

**CHOOSING BROADBAND COMPETITION
OVER UNCONSTRAINED INCUMBENT
MARKET POWER:**

A Response to Bell and TELUS

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Executive Summary

CHOOSING BROADBAND COMPETITION OVER UNCONSTRAINED INCUMBENT MARKET POWER: A Response to Bell and TELUS

The Aron/Crandall assessment is superficial, misleading, and wrong.

No one is disputing the importance of broadband facilities and next-generation network services to the Canadian economy. The principal question facing the Government is how to best expand Canada's telecommunications and information services infrastructure, consistent with national policies that encourage competition. The fundamental differences between the policies being advocated by competitors and those being supported by incumbent providers centers around how best to achieve and encourage investment in broadband facilities, and how best to assure the development of a robust competitive market for the provision of next-generation network services. TELUS and Bell Canada threaten to withdraw their investment – the only investment they focus upon – *unless the Government accedes to their demand that competition be suppressed.*

In the US, the decision to end both retail and wholesale rate regulation of ILEC last-mile broadband facilities (1) has allowed incumbent carriers ("ILECs") to charge excessive rates, (2) has allowed ILECs to earn supracompetitive profits, (3) has resulted in the erosion of competition in the US telecom market, and (4) has failed to create the promised dramatic transformation in the type and magnitude of ILEC broadband investments. US policy has decimated competitive entry and investment and has slowed the pace of broadband deployment both in the mass (consumer) market and, even more profoundly, in the small/medium business and enterprise markets.

In their March 11, 2009 petitions, Bell and TELUS barely touch on the issues of wholesale competition and essentiality, and attempt instead to convince the Government that the only way to get investment in next generation networks is to ignore competition and essentiality altogether. They urge adoption of what amounts to an industrial policy under which the ILECs are assured the opportunity to operate as unregulated monopolies with respect to wholesale (and retail) broadband services wherever cable competition is not already present, and as an unregulated duopoly for mass market services at those locations where competition from the incumbent local cable operator exists. Purporting to offer an economic rationale for the ILECs' position, the paper authored by Drs. Aron and Crandall, submitted by TELUS, is more than merely superficial; it is highly misleading. It mixes and matches data from disparate geographic (urban/suburban/rural) and product (residential/SMB/enterprise) markets and, while the authors' recommendations appear to apply across all product and geographic markets, virtually all of their analysis pertains solely to *residential* mass market broadband services,

and not to next-generation services required by small, medium, and large business customers. This lumping together of assorted geographic and product markets produces a distorted view of competition and investment incentives. There is no basis to assume that investment and competitive conditions for business services will simply mirror the conditions that are developing with respect to the cable/telco contest in urban and suburban residential markets. There are, in fact, three distinct broadband markets each with its own unique, and very different, competitive conditions and investment incentives confronting ILECs as a result of the facilities-based competition that may be present.

BROADBAND MARKETS AND COMPETITION		
Residential–urban/suburban	Cable competitor present	ILEC compelled to invest in order to avoid ceding market to cable (in the absence of mandatory unbundling, competition limited to telco/cable duopoly)
Residential–rural	No cable competitor present	Possibility of no broadband investment since competition not compelling ILEC investment – ILECs avoiding these investments regardless of regulatory regime
Business / enterprise	No cable operator present, and facilities-based competition limited to a handful of high-demand business locations	Absent mandatory unbundling, ILEC monopoly at vast majority of business locations

The ILECs’ threat to curtail investment if forced to make these new facilities available to rivals at regulated cost-based rates must be seen as little more than posturing, an empty threat whose aim is to cajole the Government into granting them *de facto* unregulated monopoly status.

Lessons from the US Experience

Both TELUS and Bell hold out the US experience as proof that removing unbundling requirements is the best way for the Government to promote investment in broadband. As it happens, actual experience in the US under the US FCC’s deregulatory policies does not bear this out. Over the very same time frame for which Bell and TELUS tout US ILECs’ “aggressive” investments, the three largest US ILECs were actually *disinvesting* in their networks. The assured availability of competitor access to unbundled ILEC “last mile” services at regulated, cost-based wholesale rates – as specifically contemplated in the landmark *Telecommunications Act of 1996* – had stimulated massive innovation and investment by entrants and incumbents alike. But that pattern of investment was abruptly reversed when the FCC, in 2001, began relieving US ILECs of their previously-mandated unbundling obligations. As a result, the US telecom industry is today far more concentrated in the hands of two mega-firms – AT&T and Verizon – and far less competitive that it had been even before the 1996 federal legislation. Enactment of the 1996 law fostered the *illusion* of a competitive telecom marketplace – an

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illusion that furnished the political rationale for deregulation – yet it was that resulting – and premature – deregulation that ultimately drove most competition from the market. TELUS’ experts strain to find a single example to support their contention that the US policies have created incentives for CLEC investment, or to support the FCC’s prediction that denial of access to ILEC next-generation networks will force competitors to “seek innovative network access options.”

By contrast, in Canada, the availability of competitor access to unbundled ILEC last mile facilities like CDN enabled competitive providers to construct Ethernet services and to develop the Ethernet market. This competitive challenge in turn forced the incumbents to more quickly evolve their own networks to support Ethernet directly, without first having to “convert” traditional TDM services to the new technology – the far less efficient solution that was being imposed upon competitors. The incumbents’ response to competitive Ethernet offerings has placed Canada well ahead of the US in the adoption of NGN services by business, enterprise, and government users. Unfortunately, rather than recognizing this as a natural technological evolution of the ILEC access network, the CRTC is erroneously treating NGN access as if it were part of a completely new and parallel network infrastructure, and in so doing has effectively limited competitor access only to legacy TDM services (CDN). This limitation enables incumbents to confine competitors to offering technologically obsolete services that are no longer capable of satisfying customers’ increasingly complex broadband requirements. If the CRTC’s decision not to recognize last mile Ethernet access facilities as essential services is allowed to stand, competition will slow, and ILECs will no longer be forced to pursue the NGN services market.

In the US, the elimination of broadband unbundling requirements has had no obvious beneficial effect with respect to broadband deployment in remote or rural areas. Despite the suggestion by Bell and TELUS that but for mandatory unbundling they would be ready to deploy residential broadband on a ubiquitous basis, the US experience belies that claim. US ILECs continue to be very focused in their broadband investments, concentrating on the highest-revenue (and least cost) targets. In fact, and despite having granted ILECs virtually all of their deregulatory wish list with respect to unbundling, price deregulation, and cost allocation, the US government, still frustrated by the lack of broadband services in rural and other underserved areas, has just earmarked more than \$7-billion in grants to fund broadband construction in these areas – some portion of which may be given to the “big three” ILECs. In any event, although the need to develop remote/rural residential broadband must be a component of any national broadband policy, it must not be allowed to become the sole or primary driver: If competition cannot be expected to bring broadband to remote communities and rural locations, then area-specific policies – including outright grants as in the US – should certainly be considered. However, there is no justification for sacrificing the benefits of robust competition in exchange for the ILECs’ empty promises and threats. The overarching goal of promoting competition to the greatest extent possible should be maintained and pursued. Rural broadband can be achieved through a narrowly targeted policy initiative – not at the expense of competition nationwide. Protection of the ILEC monopoly is neither a precondition nor a predictor of a robust telecommunications and information services economy.

Rejecting the Government’s express determination as to what constitutes facilities-based competition, Aron/Crandall eschew as not “genuine” any competition involving the use of facilities leased from an incumbent.

Aron/Crandall claim that “genuine” competition exists only where entrants acquire their own network infrastructure and are not dependent upon the incumbents’ facilities. Under the model of competition that they promote, only those firms that are vertically integrated to the same degree as an incumbent LEC (i.e., with a ubiquitous wholesale and retail presence, that is to say, an ILEC clone) qualify as offering “genuine” competitive alternatives. However, in raising the bar for “genuine competition” to this exalted height, Aron/Crandall propose a policy paradigm in which competition (in a form they find acceptable) becomes utterly unrealistic and unachievable. Surely this could not have been the outcome envisioned by the Government when, in its Order in Council, it had defined “facilities-based” competition as *including* competition over a combination of competitor-owned and leased facilities. The Commission’s apparent acceptance (with respect to NGN facilities) of Aron/Crandall’s owned-facilities-only model – their notion that only end-to-end facilities-based competition qualifies as “genuine” – operates to exclude highly beneficial competition that will result in lower *retail* prices as well as an overall expansion of investment in telecommunications and information services infrastructure. The stance that has been adopted by the Commission and that is being demanded by Bell and TELUS is antithetical to the express policy commitments of the Canadian Government to promote and rely upon competitive forces wherever possible.

Aron/Crandall’s contention that regulated rates for mandated unbundled wholesale services are not compensatory flies in the face of extensive CRTC review and multiple CRTC rulings to the contrary.

In the final analysis, the ILECs’ complaint isn’t really about unbundling – it’s really about pricing and their belated contention that unbundled rates set on the basis of CRTC Phase II costs are not sufficient to compensate them for the costs and risks of broadband deployment. Apparently, Aron/Crandall do not view rates based upon Phase II long run incremental costs as being sufficient to permit recovery of the underlying NGN investment given the various risks that such an investment program purportedly entails. But their contention that dominant incumbent carriers have been subject to escalating risks as they pursue broadband deployment is itself premised upon a seriously flawed analysis. In fact, as competitors exit the market making the dominant carriers’ market power even more entrenched, risks as perceived by investors have been steadily *falling*, making these investments *more*, not less, attractive.

The Commission has expended considerable time and effort over many years to develop and refine its Phase II cost process, and has issued a number of rulings on Phase II costing issues. Both Bell and TELUS actively participated throughout this process. In adopting the Phase II costing rules, the CRTC has determined that prices for wholesale services set on this basis are just and reasonable. In view of their oft-repeated concerns regarding “regulatory uncertainty,” it is rather ironic that Bell and TELUS persist in their ongoing campaign to relitigate the Commission’s well-established wholesale pricing standard. The time for Aron and Crandall to have raised such issues was in the

context of the cost methodology proceedings – and to the extent that such issues had been raised, they have been addressed and decided. Arguing now that CRTC-regulated wholesale prices are not compensatory is nothing more than a contrived rationale for undermining competition and the Government’s expressly stated pro-competition policy.

Conclusion

The economic conditions underlying the construction of a ubiquitous next-generation broadband infrastructure are essentially the same as those confronting the incumbent carriers’ earlier development of Canada’s voice telephone network. It is no more realistic to expect or require that entrants overbuild the entire scope of the incumbents’ NGN than it was – and is – to impose such a requirement with respect to traditional voice and narrowband telecommunications facilities. To effectively compete for enterprise customers’ broadband business, entrants must be capable of offering these customers the same extensiveness and connectivity that the incumbents offer. For this reason, competitor access to unbundled incumbent carrier NGN facilities is no less “essential” in the context of broadband services than is their access to legacy voice and TDM services – services for which the Commission maintains the “essential” or “conditional essential” classification.

As the technical nature of broadband services and applications grows more complex while the technical differences between legacy TDM and next-generation networks widen, the incumbents’ refusal to permit competitors access to next-generation facilities – and the Commission’s refusal to mandate such access – operates to effectively foreclose entrants’ ability to offer advanced services to their customers. In this way, the incumbents are being allowed to leverage and extend their ubiquitous network monopoly over to what could otherwise be a vibrantly competitive retail broadband enterprise service sector. If the CRTC’s decision not to recognize last mile Ethernet access facilities as essential services is allowed to stand, competition will dwindle, ILECs will no longer confront the competitive pressure to expand their own NGN services, and the overall extent and availability of broadband to Canada’s businesses, institutions and governments will suffer.

