based is lower in states where the UNE rental rates are lower, which suggests that unbundling decreases facilities-based competition in the short term.¹¹³ Using the FCC's data on UNE and facilities-based investment, they find that the relationship between the log of the ratio of the loop rate and the build-out cost is positively related to the log of the ratio of facilities-based lines to UNE lines. That relationship is significant statistically at the 1 percent level of confidence in all regressions. That model cannot rule out the possibility, however, that low UNE rates encourage CLECs to rent at first, and then build facilities once they have some market experience. But the notion that low UNE rates stimulate future facilities-based investment appears to be undermined by other results. In particular, a regression of the *change* in facilities-based investment over time indicates that facilities-based lines growth relative to UNE growth was faster in states where the cost of UNEs was higher

¹¹² See, e.g., Robert W. Crandall, 'An Assessment of the Competitive Local Exchange Carriers Five Years After the Passage of the Telecommunications Act', Criterion Working Paper, 27 June 2001 (finding evidence that CLECs were best able to produce revenue growth by building their own networks or significant parts of their own networks).

¹¹³ Robert W. Crandall, Allan T. Ingraham, and Hal J. Singer, 'Do Unbundling Policies Discourage CLEC Facilities-Based Investment?', Topics in Economic Analysis and Policy Section, 4 Berkeley Electronic Journals in Economic Analysis and Policy (2004).

relative to the cost of facilities-based investment. Based on this initial evidence, Crandall, Ingraham, and Singer argue that the burden of proof should now shift to the competitive local exchange carriers. If there is no evidence that low UNE rates stimulate facilities-based CLEC investment in future periods, then the entire unbundling experiment should be reconsidered.

James Eisner and Dale E. Lehman also evaluated the effect that UNE prices have on the amount and type of CLEC entry in that state.¹¹⁴ Eisner and Lehman considered three basic forms of entry: facilities-based, pure resale, and UNE-P leasing. Although they did not offer a hypothesis regarding the effect of lower UNE-P rates on facilities-based entry, they did anticipate that states with lower UNE-P rates would have more non facilities-based entry. Eisner and Lehman used FCC data comprised of CLEC form 477 filings from 1999 on. They used ordinary least squares estimation to examine the three basic forms of entry. The total number of each of these types of lines is modeled independently as the dependent variable in an equation involving wholesale prices, retail prices, demographic information, and regulatory variables as the independent variables. Eisner and Lehman found no empirical evidence that states with lower UNE rates experience more CLEC entry, except in those states where the incumbent ILEC received section 271 approval, which enables ILECs to offer long-distance service as a carrot for granting access to CLECs. However, Eisner and Lehman did find that states with lower UNE rates experience less *facilities-based* entry. They also concluded that section 271 approval is a complicating factor in modeling the effects of UNE rates on CLEC entry and investment decisions.

4. Wholesale Competition

The FCC's vision of a network of networks does not appear to have materialized in the U.S. residential market. For certain sectors of the U.S. enterprise market, however, several CLECs have established themselves as pure wholesale providers of local access. In its *Triennial Review Order*, the FCC reported that '[t]o a smaller degree, some competitive LECs began to provide selected transport services to other competitive LECs

¹¹⁴. James Eisner and Dale E. Lehman, 'Regulatory Behavior and Competitive Entry', Presented at the 14th Annual Western Conference Center for Research in Regulated Industries, 28 June 2001.

on a wholesale basis.¹¹⁵ Since 1998, CLEC-owned fiber has increased from 100,000 to 184,000 route miles. In addition, wholesale suppliers of fiber continue to invest in facilities that are being used by all carriers.¹¹⁶ The FCC noted that much of this interoffice transport is long-haul intercity, rather than local.

With respect to loop deployment for the mass market, the FCC concluded that, as of February 2003, ‘such systems are not being used currently to provide wholesale local loop offerings that might substitute for access to incumbent LECs’ loop facilities.’¹¹⁷ With respect to enterprise loops, the FCC found that ‘*some* competitive carriers have been able to deploy certain high-capacity loops to particular customer locations and that some wholesale alternatives also exist at particular customer locations.’¹¹⁸ The FCC observed that CLECs ‘have deployed fiber that enables them to reach customers entirely over their own loop facilities,’ but that such deployment is typically done at the Ocn level.¹¹⁹ The FCC noted that the evidence of self-deployment and wholesale availability of DS3 loops ‘is somewhat greater than for DS1s and is directly related to location-specific criteria.’¹²⁰ Based on that evidence of replicability, the FCC concluded that CLECs would not be impaired at the Ocn level without access to ILECs’ facilities.¹²¹ Because the record also confirmed that ‘it is economically possible to self-deploy at a three DS3 loop level to a particular customer location,’ the FCC ruled that unbundled access to DS3 loops would be limited to a total of two DS3s per requesting carrier to any single customer location.¹²² With respect to wholesale switching, the FCC found that CLEC switch deployment increased from 700 in 1999 to 1,300 in 2001.¹²³ The FCC ruled, however, that there was ‘no evidence to show that third parties are currently offering switching on a wholesale basis’ for the mass market.¹²⁴ In summary, an

¹¹⁵ See Triennial Review, *supra* note 31, p. 31 ¶ 37.

¹¹⁶ BOC UNE Fact Report 2002 pp. III-8 to III-14.

¹¹⁷ See Triennial Review, *supra* note 31, p. 136 ¶ 222.

¹¹⁸ *Id.*, p. 126 ¶ 202 (emphasis added)

¹¹⁹ *Id.*, p. 177 ¶ 298

¹²⁰ *Id.*

¹²¹ *Id.*, p. 193 ¶ 324

¹²² *Id.*

¹²³ *Id.*, p. 267 ¶ 436

¹²⁴ *Id.*, p. 271 ¶ 442

operating wholesale market appears to have emerged in enterprise switching, transport, and high-speed (DS3) loops only.

5. Other Observations about the Process

The Telecommunications Act retained the BOCs' interLATA prohibition while establishing, in section 271,¹²⁵ a process—involving each state public utilities commission, the FCC, and the Department of Justice (DOJ), acting on a state-by-state basis—by which the BOCs could earn regulatory approval to enter the interLATA market within the regions in which they provide local exchange service. By 2004, the BOCs had received section 271 authorizations to provide in-region interLATA service in 48 states (long-distance customers in Alaska and Hawaii are not yet served by BOCs) and the District of Columbia.¹²⁶ For the FCC, BOC entry into the in-region interLATA market has been ‘an incentive or reward for opening the local exchange market.’¹²⁷ That view implicitly subordinates the possible harm to consumers (in the form of delayed price reductions) from the restrictions on the BOCs while they seek that carrot.¹²⁸ In an article with Gregory Leonard published in the *Antitrust Law Journal*, we found that the average U.S. consumer received a savings of 8 to 11 percent on the monthly interLATA bill in the states where BOC entry occurred as compared to ‘control’ states where BOC entry had not occurred.¹²⁹ We also found that CLECs gained a substantial increase in cumulative share of the local exchange market in states where BOC entry occurred as compared to control states without BOC entry.¹³⁰ Finally, we found that that there was no significant change in the local bill of the average consumer in states where BOC entry into interLATA service occurred as compared to those bills in the control states.¹³¹ Thus, the failure of the FCC and the DOJ to consider the tradeoff between consumer harm from

¹²⁵ 47 U.S.C. § 271.

¹²⁶ See FCC, *RBOC Applications to Provide In-region, InterLATA Services Under § 271* (available at http://www.fcc.gov/Bureaus/Common_Carrier/in-region_applications/).

¹²⁷ 1997 Michigan Section 271 Order, 12 F.C.C. Rcd. Pp. 20,746 ¶ 388.

¹²⁸ Jerry A. Hausman, Gregory Leonard, and J. Gregory Sidak, ‘Does Bell Company Entry into Long-Distance Telecommunications Benefit Consumers?’, 70 *Antitrust L.J.* 463 (2002).

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ *Id.*

entry restriction of the BOCs into long distance and the marginal gains from further delaying BOC entry by requiring greater regulatory adherence led to significant consumer harm. We return to the question of how consumer interests should enter regulatory deliberation when we examine the regulatory experience in New Zealand.

B. United Kingdom

Mandatory unbundling in the United Kingdom was first considered by the former telecommunications regulator, the Office of Telecommunications (OfTel), in 1996. OfTel stated that three facilities-based service providers would be *sufficient* to provide effective competition in the telecommunications market United Kingdom.¹³² OfTel acknowledged that at least three facilities-based service providers (including British Telecom (BT), a cable operator, and a radio access operator) already competed in many U.K. geographic markets.¹³³ Because of the strong level of existing and expected future facilities-based competition in the United Kingdom in July 1996, OfTel decided that:

[a]ny move to allow operators to take over BT exchange lines would undermine past investments and jeopardize future plans. Our conclusion, therefore, is that direct connection to the BT Access Network would adversely affect the development of competition and would not be in the interests of the UK consumer.¹³⁴

In short, OfTel recognized that mandatory unbundling would undermine the goals of dynamic efficiency.

¹³².OfTel, OfTel's Policy on Indirect Access, Equal Access and Direct Connection to the Access Network, ¶ 46, July 1996 (available at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/competition/access96.htm).

¹³³ *Id.*

¹³⁴.*Id.*, ¶¶ 46-47. Facilities-based investment by BT's competitors existed even in the early 1990s. In particular, ILECs in the United States and Canada invested in U.K. cable companies. Those cable companies then began to offer telephone services to their customers. See, e.g., Declaration of Oliver E. Williamson, Motion of Bell Atlantic Corporation, BellSouth Corporation, Nynex Corporation, and Southwestern Bell Corporation to Vacate the Decree ¶¶ 17-22, *United States of America v. Western Electric Co., Inc. and American Telephone and Telegraph Company*, Civ. Act. No. 82-0192 (D.C. Cir. 1994). Consequently, by January 2004, over 400,000 homes in the U.K. were offered telephone service by a cable operator. *Id.*

From 1994 through 1997, regulation shifted in favor of infrastructure competition over service competition.¹³⁵ In 1996, Oftel became convinced that ‘the key to achieving a vibrant market for services provided over telecommunication networks is the promotion of fair, efficient and sustainable network competition.’¹³⁶ This emphasis of infrastructure competition affected Oftel’s treatment of issues such as number portability and equal access. The regulatory emphasis shifted back to service competition in 1998 with the issuance of several EU directives, which encouraged national regulators not to discriminate between firms that were building networks and those that were not. In December 1998, Oftel released a consultation document that called for mandatory unbundling as a *necessary* condition for bringing higher bandwidth services to consumers.¹³⁷ Oftel cited four reasons why mandatory unbundling was needed in the United Kingdom.¹³⁸ First, BT, which supplied service to 85 percent of U.K. consumers, was not equipped in 1998 to provide DSL service.¹³⁹ Second, the forthcoming 1999 European Union review on telecommunications markets was anticipated to place local loop unbundling high on its agenda.¹⁴⁰ Third, the U.K. government had stressed the importance of the deployment of new technologies to all consumers.¹⁴¹ Fourth, other countries, such as the United States, had already implemented mandatory unbundling.¹⁴² Although U.K. consumers already benefited from platform competition, Oftel felt that mandatory unbundling was important for the United Kingdom to maintain its ‘competitive advantage’¹⁴³ vis-à-vis the rest of the world.

