# REPLY REPORT ON
# THE PROPER APPLICATION OF THE ESSENTIAL FACILITY CONCEPT IN CANADIAN TELECOMMUNICATIONS


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# THE PROPER APPLICATION OF THE ESSENTIAL FACILITY CONCEPT IN CANADIAN TELECOMMUNICATIONS

## I. INTRODUCTION AND QUALIFICATIONS

1. I have been retained by Rogers Communications to assess the evidence filed by other parties to this proceeding with respect to the proper application of essential facilities in the Canadian telecommunications sector.

2. The following is a summary of my qualifications in the area of Economics, Competition Policy and Industrial Organization. I am a Full Professor of Economics at Queen's University, Kingston, Ontario. I have held full-time faculty positions for 27 years at the University of Toronto and Queen's University, and a visiting position at the University of California, Berkeley in 1987-88. I have published many articles in the area of Industrial Organization and Competition Policy, and a major textbook on the Economics of Industrial Organization, much of which is devoted to Antitrust Economics and Regulation.[1] I teach three or four courses each year at both the undergraduate and graduate level, covering the Economics of Regulation and Industrial Organization. From 1993-94, I held the T.D. MacDonald Chair at the Competition Bureau, and provided advice to the Director and other officers on many cases and issues. I have testified, given evidence, and consulted in several matters involving regulatory and competition issues, including several in the area of telecommunications. Finally, I have been an invited speaker to the Canadian Bar Association Annual Competition Law Conference on several occasions.

3. A full version of my *curriculum vitae* is attached as Appendix B to this report.

[1] Church, J.R. and R. Ware. *Industrial Organization: a Strategic Approach* (2000) San Francisco: McGraw-Hill-Irwin.

# II. SUMMARY OF MY CONCLUSIONS

a. An essential facility should be identified where access to an input belonging to a dominant incumbent, by one or more entrants, would lead to a substantial increase in competition in the downstream retail market. This is roughly the standard that has been proposed by the Commissioner of Competition. However, I do not believe that the standard should require the "effect" of a level of competition downstream that would justify complete forbearance from regulation. Competition analysis is about changes in competition, not levels of competition.

b. The appropriate standard finds an input essential where denial of access has the effect of "lessening or prevention" of competition, and not exclusively the prevention of competition, the latter having been advocated by some experts.

c. Contrary to the assumptions of those who argue for restricted access in the hope of increasing competition and investment, it can be shown first, that competition will be greater with access and second, that investment may well be greater with mandatory access than without, because the new entrant will need to invest in some facilities of its own to combine with the shared facility, in order to begin offering service.

d. In any event, the reality is that widespread, perhaps almost universal, forbearance at the retail level, has already been applied for by the ILECs and will likely be granted. The use of mandated access to essential inputs as an instrument to regulate market power is significantly more important where the alternative is unregulated dominant firms or highly concentrated oligopolies.

e. In the new reality created by the GiC *Order*, the choice envisioned by the Commissioner of Competition between mandated access and continued retail regulation will become irrelevant. As a result the CRTC should consider a broad use of mandated access when required to mitigate market power.

# III. ESSENTIAL FACILITIES: FIRST PRINCIPLES

4. I begin my analysis by addressing the fundamental purpose of mandating access to essential facilities. In a mature industry with a relatively stable technology, if a dominant incumbent has control of an input that makes entry and competition on reasonably level terms impossible, then from a public policy perspective, it is desirable to mandate access to the input and encourage competition to flourish. The public policy objective is to maximize economic welfare, and providing access to essential facilities is an instrument available to policy makers to facilitate that objective. I make this seemingly obvious point to draw a contrast with the quite different contention that facilities based competition is the public policy objective (with the implied corollary that mandatory access has frustrated its achievement.) In fact, facilities based competition is another means of achieving the same objective: that of maximizing economic welfare. In some cases facilities based competition may be the best means of achieving that objective, and in other cases providing mandatory access to one or more essential inputs may be more effective. Given the lengthy delays in constructing some facilities, e.g. local loops, it is plausible that providing mandatory access is efficient in the short term, in order to get entry and competition established, but that over a longer time horizon the required inputs can be constructed efficiently by the entrants.

5. To be sure, there are complex issues that arise in interpreting the essential facilities concept in practice. First, there is the question of identifying which inputs might be considered essential. Although the method has not always been used historically, the only precise methodology available for identifying essential inputs is the analysis of market power derived from competition economics. What essential means in this more precise language is that the input commands market power, and that mandating access would significantly diminish that market power. Since demand for the input is a derived demand, there must be market power *downstream* (in the retail

market) as a necessary (but not sufficient) condition for there to be market power upstream over this input.[2,3]

**The appropriate definition of essential facility for the Canadian telecommunications industry.**

6. Several experts have presented evidence in this proceeding as to the appropriate definition of essential facilities in the context of Canadian telecommunications.[4] The views of these experts can be ranged on a spectrum, with at one end a quite restrictive version of the U.S. "essential facilities doctrine", and at the other end a more inclusive proposal, based on competition economics, set forward by the Commissioner of Competition.

7. In the U.S. doctrine, which to the best of my understanding has little legal foundation in Canada, the four part test has been accurately described in evidence before this proceeding by Professor Robinson.[5] To summarize briefly, the U.S. test requires

> … they (the lower federal courts) have strictly defined its application to cases involving (i) *monopoly control* of a facility that is (ii) *essential to competition*, that (iii) *cannot be practicably duplicated* by competitors and (iv) where *sharing is feasible* and there is no reasonable business justification for withholding it. Robinson (Telus) at [5].