Although the need to develop remote/rural residential broadband must be a component of any national broadband policy, it must not be allowed to become the sole or primary driver: If competition cannot be expected to bring broadband to remote communities and rural locations, then area-specific policies – including outright grants as in the US – should certainly be considered. However, there is no justification for sacrificing the benefits of robust competition in exchange for the ILECs’ empty promises and threats, and the overarching goal of promoting competition to the greatest extent possible should be maintained and pursued.

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CHOOSING BROADBAND COMPETITION OVER UNCONSTRAINED INCUMBENT MARKET POWER: A Response to Bell and TELUS

Introduction

No one is disputing the importance of broadband facilities and next-generation network services to the Canadian economy. Businesses throughout Canada continually enhance their productivity and competitiveness by using flexible, high-speed networks to send and receive the information they, their suppliers, and their customers require. Residential consumers in many areas are obtaining new service options and the ability to choose between their incumbent local telephone company (“ILEC”) and their incumbent cable company for Internet access, video programming, and telephone services.

The principal question facing the Government is how to best expand Canada’s telecommunications and information services infrastructure, consistent with national policies that encourage competition. The fundamental differences between the policies being advocated by competitors, including MTS Allstream, and those being supported by incumbent providers, principally Bell and TELUS, centers around how best to achieve and encourage investment in broadband facilities and how best to assure the development of a robust competitive market for the provision of next-generation network services. TELUS and Bell Canada threaten to withdraw their investment – the only investment they focus upon – *unless the Government accedes to their demand that competition be suppressed.*

In the US, the decision to end both retail and wholesale rate regulation of ILEC last-mile broadband facilities (1) has allowed ILECs to charge excessive rates, (2) has allowed ILECs to earn supracompetitive profits, (3) has resulted in the erosion of competition in the US telecom market, and (4) has failed to create the promised dramatic transformation in the type and magnitude of ILEC broadband investments. US policy may well have benefitted Bell’s and TELUS’ ILEC brethren south of the border, but it has decimated competitive entry and investment and has slowed the pace of broadband deployment both in the mass (consumer) market and, even more profoundly, in the small/medium business and enterprise markets.

In their March 11, 2009 petitions, the ILECs barely touch on the issues of wholesale competition and essentiality. Rather, they attempt to convince the government that the only way to get investment in next generation networks is to ignore competition and essentiality altogether, and agree to adopt what amounts to an industrial policy under which the ILECs are assured the opportunity to operate as

unregulated monopolies with respect to wholesale (and retail) broadband services wherever cable competition is not already present, and as an unregulated duopoly for mass market services at those locations where competition from the incumbent local cable operator exists.

Both TELUS and Bell Canada have made explicit and implicit threats to curtail investment in their next generation networks unless they are given assurances that they can operate on a monopoly basis with little or no regulatory oversight, obligations, or constraints. Granted, TELUS and Bell don't expressly demand monopoly status, but this is both an underlying assumption and the inevitable consequence of their proposal to deny competitors wholesale access. In this reply submission, we address the claims of TELUS and its experts that the Government must shield these ILECs from competition in order to achieve what they portray as a first-rate broadband infrastructure throughout Canada.

The fallacy of the Bell/TELUS industrial policy position

Cutting through their rhetoric, Bell and TELUS see no legitimate role for competition in the Canadian broadband market. From their perspective, they can – and will if their demands are met – invest and build the broadband infrastructure that Canada, its citizens and its enterprises need, and they, not a competitive telecom market, should be relied upon to meet this challenge. In support of this contention, Bell and TELUS advance two primary arguments. First, they seek to convince the Government that they are the only providers capable of making the investment required to meet Canada's broadband requirements. Second, they portray these investments as only being feasible if they don't have to provide unbundled access to competitors at regulated prices.

Of course, that notion is fundamentally at odds with the overarching Government policy, as articulated in the Policy Direction, that seeks to encourage and facilitate competition. The ILECs offer a static view of broadband development – *they* will decide what type of infrastructure to build, what architecture and technology to deploy, where to build it, when to build it, and what to charge for its use. What this static view ignores is the *dynamic* effects of competition in stimulating innovation and efficiency. Indeed, the demand for broadband and the applications it supports – the Internet, among other things – had its origin in intensely competitive markets for software, content, information, entertainments – none of which would ever have materialized if controlled by the handful of incumbent monopolies that would now have the Government declare them the winners and leave them be. Four decades of telecom competition in the US, Canada, Europe and elsewhere have confirmed the enormous benefits that competition in this sector has engendered. The risks of ceding the future of telecom to a few legacy incumbents overwhelms whatever “risks” Aron/Crandall seek to portray if the ILECs are required to make their next generation facilities available to rivals.

Note on market definition and mismatched competitive and investment evidence

The paper authored by Drs. Aron and Crandall, filed with the TELUS submission, makes a wide-ranging assortment of claims relative to unbundling, investment, competition, and the status of broadband in Canada relative to other countries. But the Aron/Crandall analysis is more than merely superficial; it is highly misleading. It mixes and matches data from disparate geographic (urban/suburban/rural) and product (residential/SMB/enterprise) markets to arrive at conclusions that a more careful analysis would prove to be unsupported. In particular, while the authors’ recommendations appear to apply to broadband provided by ILECs across all product and geographic markets, virtually all of their analysis pertains solely to *residential* mass market broadband services, and not to next-generation services offered to small, medium, and large business customers. This lumping together of assorted geographic and product markets produces a distorted view of competition and investment incentives, which vary significantly among the various markets. In particular, there is no basis to assume that investment and competitive conditions for business services will simply mirror the conditions that are developing with respect to the cable/telco contest in urban and suburban residential markets.¹ Table 1 below identifies the three distinct broadband markets and highlights the very different competitive conditions and investment incentives confronting ILECs as a result of the facilities-based competition that may be present.

Table 1		
BROADBAND MARKETS AND COMPETITION		
Residential–urban/suburban	Cable competitor present	ILEC compelled to invest in order to avoid ceding market to cable (in the absence of mandatory unbundling, competition limited to telco/cable duopoly)
Residential–rural	No cable competitor present	Possibility of no broadband investment since competition not compelling ILEC investment – ILECs avoiding these investments regardless of regulatory regime
Business / enterprise	No cable operator present, and facilities-based competition limited to a handful of high-demand business locations	Absent mandatory unbundling, ILEC monopoly at vast majority of business locations

1. The concept that specific findings about competitive market conditions must be related to specific geographic and product markets is found throughout the Order Varying Telecom Decision CRTC 2006-15, P.C. 2007-532 April 4, 2007 (the “Order in Council”).

Choosing Broadband Competition over Unconstrained Incumbent Market Power

The ILECs' threat to curtail investment if forced to make these new facilities available to rivals at regulated cost-based rates must be seen as little more than posturing, an empty threat whose aim is to cajole the Government into granting them *de facto* unregulated monopoly status. Bell and TELUS will not cede a broadband monopoly to cable providers by withholding broadband investments in residential urban and suburban locations, because to do so would undermine their core mass market voice telephony business. ILECs will invest in broadband both to pursue profitable opportunities *and* to defend their core markets from encroachments by cable. As we discuss below, there is no evidence that a requirement to sell unbundled wholesale access to the incumbents' broadband facilities at regulated, cost-based rates *as an adjunct to the ILECs' own retail service business* will be unprofitable or will diminish overall profitability to the point where a broadband build-out will not be pursued.

As for broadband data and IP services for business use, ILECs already have extensive broadband facilities in place at commercial locations throughout Canada. Competitor-owned facilities exist at a small fraction of business and enterprise customer locations.² The FCC has determined that construction of broadband facilities by a competitor to a given commercial location becomes economically feasible only where potential revenues are sufficient to defray the investment cost involved, and that this does not occur for demand levels at two DS-3s (equivalent to 1,344 voice-grade channels) or less.³ And as we noted in our March 11 report, the US Government Accountability Office (GAO) has found that only 0.8% of the 183,000 commercial locations in the US with demand levels of at least 24 voice-grade channels had a demand for service at a capacity level greater than one DS-3 – 672 voice-grade channels.⁴ Widescale facilities-based competition is simply not a realistic expectation in the business and enterprise segment, and without mandatory unbundling and provisioning of wholesale broadband services at regulated cost-based rates, there will be no retail competition in this segment either.

2. The Government, in the Order in Council, has classified competitive TSPs as “facilities-based competition” if their networks include a combination of competitor-owned facilities along with facilities leased from other carriers, typically from ILECs. Of course, the elimination of the availability of leased facilities at cost-based prices would have the effect of drastically truncating these hybrid owned/leased facilities networks and, in so doing, would seriously, if not fatally, undermine the competitiveness of such networks and directly negate the effect of the Order in Council definition.

3. *In the Matter of 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 Docket No. 01-338; CC Docket No. 96-98; CC Docket No. 98-147, 18 FCC Rcd 16978, 17172 (2003) (“Triennial Review Order”).

4. Lee L. Selwyn, Susan M. Gately, Helen E. Golding, Colin B. Weir, *The Role of Regulation in a Competitive Environment*, March 2009 (Appendix 2 to MTS Allstream March 11, 2009 Petition) (hereinafter, “*Role of Regulation*”) at 6, citing US Government Accountability Office, *FCC Needs to Improve Its Ability to Monitor and Determine the Extent of Competition in Dedicated Access Services*, Report to the Chairman, Committee on Government Reform, House of Representatives, GAO-07-08, November 2006 (“GAO Report”), at 20.

Lessons from the US Experience

Both TELUS and Bell hold out the US experience as proof that removing unbundling requirements is the best way for the Government to promote investment in broadband and that, by removing unbundling requirements, competitors will be forced either to duplicate these facilities or to pay a “market” rate (set by the ILECs) for access to the ILECs’ networks. The support for TELUS’ position is contained in the Aron/Crandall “white paper,” while Bell produces a short letter from J. Gregory Sidak. In both, the evidence of broadband investment is highly anecdotal and focused solely upon *residential* broadband deployment.

By contrast, in our March 11 paper, we have relied upon data and financial reports *submitted by the US ILECs themselves* showing that these companies are not investing at extraordinary levels and that, in fact, over the time frame for which Bell and TELUS tout US ILECs’ “aggressive” investments, the three major US ILECs were actually *disinvesting* in their networks.⁵ Unlike Bell and TELUS, we have analyzed residential and business markets separately,⁶ put US ILEC investments in historical context by examining investment trends, and accounted for investment both by ILECs and their competitors. We also showed how the policies adopted by the FCC have harmed competition and permitted US ILECs to solidify and exploit their monopoly of broadband facilities serving all segments of the business market – an outcome that is antithetical to the Canadian Government’s Policy Direction.⁷

As we discussed in our March 11 paper, the assured availability of competitor access to unbundled ILEC “last mile” services at regulated, cost-based wholesale rates, as had been mandated by the 1996 US *Telecommunications Act*, stimulated massive innovation and investment by entrants and incumbents alike.⁸ However, the level of investment (both by ILECs and by CLECs) began to erode beginning in 2001, as the FCC adopted successive deregulatory measures, beginning with pricing flexibility for special access services and continuing with the elimination of mandated, cost-based competitor access to unbundled incumbent last-mile facilities and related deregulatory measures. The result: The US telecom industry is today far more concentrated in the hands of two mega-firms – AT&T and Verizon – and far less competitive that it had been even before the 1996 federal legislation (see Figures 1-3 below). Enactment of the 1996 *Telecommunications Act* fostered the *illusion* of a competitive telecom marketplace – an illusion that furnished the political rationale for deregulation – yet it was that resulting – and premature – deregulation that ultimately succeeded in driving most competition from the market.

5. *Role of Regulation*, at 22-25.

6. The Order in Council specifically endorses this treatment (“Whereas the Governor in Council considers that local business markets and local residential markets should be considered separately).

7. SOR/2006-355, Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives (“Policy Direction”).

8. *Role of Regulation*, at 17.