¹³⁵.See, e.g., Damien Geradin and Michel Kerf, *Controlling Market Power in Telecommunications: Antitrust vs Sector-Specific Regulation* (Oxford University Press 2003) 163.

¹³⁶.Oftel, Promoting Competition in Services over Telecommunication Networks, June 1996.

¹³⁷.Oftel, Access to Bandwidth: Bringing Higher Bandwidth Services to the Consumer, Dec. 1998 (available at

http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/competition/llu1298.htm) [*Oftel Access to Bandwidth December 1998*].

¹³⁸ Id., ¶ 1.3

¹³⁹ Id.

¹⁴⁰ Id.

¹⁴¹ Id.

¹⁴² Id.

¹⁴³ Id.

In November 1999, Oftel announced that unbundled loops and collocation would become available to competitive providers.¹⁴⁴ BT was required by July 2001 to allow unbundling and collocation within its network.¹⁴⁵ In its *Access to Bandwidth Report*, Oftel's provided the following rationale for pursuing mandatory unbundling:

The best way to achieve the variety of services that consumers want at reasonable prices is to promote effective competition in the provision of access to and delivery of these services. In examining the case for action, Oftel has considered the level of demand in various segments of the market, the supply of products available and whether there are barriers to the competitive delivery of higher bandwidth access and services. The conclusion is that regulatory action is needed to introduce competition into the upgrade of the local loop.¹⁴⁶

Oftel intended that mandatory unbundling would lead to enhanced competition in broadband services.

The Trade and Industry Committee of the House of Commons expressed a similar vision in 2001 for mandatory unbundling in the United Kingdom. In particular, the Trade and Industry Committee suggested that a new entrant would provide advanced services by augmenting the existing copper loop with its own equipment:

When the process of LLU is completed, end customers will be able to receive a range of higher bandwidth services from an operator other than BT. The service provider will attach their own

¹⁴⁴ Oftel, *Access to Bandwidth: Delivering Competition for the Information Age*, Nov. 1999 (available at <http://www.ofcom.org.uk/static/archive/oftel/publications/1999/consumer/a2b1199.htm>) [*Oftel Access to Bandwidth 1999*].

¹⁴⁵ For a thorough discussion of the regulatory requirements under mandatory unbundling in the United Kingdom, see Geradin & Kerf, *supra* note 135, (Oxford: Oxford University Press 2003) 172-174. Along with the requirement of mandatory unbundling, the Director General of Telecommunications (DGT) permitted that rates for mandatory unbundling should (1) permit the recovery of an appropriate share of common cost, (2) permit the recovery of reasonably incurred long-run incremental cost, (3) may differ across BT's service area according to varying economic circumstances, and (4) should include a reasonable return on capital employed. *Id.*, p.173.

¹⁴⁶ See *Oftel Access to Bandwidth 1999*, *supra* note 144, ¶ 2.4.

broadband equipment to the loop at the exchange and provide the end customer with matching equipment.¹⁴⁷

The Committee acknowledged, however, that mandatory unbundling was not a necessary condition for the deployment of new services in the telecommunications market. The Committee recognized that facilities-based competition from several sources could develop, but it believed that mandatory unbundling would significantly hasten the deployment of broadband services to consumers:

Local Loop Unbundling is by no means the only method of opening up access to broadband services. Cable, satellite or wireless local loops can all be used to deliver services. However, local access networks were generally rolled out by incumbent telecommunications operators over significant periods of time, protected by exclusive rights and often funded through monopoly rents. Other operators cannot match the economies of scale and coverage of these incumbent operators.¹⁴⁸

Thus, the primary intent of mandatory local loop unbundling in the United Kingdom was to expedite the delivery of advanced services to consumers, even though regulators conceded that natural market forces might provide competitive offerings within a reasonable period of time.

1. Retail Competition

a. Pricing

One rationale for mandatory unbundling is increased competition in retail services, which is characterized by lower retail prices.¹⁴⁹ Pricing data from Oftel indicate

¹⁴⁷ Select Committee on Trade and Industry, Sixth Report, 20 March 2001, ¶ 4 (available at <http://www.parliament.the-stationery-office.co.uk/pa/cm200001/cmselect/cmtrdind/90/9006.htm>) [*Select Committee Sixth Report*].

¹⁴⁸ Id., ¶ 6

¹⁴⁹ Oftel has stated that ‘competitive markets are most likely to promote innovation and increased productivity with resulting benefits in terms of lower prices and better quality and choice for consumers.’ See Oftel Access to Bandwidth 1998, supra note 137, ¶ 4.2. Oftel has also maintained that regulatory intervention ‘should be limited to situations where competition is either not possible or is not working effectively or where costs and benefits accruing to third parties are not taken into account by market participants.’ Id..

that mandatory unbundling, which was implemented in the United Kingdom in the middle of 2001, has not measurably decreased prices of telecommunications service. According to Oftel, from 1996 through the middle of 2001, the time at which BT was required to begin unbundling, prices for residential service decreased by approximately 20 percent.¹⁵⁰ In contrast, prices for residential service slightly increased after BT was required to unbundle. Similarly, the price of telecommunications service for businesses decreased by 40 percent between 1996 and mid-2001, but it has not declined measurably since mandatory unbundling was implemented.

Proponents of mandatory unbundling suggest that, because very few U.K. consumers receive their service through a UNE-based CLEC, the unbundling experiment has not been allowed to play its course. For example, over forty companies expressed interest in providing telecommunications service in the United Kingdom via local loop unbundling in 2000.¹⁵¹ But by 2002, only seven carriers were actually providing or were attempting to provide local telephone service via unbundled access.¹⁵² When discussing the unbundling experience in the United Kingdom, a 2002 OECD report conceded that ‘the policy of unbundling the local loop has failed, as yet, to generate the benefits expected.’¹⁵³

Although UNE-based competition for residential voice customers has not flourished in the United Kingdom, CLECs have provided broadband Internet service extensively through unbundled access. As of July 2003, entrants providing broadband service through unbundled access increased their DSL lines to over 536,000, which

By pursuing a policy of mandatory unbundling, Oftel believed that it could correct a market failure which, once eliminated or reduced, would result in lower retail prices.

¹⁵⁰ Oftel, *The UK Telecommunications Industry Market Information: 2001/02*, Mar. 2003, p. 7 (available at http://www.ofcom.org.uk/static/archive/oftel/publications/market_info/2003/ami0303.pdf).

¹⁵¹ OECD *Reviews of Regulatory Reform: Regulatory Reform in the UK—From Transition to New Regulation Challenges*, 2002.

¹⁵² *Id.*

¹⁵³ *Id.*

nearly equaled the total DSL customers of BT.¹⁵⁴ Almost all of these new entrants provided high-speed Internet service, as only 3,500 of the new entrants' 536,000 unbundled lines were used to provide *both* voice and data service.¹⁵⁵

Retail competition in broadband services is intense and prices have been falling. Mandatory unbundling may not be the cause of the price decline. Facilities-based cable operator ntl launched the first U.K broadband offering in April 1999, followed by Telewest in March 2000. According to the OECD, 'in the absence of a competitive product from BT the initial prices were relatively high and service levels only needed to exceed those of ISDN.'¹⁵⁶ Although BT did not launch its first DSL offering until mid-2000, owing to technical problems, lines were not widely available until May 2001.¹⁵⁷ At the end of 2000, the world's fourth largest economy ranked just 22nd in terms of broadband subscribers.¹⁵⁸ The launch of retail DSL products by BT and various third parties (via BT's wholesale offer) began a period of intense price competition between broadband providers.¹⁵⁹ By the middle of 2003, price reductions had transformed the U.K. broadband market from one of the most expensive in the OECD to the cheapest, as observed in Oftel's survey of the broadband market.¹⁶⁰ Hence, price decreases in the U.K. market can be directly linked to competition between DSL and cable providers.¹⁶¹ In the months after the launch of BT's DSL service, ntl and Telewest responded with significant price reductions, such that, by mid-2001, prices were around 50 percent of their launch levels and about 35 percent below those of BT Openworld.¹⁶² BT responded in March

¹⁵⁴ Commission of the European Communities, *Ninth Report from the Commission on the Implementation of the Telecommunications Regulatory Package: European Telecoms Regulation and Markets 2003*, Annex 1, 11 November 2003, p. 59 [*EU Ninth Report*].

¹⁵⁵ *Id.*

¹⁵⁶ OECD, *The Development of Broadband Access in OECD Countries 42* (29 October 2001) [*OECD 2001 Broadband Study*].

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

¹⁵⁹ *Id.*

¹⁶⁰ Oftel's Internet and Broadband Brief, 12 October 2003 (available at http://www.ofcom.org.uk/legacy_regulators/oftel/oftel_internet_broadband_brief/?a=87101#10).

¹⁶¹ *OECD 2001 Broadband Study*, supra note 156, p. 42.

¹⁶² *Id.*

2003 with a 25 percent price reduction, which provided the trigger for a series of price cuts by other ISPs using BT's resale service.¹⁶³

b. Investment

Another rationale for mandatory unbundling is the expectation that it will increase the ILEC's incentive to upgrade its network. Table 3 lists BT's investment in fixed capital assets for its fiscal years ending in March between 1996 and 2003.

TABLE 3: BT INVESTMENT IN FIXED CAPITAL ASSETS: FISCAL YEARS 1996-2003

Fiscal Year	Fixed Capital Investment (£ billion)
1993	0.74
1994	1.31
1995	1.08
1996	1.06
1997	1.27
1998	1.71
1999	1.83
2000	5.88
2001	5.20
2002	1.22
2003	0.56

Source: BT, Annual Report and Form 20-F 2003 at 27 (released 2003) available at:

<http://www.btplc.com/report/report03/index.htm>; BT, Annual Report and Form 20-F 2000 at 26 (Released March 2000) available at:

<http://www.btplc.com/Sharesandperformance/Howwehavedone/Financialreports/Annualreports/Annualreportsarchive.htm>.

The data in Table 3 indicate that in its fiscal year 1999, BT spent £1.8 billion on fixed-capital investment. During 2000, BT spent £5.8 billion on fixed capital investment,¹⁶⁴ and in 2001 BT spent £5.2 billion on fixed capital investment.¹⁶⁵ In fiscal year 2002, BT

¹⁶³ Id.

¹⁶⁴ BT, Annual Report & Form 20-F 2003, p. 27 (available at <http://www.btplc.com/report/report03/index.htm>).

¹⁶⁵ Id.

reduced its investment to £1.2 billion,¹⁶⁶ and in fiscal year 2003, BT spent only £555 million on fixed capital investment.¹⁶⁷ Hence, BT's investment in fixed capital assets reached its apex at the end of fiscal year 2001, which ended in March 2001, before mandatory unbundling was introduced in the United Kingdom. Of course, the end of BT's fiscal year 2001 coincided almost perfectly with the bursting of the 'telecommunications bubble,' which likely contributed, at least in part, to the decrease in BT's investment.