8. The U.S. doctrine is fundamentally not an economic test. An economic test of whether an input should be labeled as an essential facility would do so if such a designation increased total economic surplus. This is roughly consistent with the

[2] Market power must be defined in the context of identified product and geographic markets. Hence the full apparatus of competition analysis is required to properly identify essential inputs.
[3] The converse also holds true, as has been pointed out by several experts (e.g. Hausman, J.A. and J.G. Sidak (1999) "A Consumer Welfare Approach to the Mandatory Unbundling of Telecommunications Networks" *The Yale Law Journal* p.469). Perfect (or nearly perfect) competition downstream implies the absence of market power over the upstream input and no requirement for mandating access to the input.
[4] Examples of the more restrictive approach are Robinson (Telus), Weisman (Telus) and Taylor (Bell)
[5] The only case involving significant debate over the Essential Facilities concept in a hearing before the Competition Tribunal was the Interac Consent Hearing in 1996, which is discussed in Church, J.R. and Ware, R. "Abuse of Dominance under the 1986 Competition Act" *Review of Industrial Organization*, (1998) 85-129.

criteria accepted by Hausman and Sidak (1999) of increasing consumer welfare.[6] Of course, the criteria should be one of long run, not short run, economic welfare. The question of how best to exploit a technology once it has been created by a privately motivated innovator is a different one from the issue of creating the best environment and incentives for innovation to take place. In other words, allowance must be made for dynamic incentives to continue innovation, which may be eroded by forcing an innovator to share all or part of an established network.

9. The view that essential facilities should encompass a broader set of inputs, using a different methodology, may be found first in the Policy Direction, which states at 1. (c) (ii) "the potential for incumbents to exercise market power in the wholesale and retail markets for the service in the absence of mandated access to wholesale services" is central to the designation of a facility as essential.

10. The Commissioner of Competition, first in the Draft Telecom Abuse Bulletin (TAB) and secondly in her submission to this proceeding, articulated a similar standard. Thus, in the TAB at [4.2.2] she states

> For the purposes of section 79 of the *Act*, an "essential" facility is an input that provides the firm controlling it with the power to lessen or prevent competition in a relevant downstream market.' (TAB, [4.2.2])

11. In her submission to this proceeding, the Commissioner's position is summarized at [59].

> 59. The Bureau is of the view that access should only be mandated to facilities that are essential for competition. A facility can be deemed essential when all of the following circumstances are present:
>
> - The firm controlling the facility in question is vertically integrated and dominant in two markets. The first relevant market is the upstream market (or wholesale market) for the facility. The second relevant market is the downstream market (or retail market) in which the facility is an input. A necessary condition for concluding that there is dominance in the upstream market is that it is not practical or feasible for competitors to duplicate the facility in question;
> - Mandating access to the facility is likely to result in competitors entering or expanding in the downstream market; and
> - Such entry or expansion is likely to result in competition sufficient to allow for removal of economic regulation in the downstream market within a reasonable period of time.

[6] Hausman and Sidak *ibid.*

12. The Commissioner then hedges somewhat on whether she supports a lessening or a prevention standard. At [60] she sets out two possible standards for the reduction of competition in the downstream market that is attributable to the denial of access to an essential facility, and which would be reversed if access were mandated. The first of these amounts essentially to "prevention" of competition, and the second to "lessening" of competition. The Commissioner does not state a preference between these two standards, but she does state that if the CRTC were to adopt the weaker (lessening) standard that there should also be some sort of effects test, similar to that described in the third bullet of [59] (above).

13. The difference between the two extreme positions can be accurately summarized as the difference between "prevention" and "lessening" of competition being the determinative criteria for mandating access to an essential facility. The prevention position, which is aligned closely with the U.S. essential facilities "doctrine" is clearly stated by two of the experts for Telus, with excerpts reproduced below.

> Because the essential facilities doctrine requires monopolization of an essential input facility, the proper test of essentiality concerns whether the lack of access to the facility, function or service prevents competition. In other words, the essential facilities doctrine is concerned exclusively with the prevention of competition in a downstream market and not with a mere lessening of that competition. Dr. Weisman (Telus) cited at [62] of Telus evidence.

Professor Robinson makes essentially the same point.

> The word "lessen" – with or without the qualifier "substantial" – *seems to suggest a less demanding test than the doctrine requires*. As I have indicated earlier the concept of essential facilities, properly understood, is more restrictive than the general principle of monopolization or (in the Canadian context, abuse of dominant position). *If a facility is truly essential, its control must allow the owner to prevent or foreclose competition*. Robinson (Telus) at [28]

14. Only the “lessening” standard, the standard that is most consistent with Competition Law and Economics, will be effective in mitigating market power through mandating access to essential facilities. The Commissioner appears to support this conclusion also, although her position is not always consistent. As I explain in a subsequent section, my conclusion holds more strongly where the context is widespread forbearance i.e. where forbearance is not a *consequence* of mandated access, but actually precedes it.

15. In [61] the Commissioner appears to express some support for the weaker (broader) version – the “lessening” standard. She then qualifies this by saying “If the Commission adopts the weaker interpretation but does not adopt a test that assesses competitive impact (such as the third element of the Bureau's test in paragraph 59), it would be adopting an approach that is broader than the competition approach, and which may lead it to require mandated access in cases where the costs of doing so exceed the benefits.” It is hard to see how this statement can be correct. If refusing access to an essential facility has created a Substantial Lessening of Competition that would meet the standards of the Competition Act, it follows that the benefits of mandating access exceed the costs, just as they do, presumably, for interventions under the Competition Act (that is, in fact, one sensible interpretation of what a Substantial Lessening of Competition (SLC) means). But the Commissioner’s condition in her third bullet is much stronger than the threshold of a SLC, and in fact it is not necessarily even related to whether there is an SLC or not. The benefit of mandating access is measured by the change in competition, not whether the market is competitive enough following mandatory access to qualify for forbearance.