Concentration of US Telecom Industry Revenues - 1995

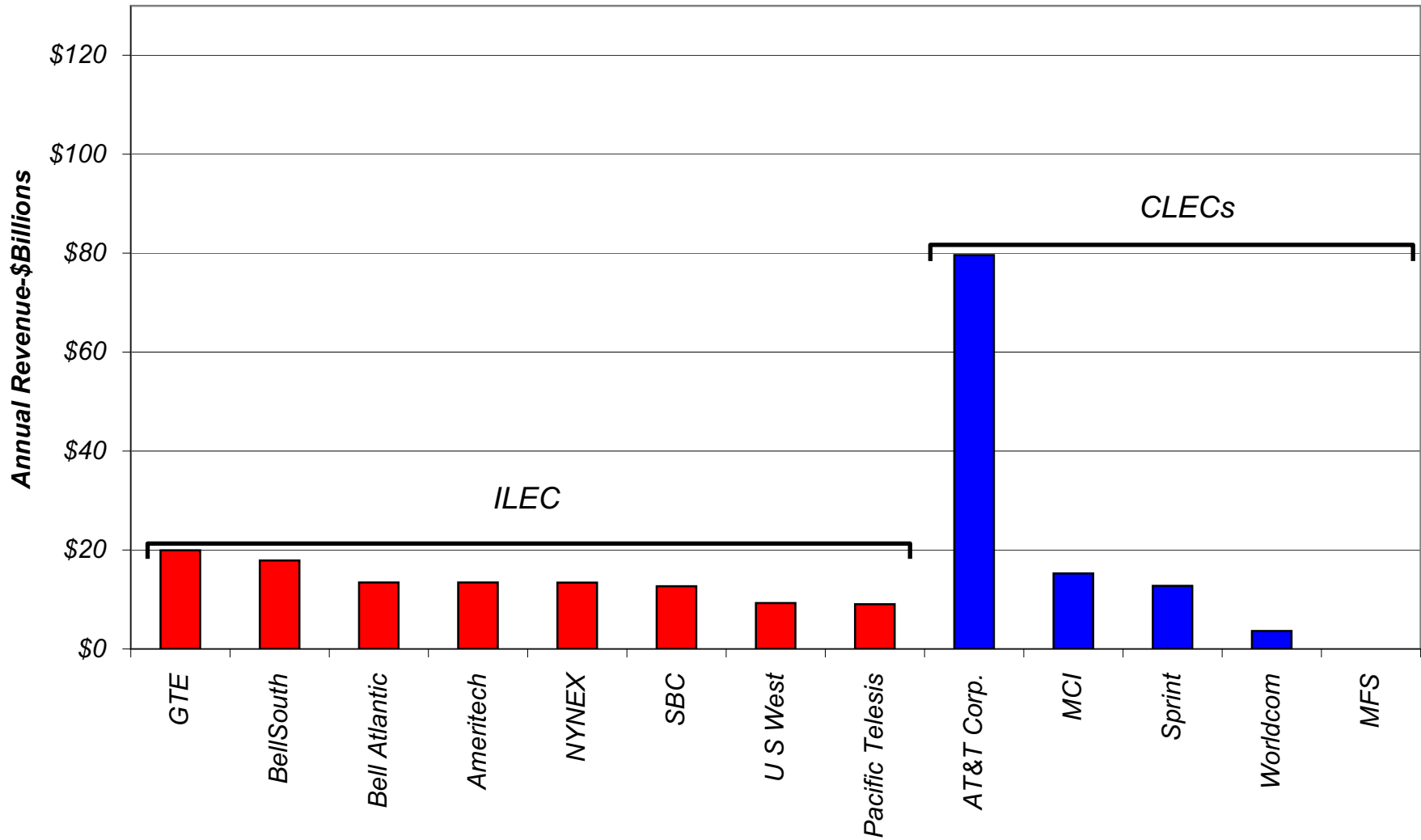


Figure 1

Concentration of US Wireline Telecom Industry Revenues - 2008

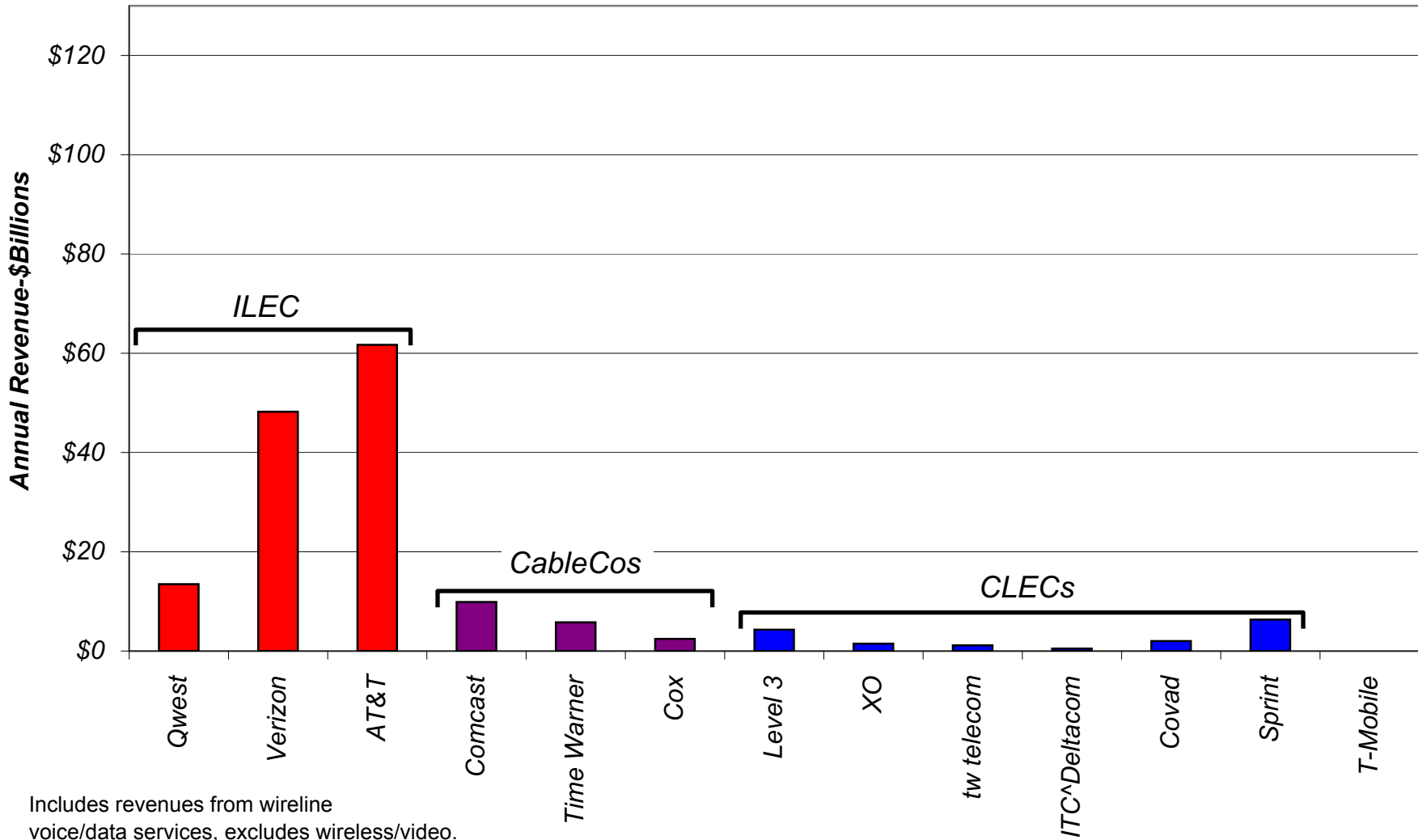


Figure 2

Concentration of US Total Company Telecom Industry Revenue - 2008

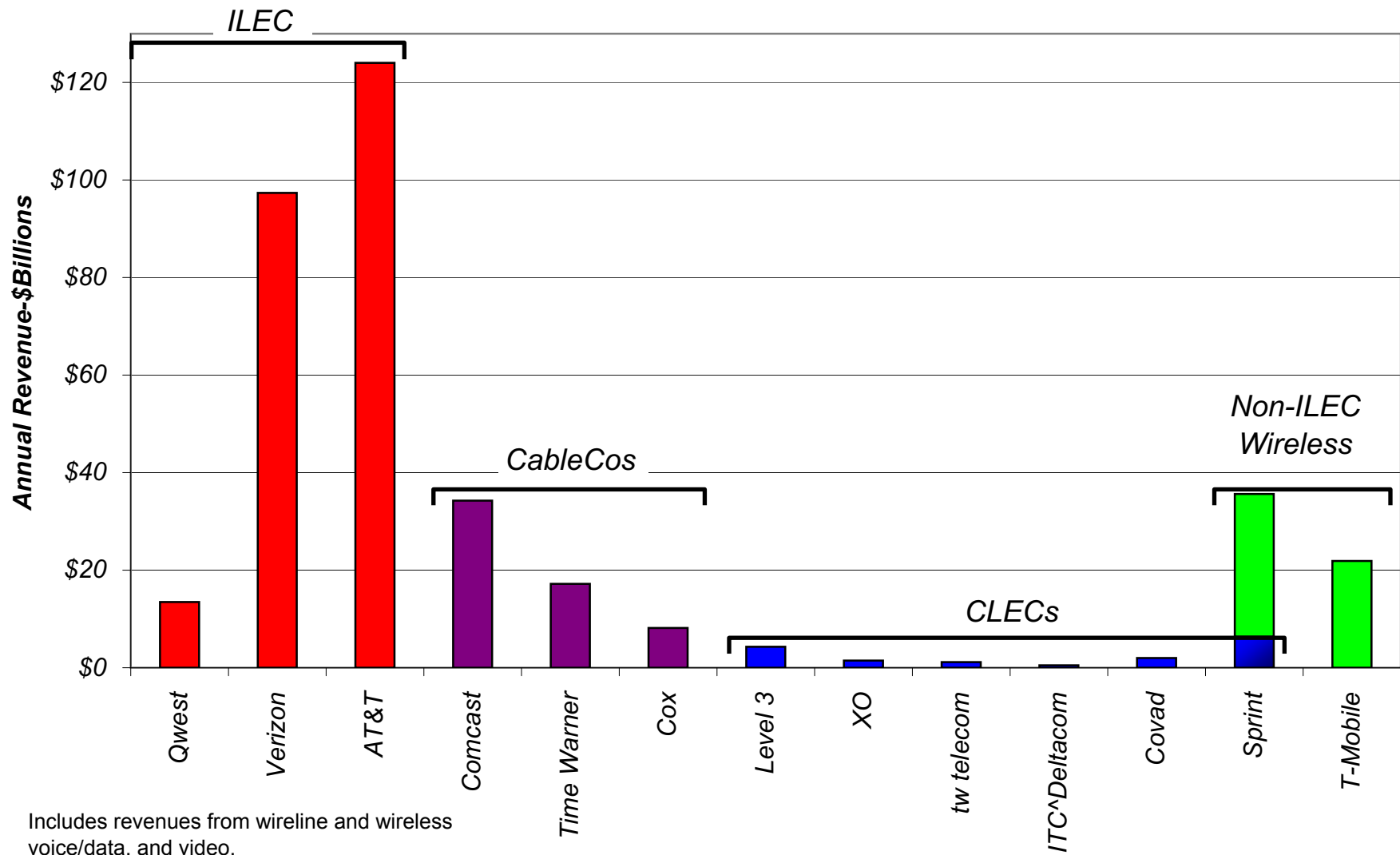


Figure 3

The relationship between a pro-competitive regulatory regime – one that recognized the importance of assuring competitor access to ILEC network facilities – and US telecom industry investment was clearly shown in Figure 5 of our March 11 paper (reproduced as Figure 4 here): Capital expenditures both by ILECs and by competitive TSPs were greater during the period immediately following the 1996 *Telecommunications Act*, when wholesale regulation was intact and competitors were gaining market share, than in the deregulatory period that followed (under which much of the initial competition was squelched).