BT's pattern of investment corresponds closely with the pattern of investment by the entire U.K. telecommunications industry. From 1994 through 2000, telecommunications investment in the United Kingdom increased substantially. Approximately £4 billion was invested by the telecommunications industry in 1994, accounting for 4 percent of total investment in the United Kingdom that year.¹⁶⁸ By 2000, nearly £12 billion was invested by the telecommunications industry. Between 2000 and 2001, telecommunications investment in the United Kingdom fell by approximately £4 billion.

2. Entry Barriers

Mandatory unbundling is considered necessary whenever market forces cannot be relied upon to produce facilities-based competition. An analysis of platform competition for broadband services in the United Kingdom, however, reveals that entry unrelated to unbundling currently exists. As of July 2003, BT operated over 563,000 DSL lines in the United Kingdom,¹⁶⁹ while cable operators served nearly 1.1 million customers.¹⁷⁰ Given the nearly two-to-one advantage of cable modem service to BT's DSL service in the United Kingdom, it is not reasonable to presume that BT has market power in the broadband Internet services market, especially in those geographic markets passed by cable networks.

¹⁶⁶ Id.

¹⁶⁷ Id.

¹⁶⁸ OFCOM, Strategic Review of Telecommunications: Phase I Annex F-J 35 (Spring 2004) *available at*: http://www.ofcom.org.uk/codes_guidelines/telecoms/strategic_review_telecoms/?a=87101#remit.

¹⁶⁹ See EU Ninth Report, *supra* note 154, p. 59.

¹⁷⁰ Id.

Cable operators ntl and Telewest also compete vigorously with BT for residential and business voice customers. U.K. cable companies have offered residential telephone service for nearly a decade. When the cable companies first deployed coaxial cable for television services, they simultaneously laid regular copper phone lines in the same trenches.

Cable telephony's share of fixed voice connections has steadily increased over time. In March 1998, cable operators ntl and Telewest provided telephone service to 9.1 percent of residential customers.¹⁷¹ By December 2003, their combined share of the residential voice market had increased to 16.6 percent.¹⁷² Hence, in households passed by cable networks, cable operators have roughly 33 percent of fixed-line voice connections.¹⁷³ The increase in the cable companies' share of residential voice services in the United Kingdom came largely at the expense of BT, whose share fell from 86.2 percent to 82.7 percent between March 1998 and December 2003.¹⁷⁴

Cable companies' share of business voice service revenues in the United Kingdom has also increased. Between 1996 and 1997, ntl and Telewest controlled only 2.6 percent of business voice revenues, but by December 2003 those companies had acquired a 4.8 percent share.¹⁷⁵ Cable's share of business voice revenues is smaller than its share of residential voice revenues because cable operators must compete with several other facilities-based CLECs, including Colt Telecom Group (COLT), in the business sector.

¹⁷¹ Oftel, *The UK Telecommunications Industry Market Information: 2001/02*, Mar. 2003, p. 27 (tbl. 8a) (available at http://www.ofcom.org.uk/static/archive/oftel/publications/market_info/2003/ami0303.pdf) [*2003 UK Telecommunications Information Report*].

¹⁷² Ofcom, *Ofcom Fixed Telecoms Market Information Update*, May 2004, at tbl. 7 (available at http://www.ofcom.org.uk/research/industry_market_research/m_i_index/telecoms_providers/fix_t_mkt_info/) [*Ofcom FTMI Update*].

¹⁷³ *Id.*; Ofcom, *ITC Multichannel Quarterly*, July 2003 (available at http://www.ofcom.org.uk/research/industry_market_research/m_i_index/tv_radio_region/itc_market_info/cable_sat_stats/multichannel_q2_2003.doc) [*ITC Multichannel Quarterly*].

¹⁷⁴ *Id.*; 2003 UK Telecommunications Information Report, *supra* note 171, p. 27 (tbl. 8a).

¹⁷⁵ See 2003 UK Telecommunications Information Report, *supra* note 171, p. 32 (tbl. 13); *Ofcom FTMI Update*, *supra* note 172, tbl. 11.

COLT, which has operations in 32 cities in 13 European countries, competes directly with BT and cable operators for business customers. COLT established its metropolitan area network in London in 1993.¹⁷⁶ It expanded its network to include Birmingham in December 2000 and Manchester in February 2002.¹⁷⁷ The COLT network is largely deployed on COLT's fully owned fiber, which when supplemented with current hardware, can reach multi-gigabit speeds on a single circuit. COLT targets its services to business users ('COLT interAccess') and resellers of Internet access ('COLT InterTransit'). COLT also offers its business customers a full range of voice services.¹⁷⁸ Fidelity Investments owns 56 percent of COLT.¹⁷⁹ COLT expected to spend between £150 million and £200 million in capital expenditure in 2004, depending on customer demand.¹⁸⁰ As of March 2004, COLT reported having over 17,000 business customers across Europe.¹⁸¹

BT's share of both residential and business voice revenues has decreased significantly since 1993. BT's share of residential voice revenues, which was nearly 100 percent in 1993, declined steadily to just below 70 percent in 2001.¹⁸² Since 2001, when BT was required to unbundle the local loop, BT's share of residential revenues has remained constant at 70 percent. In 1993, BT controlled approximately 85 percent of the voice revenues in the business sector. That share, however, had steadily declined to below 60 percent by 2001. By 2003, BT's share of business voice revenues had decreased to approximately 52 percent.

3. Stepping Stone Hypothesis

As of mid 2004, it was not apparent that new entrants in the United Kingdom had used unbundled loops to evolve into facilities-based competitors. A lack of conversion

¹⁷⁶ COLT, About Us (available at www.colt.net).

¹⁷⁷ Id.

¹⁷⁸ Id.

¹⁷⁹ *COLT Telecom Group plc*, Hoover's Company Basic Records, 12 May 2004.

¹⁸⁰ Nic Fildes, Dow Jones Newswire, 22 April 2004,*1

¹⁸¹ *COLT Telecom expands metro optical services offering*, M2 Presswire, 9 March 2004,*1

¹⁸² OFCOM, Strategic Review of Telecommunications: Phase I Annex F-J 35 (Spring 2004) available at:

http://www.ofcom.org.uk/codes_guidelines/telecoms/strategic_review_telecoms/.

from unbundled access to facilities-based service is likely due to the high level of facilities-based investment that already occurred *before* unbundling was mandated. In particular, entrants controlled 24.0 percent of the revenues for residential voice services by March 2001,¹⁸³ and 39.5 percent of the business revenues from voice services by March 2001.¹⁸⁴ The high level of facilities-based competition that predated the decision-making process for local loop unbundling raises serious issues as to whether mandatory unbundling was even needed for voice or broadband services in the United Kingdom by the time that Oftel mandated it in November 1999.

4. Wholesale Competition

A final rationale for mandatory unbundling is increased competition in the wholesale market, which is typically characterized by supply of alternative networks by CLECs for new entrants. The size of the wholesale market in the United Kingdom has grown considerably since the mid 1990s. Between 1996 and 2002, the wholesale market for voice services in the United Kingdom increased from £1.9 billion to £4.5 billion—a 130 percent increase.¹⁸⁵ By March 2002, the largest share of the wholesale voice market, approximately 49.1 percent, was controlled by BT.¹⁸⁶ Cable operators ntl, Telewest, and Cable & Wireless controlled approximately 19.9 percent of the wholesale voice revenues in the United Kingdom.¹⁸⁷ The remaining 31 percent of the market was controlled by ‘other operators.’¹⁸⁸

Business districts in most major cities and towns in the United Kingdom are served by facilities-based CLECs. These CLECs typically offer service to both business customers and CLECs for resale. Table 4 lists the facilities-based competition that incumbent BT faces for major markets in the United Kingdom.

¹⁸³ 2003 *UK Telecommunications Information Report*, supra note 171, p. 26 (tbl. 8).

¹⁸⁴ Id., p. 32 (table 13)

¹⁸⁵ Id., p. 39 (table 18)

¹⁸⁶ Id.

¹⁸⁷ Id.

¹⁸⁸ Id.

TABLE 4: FACILITIES-BASED PROVIDERS OF CORE FIBER AND
METROPOLITAN AREA NETWORKS

	C&W[1]	ntl	Telewest	Energis	Torch/ Kingston	WorldCom	Thus	Colt	Global Crossing
London - City	CORE & MAN			CORE & MAN		CORE & MAN		CORE & MAN	CORE
London - Docklands	CORE & MAN	CORE & MAN		CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN
London - West End	CORE & MAN	CORE & MAN		CORE & MAN				CORE & MAN	CORE
London - Westminster	CORE & MAN	CORE & MAN				CORE & MAN		CORE & MAN	CORE
London - Hammersmith	CORE & MAN	CORE & MAN				CORE & MAN		CORE & MAN	CORE
West London	CORE & MAN		CORE & MAN			CORE & MAN			CORE
Basingstoke	CORE	CORE & MAN		CORE & MAN					CORE
Bracknell	CORE & MAN			CORE & MAN	CORE & MAN				CORE
Bradford	CORE & MAN		CORE & MAN		CORE & MAN				CORE
Birmingham	CORE & MAN		CORE & MAN	CORE & MAN	CORE & MAN	CORE		CORE & MAN	CORE
Bristol	CORE & MAN		CORE & MAN	CORE & MAN	CORE & MAN	CORE	CORE & MAN		CORE
Cambridge	CORE & MAN	CORE & MAN				CORE			CORE
Chester	CORE	CORE & MAN					CORE & MAN		CORE
Derby	CORE & MAN	CORE & MAN			CORE & MAN				CORE
Edinburgh	CORE & MAN		CORE & MAN	CORE & MAN		CORE	CORE & MAN		CORE
Exeter	CORE				CORE & MAN				CORE
Farnborough	CORE				CORE & MAN				CORE
Glasgow	CORE & MAN	CORE & MAN		CORE & MAN		CORE	CORE & MAN		CORE
Guildford	CORE & MAN	CORE & MAN			CORE & MAN				CORE
Halifax	CORE		CORE & MAN		CORE & MAN				CORE
Huddersfield	CORE	CORE & MAN			CORE & MAN				CORE
Hull	CORE				CORE				CORE

					& MAN				
Leeds	CORE & MAN	CORE & MAN		CORE & MAN	CORE & MAN	CORE	CORE & MAN	CORE & MAN	CORE
Leicester	CORE & MAN	CORE & MAN			CORE & MAN	CORE			CORE
Liverpool	CORE & MAN		CORE & MAN				CORE & MAN		CORE
Maidenhead	CORE				CORE & MAN				CORE
Manchester	CORE & MAN	CORE & MAN		CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE
Milton Keynes	CORE & MAN		CORE & MAN		CORE & MAN	CORE	CORE & MAN		CORE
Newbury	CORE								CORE
Newcastle	CORE & MAN		CORE & MAN				CORE & MAN		CORE
Nottingham	CORE & MAN	CORE & MAN			CORE & MAN				CORE
Plymouth	CORE				CORE & MAN				CORE
Reading	CORE & MAN	CORE & MAN		CORE & MAN	CORE & MAN	CORE	CORE & MAN		CORE
Sheffield	CORE & MAN		CORE & MAN		CORE & MAN	CORE			CORE
Slough	CORE & MAN		CORE & MAN		CORE & MAN				CORE
Swindon	CORE	CORE & MAN			CORE & MAN				CORE
Wakefield	CORE		CORE & MAN		CORE & MAN				CORE
Warrington	CORE	CORE & MAN					CORE & MAN		CORE
York	CORE	CORE & MAN			CORE & MAN		CORE & MAN		CORE
Other UK Towns	100+	60+	32+	50+	+	11+	132+	+	+

Source: BT, On Relevant Product and Service Markets Within the Electronic Communications Sector Susceptible to Ex Ante Regulation In Accordance with Directive 2002/21/EC, July 2002, at 11 tbl. 3.