16. The broader standard is necessary because there are many downstream retail markets in which some partial entry has taken place, but where lack of full access to

one or more essential inputs would make the terms of the retail competition quite unequal, and the continued dominance of the incumbent very likely. Information filed as part of the process to consider the ILECs' forbearance applications indicate there remains significant dependence on leased facilities. In many residential markets there is only limited entry by facilities-based competitors and any additional competitors are dependent on leased facilities from the ILECs. In the case of business markets, several of the companies named as competitors rely extensively on facilities leased from the ILECs to provide service to some or all of the exchange.

17. To further illustrate the concern about the existing market structure, and by inference the important role that could be played by access to essential facilities, I reproduce below an excerpt from a recent speech by the Commissioner of Competition.

> We know that we face considerable challenges arising from the network structure of your industry, often featuring large sunk costs and significant economies of scale, density, and scope. Interconnection, both among competitors in the same market (e.g., local telephone service) and across market boundaries (e.g., long distance call termination), is widespread and usually necessary for firms to compete. And critical to any competition analysis, the proper definition of the relevant market in the telecommunications industry poses particular challenges because of the rapidly evolving product and technology base and shifting consumer interests.
>
> In the past, certain of these structural factors led to the natural monopolies we all grew up with. And even now, we have a sector that is, in many markets, still in transition from monopoly to duopoly, with the fate of that transition uncertain in some minds. ***Naturally, there are serious questions as to whether a duopoly itself is adequately competitive***, especially given the large market shares of some participants. (Sheridan Scott, speech to the Telecom Summit, June 13th, 2007, emphasis added).

18. Finally, the appropriate standard based on Competition Law and Economics principles is similar to the U.S. concept of "impairment" which appears in 251(d) (B) of the Telecommunications Act of 1996 and which has been the subject of some important judicial decisions. The original FCC interpretation was criticized by the U.S. Supreme Court in *Iowa Utilities*[7] as being too vague and too inclusive. However, subsequent interpretations by the FCC, notably the Triennial Review Order (TRO)

[7] AT&T v. Iowa Utils. Bd., 119 S. Ct. 721, 754 (1999)

(2003) and the Triennial Review on Remand Order (TROO) (2005) have demonstrated an increasingly sophisticated analysis based on antitrust principles, particularly with reference to barriers to entry. For example, in making a determination regarding mandatory access, the FCC now considers the extent of sunk costs involved in the CLEC entry investment decision, and also the likely volume of the CLEC business in relation to the extent of economies of scale. The FCC analysis in these cases corresponds very well to the framework that I discuss under the headings "barriers to entry" and "facilities based competition" in subsequent sections. The FCC decision framework could form a sound basis for the CRTC's analysis of essential facilities in the Canadian market. Although Canadian markets generally have smaller volumes of traffic the principles articulated by the FCC of sunk costs, economies of scale and barriers to entry translate perfectly well to the Canadian context.

**The importance of an analysis of barriers to entry**

19. An assessment of barriers to entry is essential in order to evaluate the extent of market power in any market. Broadly speaking, without barriers to entry, there can be no market power. In considering the case of essential facilities in a vertical structure, barriers to entry must be assessed at both levels of the vertical chain. Without a barrier to entry into the input market, there obviously would be no essential facility. But barriers in the downstream market are relevant also. If barriers to entry are significant at the retail level, even mandating access to an essential input would not ensure competition.

20. It is standard wisdom in industrial organization economics that sunk costs, economies of scale and network effects all operate as significant barriers to entry.[8] These factors should be considered carefully on a case-by-case basis, in contrast to the somewhat uncritical support for facilities based competition that has been offered by commentators, in this proceeding and elsewhere. To explore a single example,

[8] Church and Ware, *ibid*, Chapter 14.

consider the case of the ILECs CDN network as used to provide local service to business customers. As the evidence provided by Shaw Communications points out:

> It is also not operationally or economically feasible for competitors to duplicate ILEC CDN service. While a few buildings may be served by competing fibres, a competitor cannot compete in business markets by serving a few buildings. In order to compete in the business local exchange market, competitors must be able to serve all business locations. This is not possible without an ubiquitous network.
>
> There are significant operational barriers to competitive duplication of ILEC network coverage. Access to buildings, municipal rights of way and support structures all pose significant barriers to network deployment throughout business markets. While it is possible to overcome these barriers in some locations over a period of time, ubiquitous network deployment by competitors is not operationally possible, even over the long term.
>
> It is also economically impossible for a competing service provider to deploy a ubiquitous network that can compete with ILEC services in business local markets. The sunk costs of this kind of deployment are enormous and cannot be justified based on likely customer revenues. The ILEC networks were economically justified in a monopoly environment and much of the costs of these networks have been recovered. New entrants, in contrast, would be required to deploy the same networks, at substantially higher costs, without the benefit of a guaranteed customer base and access to economies of scale and scope, and to compete with the lower cost networks of the ILECs. In this situation, there is no basis for rational economic entry. Shaw at [43]-[45].