We also demonstrated that the claims of “extraordinary” broadband investment by US ILECs after they obtained price deregulation and the elimination of their unbundling obligations are simply hyperbole. Despite persistent claims by US ILECs that deregulation is necessary to induce them to invest in broadband, in reality their post-deregulation investment levels are actually less than when price caps were in effect for wholesale last-mile services.⁹ In fact, rather than boosting their investments, in every year since 2001, US ILECs have taken more capital off their books through depreciation than they have added – that is, their net investment has turned negative. So, even if they are spending “billions” deploying broadband to locations where cable competition compels those investments, the US ILECs are *not increasing* their overall investments in next generation networks.

The fallacy of deregulation as incentive to investment by ILECs and competitors

As in Canada, there is far more propaganda than any hard evidence to support the claim that US ILECs found it uneconomic to pursue broadband investments because of unbundling requirements. In his “review of investments made by American ... ILECs in next-generation telecommunications networks,”¹⁰ Bell’s consultant, Dr. Sidak, quotes an August 2004 statement by a Verizon executive claiming that the company was bypassing many of its northeastern states for FiOS investment because of the “risk” of having to unbundle fibre.¹¹ Even after the unbundling requirement was eliminated,¹² however, Verizon has deployed FiOS plant mainly in the larger metropolitan areas in its operating territory. Moreover, Verizon has never indicated any intention to offer FiOS territory-wide and in 2006 announced plans to divest its northern New England (Maine, New Hampshire and Vermont) and

9. *Id.*, at 22-25.

10. Letter from J. Gregory Sidak, Criterion Economics, LLC, to Jonathan Daniels, Esq., Vice President, Regulatory Law, Bell Canada, dated March 11, 2009 (Appendix 2 to Bell Petition) (hereinafter, “Sidak letter”).

11. “Verizon blames federal rules for broadband holdup,” CNET News, August 24, 2004, available at http://news.cnet.com/Verizon-blames-federal-rules-for-broadband-holdup/2100-1034_3-5322874.html

12. *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, CC Docket No. 02-33, 20 FCC Rcd 14853 (2005) (“*Broadband Wireline Internet Access Order*”).

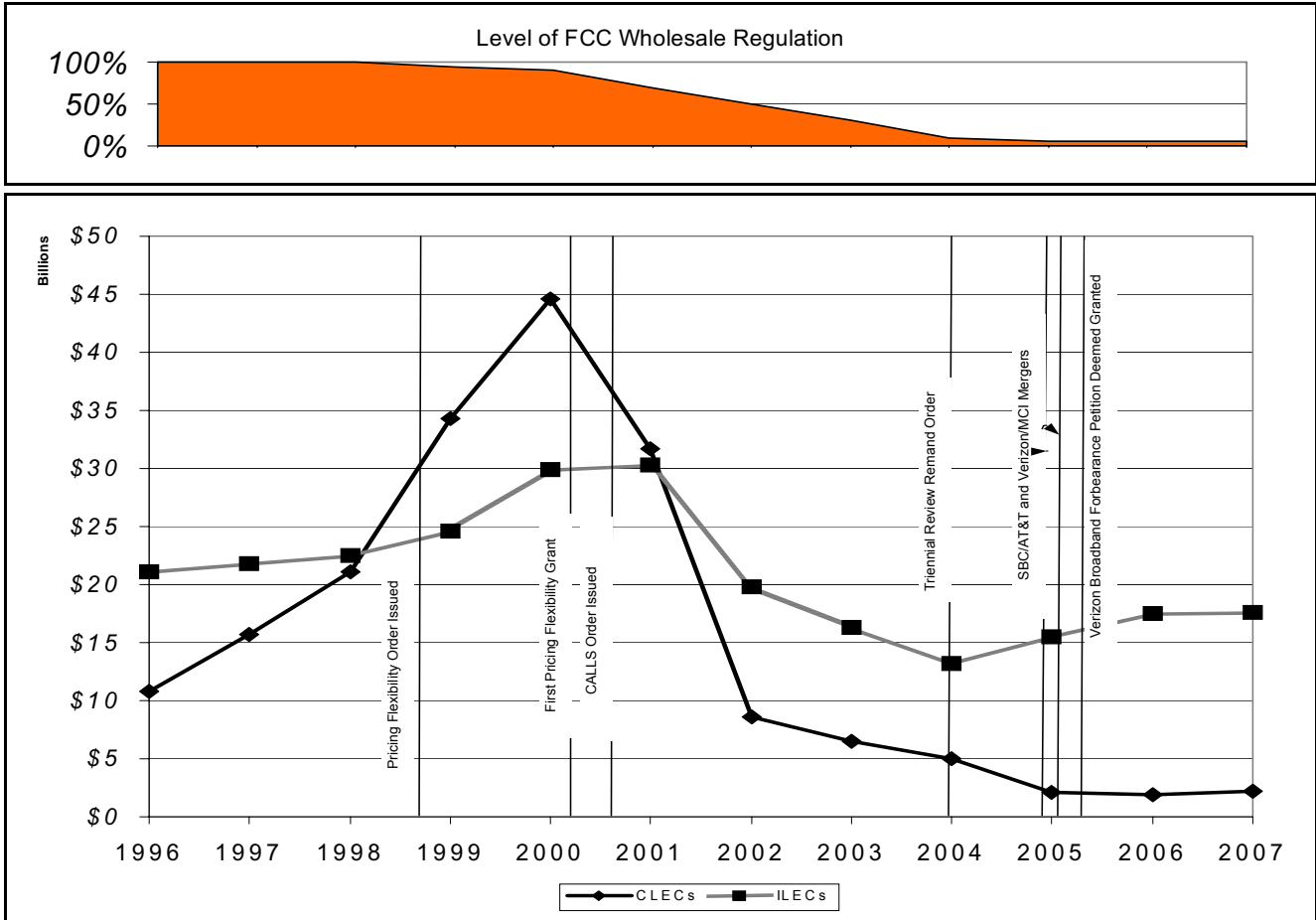


Figure 4. US ILEC and Competitive TSP Capital Expenditures, 1996-2007.

upstate New York service territories altogether.¹³ Although the Company did not find a buyer for upstate New York, it sold the three-state northern New England territory in 2008 rather than upgrade any of its facilities in those states to broadband.¹⁴

TELUS’ experts Aron and Crandall describe US ILECs’ video service as “in its infancy” in 2004, before the FCC policy changes. Interestingly, the article that Aron/Crandall cite as their source makes clear that attempting to find a workable strategy for entering the video market had been identified as a

13. <http://dealbook.blogs.nytimes.com/2006/08/16/verizon-puts-new-england-phone-lines-up-for-sale/?scp=4&sq=verizon%20sale%20maine&st=cse>.

14. It is not at all clear that Verizon’s investors are bearing much, or any, of the risks associated with FiOS construction. In 2005, the FCC advised US ILECs that they could continue to carry mass market broadband investment in their regulatory rate base despite the fact that the broadband and video services to be derived therefrom are entirely deregulated. *Broadband Wireline Internet Access Order*, at 14925-6. In effect, customers of Verizon’s regulated voice and other legacy services, and not outside investors, are paying for and bearing most of the risk of FiOS.

priority by US ILECs as far back as the late 1980s. As the article makes clear, what has finally propelled the ILECs forward with their investments over the past five years is competition from cable companies. Explaining the renewed commitment to video deployment as of July 2005, the article notes that

... industry analysts recognize that the Bell companies will launch video services and begin acquiring customers within the next year, if for no other reason than they don't have much choice if they plan to compete with cable on its bundled services offering that includes voice.¹⁵

Nowhere do these analysts associate the impetus to invest with unbundling or any other regulatory concessions.

The Bell and TELUS arguments really beg the question of whether cable-telco competition for the provision of bundled video-Internet-voice service to residential urban and suburban customers would have spurred investment of the same relative magnitude whether or not the FCC had acceded to the ILECs' demands for deregulation. While investment may well be more attractive to ILECs when there are no limits on what they can charge competitors, this does not mean that the investments could not be justified without putting the ILECs in a position to exploit their market power. If US ILECs determined that their threat to withhold broadband investment would work to coerce regulatory concessions, then the fact that they got the concessions certainly does not prove the truth of their claim that investment without regulatory concessions was uneconomic.

In the residential market, Aron and Crandall also claim that there is notable "contrast" between the US and Canadian experiences with respect to recent investment by cable companies in response to ILEC investment.¹⁶ They attribute this "mutually-reinforcing dynamic of responsive competitive investments" – basically, the need to catch up with, and if possible to surpass, one's competitors innovations – to the US deregulatory policies.¹⁷ In fact, while the principle they describe is undeniable, there is very little to contrast and certainly none that is attributable to deregulation. In Canada as in the US, cable companies and telcos have stepped up their investments in order to avoid ceding the residential broadband market to the other. But it is competition, not deregulation, that is driving this process. And other than the legacy cable television operator that already has a last-mile distribution infrastructure in place, *there is little or no other "last mile" access investment taking place in the US either in the residential or business/enterprise segments.*

15. "Telco video: Is the third time charmed?" *Telephony Online*, July 11, 2005, http://telephonyonline.com/mag/telecom_telco_video_third/.

16. Debra J. Aron and Robert W. Crandall, *Investment in Next Generation Networks and Wholesale Telecommunications Regulation*, September 15, 2008 (Appendix 1 to TELUS March 11, 2009 Petition) (hereinafter, "Aron/Crandall"), at 28.

17. *Id.*, at 28.

Beyond the residential front, TELUS's experts strain to find a single example to support their contention that the US policies have created incentives for CLEC investment, or to support the FCC's prediction that denial of access to ILEC next-generation networks will force competitors to "seek innovative network access options."¹⁸ However, they cannot (and barely attempt to) show that the FCC's prediction has been borne out. US CLEC Level 3, which Aron and Crandall claim "has invested successfully in its own broadband infrastructure," is *not* a provider of last-mile broadband access services. It does not offer mass market, residential broadband services, and has minimal connectivity to enterprise customer end user buildings. Level 3 is primarily a *transport* service provider, offering intercity and metropolitan area private line, Ethernet, and Internet backbone transport network services. Level 3 describes its network as follows:¹⁹

The Level 3 Communications Network today operates as one of the largest IP transit networks in North America and Europe.

The Level 3® Network was designed to maximize coverage, performance, flexibility and scalability. We offer more long-haul and metro route options than other providers. In addition to our intercity route miles, we give customers access to over 26,000 metropolitan route miles.

Our high-capacity, nationwide backbone was recently overbuilt with new DWDM, IP and private-line switching layers. Level 3 technology deployments have enabled new, market-leading services like 10 GigE LAN PHY and 40 Gbps Wavelength services.

Our voice footprint is always expanding with our network. We currently have connectivity to every long-distance tandem office in the United States, as well as to a large and growing number of end offices. Our customers have the ability to terminate calls anywhere in the world over the Level 3 Network.

Level 3 has deployed optical transport facilities, *but not in the last mile, access segment*. Much of Level 3's "investments" have consisted of its acquisition of assets – at bargain basement prices – of five CLECs that were unable to survive independently under FCC policies that have caused even the largest and most well-established of US CLECs to fail. And, although Aron and Crandall note that Level 3's Internet backbone business is growing by 70 percent per year, these long-haul backbone facilities are completely irrelevant to anything at issue here.

18. *Id.*, at 29

19. <http://www.level3.com/index.cfm?pageID=242> (accessed 4/2/08)

Choosing Broadband Competition over Unconstrained Incumbent Market Power

US ILECs, lacking competitive pressure, have lagged behind Canada in Ethernet and other NGN services.