Note: CORE is backbone fiber service and MAN is metropolitan access network service.

In the forty geographic areas listed in Table 4, each market contains at least three alternative providers of backbone fiber service (core service) or both core service and metropolitan access network (MAN) service. With at least three companies *other than BT* owning network assets in major markets in the United Kingdom, it is reasonable to conclude that the wholesale business market is competitively supplied. Table 4 does include power companies, which are also well positioned to address the business sector.

5. Other Observations About the Process

The industry structure facing U.K regulators was unique in the sense that competition from cable telephony emerged *before* mandatory local loop unbundling was ordered, let alone implemented. Cable operators have opposed mandatory unbundling on the grounds that it would not encourage facilities-based competitors to expand into rural areas. For example, Telewest stated in February 2000:

[W]e do not believe that local loop unbundling will deliver the necessary universal broadband upgrades that Government policies require. It may purely delay the dominant player from full broadband upgrade of its local infrastructure (assuming that ADSL over twisted copper pair is only an interim solution) and deter alternative local loop investors from further substantial build, particularly to the lower density areas.¹⁸⁹

Telewest argued, correctly, that CLECs that rely on unbundled access were likely to focus their activities in densely populated markets.¹⁹⁰

Although the cable companies in the United Kingdom have begun to offer broadband Internet and voice service to their existing base of customers, only 50 percent of the homes in the United Kingdom were passed by the cable network as of July 2003.¹⁹¹ This lack of coverage explains in part why cable television accounted for only 26.4 percent of the multichannel television market in the United Kingdom as of 2003.¹⁹² Satellite television is much stronger in the United Kingdom than in the United States, as BskyB controls much of the sports content that cable operators cannot provide. It might be tempting for regulators to consider the cable industry's investment in broadband and telephony *in cables' existing footprint* as a sunk investment, which cannot be reversed through mandatory unbundling of BT's local loops. But mandatory unbundling of BT's network in rural areas might indirectly decrease the incentive of the cable operators to expand into rural areas, as UNE-based CLECs could enter those rural areas through

¹⁸⁹ Response of Telewest Communications, Towards a New Framework for Electronic Communications Infrastructure and Associated Services—The 1999 Communications Review, Feb. 2000, §E ¶ 2.3 (available at <http://europa.eu.int/ISPO/infosoc/telecompolicy/review99/comments/telewest28b.htm>).

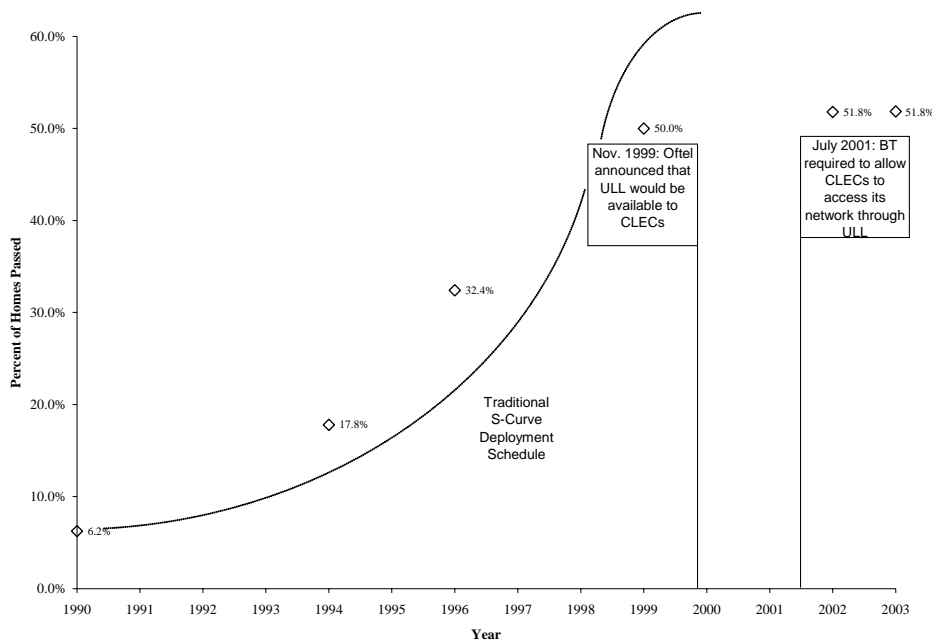
¹⁹⁰ *Id.*

¹⁹¹ See ITC Multichannel Quarterly, *supra* note 173.

¹⁹² *Id.*

unbundling *at a lower cost*. Cable operator Telewest succinctly explained the fallacy of the regulator's decision-making when it declared: '[I]f demand [for unbundled access] really exists, the market will deliver access products for new broadband services without regulatory intervention.'¹⁹³ Figure 6 shows the percent of homes passed by a cable operator in the United Kingdom between 1990 and 2003.

FIGURE 6: PERCENT OF U.K. HOMES PASSED BY CABLE, 1990-2003



Source: Peter Humphreys, *Radio and Television Systems in Great Britain*, Spring 1999 (available at http://www.obs.coe.int/oea_publ/hbi/HBI2K_GB.html); Teldok, *Teldok Yearbook 1997*, 24 July 1997, at 245; Martyn Williams, *TS News-UK Market Roundup*, 4 December 1996; OFCOM, *ITC Multi-Channel Quarterly-Q3 2002*, 17 December 2002, at 7; OFCOM, *ITC Multi-Channel Quarterly-Q2 2003*, June 2003, at 7.

The deployment of any new technology typically follows an 'S-curve.' Initially, technology penetration increases at an increasing rate. After some critical point, the technology is deployed at a diminishing rate until the entire market is saturated. Until 1999, cable penetration in the United Kingdom followed a deployment schedule similar to that suggested by the S-curve. In particular, cable penetration rapidly increased from only 6.2 percent in 1990 to 50 percent by 1999. Since 1999, however, cable penetration has increased by only 1.8 percent. The slow deployment of cable services to new markets

¹⁹³ See Response of Telewest Communications, *supra* note 189, § E ¶ 2.5.

in the United Kingdom could be explained, in part, by the introduction of mandatory unbundling of BT's network. If this effect is present, consumers have been injured by the decrease in competition to BSkyB. Hence, Ofcom's policy has led to greater market power for a company that Ofcom recognizes is exercising market power.¹⁹⁴ Again, the regulator in the United Kingdom as in the United States did not do an analysis of the effect of its regulatory policy on consumer welfare.

As late as mid-2005, Ofcom believed that it was necessary to resort to greater levels of regulatory intervention to make unbundling work. In June 2005, Ofcom stated that "years of intrusive regulation have not created the conditions for the sustainable competition necessary for long-term consumer benefit and which, in other countries, has spurred investment in next generation core and access networks."¹⁹⁵ Ofcom's fundamental concern was that some assets were supposedly economically impossible to replicate, which created an "enduring bottleneck," especially in the access part of the network.¹⁹⁶ Ofcom rejected the option of recommending a Competition Commission investigation, which could have led to the break-up of BT, and it instead opened a public consultation on the proposal to accept a series of solutions offered by BT.¹⁹⁷

In November 2004, Ofcom opened the Phase 2 consultation of its Strategic Review of Telecommunications.¹⁹⁸ The review noted that the fixed line market in the United Kingdom has remained fragmented and that BT was larger than most of its

¹⁹⁴ See, e.g., Ofcom, *The Regulation of Electronic Programme Guides*, March 2003, ¶ 16 (available at http://www.ofcom.org.uk/consultations/past/epg/stat_provisions/?a=87101); Oftel, *Beyond the Telephone, the Television and the PC*, Aug. 1995, ¶ 4.4.12, (available at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/info_super/multi.htm).

¹⁹⁵ OFCOM Telecommunications Statement, June 23, 2005, p. 1 (available at http://www.ofcom.org.uk/consult/condocs/telecoms_p2/statement/main.pdf).

¹⁹⁶ *Id.*

¹⁹⁷ Notice under Section 155(1) of the Enterprise Act 2002: Consultation on undertakings offered by British Telecommunications plc in lieu of a reference under Part 4 of the Enterprise Act, OFCOM, June 30, 2005, ¶ 1.1 (available at <http://www.ofcom.org.uk/consult/condocs/sec155/sec155.pdf>).

¹⁹⁸ Strategic Review of Telecommunications: Phase 2 consultation document, OFCOM, Nov. 18, 2004 (available at http://www.ofcom.org.uk/consult/condocs/telecoms_p2/tsrphase2/maincondoc.pdf).

competitors combined, in terms of revenues, market capitalization, and investment.¹⁹⁹ The review argued that the economies of scale and sunk costs for fixed networks are especially difficult for entrants to overcome, which made them reliant on BT to provide wholesale access to the network.²⁰⁰ Ofcom stated that the result of this reliance on BT was slow product development, inferior wholesale products, poor transactional processes, and a general lack of transparency, which combined to create an unattractive market for competition.²⁰¹

Ofcom offered three potential courses of action in its November 2004 review.²⁰² The first option involved across-the-board deregulation and complete reliance on competition law to constrain BT's purported market power. The second option was to make a reference to the Competition Commission under the Enterprise Act of 2002, which would actively consider the structural separation of BT. The third option was to seek from BT "real equality of access," which consisted of two parts.²⁰³ The first part would require "BT's own downstream operations use the same products, processes, and prices as those used by their retail rivals."²⁰⁴ The second part would require "operational separation within BT that would ensure that those responsible for overseeing BT's bottleneck assets had real incentives to wish to serve other operators in practice and on the ground with the same zeal, efficiency and enthusiasm as they served the remainder of BT's downstream activities."²⁰⁵ BT chose Ofcom's third option.

BT responded to Ofcom's November 2004 review in February 2005 by announcing a "comprehensive set of proposals to stimulate the UK telecoms industry."²⁰⁶ The proposals announced in February 2005 formed the basis for the proposed regulatory

199. *Id.*

200. *Id.* ¶ 1.19.

201. *Id.* ¶ 1.20.

202. *Id.* ¶ 1.26.