21. The first of these paragraphs describes network effects, and the last the effect of sunk costs, in each case presenting an entrant with a formidable barrier to entry. The second paragraph describes a different kind of potential barrier to entry, one that could best be described as a contractual barrier to entry.

22. The Commissioner at [62] describes circumstances under the weaker/lessening standard in which entry would not restore competition effectively, without further

regulatory intervention. Both of these circumstances involve economies of scale.[9] In the second case cited by the Commissioner, entry is profitable but raises industry average costs – in other words, competitive entry is actually inefficient. Only regulated retail pricing, or possibly mandated access to the incumbent's facilities, would address this problem, which has not been considered by any of the commentators arguing for unregulated facilities based competition.[10] Since retail price regulation is being phased out as a result of the Order in Council (*Order Varying Telecom Decision CRTC 2006-15)* (I address this issue extensively in a later section) the option to mandate access to essential facilities would be the only tool available to foster efficient competition when an unregulated market will not.

23. Another example offered by the Commissioner, which is largely consistent with the competition based standard for essential facilities, is her discussion of call termination in her response to the Bureau(CRTC)12Apr07-104:

> The Bureau's proposed approach to defining a facility as essential identifies call termination as an essential facility. To see this suppose that there is an incumbent with 100% market coverage who refuses to interconnect with an entrant. The incumbent is dominant in both the retail market and the market for call termination to its customers. Refusing interconnection creates a significant hurdle for the entrant to provide service and acquire customers. Indeed it is unlikely that they will have any adoptions in the absence of interconnection. The entrant will therefore likely not find it practicable or feasible to duplicate any of the network of the ILEC: unless all consumers switched, it is unlikely that any would switch and hence entry would not be profitable. However, with interconnection it is possible for the entrant to enter: the interesting question in applying the Bureau's approach is whether that entry allows for a significant increase in competition, an increase sufficient to warrant forbearance in some relevant market. In the case of cable companies, the answer to that would appear to be yes in residential local exchange services in regions where cable companies offer digital telephony. Hence the Bureau would agree that

[9] The exact scenarios proposed are: "(i) post-entry, the entrant has a cost disadvantage based on scale differences; or (ii) post-entry, the firms are of similar size, but their average cost is significantly greater than marginal cost."

[10] Curiously, even though in these cases the Commission concedes that "alternative policy options should be considered to control the exercise of market power" [62] she does not conclusively support the broad definition of essential facilities that is precisely the instrument that she cites, and which in the absence of continued retail regulation would be the only instrument available.

> interconnection, defined as call termination and associated ancillary services, is an essential facility.

24. In the middle of the above paragraph the same confusion arises between the *increase* in competition and the level of competition. A competition standard should be based on the change in competition (that is the natural meaning of "lessening" of competition). Yet the Commissioner has unnecessarily tied a finding of essential facilities to the necessity of achieving a certain *level* of competition at the retail level, a connection that has no logical basis.

25. Although I am advocating a standard for Essential Facilities based on Competition Analysis, the standard in a regulated environment should not have to meet the test required for an Abuse of Dominant Position under s.79 of the *Competition Act*. A regulated standard should instead be based on the criterion of mitigating market power. The Commissioner of Competition has also accepted the view that mandating access is not related to a finding of Abuse of Dominance but to the exercise of market power; (see Bureau(CRTC)12Apr07-106)**.**

**The Role of Facilities Based Competition**

26. Given that facilities based competition is a means to an end and not an end in itself, in this section I discuss some of the advantages and disadvantages of facilities based competition. First, much of the discussion of facilities based competition is predicated on the assumption that the level of entry will be unchanged whether access is mandated or not. In some cases the claim appears to be that entry and competition will be even greater *without* mandatory access.

27. In a balanced assessment, it should be noted that there is no robust theoretical support for the proposition that entry and competition will be as least as effective without access as with mandatory access to an input controlled by an incumbent. A reasonable theoretical analysis can easily draw the opposite conclusion, namely that

mandated access will lead to greater competition, and a higher level of investment.[11] Consider the table below.

| | | Mandatory Sharing of Essential Facilities | |
|---|---|---|---|
| | | Entry | No Entry |
| No sharing of facilities | Entry | A | B |
| | No Entry | C | D |

28. Those advocating the virtues of facilities based competition assume, explicitly or implicitly, that cell A in the above table is the relevant one i.e. that entry and competition will take place whether access to an essential facility is mandated or not. This leads easily to the corollary that incentives for investment will be reduced under mandatory access and that actual investment will be greatest with the most restrictive framework for access to essential facilities. The conclusion rests on two building blocks. First, that obviously the input will have to be duplicated by the incumbent if access is not mandated, leading, presumably to a higher level of investment. Second, that incentives for investment, broadly defined, will be reduced where mandatory access is the prevailing regulatory environment, and hence investment will be greatest where this is not the case.

29. In fact, however, it is perfectly plausible, perhaps more plausible, that cell C is the relevant one in the above table. That is, without sharing, there will be no entry or competition, but with sharing, profitable entry will occur. The barrier to entry that is removed through mandatory access may consist of one or more of the types described in paras 21 and 22 above. That is, sunk costs and economies of scale may provide a

[11] I review the empirical evidence for the proposition in a later section.

formidable barrier to an entrant because of the scale of the investment required, and the possible risks that profitability will be delayed. Secondly, contractual barriers to entry imposed by exclusive access arrangements to buildings, could also be eased by mandatory access. We can draw two conclusions that contradict the assumptions of those who argue for restricted access in the hope of increasing competition and investment. First, competition will be greater with access – in fact without access there may be no competition at all. This was, after all, the rationale for the "stepping stone" approach to encouraging entry. Second, investment may well be greater with mandatory access than without, because the new entrant will need to invest in some facilities of its own to combine with the shared facility, in order to begin offering service.