Bell and TELUS both avoid discussing the effects of deregulation and forbearance in the US with respect to investment in NGN services to serve the business market. In this market, where there is no ubiquitous competitor (such as cable in the residential market), deregulation has clearly dulled the incentives of US ILECs to invest in the deployment of Ethernet and other NGN services *in large part because of the lack of any effective competitor in this segment*. At the same time, when US CLECs have attempted to push forward with Ethernet services, they have been hampered by the withdrawal of unbundled access. As discussed in our initial report, unbundling of ILEC NGN facilities stimulates competitor investment because, by expanding the scope of connectivity that small TSPs can offer their customers, it makes their small networks more valuable and their investments more profitable.²⁰ But without access to ILEC unbundled facilities, competitive investment has dropped to a trickle, and there is no significant competitive pressure to force the ILECs to expand their own NGN offerings.

By contrast, in Canada, the availability of competitor access to unbundled ILEC last mile facilities like CDN enabled competitive providers to construct Ethernet services and to develop the Ethernet market. This competitive challenge in turn forced the incumbents to more quickly evolve their own networks to support Ethernet directly, without first having to “convert” traditional TDM services to the new technology – the far less efficient solution that was being imposed upon competitors. The incumbents’ response to competitive Ethernet offerings has placed Canada well ahead of the US in the adoption of NGN services by business, enterprise, and government users. Unfortunately, rather than recognizing this as a natural technological evolution of the ILEC access network, the CRTC is erroneously treating NGN access as if it were part of a completely new and parallel network infrastructure, and in so doing has effectively limited competitor access only to legacy TDM services (CDN). This limitation enables incumbents to confine competitors to offering technologically obsolete services that are no longer capable of satisfying customers’ increasingly complex broadband requirements. If the CRTC’s decision not to recognize last mile Ethernet access facilities as essential services is allowed to stand, competition will slow, and ILECs will no longer be forced to pursue the NGN services market.

That it is the dominant incumbent carriers, and not entrants, that get to dictate the nature and scope of broadband services that will be offered in any given area is readily demonstrated by looking at conditions across the service territories of the three largest US ILECs – Verizon, AT&T and Qwest. As Sidak (for Bell Canada) has pointed out, each has adopted their own unique, and very different, approach to residential broadband deployment.²¹ Verizon has adopted a fibre-to-the-home (FTTH) architecture branded as “FiOS” in selected markets (although in the process it chose to sell off three entire states so as to limit pressure to deploy facilities in low-density areas). AT&T’s *u-verse* is a

20. Lee L. Selwyn, *The Non-Duplicability of Wholesale Ethernet Services*, March 2009 (Appendix 3 to MTS Allstream March 11, 2009 Petition), at 8.

21. Sidak letter, at 1-2.

fibre-to-the-node (FTTN) architecture that relies on existing copper distribution cable for the final 100-200 meters. Qwest, the smallest of the surviving RBOCs, has also adopted a broadband deployment strategy that involves fibre-to-the-node, but on a far more limited scale than AT&T. FTTH is generally viewed as technically superior to FTTN, but is considerably more costly to deploy. If there were effective competition in the broadband market – which there is not – marketplace forces would ultimately sort out these “quality vs. cost” tradeoffs, affording customers the opportunity to pay more for higher quality service. But the lack of competition, even for mass market services, means that customers are being *denied* that choice. If one resides in Verizon territory and in an area thereof in which Verizon has decided to deploy FTTH, then that is what the customer will be offered. If a customer in AT&T or Qwest territory wants FTTH, as a general matter they will not be able to get it, because no one – not the phone company nor anybody else – will be offering it.

Given the enormous importance that Aron/Crandall have ascribed to the FCC’s decision to eliminate any unbundling requirement with respect to broadband services, it is noteworthy that, notwithstanding that its unbundling and other policies intended to incent ILEC broadband investment apply *nationwide*, the three RBOCs’ individual investment responses have been so dramatically different. The FCC unbundling, rate deregulation, and cost accounting policies apply consistently across all three RBOC footprints, yet their respective investment responses have been decidedly different. The FCC’s industrial policy has had the effect of declaring the RBOC the “winner” within each of their respective service territories, and no competitor operating at a scale sufficient to challenge the RBOC’s deployment strategy in the marketplace has been able to enter the market. If retail-level competition were present – i.e., based upon a platform of unbundled ILEC network elements – consumers in all parts of the country would have more choice, and the dominant carriers’ ability to dictate market outcomes would be attenuated. If, as Aron/Crandall acknowledge, it isn’t even clear whether fibre should be deployed all the way to the home,²² then how can they justify promoting a government policy that would effectively ratify whatever deployment strategy the ILEC elects to pursue without any regulatory or market challenge to that decision?

In the US, the elimination of broadband unbundling requirements has had no obvious beneficial effect with respect to broadband deployment in remote or rural areas.

Despite the sense that one gets from the Bell and TELUS submissions that but for regulatory limitations they would be ready to deploy residential broadband on a ubiquitous basis, the US experience suggests that this would not be the case. US ILECs continue to be very targeted in their broadband investments, concentrating on the highest-revenue (and lowest cost) targets. Overall, there is no evidence that the regional Bell operating companies – AT&T, Verizon, and Qwest – have any particular incentive to invest in broadband facilities to remote areas and even less so when there is no cable CLEC presence. In fact, US RBOCs – particularly Verizon and Qwest – have divested much of their rural service areas. Having blamed regulation for their reluctance to invest, the RBOCs have not

22. Aron/Crandall, at 24-25.

significantly expanded their rural broadband deployment since the elimination of regulatory requirements.

In fact, and despite having granted ILECs virtually all of their deregulatory wish list with respect to unbundling, price deregulation, and cost allocation, the US government, still frustrated by the lack of broadband services in rural and other underserved areas, has just earmarked more than \$7-billion in grants to fund broadband construction in these areas – some portion of which may be given to the “big three” ILECs.²³ Whether or not such grants will achieve their objective, of course, remains to be seen. And given other recent experience with stimulus money being handed out to banks and other financial institutions with few if any strings attached, it seems certain that significant government oversight will be needed to assure that the recipients of these grants actually fulfill their commitments.

In any event, although the need to develop remote/rural residential broadband must be a component of any national broadband policy, it must not be allowed to become the sole or primary driver: If competition cannot be expected to bring broadband to remote communities and rural locations, then area-specific policies – including outright grants as in the US – should certainly be considered. However, there is no justification for sacrificing the benefits of robust competition in exchange for the ILECs’ empty promises and threats, such that the overarching goal of promoting competition to the greatest extent possible should be maintained and pursued. Rural broadband can be achieved through a narrowly targeted policy initiative – not at the expense of competition nationwide.

Protection of the ILEC monopoly is neither a precondition nor a predictor of a robust telecommunications and information services economy.

The Policy Direction specifies that, “[i]n exercising its powers and performing its duties under the *Telecommunications Act*, the ... [CRTC] should

- (i) rely on market forces to the maximum extent feasible as the means of achieving the telecommunications policy objectives, and
- (ii) when relying on regulation, use measures that are efficient and proportionate to their purpose and that interfere with the operation of competitive market forces to the minimum extent necessary to meet the policy objectives.²⁴

In many important respects, these are not “new” principles – they have guided competitive telecom policy in the US, Canada and elsewhere for several decades. What has changed and evolved over time

23. These grants were part of the economic stimulus package enacted into law in the American Recovery and Reinvestment Act of 2009, Pub.L. 111-5.

24. Policy Direction, *supra*, fn. 7, at para. 1(a)(i)-(ii).

is the *scope* of those services for which market forces *can* be relied upon in place of regulation to achieve a competitive result – i.e., just and reasonable rates.

At the outset, this principle was applied *horizontally*, identifying those telecom segments not subject to high fixed cost, “natural monopoly” conditions and removing these from traditional price- and earnings-based economic regulation. Customer premises equipment (CPE) and long distance services were among the first segments to be recognized as *not* embodying natural monopoly attributes, and were among the first to be deregulated.²⁵ By the 1990s, it became clear that certain aspects of *local* service, previously viewed as natural monopoly activities, could similarly be carved out and removed from price and earnings regulation. The foundation of all of these horizontal separations was *interconnection* – the assurance that products and services provided competitively could still be connected to the core monopoly public telephone network. In order for this model to work successfully, it is essential that the provider of services still subject to monopoly status not be able to extend that monopoly to exert market power in what would become adjacent, competitive markets. Structural separation – of the type adopted in the 1984 Bell System divestiture in the US and to a more limited degree elsewhere – would make the monopoly provider *indifferent* as to which competitive provider (in the adjacent segments) its customers selected by foreclosing the incumbent monopolies’ entry into those competitive segments.

While the earliest designations of competitive segments focused on horizontal service distinctions, the same principle applies with respect to *vertical* distinctions as well. That is, where the core, ubiquitous local telecom access and distribution networks exhibit natural monopoly attributes, the *retail* provision of network services is not a natural monopoly activity. In fact, many industries that may be highly concentrated at the manufacturing level distribute their products through unaffiliated retail channels that compete aggressively for the ultimate consumers’ business.

Yet Aron/Crandall claim that only what they term as “facilities-based competition” (ignoring the Government’s definition) qualifies as “genuine” competition,²⁶ and under the model of competition that they promote, only those firms that are vertically integrated to the same degree as an incumbent LEC (i.e., with a ubiquitous wholesale and retail presence, that is to say, an ILEC clone) qualify as offering “genuine” competitive alternatives. However, in raising the bar for “genuine competition” to this exalted height, Aron/Crandall propose a policy paradigm in which competition (in a form they find acceptable) becomes utterly unrealistic and unachievable. Surely this could not have been the outcome envisioned by the Government when, in its Order in Council, it had defined “facilities-based”

25. The identification of CPE, long distance, equipment manufacturing and information services as not requiring natural monopoly treatment was a core principle behind the 1984 break-up of the Bell System in the US. These lines of business were removed from the scope of monopoly local exchange carrier (Bell Operating Company) business and transferred to the truncated AT&T entity that emerged from that process.

26. Aron/Crandall, at 42.

competition as *including* competition over a combination of competitor-owned and leased facilities.²⁷ The Commission's apparent acceptance (with respect to NGN facilities) of Aron/Crandall's owned-facilities-only model – their notion that only end-to-end facilities-based competition qualifies as “genuine” – operates to exclude highly beneficial competition that will result in lower *retail* prices as well as an overall expansion of investment in telecommunications and information services infrastructure. This position is antithetical to the express policy commitments of the Canadian Government to promote and rely upon competitive forces wherever possible.

A recent policy decision by the government of Australia strongly affirms the importance of promoting competition rather than creating conditions that favor investment in facilities by an unregulated ILEC monopoly. The Australian government sought to ensure the construction of a ubiquitous broadband network in a manner that would fully support and encourage its pro-competitive policies. After receiving proposals from major providers, including Australia's dominant ILEC, Telstra, that failed to meet all of the government's criteria, On April 6, 2009, Australia's Prime Minister Kevin Rudd announced that the government has decided instead to establish a company to build and operate a national wholesale-only open access broadband network. Although the government will, initially, be the company's majority shareholder, its objective is to achieve full privatization within five years of the network's completion. Summing up why it adopted this dramatic change, the Government noted that:

Telecommunications policy [in Australia] has stifled competition and investment for over a decade. While the former government privatised a telecommunications infrastructure monopoly, it did not set up an adequate competition regime and it did not invest in next generation broadband infrastructure.²⁸

The level of government involvement selected by Australia is not a precondition of achieving competition, but clearly open access is. The policy direction that has been embraced by the Australian government underscores the conclusion that ubiquitous deployment need not be achieved at the expense of competition.

While claiming that only end-to-end facilities-based competition qualifies as “genuine” competition, Bell and TELUS effectively concede that such “genuine” competition is unrealistic as an economic matter.