203. OFCOM Telecommunications Statement, *supra* note 195, p. 2.

204. *Id.*

205. *Id.*

206. *BT Unveils Proposals to Stimulate the UK Telecoms Industry*, BT Press Release DC05-057, Feb. 3, 2005 (available at <http://www.btplc.com/News/Articles/Showarticle.cfm?ArticleID=a13fbce7-157c-4220-bc38-c4c482026d50>).

settlement with Ofcom, which was formally proposed by BT in June 2005.²⁰⁷ In response to BT's proposal, Ofcom opened a public consultation to elicit comments on BT's solutions.²⁰⁸

The most significant of BT's proposed undertakings was the creation of a new business unit within BT, provisionally named the Access Services Division (ASD), which would provide equal access to its nationwide network.²⁰⁹ The ASD would provide, on behalf of BT, wholesale line rental, local loop unbundling, wholesale extension service, partial private circuits, backhaul extension service, and various other products.²¹⁰ The ASD would not provide any service to BT unless it also offered that product to BT's competitors on an "equivalence of input" basis, which would include the same timeframes, terms, conditions, and prices.²¹¹

The CEO of the ASD would report to the CEO of BT, but the CEO of the ASD would not be a member of BT's operating committee.²¹² BT would agree annually to the ASD's operating plan and capital expenditure plan, but the ASD would provide separate financial and regulatory accounts.²¹³ The ASD's management team and headquarters would be located in a separate building from BT's management team, and remuneration of the ASD's personnel would be based entirely on the performance of the ASD rather than BT.²¹⁴ The ASD systems would be logically separated immediately, and the operational support systems would follow a timesframe for physical separation.²¹⁵ The ASD would have its own staff of approximately 30,000 employees, and it would have a distinct brand name.²¹⁶

207. *BT Commits to Support New Era of Regulation*, BT Press Release DC05-405, June 23, 2005 (available at <http://www.btplc.com/News/Articles/Showarticle.cfm?ArticleID=e89ed523-12a0-45a1-bc2b-321f127e83be>).

208. OFCOM Consultation, *supra* note 197, p. 4.

209. *Id.* p. 7.

210. *Id.*

211. *Id.*

212. *Id.*

213. *Id.*

214. *Id.* p. 8.

215. *Id.*

216. BT Press Release DC05-405, *supra* note 207.

A significant part of the agreement between BT and Ofcom is the creation of an internal, five-member “Equality of Access Board,” supported by an “Equality of Access Office,” to monitor the company’s compliance with its “Undertakings” agreement and to recommend remedial action to BT’s management.²¹⁷ Three members of the Board would be “independent,” meaning that BT would select them with Ofcom’s advice and consent.²¹⁸ Ofcom would receive minutes of the proceedings of the Equality of Access Board, as well as regular reports. The Equality of Access Board “may suggest to BT remedial action to ensure compliance with these Undertakings,” and “BT shall take due account of any suggestions or comments the [Equality of Access Board] may have.”²¹⁹ The Equality of Access Board “shall inform Ofcom, within ten working days, when it comes to its attention that there has been a non-trivial breach of these Undertakings.”²²⁰ BT is required to fund and staff this internal oversight activity satisfactorily: “BT shall ensure that the [Equality of Access Office] is resourced commensurate with the demands placed upon it and is able to operate with the level of independence required.”²²¹ The Equality of Access Board would have access to information held anywhere in or by BT that the Board deemed that “it needs to fulfil its role,”²²² and, in a curiously worded provision, the Board “shall determine how best to engage with representatives of industry in order to understand their issues and concerns.”²²³

This arrangement underscores that decisions concerning network access implicate both ownership and control of the incumbent firm. One way to view BT’s undertaking with Ofcom is that the regulator’s indirect majority participation in the governance of the ASD obviates detailed ex ante regulation of wholesale services. Nonetheless, the risks of ownership (including the financial risk inherent in making sunk investments in network infrastructure) would remain with BT’s shareholders. Perhaps this hybrid re-nationalization of BT’s access network will purchase regulatory relief for its retail

217. Annex E: The Undertakings offered by BT, § 10.

218. Id. § 10.1.

219. Id. § 10.15.1.

220. Id. § 10.17.

221. Id. § 10.17.

222. Id. § 10.23. This power is actually granted directly to the Equality of Access Office rather than the Equality of Access Board.

223. Id. § 10.38.

business. But there is reason for skepticism, given the familiar tendency of regulators to perpetuate (and even initiate) intervention in markets that have become demonstrably competitive. Further, the UK government's previous record with a somewhat similar plan for the railroads ended in financial disaster in 2001 because the regulator would not permit the network provider to set rates high enough for continued investment and modernization of the rail network.²²⁴

C. New Zealand

Deregulation of the telecommunications industry in New Zealand began in April 1989 with the separation of Telecom Corporation (Telecom) from New Zealand Post Office.²²⁵ Telecom became fully privatized in 1990. In accordance with New Zealand's Commerce Act of 1986 and the Fair Trading Act of 1986, Telecom was declared 'dominant' in the telecommunications market. As a result, the regulator placed certain constraints on Telecom, but 'reaffirmed its reliance on general competition law to achieve its objective in telecommunications.'²²⁶ In 1995, in an appeal of an access-pricing dispute styled as a violation of the Commerce Act, the Judicial Committee of the of the Privy Council of the House of Lords embraced the efficient component-pricing rule, which implies that an incumbent (Telecom) may charge an entrant (Clear Communications) the incumbent's opportunity cost of granting access, as a principle consistent with New Zealand antitrust law.²²⁷

Unlike many other countries, New Zealand did not adopt any sector-specific regulation.²²⁸ Section 64 of the Telecommunications Act of 2001 required the Commerce Commission (CC) to determine the necessity of regulating access to the unbundled

²²⁴ Hausman and Myers (2002) discuss the railroad network financial disaster in the UK.

²²⁵ New Zealand Telecommunications 1987-2001, Publication No. 8, ¶¶ 8-9 (August 2001) [*New Zealand Pub. No. 8*].

²²⁶ *Id.*, ¶ 24

²²⁷ For an economic assessment of this decision, see William J. Baumol and J. Gregory Sidak, 'The Pricing of Inputs Sold to Competitors: Rejoinder and Epilogue', 12 *Yale J. Reg.* 176 (1995).

²²⁸ See, e.g., Geradin & Kerf, *supra* note 135, p.119 (explaining how the New Zealand adopted the opposite approach of the United States, where sector-specific regulation was pervasive).

elements of Telecom’s local loop network and fixed public data network.²²⁹ The CC initially set resale discounts as specified in the Telecom Act of 2001. In December 2003, the CC recommended in its *Final Report* against unbundling local loops, line sharing, and unbundling ‘elements of Telecom’s fixed Public Data Network beyond those supporting the Asymmetric Digital Subscriber Line (ADSL) bitstream services.’²³⁰

To measure the efficacy of full local loop unbundling, the CC used a cost-benefit analysis that measured the changes in total surplus (consumer and producer surplus) relative to the status quo of no regulation.²³¹ The New Zealand CC uses the “Long Term Benefits to End-Users” (LTBE) criteria in determining its regulatory policies. This determination usually involves an explicit cost-benefit analysis.²³² To the extent that mandatory unbundling reduces prices in the short term, consumer welfare increases. The increase in consumer welfare due to an expansion in output is referred to an “allocative efficiency” gain. The CC also considered the “wealth transfer” from producers to consumers when prices decline, which occurs independent of output expansion. Although the CC found short run gains in welfare, the calculations were subject to considerable uncertainty and criticism, and did not take account of effects on investment by the incumbent. Although it recognized the potential importance of dynamic efficiency, the CC believed that there was no robust method of quantifying dynamic efficiency gains that were applicable to its decision.²³³

The CC ultimately elected not to adopt local loop unbundling and listed several reasons in support of its decision. First, the CC noted that platform competition, especially in the form of fixed wireless networks, was likely to ‘evolve and reduce the extent of [Telecom’s] bottleneck over time.’²³⁴ Second, the CC explained that the potential for dynamic efficiency gains from local loop unbundling was tempered by

²²⁹ Telecommunications Act 2001 Section 64 Review and Schedule 3 Investigation into Unbundling the Local Loop Network and the Fixed Public Data Network, Final Report, 9 December 2003, p. i [CC *Final Report*].

²³⁰ *Id.*, pp. i, ii

²³¹ *Id.*, p.153 ¶¶ 622-26

²³² Australia uses a similar approach. The ACCC calls its test the “Long Term Interest of end-users” (LTIE) approach. Australia and New Zealand are the two regulatory bodies that use an explicit economic approach to determination of regulation.

²³³ *Id.*, p. 169 ¶ 695

international experience, noting that ‘in a significant number of countries, the gains from local loop unbundling have been disappointing.’²³⁵ Third, the CC revealed that responses to its draft report indicated ‘fairly limited demand for local loops’ as the preferred means of competitive entry.²³⁶ Fourth, the CC explained that mandatory unbundling was ‘a resource intensive activity,’ which generated ‘a significant level of controversy in determining terms of access to unbundled loops in overseas jurisdictions.’²³⁷ Most importantly, the CC determined the economic incentives for the incumbent to invest in new services would be significantly decreased and that these new services could lead to very large welfare gains to consumers.

Instead of mandatory unbundling, the CC ‘recommended’ access to Telecom’s ADSL service for residential and small and medium size enterprises (SMEs), along with the associated backhaul transmission services²³⁸ and operational support systems (OSSs).²³⁹ With the exception of updating the ‘Kiwi Share,’ which imposes universal service obligations on Telecom and establishes a price ceiling for its residential calls,²⁴⁰ the result of the CC’s recommendations was a largely unregulated telecommunications market relative to most European countries and the United States.

1. Retail Competition

In this section, we examine the recent trends in investment and pricing in New Zealand. The New Zealand survey provides a potential counterfactual to the unbundling experience in other countries. .

²³⁴ Id., p. 196 ¶ 788

²³⁵ Id., p. 197 ¶ 792

²³⁶ Id., p. 197 ¶ 793

²³⁷ Id., p. 197 ¶ 794

²³⁸ Id., p. ii

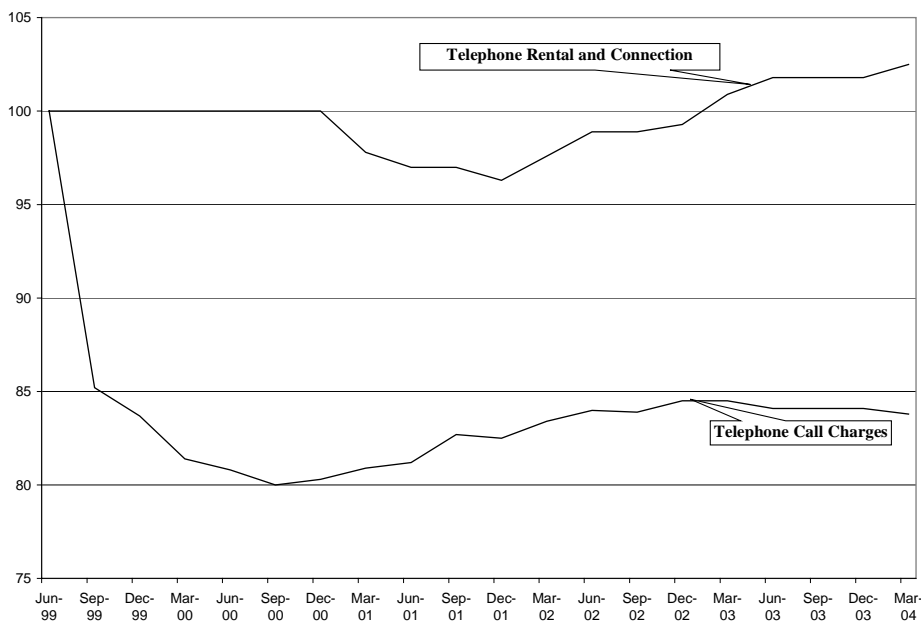
²³⁹ Id., p. iii

²⁴⁰ Government Announces Updated Kiwi Share Obligation (available at <http://www.med.govt.nz/pbt/telecom/minister20011218b.html>); Determination for TSO Instrument for Local Residential Service for period between 20 December 2001 and 30 June 2002 p.11 (available at <http://www.comcom.govt.nz/telecommunications/obligations/FinalDetermination17Dec2002.PDF>). Among other requirements, Telecom is required to provide (1) a monthly line rental no higher than the CPI adjusted price of the residential line rental charged at 1 November 1989 and (2) free local calling.

a. Pricing

Despite the fact that the CC has abstained from mandatory unbundling, prices for telecommunications services in New Zealand have not increased substantially. Figure 7 shows the prices for telephone rental and connection and telephone call charges in New Zealand since June 1999.