30. A theoretical model that supports these conclusions could be structured as follows. Suppose that in order to produce a good or service two fixed investments are required, denoted by $f_1$ and $f_2$ (measured in dollar amounts). If input 1 is designated as an essential facility with mandatory access, it may be shared by the incumbent and the entrant. Suppose that, without sharing, the market is a "strong Natural Monopoly".[12] The implication is that not only is entry undesirable on efficiency grounds, it will also not be profitable. If input 1 is shared, however, it may be efficient to have a second firm producing, by investing in its own input 2 and sharing the input 1 of the incumbent. In technical terms the industry with a shared facility is no longer a Natural Monopoly. Moreover, entry is not only efficient on cost minimization grounds, but the associated competition will bring additional benefits to the consumer. The only way to bring about such entry, however, is to mandate access, as the incumbent monopolist will not voluntarily encourage competition. If entry is facilitated, total investment will increase by the $f_2$ required for the entrant to produce. Thus, mandatory access increases total investment, the opposite of the assumption that has been made by those opposing such policies. Moreover, competition also increases with entry.

[12] A full definition of this term may be found in Church and Ware (2000) at p. 760. Briefly, it means that extensive economies of scale imply that costs are minimized with single firm production. Moreover, it is impossible for an entrant to find room to get into the market and destroy the monopoly equilibrium.

Appendix A to my report contains a detailed description of one theoretical model that supports these results.

# IV. SOME COMMENTS ON PRICING ACCESS TO AN ESSENTIAL FACILITY

31. It is impossible to fully discuss mandating access to an essential facility without giving consideration to the price at which that access should be transacted. After, all it would be trivial, and meaningless, to grant access at a prohibitively high price. Several experts have commented in their evidence on the pricing issue, notably Dr. Aron (Telus).

32. There are three conceptual approaches to pricing access, all well known to regulatory economists. These are: first, follow the Efficient Components Pricing Rule, which essentially preserves the incumbent monopolist's rents but has some attractive incentive and efficiency properties. Second, adopt the more theoretically sound methodology of Ramsey Pricing. The third approach is to use some measure of incremental cost as the basis for pricing, usually with a percentage markup to allow for a normal rate of return on capital.

33. Most regulatory agencies (including the CRTC) have adopted the third of these approaches. The reasons have partly to do with transparency and verifiability. Neither ECPR prices (properly adjusted for competition and other effects) nor Ramsey Prices are easy to compute, and both have formidable information requirements. Cost based pricing has the great virtue that, once the cost concept itself has been agreed upon, it is not difficult to compute the relevant cost measures, and to add an agreed markup. Moreover, the resulting values are transparent and verifiable by third parties.

# V. MANDATORY ACCESS AND INVESTMENT: THE EMPIRICAL EVIDENCE

34. As I discussed above, a significant part of the case against a broad definition of essential facilities is that the effect is to reduce the incentives for investment. And by

extension that the regimes of mandatory access put in place in the U.S., the EU and Canada have had the effect of reducing the realized level of investment in network facilities.

35. A typical version of the argument is exemplified by the discussion in Hausman and Sidak (1999), from which excerpts are reproduced below.

> Regulatory use of cost-based rates (such as TELRIC) creates disincentives for new investment and for innovation in telecommunications. If the new investment succeeds, the CLEC can purchase the ILEC's unbundled element at cost, as set by TELRIC. If the new investment fails, the CLEC does not bear any of the cost, but the ILEC's shareholders bear the cost of the unsuccessful investment. Thus, the regulators force the incumbent to provide CLECs a *free option* on its investment. (Hausman and Sidak (1999) p. 458)
>
> By the principle of " conservation of value" in finance, the Commission's grant of a free option to a CLEC diminishes the expected return of an ILEC's investment by the value of the option given to the CLEC. Thus, the grant of the option decreases ILECs' incentives to invest. (*ibid*).

36. An even simpler version of the theoretical argument is that entrants who are granting mandatory access are free riding on the incumbent's risky investment in network elements, and any such free riding will diminish the incentive of all incumbents to make either similar investments or risky new investments in uncertain technologies.

37. There is a counter theoretical argument that entry at the retail level will force the incumbents to engage in new investment to defend their competitive position, and also possibly stimulate innovation by incumbents who are being forced to work harder to preserve a competitive advantage. It is worth noting the classic result of Arrow (1962) that competitive firms have a greater incentive than monopolists to undertake R&D, essentially because the innovation is not replacing existing monopoly rents.[13]

[13] In the Economics of R&D literature this is referred to as the "replacement effect". See Church and Ware (2000) p. 581.

38. It has also been claimed by several authors that the empirical evidence supports the claim of a reduced incentive to invest, particularly that the slowdown in telecom investment post 2000 was due, at least in part, to the mandatory access regimes that had been put in place. But what does a balanced review of the evidence actually indicate? First, there is confusion about what theoretical proposition is actually being asserted. Even if it were true that the incumbent's incentive to invest were reduced somewhat by a mandatory access regime, the *total incentive to invest* (by all parties, including entrants) may still increase. That is, we even if we concluded that investment by an incumbent firm would decrease, total investment by all suppliers in the local telecom market might well increase. The critics of mandatory access do not always make it clear which of these propositions they are claiming to be true.[14]

39. Willig et al in a report filed for AT&T concluded that access by CLECs at cost-based rates had caused ILEC capital expenditures to increase, and increase with decreasing access prices.[15] Crandall (2005) reviewed all the empirical studies to date, and concluded that when carefully analyzed none of the studies supported the view that mandatory access rates had influenced the level of capital spending by Bell companies. One of the few studies to consider total telecom investment rather than ILEC investment, a preliminary study conducted at the OECD on OECD countries finds that total investment is higher in those countries with mandatory access than in those without.[16] This is consistent with the theoretical framework that I have set out in the preceding section.