In an attempt to impress the Government with the riskiness of NGN investment, Bell and TELUS present a compelling case that the level of investment to deploy NGN facilities *on a ubiquitous basis* is

27. Order in Council, *supra*, fn. 2.

28. Australian Government, Department of Broadband, Communications and the Digital Economy, 21st Century Broadband (National Broadband Policy Brochure), http://www.dbcde.gov.au/__data/assets/pdf_file/0009/110016/21st_Century_Broadband_-_Brochure_low_res_web.pdf, at 2 (accessed April 14, 2009).

only within the reach of a provider with an existing ubiquitous network infrastructure (i.e., the ILEC).²⁹ For example:

- “[T]he design and integration of NGNs represent one of the largest civil engineering projects ever undertaken in Canada.”³⁰
- “The size of the investment that ILECs are contemplating to bring NGNs to the vast majority of Canadians ranks in the billions of dollars.”³¹
- “Deploying new, very high-speed networks requires massive investment in a risky market environment. The risk of deploying these networks is far greater than the risk that the telecommunications companies faced in deploying copper networks in the regulated monopoly era.”³²

While this may be true as to ubiquitous deployment, as demonstrated by MTS Allstream’s extensive CLEC investments (and those of US CLECs before wholesale access was undermined), it is not the case that competitors lack the resources to make selective investments to expand their own NGN facilities, provided that they continue to have the ability to serve customers’ full network requirements using fairly priced wholesale access. Nonetheless, the large ILECs will, by their own admission, inevitably remain the sole (monopoly) provider of last-mile broadband facilities to most locations and will remain the only provider with ubiquitous coverage. This was explicitly recognized in the Government’s forbearance framework that permitted the deregulation of retail rates in the business market in the presence of a sole competitor leasing unbundled network elements from the ILECs.

If the cost and riskiness of deploying broadband on a ubiquitous basis is unattainable for any provider lacking Bell and TELUS’ size and scope, then it can hardly be presumed that the economic barriers to competitor investment will simply vanish when wholesale access is no longer an alternative. In light of this contradiction, the ILECs’ second proposition – that CLECs can be “incented” to invest in their own facilities by denying them cost-based access to ILEC NGN facilities – makes no sense. Since Bell and TELUS are well aware that the only competitor that can challenge them on a broad geographical basis is cable and that ubiquitous (rather than targeted) broadband investment by competitors to extend NGN to the business market is impractical, their proposal that the Government suspend regulated wholesale access would operate to choke off competitors’ ability to expand and invest, ultimately ensuring their demise. In the end, the large ILECs would thus gain the

29. Cable company networks that have been or are being upgraded to offer competitive broadband services are still largely focused on serving residential customers in high-density areas.

30. Bell *Petition to Governor-in-Council*, March 11, 2009, at para. 11.

31. *Id.*, at para. 14.

32. Aron/Crandall, at 41.

opportunity to operate with neither competition nor regulation to constrain their prices or to compel them to expend and to innovate. As discussed in our paper filed with MTS Allstream's March 11 petition, this is precisely what has occurred in the US.

To accept the linkage that Aron/Crandall seek to draw – as between enabling the ILECs (by eliminating their requirement to unbundle) to construct a ubiquitous broadband infrastructure and assuring that such an infrastructure will be built in Canada – is tantamount to the adoption of an industrial policy under which the ILECs are selected – by the Government, not by market forces – as the entities charged with delivering the national broadband infrastructure. Although they never say it in these words, the clear implication of Aron/Crandall's position is that construction and operation of an NGN infrastructure is a “natural monopoly.” Yet while this “natural monopoly” model has some parallels with the legacy regulatory model under which the wireline PSTN had been built (in both Canada and in the US), under the model now being advocated by the ILECs for their NGN, the monopolist is not subject to any price regulation or earnings constraints whatsoever.³³

Regulated wholesale rates constrain the ILECs' ability to impose supracompetitive retail prices.

Rates for retail broadband services, both residential and business, are not regulated in Canada. In forbearing from regulating these services, the CRTC is counting on competition to constrain the incumbents' prices. That will occur only to the extent that competition is present throughout the forborne retail market; where it is not, no pricing constraint will limit the ILECs' exercise of market power.

The availability of *wholesale* services for use by entrants in competing for retail business effectively eliminates this problem. Competition may well be feasible *at the retail level* where it is impractical at the facilities level, provided that competing retail service providers are able to obtain the use of ILEC facilities. In the US, resale-type retail competition was a key element of FCC competitive telecom policy as far back as the late 1970s, when preexisting prohibitions on the resale of private line

33. The desire (or demand) to be protected from the vagaries of the competitive market are also evident in the ILECs' argument that wholesale regulation introduces “regulatory uncertainty” that is unattractive to investors. For example, in the opinion letter from Gregory Sidak filed with Bell's March 11, 2009 submission, Sidak asserts that “by failing to promulgate clear and definite rules for unbundling, the FCC created disincentives for next-generation investment and consequently slowed the pace of innovation in the telecommunications industry.” Leaving aside the absence of citations to any authoritative source for this conclusion, Sidak fails to acknowledge that a lot of the “uncertainty” about FCC policies in recent years arose from the persistent pressure by the RBOCs for the FCC to walk away from its pro-competitive regulatory mandates and that, in fact, the greatest harm was sustained with respect to competitors and competitive investments. Moreover, regulation is hardly the only factor introducing uncertainty in today's telecommunications industry investments, yet it's the one thing that ILECs consistently harp on. Technological changes, such as the vast expansion of wireless telephony, IP telephony over cable facilities, and commercialization of the Internet, have certainly increased investment risks to some extent. However, despite the uncertainty that such changes may have introduced, investors have not shied away from making capital available to ILECs in the US. The notion that the wholesale unbundling obligation is the “last straw” – that is, that all of the other risks are supportable if only ILECs can operate without limits on their wholesale pricing to competitors – shows the extent to which the ILECs intend to rely upon overpricing non-competitive services to finance their expansion.

and Wide Area Telecommunications Service (WATS) bulk long distance services were eliminated.³⁴ The Policy Direction called for reliance upon “market forces to the maximum extent feasible as the means of achieving the telecommunications policy objectives”³⁵ and directed the Commission to “complete a review of its regulatory framework regarding mandated access to wholesale services, [and] ... to determine the appropriate pricing of mandated services, which review should take into account the principles of technological and competitive neutrality, 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, and the impediments faced by new and existing carriers seeking to develop competing network facilities.”³⁶ Competition at the retail level *is entirely practical*, provided that competing retail service providers are able to obtain access to the same ubiquitous set of underlying facilities that is available to the ILEC itself. “[I]n the absence of mandated access to wholesale services,” incumbents have both the potential and a strong economic incentive “to exercise market power in the wholesale and retail markets for the service.”³⁷ The availability of regulated *wholesale services* makes the nonregulation of retail services practical and works to assure that nonregulated retail rates are just and reasonable and not set at excessive, monopolistic levels.

Canada’s large ILECs would have very different incentives with respect to offering wholesale access if they faced competitive pressure with respect to wholesale facilities. Although not said in so many words, the ILECs’ “we won’t invest if we have to unbundle” argument can be translated into “we won’t invest if we are not permitted to exploit our market power with respect to our broadband infrastructure to generate supracompetitive profits.” One need hardly read between the lines to note the admission by Aron and Crandall that their vision of a national broadband deployment relies upon the ILECs’ ability to price at supracompetitive levels and to be shielded from any regulatory mechanism that would limit their ability to extract monopoly profits:

Factors that affect profitability of investment decisions include the anticipated demand for the services that are enabled by the new infrastructure, the anticipated growth rate of the demand, the degree of uncertainty about the future demand, the costs of providing the services, the anticipated prices that can be charged for the services in light of the anticipated competition, and, importantly, the regulatory rules and obligations to which they are subject. Any regu-

34. Shortly after ending resale restrictions on private lines in *Regulatory Policies Concerning Resale and Shared Use of Common Carrier Services and Facilities. Report and Order*, 60 FCC 2d 261 (1976), *recon.* 62 FCC 2d 588 (1977), *aff’d sub nom. American Telephone and Telegraph Co. v. FCC*, 572 F. 2d 17 (2nd Cir. 1978) *cert. denied*, 439 US 875 (1978), the FCC extended this policy to MTS and WATS in *Regulatory Policies Concerning Resale and Shared Use of Common Carrier Domestic Public Switched Network Services, Report and Order*, 83 FCC 2d 167 (1980).

35. Policy Direction, *supra*, fn. 7, at para. 1(a)(i).

36. *Id.*, at para. 1(c)(ii).

37. *Id.*

latory restrictions that harm the business case for investment will necessarily be relevant to the investment decisions by the regulated companies and their shareholders.³⁸

Of course, the ILECs and their experts do not concede that they face minimal competition with respect to the business market or areas where cable facilities have not been deployed. Aron/Crandall persist in promoting the notion that there is “real” (facilities-based) competition from intermodal providers, such as wireless, cable and satellite. Under this view, cable is the facilities-based “CLEC,” while other CLECs that resell ILEC wholesale services are not “genuine” competitors. But distinctions about alternative suppliers based upon their platform misses the most crucial point – do they actually serve to constrain the ILECs’ prices? If the intermodal providers that Aron and Crandall rely upon in their analysis were actually making the market competitive, then – with or without the obligation to lease unbundled NGN components – the ILECs could not impose supracompetitive retail rates or earn supracompetitive profits at the retail level.

If such competition actually existed, they would gain little or nothing by refusing to offer wholesale services at regulated rates. In fact, to the extent that using multiple different retail channels helped to expand the ILECs’ market overall, the ILECs should voluntarily seek to develop wholesale channels as a means of competing with wireless, cable and satellite. The fact that Bell and TELUS insist upon operating solely on a vertically integrated basis affords further proof as to the lack of effective competition, from whatever source.

In this regard, Aron and Crandall place far greater weight on building the infrastructure than on assuring the development of competition and, to the extent that these goals are in conflict, would subordinate competition to NGN construction. They view using regulation to prop up competition as some sort of “infant industry” theory that would operate to undermine the overarching goal of assuring that a broadband infrastructure is created.

The alternative to an industrial policy approach – putting the future of Canada’s NGN requirements exclusively in the hands of the large ILECs – can be achieved by preserving competitor access to NGN components. In this way, the Government maintains the potential for simultaneous expansion of facilities- and non-facilities-based competition. Freedom from competition is not and has never been a necessary condition for attracting investment.

38. Aron/Crandall, at 19-20.

In the final analysis, the ILECs' complaint isn't really about unbundling – it's really about pricing and their belated contention that unbundled rates set on the basis of CRTC Phase II costs are not sufficient to compensate them for the costs and risks of broadband deployment.

Although there are all sorts of business risks inherent in deploying NGN facilities, what Bell and TELUS claim ultimately makes ILEC investment in NGN facilities “too risky” to pursue is the prospect of having to sell unbundled access to competitors at wholesale rates that are subject to regulatory ratesetting limits based upon so-called Phase II costs. Apparently, Aron/Crandall do not view rates based upon Phase II as being sufficient to permit recovery of the underlying NGN investment given the various risks that such an investment program entails.³⁹ They also complain that Phase II costs do not consider other cost-causative factors, such as the “real option value” of an incumbent’s network.⁴⁰ The solution they advance to resolve their dissatisfaction with the Phase II pricing rules – the elimination of price regulation altogether – is a draconian measure that amounts to throwing the baby out with the bath water. The Commission has expended considerable time and effort over many years to develop and refine its Phase II cost process, and has issued a number of rulings on Phase II costing issues, the most recent of which was decided just over one year ago.⁴¹ Both Bell and TELUS actively participated throughout this process. In adopting the Phase II costing rules, the Commission has, at least implicitly if not explicitly, concluded that prices for wholesale services set on this basis are just and reasonable.⁴² It is not even clear that the specific “risk” issues being raised now by Aron and Crandall – the putatively extraordinary level of risk associated with broadband investment and the costs associated with the “real option” that is afforded competitors purchasing wholesale access to the ILECs’ broadband facilities – was ever raised as a Phase II costing issue. The time for Aron and Crandall to have raised such issues was in the context of the cost methodology proceedings, and not as a contrived rationale for undermining competition and the Government’s expressly stated pro-competition policy.