Figure 7: Statistics New Zealand's Real Residential Telephone Service Price Index:
Percent Change from June 1999 Index



Source: Statistics New Zealand (available by request at <http://www.stats.govt.nz/>).

As Figure 7 shows, telephone rental and connection charges offered by all carriers in New Zealand consistently decreased from June 1999 to December 2001. From March 2003 through March 2004, telephone rental and connection charges have increased by a modest 2.5 percent. Similarly, the price for telephone call charges has remained flat over the past few years. According to Statistics New Zealand, prices for residential telephone service decreased by an average of 3.5 percent per year between 1991 and 2001.²⁴¹ One

²⁴¹ See New Zealand Pub. No. 8, supra note 225, pp. 22-23.

possible explanation for the decline in prices in the absence of mandatory unbundling is that TelstraClear and other facilities-based rivals compete with Telecom in urban areas.²⁴²

b. Investment

As of June 2003, Telecom had decreased its capital expenditure by over 60 percent since 2001.²⁴³ The decline in Telecom's investment may be attributable to the rapid decline in telecommunications prices and the general decline of the global telecommunications market. The decline in Telecom's *rate* of investment is potentially misleading, however, because Telecom increased its investment in the late 1990s. In particular, Telecom introduced high-speed Internet access in 1999 with the roll out of Jetstream, which is based on ADSL technology.²⁴⁴ In 2000, following the development of Jetstream, Telecom connected New Zealand's North and South Islands using a submarine cable, with an estimated investment of NZ\$38 million. The submarine cable allows 98 percent of New Zealand's population to access Telecom's wireless network.²⁴⁵ Telecom also introduced voice over Internet protocol (VoIP) in 2000.²⁴⁶ Telecom offers VoIP to business customers, which is a fully managed service that includes extensive IP services and is the base for their next generation network (NGN), which is currently being developed and will gradually be rolled out over the next ten years.²⁴⁷ Telecom's NGN is comprised of 'a single network that delivers multiple applications (voice, data, video) to

²⁴² TelstraClear's network was established before TelstraSaturn bought Clear Communications in 2001. TelstraSaturn and Clear separately invested in fiber optic networks in New Zealand. See, e.g., Country Profile: New Zealand, Hot Telecom, March 2004, p.14 (available at <http://www.hottelecom.com/new-zealand.html>) [*New Zealand Profile*].

²⁴³ Telecom New Zealand Annual Report for the Year Ended 30 June 2003, p. 4 (available at http://www.telecom.co.nz/binarys/annual_report_2003.pdf)

²⁴⁴ TelstraClear Company Information (available at <http://www.telecom.co.nz/content/0,3900,200633-1548,00.html>) [*TelstraClear Information*]

²⁴⁵ *Id.*

²⁴⁶ NetIQ Case Study, *Telecom New Zealand Prepares for IP Telephony with NetIQ's Vivinet Manager*, 2003 (available at <http://www.netiq.com/products/vm/whitepapers.asp>).

²⁴⁷ See Telecom New Zealand's website (<http://www.telecom.co.nz/content/0,3900,202900-201383,00.html>); TelstraClear, *Telecom NZ Next Generation Network Regulatory Issues raised by NGN Deployment*, Conference on Commerce Commission Draft Report 10-14 November 2003, p. 5 (available at <http://www.comcom.govt.nz/telecommunications/llu/Conf/tclngn.PDF>)

multiple devices, whether fixed or mobile.²⁴⁸ In addition to the development of the NGN, Telecom plans to roll out its 3G wireless services in the next few years, after paying a concession fee of US\$16.94 million in January 2001.²⁴⁹

Perhaps more importantly, Telecom is rolling out video services over ADSL, which will lead to large benefits to New Zealand consumers.²⁵⁰ Fearing Telecom would slow its investment in video capabilities, the CC gave TelstraClear low grade (128K) bitstream in lieu of full loop unbundling. The main competition for Telecom's video service is satellite television, as cable television penetration in New Zealand is lacking (except in Wellington). Soon, Telecom will have the 'triple play' of voice, broadband, and television over a single network. It is noteworthy that New Zealand is in the forefront of video over the fixed-access network while the United States, which imposes more severe unbundling requirement on its fixed-access providers, lags behind.

2. Entry Barriers

As of early 2004, facilities-based competition was well underway in New Zealand. TelstraClear represents the most significant facilities-based competitor to Telecom. TelstraClear invested over \$1 billion in New Zealand through 2002, with an additional investment of approximately \$200 million in 2003.²⁵¹ By June 2002, TelstraClear had acquired a 7 percent share of all fixed-access voice connections.²⁵² TelstraClear, which owns Clear Net and Paradise.net, and other entrants had acquired 28 percent of the residential broadband market by June 2003.²⁵³

Before the purchase of Clear Communications by TelstraSaturn and Austar in December 2001 (which formed TelstraClear), both Clear and TelstraSaturn independently invested millions of dollars to establish their own fiber-optic networks.²⁵⁴ Since the

²⁴⁸. Murray Milner and Vince Pizzica, 'Telecom New Zealand: Pragmatic Evolution to Next Generation Networks', Alcatel, 22 April 2003.

²⁴⁹. See New Zealand Profile, *supra* note 242, p. 21.

²⁵⁰. See Jerry Hausman, Analysis of OXERA Cost Benefit Analysis (Conference Presentation), 11 November 2003, p. 5.

²⁵¹. New Zealand Commerce Commission, *4th Annual New Zealand Telecommunications & ICT Summit*, 25 June 2003, pp. 2-3. [*4th Summit*]

²⁵². See New Zealand Profile, *supra* note 242, p. 27.

²⁵³ *Id.*, p. 19

²⁵⁴ See *4th Summit*, *supra* note 251, p. 14.

acquisition, TelstraClear has been developing a nationwide network in New Zealand to provide telephone, data, Internet, mobile, and cable television services.²⁵⁵ TelstraClear plans to spend NZ\$14 million to roll out its network in nine cities.²⁵⁶ In January 2002, TelstraClear proposed the construction of an overhead network with underground connections in Auckland, which will provide direct competition to Telecom's network.²⁵⁷ During the Section 64 Review proceeding in 2003, TelstraClear claimed that it had determined not to continue rolling out its network because it was too expensive.²⁵⁸ Such claims seem implausible in light of the fact that Telstra is the largest Australian company and paid its shareholders an interim dividend of A\$1.6 billion in April 2004.²⁵⁹ Thus, our hypothesis that mandatory unbundling undermines the incentive of CLECs to invest in their own facilities seems to hold. While the CC did not mandate unbundling it did mandate bitstream sharing for DSL and TelstraClear has not increased its network coverage (except marginally) in the last three years. Another significant facilities-based rival in New Zealand is Counties Power, which rolled out a fiber optic and radio network on May 8, 2003.²⁶⁰ The project, called Wired Country, provides high speed Internet and telephone services to business and residential customers in the Franklin and Papakura regions of New Zealand.²⁶¹

Fixed wireless access (FWA) providers represent yet another source of facilities-based competition. In its decision not to require unbundling, the CC noted the potential for fixed wireless to constrain Telecom's local telephone prices:

²⁵⁵ See TelstraClear Information, supra note 244.

²⁵⁶ See New Zealand Profile, supra note 242, p. 19.

²⁵⁷ *TelstraClear Application: Area 3 Rollout Assessment of Environmental Effects*, Jan. 2002, p. 3 (available at http://www.telstraclear.co.nz/network_proposal.pdf).

²⁵⁸ See New Zealand Profile, supra note 242, p. 14 ('Over a year ago [TelstraClear] basically abandoned the roll out of any new fixed infrastructure themselves and their future now depends on utilising TNZ's national network wherever it can.').

²⁵⁹ Telstra Press Release, *Telstra pays shareholders interim dividend of \$1.6 billion*, 29 April 2004 (available at http://www.telstra.com.au/communications/shareholder/docs/tls225_interimdividend.pdf) . Telstra has announced a total expected payout of over A\$4 billion over the next few years.

²⁶⁰ See 4th Summit, supra note 251, pp. 2-3.

²⁶¹ *Counties Power Gets Totally Wired*, Axon, October 2003 (available at <http://www.axon.co.nz/info/Counties%20Power%20gets%20totally%20wired.htm>)

The Commission notes the potential for Fixed Wireless Access (FWA) to evolve and reduce the extent of this bottleneck over time, although the Commission has reservations over the technical capacity of FWA to be a substitute for services that can run over the local loop network. FWA is likely to evolve over time in terms of its capacity and its ability to substitute for services that run over the local loop network, although the timing and nature of this evolution is uncertain.²⁶²

The CC's inclusion of fixed wireless in the relevant product market is notably at odds with the position of the U.S. FCC, which has argued that FWA is not a suitable substitute for the fixed copper network.²⁶³

Beginning in 1999, Woosh Wireless (formerly Walker Wireless) began rolling out a national FWA network to compete with Telecom's fixed-access network.²⁶⁴ Woosh competes with Telecom in voice and data services by targeting residential and business customers.²⁶⁵ As of May 2004, deployment of Woosh's network was underway in Auckland and Southland, and was expected to continue in Wairarapa, Northland, Canterbury, and other major markets in late 2004.²⁶⁶ In addition to Woosh, other FWA providers, such as Broadcast Communications Limited (BCL), are investing in FWA technology intended to compete with Telecom. For example, BCL is rolling out a FWA network that covers rural and provincial areas in New Zealand.²⁶⁷

Telecom regards Woosh and other FWA providers as competitors in the local telephone services market. According to a Telecom study, if Woosh were able to capture 10 percent of the local market covered by its roll-out, then Woosh would be able to undercut Telecom's prices by 22 percent.²⁶⁸ As Woosh and other CLECs increase their market share, they will be able to exert further pricing pressure on Telecom.²⁶⁹

²⁶² See CC Final Report, *supra* note 229, p. 196 ¶ 788.