40. Finally, the effect of access rules on the incentive to invest of ILECs must depend to a significant degree on the kind of network element to which access is being mandated. As Dale Hatfield describes in detail in his expert report for Rogers, "physical layer" facilities are less likely to involve a net benefit of duplication by the entrant, than are the "higher layers of the protocol" stack, such as switching and control

[14] For example, Hausman and Sidak (1999, 2000) refer largely to the ILEC's incentive to invest, not the effect of mandatory access on investment by all parties.
[15] Robert D. Willig, William H. Lehr, John P. Bigelow & Stephen B. Levinson, Stimulating Investment and the Telecommunications Act of 1996 (report filed by AT&T in FCC Docket 01-338, Oct. 11, 2002).
[16] Sean Ennis, "Access, Investment and Facilities-Based Competition" OECD Powerpoint, 2 November, 2006.

functions.[17] In economic terminology, I believe the distinction being drawn by Professor Hatfield is between network elements that are Natural Monopolies and those which are not. The case is strong for mandating access to the former, but much weaker to the latter.

# VI. THE IMPLICATIONS OF THE POLICY DIRECTIVE AND GOVERNOR IN COUNCIL *Order Varying Telecom Decision CRTC 2006-15*

41. The context of the essential facilities debate has changed significantly with the issuance of *Order Varying Telecom Decision CRTC 2006-15*. The order sets out new criteria for forbearance of local telecom markets, which are unrelated to essential facilities. The end result of this process, and of the flood of applications for forbearance which have followed it seems likely to be near universal forbearance from regulation in local telecom markets.[18] Nevertheless, the major submissions to this proceeding were made with a *regulated* alternative to any mandated access to essential facilities. As a result of this significant change in the context, the criteria for assessing an essential facility need to reflect an increased need to mitigate market power at the retail level.

42. To give just a few examples that illustrate the change in context, in the evidence of the Commissioner of Competition to this proceeding the Essential Facilities designation is envisioned as a rare exception to a framework of regulated retail rates. Thus, at [51]

> The Bureau submits that only those facilities, functions and services to which granting access is likely to result in competition sufficient to allow for the removal of economic regulation in the downstream market should be considered to be essential and subject to mandated access.

[17] See Dale Hatfield, report to this proceeding (Rogers) esp. pp14-17.
[18] Applications for forbearance in residential markets cover almost all of the CMAs, accounting for 95% of the total population; applications in business sector have been fewer, but steadily increasing.

43. Again, in Bureau(Cogeco)12Apr07-4

> The set of essential facilities in this context should be limited only to the ones that have allowed the cable companies to enter and will allow other facilities-based providers to enter on the same basis, as the Bureau references in paragraph 65 of its evidence (e.g. call termination, numbering codes). Other service providers that rely on a broader set of mandated services have not, to this point, provided effective competition in residential markets such that economic regulation can be removed, and it is unlikely that continued access to those services will generate that result, where necessary.
>
> The Bureau's test for essential services is intended to apply to both residential and business markets, and may achieve different results based on the facts at hand in each assessment. In both cases, a service should be designated essential only if mandated access is likely to result in entry sufficient to allow for the removal of economic regulation in the downstream market within a reasonable period of time. In the residential market, that entry has come from cable companies in most areas; in business, it remains to be seen whether this will be the case on a widespread basis.

The clear implication of both these statements by the Commissioner of Competition is that "facilities, functions and services" which do not satisfy the essential facilities criteria will continue to be regulated in the downstream market. However, this counter-factual circumstance has changed dramatically as a result of the GiC order varying Telecom Decision CRTC 2006-15. It now seems likely that forbearance will be widespread, perhaps almost universal. As of May, 2007, the ILECs had filed applications for forbearance in several hundred local exchanges, in both residential and business service categories.

44. Part of the explanation for the much wider granting of forbearance than envisioned by the Commissioner lies in the different criteria established in the GiC *Order*. In the passage reproduced below from Bureau(The Companies)12Apr07-9, the Commissioner envisions that if only duopoly competition is available downstream, it would require "end-to-end" facilities based competition in order to grant forbearance.

> The Bureau advanced the proposition in the *Local Forbearance* proceeding that competition between the ILEC and cable companies in digital telephony might be a

> case when two is enough to warrant forbearance. In particular, the Bureau suggested that it could be the case that competition between two end-to-end facilities based competitors (i.e., competing networks) in residential local exchange service is sufficient to replace regulatory constraints on the exercise of market power for this service.

45. By contrast, the *Order* does not require "end-to-end" facilities based competition, but allows for the entrant to lease facilities from the incumbent, provided they satisfy the requirement of access to 75% of the incumbent's customers. Clearly, the *Order* envisions continuing access by entrants to these leased facilities.

46. Many of the markets subject to applications for forbearance are at best, duopolies, and in several cases entry of even a second seller is difficult and costly and may not occur without intervention from the Commission. In most cases where two cable companies appear as competitors to an ILEC in a single Local Forbearance Region, the two cable companies are operating in distinct areas, and do not compete with each other. Thus, the true market structure remains a duopoly, even though a coarse statistical analysis may show three competitors.