Risk, along with the various other concerns being expressed by Aron/Crandall with respect to Phase II regulated prices, is quantifiable in economic terms. In fact, the economic effects of such “risk” may already be fully captured in various inputs to Phase II costs (e.g., cost of capital, depre-

39. Aron/Crandall, at 23 and fn. 58. Notably, from our review of the Commission’s Phase II pricing orders, it does not appear that TELUS or its experts had ever raised the issue of risk as a potential cost element or consideration.

40. *Id.*, at 23. “Real option value” refers to the ability of network users to discontinue their use of a service prior to the carrier’s recovery of its investment. Notably, from my review of the Commission’s Phase II pricing orders, it does not appear that TELUS or its experts ever raised this issue as a potential cost element or consideration.

41. CRTC Telecom Decision 2008-14 (February 21, 2008).

42. The CRTC’s Phase II pricing rules are actually more generous to the ILECs than their counterpart in the US. Under the FCC’s so-called “TELRIC” (for “Total Element Long Run Incremental Cos”) pricing rules, wholesale rates for unbundled network elements (UNEs) are to be set *at* TELRIC, which includes cost of capital. CRTC Phase II pricing rules are similar and similarly include cost of capital but, unlike in the US, also include a 15% markup or profit *over and above the normal competitive-level profit that is reflected in the authorized cost of capital.*

ciation rates). Of course, Bell and TELUS aren't actually proposing to stop selling unbundled last-mile broadband to their competitors – they are perfectly willing to offer the desired services to whom they choose, on their terms, and as long as they are free to charge prices that permit them to exploit their monopoly power.

Over the years, as an alternative to asking directly for the elimination of unbundling obligations, ILECs in both Canada and the US have come up with a litany of arguments as to why wholesale rates must be higher than regulators have determined to be “just and reasonable,” with the objective of pushing the price of access by their competitors to a point where use of such services by competitors becomes completely uneconomic and impractical. Thus, in the US, ILECs aggressively promoted the “efficient component pricing rule” (“ECPR”) under which wholesale rates would be increased to capture “lost” *retail* profits,⁴³ repeatedly sought to recover embedded costs (which the ILECs and their experts have characterized as “actual” costs),⁴⁴ and appealed the FCC’s TELRIC standard all the way to the US Supreme Court, where it was ultimately upheld.⁴⁵ In Canada, the CRTC has considered and rebuffed many similar challenges to its wholesale pricing standard.⁴⁶

Now, in the paper submitted by TELUS, Aron/Crandall have come up with yet another theory to justify the ongoing claim that the prices for unbundled wholesale components are too low. This latest theory is based upon the observation that the costs incurred by the ILEC are “sunk,” yet competitors pay for their use of the facility only so long as they require it. According to Aron and Crandall, there is a cost to the ILEC and a value to the competitor of this “real option” to “walk away if a new technology were to appear” before the cost of the ILEC’s facility has been recouped.⁴⁷ However, Aron/Crandall fail to consider and acknowledge that the various risks associated with technological

43. See, *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996; Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers, First Report and Order*, 11 FCC Rcd 15499, 15859-60 (1996) (“*Local Competition First R&O*”) (rejecting use of ECPR).

44. See, e.g., Declaration of Debra J. Aron, filed by Defendants, Illinois Bell Telephone Co., Inc. d/b/a SBC Illinois in U.S. District Court (N.D. Ill. E.D.) at para. 58 and Chart 5 (equating ILEC embedded costs reported in the FCC’s Automated Reporting Management Information System [ARMIS] with “actual” costs).

45. See, *Verizon v. FCC*, 467 US 467 (2002).

46. See, Telecom Decision CRTC 2008-17 at para. 133: “The Commission notes that parties did not provide compelling evidence or argument to justify a change to the current mark-up. As a result, the Commission considers it appropriate to retain the current pricing principles for setting prices for essential, including conditional essential services, based on Phase II costs plus a [15 percent] mark-up.”

47. Aron/Crandall, at 23.

obsolescence, market conditions, and the like are already reflected in various components of the Phase II cost, such as depreciation and cost of capital (and this is before the addition of the 15% mark-up).⁴⁸

It is also ironic, given their strong aversion to regulatory uncertainty, that Bell and TELUS persist in their ongoing campaign to relitigate the Commission's well-established wholesale pricing standard. The burden to the competitive process imposed by the large incumbents' constant relitigation of interconnection costs is hardly unique to either the US or to Canada. Thus, the agency charged with arbitrating interconnection agreements ("undertakings") in Australia, the Australian Competition and Consumer Commission, has noted that

The tendency for Telstra [Australia's dominant ILEC] to make continuous and incremental changes to undertakings and to keep raising both old issues and new cost claims means that resolution of access issues is cumbersome, vexatious and inefficient.⁴⁹

Having failed in the past to show that rates set on this basis are noncompensatory, Bell and TELUS now propose a far more drastic remedy. Instead of asking for a reassessment of the rate levels, they propose to do away entirely with wholesale rate regulation. With unbundled access continuing to play such a critical role in enabling competitors to provide competitive (and forborne) retail services, the mere possibility that the wholesale rate requires adjusting is hardly a sufficient basis to do away with wholesale rate limits altogether.

Ironically, the CRTC already has the proper tools to guard against wholesale rates being set too low, if in fact they are. Yet under the "no regulation" scenario being sought by Bell and TELUS, there will be no regulatory safeguards to prevent below-cost pricing of wholesale service in those niche markets where facilities-based competition may be present, or to prevent retail consumers from being grossly overcharged where it is not. Aside from their unsupported rhetoric, Aron/Crandall have offered no evidence that existing wholesale rates are not fully compensatory, or that the CRTC's existing wholesale pricing policy is not fully capable of producing compensatory wholesale rates. Moreover, they offer no basis for their apparent assumption (or contention) that if unbundling and rate regulation of wholesale services remains in place, prices for wholesale services will be at sub-compensatory levels. Or, more generally, they have failed to demonstrate that it is not possible to set compensatory prices that provide the appropriate make-buy signals to competitors.

48. In *The Role of Regulation* (at 23), we noted that in each of the years since 2001, the largest local carriers in the US have *disinvested* in their networks – i.e., the depreciation charge in each of those years was greater than the amount of new capital investment in the incumbents' networks. Disinvestment implies that capital is being extracted from the ILEC entity and diverted elsewhere in the parent company's business. At the very least, it suggests that, if anything, the depreciation accruals – which are captured in incremental cost pricing of unbundled wholesale services – have been excessive – i.e., they have more than compensated for technological obsolescence and risk.

49. Australian Government, Department of Broadband, Communications and the Digital Economy, *National Broadband Network: Regulatory Reform for 21st Century Broadband, Discussion Paper*, April 2009 at 14, citing ACCC, *Telstra's Undertakings for Unconditioned Local Loop Service Discussion Paper* (Public Version), March 2005, p. 2.

Aron/Crandall’s contention that dominant incumbent carriers have been subject to escalating risks as they pursue broadband deployment is based upon a seriously flawed analysis; in fact, as dominant carrier market power becomes more entrenched, risks as perceived by investors have been steadily decreasing.

In support of their contention that Canadian ILECs will not invest in broadband if forced to “share” these next-generation facilities with rival service providers, Aron/Crandall claim that such investment undertakings present extraordinary risks to investors and that the market will not accept such risks without full retail and wholesale price deregulation of broadband. In an attempt to demonstrate this purported linkage between broadband and risk, Aron/Crandall provide, in their Table 2, a comparison of financial equity betas – the standard measure of systematic risk – calculated over five-year and two-year periods, respectively, of a number of dominant incumbent telecommunications companies worldwide. According to Aron/Crandall, the betas calculated over the most recent two-year period are generally higher than those taken over the past five years, indicative of the escalating risks attributable to the most recent NGN investments.

Upon closer examination, it is apparent that, as presented, the Aron/Crandall analysis is wildly misleading and fatally flawed, for a number of reasons.

- *Time periods selected for the beta calculations.* The particular 2- and 5-year time periods chosen by Aron/Crandall, both of which ended in July of 2008, are anomalous, and their particular selection appears to have been mainly results-driven. Indeed, the very same calculations taken over different time periods – including the post-July 2008 period – demonstrate *precisely the opposite result* – that investors actually find dominant incumbent telecommunications companies to be increasingly insulated from competition, and thus decidedly *less risky* than the market overall.
- *The analysis is of parent company risk, not wireline ILEC risk.* Because any beta analysis is necessarily based upon variations in share prices of publicly traded companies, Aron/Crandall’s betas reflect systematic risk *at the parent company level*, which includes far more and far more diversified investments than the NGN pursuits of the wireline ILEC affiliate(s). In fact, *none of the companies included in Aron/Crandall’s analysis are “pure play” ILECs*; all have a broad mix of telecom (and in some cases non-telecom) lines of business including, among other things, wireless, interexchange services, Internet Service Provider (ISP), and Internet Backbone networks, with wide variation in the relative proportions of each line of business in each parent company’s portfolio. At the parent company level, the relative mix of government and private ownership, and of domestic vs. foreign telecom business activity, is also highly variable. The nature and extent of government regulation across the full list of companies is also highly variable. Equity betas are heavily impacted by the amount of debt being carried by the parent company. All of these factors, individually and in combination, affect systematic risk, yet Aron/Crandall ignore all of them in their simplistic attempt to ascribe what their truncated study suggests as elevated risk solely to broadband investment.

- *Lack of reproducibility of Aron/Crandall’s results.* Finally, as tends to be typical of results-driven analyses, Aron/Crandall do not provide any of the data they used or a discussion of their methodology, making it difficult to inspect the calculations themselves, reproduce their results, or test the robustness of their results to, for example, changes in the time periods selected.

As we demonstrate below and in more detail in Appendix 1, the use of parent company equity betas to infer investor sentiment about specific business segments (in this case, wireline local carrier operations) is meaningless. However, even accepting Aron/Crandall’s premise, telecom company betas have been *decreasing* over time, indicating that investors have come to view telecommunications companies as a safe haven from overall market risk.

The time periods over which Aron/Crandall made their beta calculations produced anomalous results, suggesting that risk was increasing when in fact telecom betas have been decreasing.

Equity betas are highly sensitive to the time frame selected for the analysis. Aron/Crandall selected two seemingly innocuous time frames – two and five years, respectively – to examine betas and upon which to identify what they suggest is a trend of increasing risk. Their samples run from July (of 2003 or 2006) to July of 2008. Had Aron/Crandall selected slightly different time periods, they would have been forced to draw very different conclusions from their analysis. Table 2 below compares the betas for AT&T, Verizon, BCE, and TELUS as calculated by Aron/Crandall with those we performed over the period between July 2008 and March 2009 – i.e., the months immediately following the end-date of the Aron/Crandall dataset – and also for 1- and 5-year periods extending back from March 2009. The results confirm *declining* betas over time – i.e., precisely the *opposite* of the results presented by Aron/Crandall.