²⁶³ See Triennial Review, *supra* note 31, p. 141 ¶ 231 ('In addition, recent financial difficulties of fixed wireless carriers suggest the potential to use such services as substitutes for local loops used to serve the mass market is limited, at least for the short term.').

²⁶⁴ See CC Final Report, *supra* note 229, p. 91 ¶¶ 368-370.

²⁶⁵ *Id.*, p. 94, ¶ 385.

²⁶⁶ Whoosh Wireless, About Us, (available at <http://www.woosh.com/UserInterface/Woosh/Static/WhoisWoosh/WhoisWoosh.aspx>).

²⁶⁷ See CC Final Report, *supra* note 229, p. 95, ¶ 392.

²⁶⁸ Telecom's Response to the Commission's Draft Report, 29 October 2003, p. 55.

²⁶⁹ See CC Final Report, *supra* note 229, p. 96, ¶ 399.

Facilities-based entrants argue that mandatory unbundling would hinder the introduction and development of new technologies that compete with Telecom's local loops.²⁷⁰ In particular, those CLECs explain that mandatory unbundling will make raising investment capital increasingly difficult. They also point out that mandatory unbundling would reduce the price at which competitive fixed-line services could be offered, thereby undermining the return on their investment. According to some economists, New Zealand likely experienced more facilities-based competition than the United States due to its 'light-handed' approach to telecommunications regulation.²⁷¹

3. Stepping Stone Hypothesis

The stepping-stone hypothesis implies that after initial entry into the market through the use of a competitor's lines, CLECs will eventually invest in construction of their own network. The OECD and other analysts are in favor of mandatory unbundling in New Zealand.²⁷² Despite these views, in May 2004 the New Zealand government accepted the CC's recommendation on mandatory unbundling.²⁷³ Hence, the stepping stone hypothesis was never put to the test in New Zealand.

4. Wholesale Competition

We are not aware of any evidence that facilities-based entrants are providing wholesale access to new entrants in New Zealand. As of December 2003, the CC characterized the wholesale markets for local loops, bitstream access, fixed public data

²⁷⁰ Id., p. 167, ¶ 688 and p. 174, ¶ 710

²⁷¹ See, e.g., James R. Green and David J. Teece, 'Four Approaches to Telecommunications Deregulation and Competition: The U.S., U.K., Australia, and New Zealand', U.C. Berkeley Working Paper, Feb. 1999, p. 21.

²⁷² See, e.g., OECD, *Broadband and Telephony Services Over Cable Television Networks*, 7 November 2003, p. 44; Paul Budde, *New Zealand—Analysis—Market Overview, 1998-2002*.

²⁷³ Honorable Paul Swain, Decision on Telecom Network Recommendations, 19 May 2004 (available at <http://www.beehive.govt.nz/ViewDocument.cfm?DocumentID=19750>) (explaining that his decision 'decision that has the potential to quickly promote more competition in the long term interests of consumers.').

network (PDN) services, and backhaul services as ‘limited,’ with the exception of wholesale competition in Auckland Central, Mt. Wellington, Manukau City, Courtenay Place, and Wellington Exchange Serving Areas.²⁷⁴ Given the nature of the supply of and demand for switching, transport, and high-capacity loops serving business customers, however, we expect that the development of a wholesale market in New Zealand should be no different from the U.S. experience.

5. Other Observations about the Process

New Zealand is unique among the countries we discuss in that the CC used the appropriate social-welfare framework—namely, the sum of consumer and producer surplus—to assess various regulatory policies. Most regulators, including the U.S. FCC, have embraced a competitor-welfare framework when formulating telecommunications policy. Perhaps more remarkable, the CC considered dynamic efficiency in addition to static efficiency when evaluating alternatives, and defined the former as ‘how well the competitive process works: how well the market ultimately responds to the demands of end-users over time, by changes to what is produced and how it is produced.’²⁷⁵ The CC concluded that (negative) dynamic efficiency effects of unbundling could potentially exceed (positive) static effects:

The general point, though, is that regulation imposes risks on investors and can potentially hamper investment and, as a consequence, innovation. Regulation may mean that firms with access to Telecom’s local loop network or fixed PDN may have access to the benefits of an upgraded network without taking associated risks, which are borne by the owner of the network. Regulated firms may be reluctant to invest when competing firms have access to some of the rents provided by their assets. A risk for the regulated firm is that entrants may ‘cherry pick’ markets, without committing to the market in the same way as the incumbent has. The importance of these possibilities would depend on the extent of unbundling and the behaviour of access-seekers.²⁷⁶

²⁷⁴ See CC Final Report, *supra* note 229, p. 434.

²⁷⁵ *Id.*, p. 166 ¶ 684

²⁷⁶ *Id.*, p. 176 ¶ 719

As other countries are considering whether to mandate unbundling, the CC's framework for analysis provides a different point of view in that it was more explicitly economic in focus.

VI. The End of Regulation?

We believe the end point of the current regulatory process should be facilities-based competition. As we discussed in the beginning of this paper regulation sets prices based only on costs, which cannot be the correct approach when competition exists together with technologies that exhibit important fixed costs (economies of scale) and economies of scope, and that require large sunk cost investments. Further, we believe that the former "natural monopoly" justification for a single network has been demonstrated to no longer hold given the success of cable networks in providing both broadband internet and residential voice service in both the United States and the United Kingdom. Also, the increasing use of cellular telephony and other wireless technology such as fixed wireless, WiFi, and in the future WiMax provides additional competition to the landline network.²⁷⁷ While regulators such as the FCC have been very slow to take account of competition, scrutiny by the U.S. Court of Appeals for the D.C. Circuit has forced the FCC to moderate its approach. Indeed, in August 2005 the FCC voted to deregulate ILEC provision of broadband Internet service, DSL, so that it need no longer be unbundled after a one-year transition period. Thus, the FCC has retreated from its mandatory sharing approach and recognized the competitive reality that cable networks have approximately a 60% share of broadband Internet demand.

We first consider the question: Should landline service in the United States continue to be regulated, or should we see "The End of Regulation"? Telecommunications regulators, along with many antitrust authorities, are fixated by market share calculations. Given past experience, we might expect them to require the incumbent landline providers' share to fall below a particular threshold (say, 50%) before substantial deregulation would occur. However, this approach would be incorrect

²⁷⁷ For a discussion of wireless technology as a competitive factor for landline networks, see J. Hausman, "From 2G to 3G: Wireless Competition for Internet-Related Services," R. Crandall and J. Alleman ed., Broadband, Brookings, 2002.

because in a high fixed cost business such as telecommunications only a small loss in market share is sufficient to constraint a large firm from increasing price above competitive levels.

Suppose prices under regulation are set at approximately “competitive levels.” Assuming that no price discrimination occurs, consider the decision of an incumbent to increase prices 5% above the competitive level.²⁷⁸ Because competition takes place at the margin, only a small proportion of the ILEC’s customers need to defect to defeat its attempted price increase. In a simple example, it is possible to calculate that necessary proportion. Suppose that an ILEC attempted to increase prices on end-user access by 5%. How much traffic would that ILEC need to lose before the increase would be unprofitable? The formula to calculate that “critical share” is:

$$(1 - MC/P) Q_1 < (1.05 - MC/P) Q_2. \quad (5.1)$$

An important empirical fact for network elements is that fixed costs are a very large component of the overall cost, so that marginal cost is a relatively small component. Assume, for example, that the ratio of marginal cost to price, MC/P , is 0.2. Then Q_2 would be $0.94Q_1$, so that the critical share is 6%. Thus, if the ILEC were to attempt to raise its price by 5%, and if, as a result, it were to lose more than 6% of its traffic, the attempted price increase would be unprofitable and thus unilaterally rescinded.²⁷⁹ This calculation demonstrates that only quite small competitors’ shares are needed to defeat supracompetitive pricing by an incumbent.²⁸⁰

Two further considerations operate in opposite directions. First, we have assumed no price discrimination. If price discrimination occurs, the calculation of equation of (5.1) operates in only narrower markets. However, although historically price

²⁷⁸ A 5% price increase above the competitive level is often used in antitrust analysis. Regulation sometimes leads to prices below the competitive level, so this analysis would need to be modified in those situations.

²⁷⁹ For a more extensive discussion of critical share, see J. Hausman et al., “Market Definition Under Price Discrimination,” *Antitrust Law Journal*, 64, 1996.

²⁸⁰ We do not consider coordinated interaction among the incumbent and its competitors. Given the technologies involved and services offered, such coordination would be extremely unlikely to occur or be successful.

discrimination was often required by regulators for monopoly providers, with competition it is more difficult to undertake price discrimination profitably, especially in a business with large fixed costs and low marginal costs.²⁸¹ Further, in the United States section 202 of the Communications Act of 1934 forbids price discrimination.²⁸² So long as price discrimination does not occur, our calculation of a share below 10% continues to hold.

This relatively low share will decrease when we further consider the fact that many customers buy bundles of services. If they stop their landline subscription, they are very likely to stop subscription for voice mail, broadband Internet, call forwarding, and other services provided as bundles. In this situation the required percentage loss to constrain prices can be significantly below 5%.²⁸³ Thus, we conclude in the quite near future, or even at present, where the incumbents have lost greater than 5% of their landline subscription to cable and wireless competition, regulators could safely decree the end of regulation. Incumbents could then provide new services and compete better against the cable networks, which currently exercise market power, without the possibility that they will be required to share their successful new services with competitors at regulatory decreed prices.

The alternative to wireline facilities-based competition and deregulation is “regulation forever.”²⁸⁴ Our reading of the regulatory experience in the United Kingdom and New Zealand is that the onset of regulation coincided with the end of competitor-based expansion of wireline networks. As we discussed, the cable television networks stopped their expansion in the United Kingdom and Telstra-Clear stopped its network expansion in New Zealand. Similar experiences occurred in other countries such as Australia. Although we can advance other reasons for this observed end to geographic

²⁸¹ See J. Hausman, et. al., "Market Definition Under Price Discrimination," Antitrust Law Journal, Vol. 64, 1996. The calculations in the paper demonstrate that the firm would have to be able to successfully target customers in approximately 95% of the cases to be profitable. Firms are unlikely to have the requisite information to be correct 95% of the time.

²⁸² 47 U.S.C. § 202.

²⁸³ See Dennis Weisman, "Natural Constraints on the Market Power of the (De)regulated Firm", mimeo 2005.

²⁸⁴ If wireless became a significant competitor, deregulation might follow.

expansion, a leading cause would seem to be that competitors need not make significant sunk investments in regulatory access to incumbents networks. Instead, they acquire access at below competitive prices without the risk of sunk network investments.

Without facilities-based competition, the regulator will be in charge of the future direction of telecommunications in these countries. Indeed, this future role for regulators seems to have been made explicit in the proposed restructuring of BT, since Ofcom would assume corporate governance of BT's access network, even though ownership (and, hence, financial risk) would remain with private shareholders.