47. The Commissioner of Competition's original proposal at [59] was that a facility would be declared essential only when unbundling would facilitate forbearance from regulation in the downstream market. The criteria could be set strictly, because the alternative would be continued regulation and presumably no opportunity for the exercise of market power. If retail markets are deregulated already, then what criteria should be used to identify a facility as essential? It seems likely that forbearance from regulation will occur in many markets where significant market power remains. In these markets, the unbundling of an essential input can play an important role in mitigating that market power, and leading to at least a greater degree of competition at the retail level. Such a methodology is largely consistent with the broader approach to essential facilities outlined by the Commissioner of Competition, but not with the "essential facilities doctrine" which derives from U.S. antitrust law. In order for access to essential facilities to be effective in mitigating downstream market power, it would

require implementation of the Commissioner's "weaker" standard, i.e. based on a lessening and not a complete prevention of competition.

48. Finally, the third element of the Commissioner's definition of an essential facility at [59] implies the CRTC can choose between mandated access where this will lead to forbearance or continued retail rate regulation instead of mandated access. Clearly, in the new reality of widespread forbearance, such a choice has little meaning, and the CRTC should consider a broad use of mandated access when required to mitigate market power.

**APPENDIX A:**

**A Theoretical Model in which Sharing Facilities makes Entry Efficient**

Suppose that demand is given by $P = a - bQ$ and that technology is characterized by the cost function $C = f_1 + f_2 + cQ^2$. $f_1$ and $f_2$ are sunk facilities that impose fixed rather than variable costs. We can solve for several critical values with this cost and demand structure. First, assume no sharing of facilities, so that an entrant must invest in $(f_1 + f_2)$ in sunk facilities in order to produce. We can solve for the optimal regulated price and quantity (optimal second best pricing), and for the quantity and average cost where average cost is minimized.

Now assume that input 1 may be feasibly shared, without congestion. If access is mandated, an entrant would be charged an access fee so that in effect the fixed cost $f_1$ is shared equally between the two firms. We can now solve for optimal second best pricing with two firms in the market. In addition, we can find the level of production at which the industry transitions from a Natural Monopoly to a Natural Duopoly, meaning that it is cost efficient to have two firms produce rather than one.

Purely for illustrative purposes, assume the parameter values:
$a = 2; b = 1; c = .1; f_1 = .2; f_2 = .1$ . It can then be readily verified that with no sharing of facilities the industry is a Natural Monopoly, actually a Strong Natural Monopoly in which not only is it efficient to have only one firm produce but that entry would be impossible if the incumbent sets the price and quantity that a regulator would choose. However, if sharing of input 1 is feasible, and access is mandated, it is optimal to have a duopoly (the market is known as a Natural Duopoly). Moreover, entry at the optimal regulated price is profitable. Finally, it is easy to show that total economic welfare, measured by the sum of consumer and producer surplus, will *increase* as a result of the mandatory sharing of facility 1.

# CURRICULUM VITAE

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B.A. Honours (Economics)
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POSITIONS HELD:

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| July 1997 - present | Professor, Queen's University |
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| 1989 - December 1990 | Associate Professor, University of Toronto |
| 1987-88 | Visiting Associate Professor, Department of Economics, University of California, Berkeley. |
| 1986-87 | Sabbatical Leave. Visiting Research Scholar, Carleton University and National Bureau of Economic Research, Stanford University |
| July 1986 | Promoted to Associate Professor with Tenure, University of Toronto. |
| 1981-86 | Assistant Professor (Economics), Erindale College, University of Toronto. |
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| 1979-80 | Instructor, Introductory Economics, Queen's University |
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| 1975-1977 | U.K. Department of Industry, Industrial Policy Analysis and Briefing Division. Provided advice on government support for research and development, and special assistance schemes for industry. During this period I completed a cost-benefit study of cost sharing support for industrial development projects. |
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**AWARDS:**

Holder of R. Samuel Mclaughlin Scholarships for graduate studies at Queen's University, 1977-78, 1978-79, 1980-81 sessions.

Awarded a Social Sciences and Humanities Research Council Post Doctoral Fellowship for 1983-84, renewed for 1984-85.

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1983: $6,760
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Awarded an SSHRC Leave Fellowship, 1986-87.

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Industrial Organization:

- Antitrust Economics and Competition Policy
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## BOOKS

*Industrial Organization: a Strategic Approach*. (with Jeffrey Church, University of Calgary) 2000. Boston: Irwin McGraw-Hill.

## JOURNAL PUBLICATIONS

"Efficiencies Analysis for Retail Sector Mergers," (with John Blakney) *European Competition Journal*, November 2006, pp. 285-310.

"Does Canada Pipe Really Have Market Power?" (with A. Basiliauskas) 2005 *Canadian Competition Record.* Vol 22, No. 2.

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"Efficiencies and the Propane Case" (2000), *International Antitrust Bulletin.*

"A Dynamic Model of Endogenous Trade Policy," (2001) joint with Bev Lapham, *Canadian Journal of Economics.*

"Interac, Essential Facilities and Access to Electronic Funds Networks: a Comment on Mathewson and Quigley," (1998) with Brian Rivard, *Canadian Competition Record*, 18: 12-21.

"Abuse of Dominance under the 1986 Canadian *Competition Act*," with Jeffrey Church, (1998) *Review of Industrial Organization*, 13: 85-129.

"Trade Dress and Pharmaceuticals: Efficiency, Competition and Intellectual Property Rights," 1997 with Jeffrey Church, *Policy Options*, September.