However, experience has demonstrated that market do considerably better than regulators in creating consumers welfare gains. Although international benchmark comparisons will provide some useful information, the natural regulatory tendency towards a competitor welfare standard rather than a consumer welfare standard will continue to create problems. Thus, our two closing comments are that regulators should be required to adopt an explicit consumer welfare goal, as in New Zealand and Australia, and that a viable regulatory plan should be implemented where the end point is facilities-based competition and deregulation. The technology and economics exist for such an end point. The regulatory framework in a given country will determine the speed at which this end point of the "End of Regulation" is approached.

Figure 1

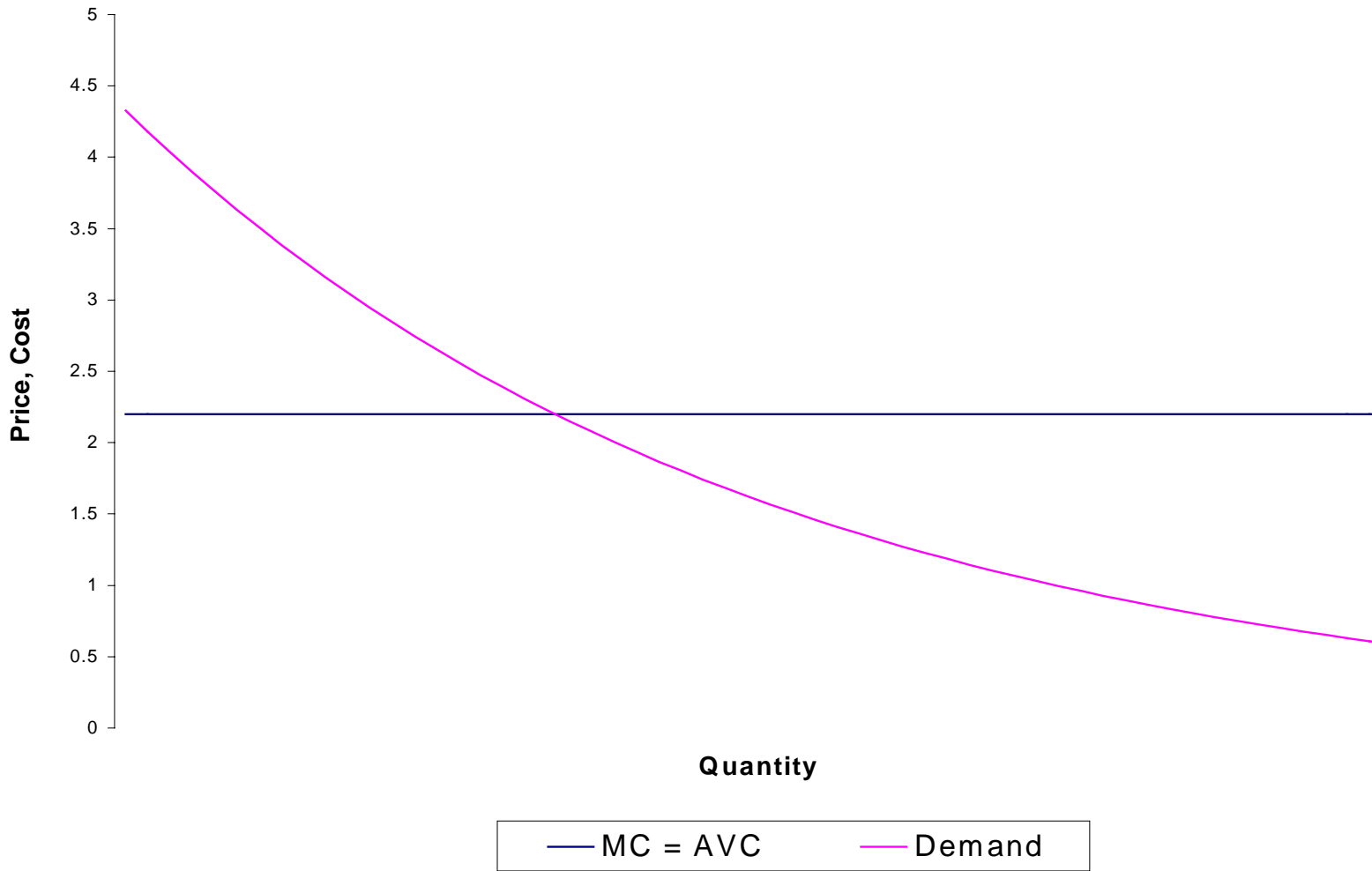
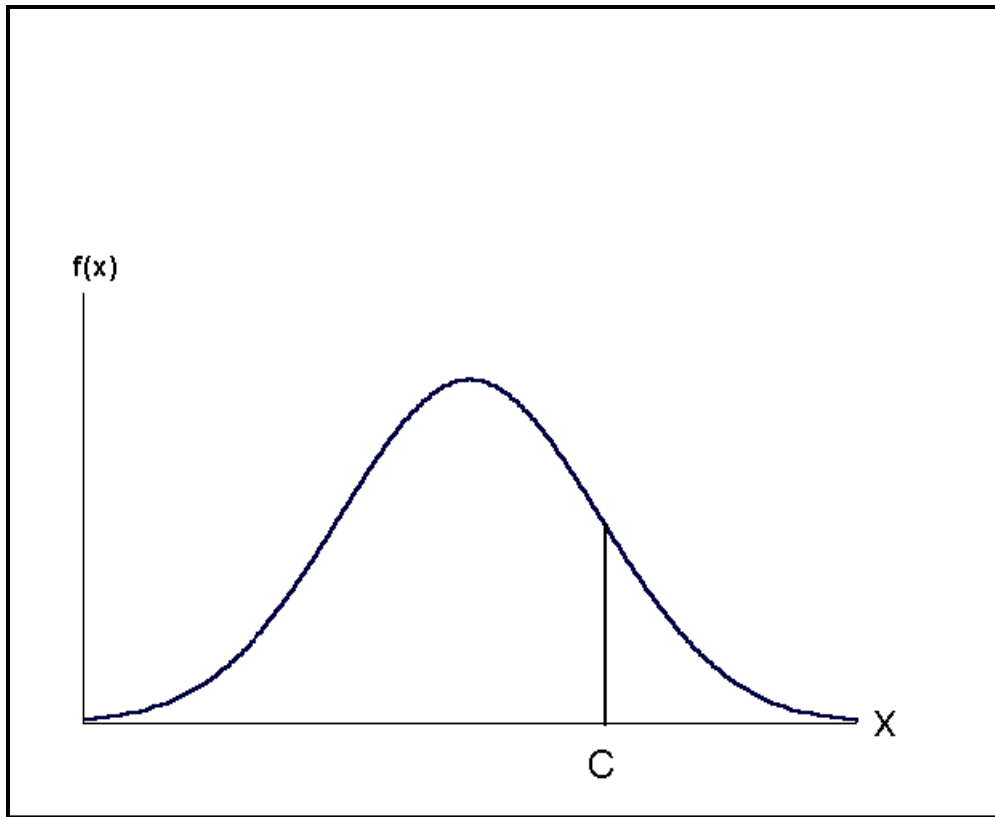
Cost and Price with Constant Returns to Scale

Figure 2



References

- Alleman J. and E. Noam, eds, The New Investment Theory of Real Options and its Implications for Telecommunications Economics, Kluwer, Boston, 1999.
- Armstrong M. and J. Vickers, "Regulation in Telecommunications", in M. Bishop, J. Kay, and C. Meyer eds., The Regulatory Challenge, Oxford University Press, Oxford, UK, 1995.
- Baumol, W., "Option Value Analysis and Telephone Access Charges", in J. Alleman and E. Noam, eds, The New Investment Theory of Real Options and its Implications for Telecommunications Economics, 1999
- Baumol W. J. and J. G. Sidak, Toward Competition in Local Telephony, MIT Press, Cambridge, MA , 1994.
- Beesley, M. and S. Littlechild, "The Regulation of Privatized Monopolies in the United Kingdom," Rand Journal of Economics, 20, 1989.
- Dixit, A. and R. Pindyck, Investment Under Uncertainty, Princeton Univ. Press, Princeton, NJ, 1994.
- Farrell, J., "Competition, Innovation and Deregulation", mimeo, 1997.
- Georgescu-Roegen, N. "Some properties of a generalized Leontief model", T.C. Koopmans, ed. Activity Analysis of Production and Allocation, Wiley: New York, 1951.
- Greene, W.H., Econometric Analysis, Macmillan Publishing Co., New York, 1990.
- Hausman, J., "Reply Affidavit of Prof. Jerry Hausman, FCC CC Docket No. 96-98, July 1996, mimeo.
- Hausman, J., "Valuation and the Effect of Regulation on New Services in Telecommunications," Brookings Papers on Economic Activity: Microeconomics, 1997.
- Hausman, J. "Taxation by Telecommunications Regulation", Tax Policy and the Economy, 12, 1998a.
- Hausman, J., "Telecommunications: Building the Infrastructure for Value Creation", in S. Bradley and R. Nolan eds., Sense and Respond, Harvard Business School Press, Boston, MA, 1998b.

Hausman, J. "Regulation by TSLRIC: Economic Effects on Investment and Innovation," Multimedia Und Recht, 1999a.

Hausman, J., "The Effect of Sunk Costs in Telecommunication Regulation," in J. Alleman and E. Noam, eds, The New Investment Theory of Real Options and its Implications for Telecommunications Economics, 1999b.

Hausman, J., "Comment", in J. Alleman and E. Noam, eds, The New Investment Theory of Real Options and its Implications for Telecommunications Economics, 1999c.

Hausman J. and S. Myers, "Regulating the U.S. Railroads: The Effects of Sunk Costs and Asymmetric Risk," Journal of Regulatory Economics, 22, 2002.

Hausman, J., G. Leonard, and C. Velluro, "Market Definition Under Price Discrimination," Antitrust Law Journal, 64, 1996.

Hausman J. and H. Shelanski, "Economic Welfare and Telecommunications Welfare: The E-Rate Policy for Universal Service Subsidies," Yale Journal on Regulation, 16, 1999.

Hausman J. and J. G. Sidak, "A Consumer-Welfare Approach to the Mandatory Unbundling of Telecommunications Networks," Yale Law Journal, 109, 1999.

Hausman, J. and T. Tardiff, "Efficient Local Exchange Competition," Antitrust Bulletin, 1995.

Kahn, A.E., The Economics of Regulation, MIT Press, Cambridge, MA, 1988.

Laffont, J.J. and J. Tirole, Competition in Telecommunications, MIT Press, Cambridge, MA, 2000.

MacDonald R. and D. Siegel, "The Value of Waiting to Invest," Quarterly Journal of Economics, 101, 707-728, 1986.

Mirrlees, J., "The Dynamic Nonsubstitution Theorem", Review of Economic Studies, 36, 1976, pp. 67-76.

Samuelson, P.A., "A New Theorem on Nonsubstitution", Money, Growth and Methodology, C.W.K. Gleerup: Lund, 1961, pp. 407-423.

Samuelson, P.A., "Understanding the Marxian Notion of Exploitation: A Summary of the So-called Transformation Problem between Marxian Values and Competitive Prices", Journal of Economic Literature, 9, 1971, pp. 391-431.