"Delegation, Market Share and the Limit Price in Sequential Entry Models," (1996) with Jeffrey Church, *International Journal of Industrial Organization*, 14: 575-609.

"Public Firms as Regulatory Instruments with Cost Uncertainty," (1996) with Devon Garvie, *Canadian Journal of Economics*, XXIX No. 2: 357-378.

"Raising Rivals' Costs and Alcoa: a Rejoinder" (1994) *Canadian Competition Policy Record*, October.

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"Markov Puppy Dogs and Related Animals," (1994) with Bev Lapham, *International Journal of Industrial Organization,* 12, 569-593.

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"Evolutionary Stability in the Repeated Prisoner's Dilemma," (1989) with Joseph Farrell, *Theoretical Population Biology*, 36, 161-166.

"Eliminating Price Supports: a Political Economy Perspective," (1989) with Tracy Lewis and Robert Feenstra, *Journal of Public Economics*, 40, 159-185.

"Forward Markets, Currency Options and the Hedging of Exchange Risk," (1988) with Ralph Winter, *Journal of International Economics*, 25, 291-302.

Review of The New Industrial Organization: Market Forces and Strategic Behavior by Alexis Jacquemin (1988), *Southern Economic Journal*.

"A Theory of Market Structure with Sequential Entry" (1987), with Curtis Eaton, *Rand Journal of Economics*, Vol. 18, #1, 1-16.

"A Model of Public Enterprise with Entry" (1986), *Canadian Journal of Economics*, XIX, 642-655.

"Long Term Bilateral Monopoly: The Case of a Resource" (1986), with Tracy Lewis and Robin Lindsey, *Rand Journal of Economics*, vol. 17, No. 1.

"Public Pricing Under Imperfect Competition" (1986), with Ralph Winter, *International Journal of Industrial Organization*, 4, 87-97.

"On the Shapes of Market Lattices in Loschian Spatial Models" (1986), with Mukesh Eswaran, *Journal of Regional Science*."Inventory Holding as a Strategic Weapon to Deter Entry" (1985) *Economica*, 52, 93-102.

"Lumpy Investment in a Growing Differentiated Market" (1984), *Economica*, 51, 377-391

"Sunk Costs and Strategic Commitment: A Proposed Three-Stage Equilibrium" (1984), *Economic Journal*, 94, 370-378.

"Strategic Timing and Pricing of a Substitute in a Cartelized Resource Market" (1983), with Nancy Gallini and Tracy Lewis, *Canadian Journal of*

*Economics*, XVI, 429-446.

*Three Essays on the Economics of Differentiated Markets* (1981), Ph.D. Thesis, Queen's University,

"The Relationship Between Efficiency and Technical change" (1977), in *Industrial Efficiency and the Role of Government*, edited by C.Bowe, HMSO, London.

## ARTICLES IN BOOKS

Publication (on CD) of paper "The Role of Price Correlations" contained in proceedings of Canadian Bar Association 2004 Annual Fall Conference on Competition Law

Publication (on CD) of paper "Recent legislative changes: is competition law becoming too industry specific?"contained in proceedings of Canadian Bar Association 2002 Annual Fall Conference on Competition Law

"The Effect of Uncertainty on theValue of Strategic Commitment." 2002. With B.C.Eaton, in volume, Applied Microeconomic Theory: Selected Essays of B. Curtis Eaton. Northampton, MA: Edward Elgar.

"Leading Edge Issues in the Economics of Competition Law," in J.B.Musgrove ed., *Competition Law for the 21st Century*, (proceedings of the 1998 Canadian Bar Association), Juris Publishing.

"Network Industries, Intellectual Property Rights, and Competition Policy." 1998. in N. Gallini and R. Anderson ed., *Competition Policy, Intellectual Property Rights and International Economic Integration* Industry Canada Research Series, The University of Calgary Press.

"Entry Deterrence" (1991) chapter in *New Developments in Industrial Organization* ed. by Manfredi La Manna and George Norman, Edward Elgar Publishing, London.

Review of Market Structure and Innovation, by M.I.Kamien and N.L.Schwartz (1983), *Canadian Journal of Economics*.

## WORKING PAPERS

"Forbearance, Regulation, and Market Power in Natural Gas Storage: The Case of Ontario" co-authored with David Brown, Ontario Energy Board, submitted to *World Energy Congress*, Rome, November 2007

## RECENT PROFESSIONAL ACTIVITIES

Refereeing on a regular basis for *American Economic Review, Canadian Journal of Economics, The International Journal of Industrial Organization, The Journal of Industrial Economics*, and occasionally for *Journal of International Economics,* and *International Economic Review.*

Presentations at the Canadian Bar Association annual conference, 2001, 2002, 2003, 2004.

Presentation of a paper "Efficiencies and the Propane Case" at the CBA Competition Law Section Meetings, Ottawa, September 2000.

Organizer, Paper presenter and Chair of two Sessions on *Competition Act* at 1997 Canadian Economics Association Annual Conference, St. John's, Nfld., June 1997.

Organizer and Chair of Panel Session on Canadian Competition Policy at 1992 Canadian Economics Association Annual Conference, Charlottetown, June 1992.

Co-Organizer of UBC Conference on Industrial Organization, July 1993

Organizer of a Conference on *Barriers to Entry*, March 1995, at the Bureau of Competition Policy, Ottawa.

Holder of the T.D.McDonald Chair in Industrial Organization at the Competition Bureau, Ottawa, from 1993-94.

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