Table 2						
CALCULATION OF BETAS OVER ALTERNATIVE TIME PERIODS						
	Aron/Crandall 5-year July 31, 03-July 24, 08 (Note 1)	Aron/Crandall 2-year July 31, 06-July 24, 08 (Note 1)	Feb 1, 00 – Mar 2, 09 (Note 2)	Mar 2, 04 – Mar 2, 09 (Note 2)	Mar 3, 08 – Mar 2, 09 (Note 2)	July 1, 08 – Mar 2, 09 (Note 2)
S&P 500	1.00	1.00	1.00	1.00	1.00	1.00
AT&T	1.07	1.44	0.78	0.73	0.67	0.55
Verizon	1.02	1.26	0.88	0.67	0.61	0.57
BCE	0.75	1.23	82.00	0.94	0.81	0.85
TELUS	1.57	1.91	1.32	1.07	0.78	0.67
Note 1: Aron/Crandall do not specify which market index was used in their calculation; it may have been something other than the S&P 500.						
Note 2: Source data for, and discussion and details of these calculation are provided in Appendix 1 hereto.						

Aron/Crandall have adopted a “black box” approach to calculating their betas, making it difficult to analyze or to reproduce their calculations

There are numerous ways to calculate a beta for a company, and each choice that is made will change the outcome of the analysis. It is important to note that many sources of company betas will all differ (sometimes dramatically) due to variations in the way that the source conducts its own calculations. None of these methods is necessarily “right” or “wrong,” but must be understood and used in context. Table 3 below reproduces Aron/Crandall Table 2, and additionally includes the betas for each company as provided by four public sources, Yahoo finance, Google finance, the Value Line Investment Survey, and Scottrade.

Table 3						
BETAS AS CALCULATED BY VARIOUS PUBLIC SOURCES						
	Aron/Crandall		Public Sources			
Company	5-year	2-year	Yahoo	Google	Value	Scottrade
AT&T	1.07	1.44	0.79	0.70	0.80	0.73
BCE	0.75	1.23	1.19	1.04	0.85	0.90
BT Group	1.16	1.42	1.46	1.44	0.85	1.01
Belgacom	0.83	1.05	N/A	N/A		N/A
Deustche Telekom	1.11	0.91	0.72	0.77	0.75	0.65
France	0.94	0.80	0.74	0.72		0.62
KPN	0.79	1.05	N/A	0.80		N/A
NTT	0.20	0.14	0.53	0.51		0.36
TDC	0.28	0.03	N/A	N/A		N/A
Telecom Italia	1.18	1.19	1.03	0.99		0.86
Telecom New	0.97	1.01	1.07	1.15	0.85	1.01
Telefonica	1.09	1.10	0.96	0.90	1.00	0.82
Telekom Austria	1.38	1.52	N/A	1.41		N/A
Telia-Sonera	1.13	1.48	N/A	1.24		N/A
Telstra	0.87	1.00	N/A	0.93		N/A
TELUS	1.57	1.91	1.09	1.13	0.65	1.07
Verizon	1.02	1.26	0.74	0.66	0.75	0.68

Notes: N/A = Not Available from that source. Figures were obtained on April 2, 2009.

The results shown in this table are important for two reasons. As mentioned above, all four sources come up with different betas for each company, highlighting the fact that the choice of calculation methodology can materially affect the results. Second, Table 3 shows that Aron/Crandall’s characterization of ILEC betas as having become considerably more risky – as they have put it, “the days of low risk betas of around 0.6 are long gone and virtually all of the incumbent companies are showing

significantly higher risk in recent years”⁵⁰ – was driven by their own specific beta methodology and choice of time periods, because reliable public sources of financial information show significantly lower betas than those presented by Aron/Crandall.

Aron/Crandall’s assessment of BT’s equity beta is at odds with a recent analysis of BT’s risk and cost of capital undertaken by Ofcom in the UK

In addition to producing exaggerated assessments of systematic risk for the major US and Canadian ILEC parent companies, Aron/Crandall appear to have also offered highly overstated estimates of BT’s beta. In its December 2008 report, *A New Pricing Framework for Openreach*, Ofcom, the UK telecommunications regulator, has calculated equity betas for both of BT Group’s tracking stocks – *Openreach*, the regulated unit of BT that “is required to provide services to competing providers of telecommunications services,” and the largely unregulated rest of BT. Table 4 summarizes Ofcom’s findings and compares them with those advanced by Aron/Crandall:

Table 4		
ESTIMATES OF BT GROUP (UK) BETAS		
Ofcom December 2008 report	as of May 2008	as of December 2008
BT Openreach	0.70 – 0.80	0.75 – 0.85
Rest of BT	0.90 – 1.00	0.95 – 1.05
Source: Ofcom, <i>A New Pricing Framework for Openreach</i> , December 2008, at 40. Ofcom’s analysis is relative to the FTSE Allshares Index.		
Aron/Crandall	5 years (7/31/03 – 7/24/08)	2 years (7/31/06 – 7/24/08)
BT Group	1.16	1.42
NOTE: Aron/Crandall do not specify whether their “BT Group” beta is for Openreach, the rest of BT, or all of BT.		

It is noteworthy that Ofcom has estimated *higher betas* for the *non-regulated* “Rest of BT” than for the regulated *Openreach* unit, and that all of its estimates are well below those advanced by Aron/Crandall. Even with mandatory unbundling and structural separation in place, BT shares present less risk than the market overall.

50. Aron/Crandall, at 25.

Beta only measures one element of risk.

Equity betas measure only “systematic risk” – the degree to which risks that are common to the entire economy affect an individual firm.⁵¹ Companies with high systematic risk tend to rise relatively more than a market-wide increase, and fall less than a market-wide decrease. But there are several other kinds of risk that do not correlate directly with day-to-day fluctuations in the market. These include risks unique to the company’s particular type of business, its financial position, its debt ratio, its management team and personnel, and other factors. Aron/Crandall have not even attempted to address any of these sources of risk – let alone control for them. Current ILEC credit ratings also provide some insight into how investors view risks associated with acquiring the firm’s debt. Table 5 below summarizes current credit ratings for AT&T, Verizon, BCE, TELUS, and several of the European and Far East carriers included in the Aron/Crandall beta tabulation:

Table 5		
CREDIT RATINGS OF THE MAJOR ILECS		
Company	Moody’s	Standard & Poor’s
AT&T	A2	A
BCE	Baa2	BBB
TELUS	Baa1	BBB+
Verizon	A3	A
BT	Baa2	BBB
Deutsche Telecom	Baa1	BBB+
France Telecom	A3	A-
NTT	AA1	AA
Telecom Italia	Baa2	BBB
Telefonica	A3	A-
Telstra	A2	A
Telecom Austria (Swisscom)	A2	A-
Telia	A3	A-
Figures were obtained on April 2, 2009.		

As can be seen from the table, all of these telecommunications companies actually have strong investment-grade credit ratings. By contrast – and not shown in their tabulation – Level 3, one of the largest US carriers not affiliated with an incumbent carrier – has a CCC bond rating – i.e., junk bond

51. Examples of “systematic risk” include the effects of changes in interest rates, energy costs, currency exchange rates, employment, and other macroeconomic conditions. Non-systematic or company-specific risks are those whose impact falls mainly upon an individual company. Examples include things like the effect of the outcome of specific litigation (e.g., a patent dispute), changes in consumer preferences for the firm’s products, the illness or death of an individual seen as critical to the firm’s overall performance (e.g., Steve Jobs at Apple), and the like.

status.⁵² Aron/Crandall seem to represent that investing in next generation broadband facilities is a “bet the company” type of decision but, it would seem, at least with respect to dominant incumbent service provider NGN investments, lenders clearly disagree, as all of these companies maintain strong investment-grade bond ratings. Moreover, a low Beta doesn’t necessarily represent a low risk company. Vonage, a US company providing nomadic VoIP (Voice over Internet Protocol) services, has a relatively moderate Beta of approximately 1.00, while this company faces great uncertainty, government regulations, fierce competition, and has never earned one penny of profit.

The significant differential in risk level associated with dominant incumbent carriers vis-à-vis entrants highlights yet another barrier confronted by entrants in building out their own competing facilities. All else equal, investors will demand higher returns from entrants’ investments than from those being undertaken by dominant incumbents. If, as Aron/Crandall suggest, “Analysts commenting on Verizon’s and AT&T’s massive broadband investments have expressed mixed views on whether these investments will ultimately compensate their investors adequately for the risks taken, with some analysts expressing optimism and others skepticism,” investors will necessarily be even more skeptical in their assessments of large-scale broadband deployments being proposed by entrants. And if non-incumbents are unable to attract capital to support their construction efforts – or would be confronted with such high costs of capital so as to render any such project economically infeasible – they will be unable to compete with incumbents using their own facilities, and the incumbents’ monopoly position will remain unchallenged.

Conclusion

The economic conditions underlying the construction of a ubiquitous next-generation broadband infrastructure are essentially the same as those confronting the incumbent carriers’ earlier development of Canada’s voice telephone network. It is no more realistic to expect or require that entrants overbuild the entire scope of the incumbents’ NGN than it was – and is – to impose such a requirement with respect to traditional voice and narrowband telecommunications facilities. To effectively compete for enterprise customers’ broadband business, entrants must be capable of offering these customers the same extensiveness and connectivity that the incumbents offer. For this reason, competitor access to unbundled incumbent carrier NGN facilities is no less “essential” in the context of broadband services than is their access to legacy voice and TDM services – services for which the Commission maintains the “essential” or “conditional essential” classification.

As the technical nature of broadband services and applications grows more complex while the technical differences between legacy TDM and next-generation networks widen, the incumbents’

52. In fact, apparently oblivious to its junk bond credit rating, Aron/Crandall have singled out Level 3 as a competitive success story. According to them, “Level 3 is an example of a CLEC in the U.S. that has invested successfully in its own broadband infrastructure. ... In 2006, Level 3 completed its initial planned deployment of its ‘next generation of optical transport technology’ in North America and Europe, and reported that its Internet backbone business was growing at a rate of 70 percent per year.” Aron/Crandall, at 29, footnote references omitted.

refusal to permit competitors access to next-generation facilities – and the Commission’s refusal to mandate such access – operates to effectively foreclose entrants’ ability to offer advanced services to their customers. In this way, the incumbents are being allowed to leverage and extend their ubiquitous network monopoly over to what could otherwise be a vibrantly competitive retail broadband enterprise service sector. If the CRTC’s decision not to recognize last mile Ethernet access facilities as essential services is allowed to stand, competition will dwindle, ILECs will no longer confront the competitive pressure to expand their own NGN services, and the overall extent and availability of broadband to Canada’s businesses, institutions and governments will suffer.

Although the need to develop remote/rural residential broadband must be a component of any national broadband policy, it must not be allowed to become the sole or primary driver: If competition cannot be expected to bring broadband to remote communities and rural locations, then area-specific policies – including outright grants as in the US – should certainly be considered. However, there is no justification for sacrificing the benefits of robust competition in exchange for the ILECs’ empty promises and threats, and the overarching goal of promoting competition to the greatest extent possible should be maintained and pursued.

Appendix 1

Details of ETI Analysis of Incumbent TSP Equity Betas

In support of their contention that Canadian ILECs will not invest in broadband if forced to “share” these next-generation facilities with rival service providers, Aron/Crandall claim that such investment undertakings present extraordinary risks to investors and that the market will not accept such risks without full retail and wholesale price deregulation of broadband. As discussed above, it is apparent that, as presented, the Aron/Crandall analysis is fatally flawed and wildly misleading, for a number of reasons. These include:

- *Time periods selected for the Beta calculations.*
- *The analysis is of parent company risk, not wireline ILEC risk.*
- *Lack of reproducibility of Aron/Crandall’s results.*

As we have shown, the use of total company equity Betas to evaluate investor sentiment about specific business segments (in this case, ILEC operations) is meaningless, but even accepting Aron/Crandall’s premise, telecom company Betas have been *decreasing* over time, indicating that investors have come to view telecommunications companies as a safe haven from overall market risk.

Time periods selected for the Beta calculations

Equity Betas are highly sensitive to the time frame selected for the analysis. Beta is a measure of the volatility of the share price of a particular company relative to that for the “market” as a whole, with the latter generally being represented by some market-wide price index, such as that for the Standard & Poor’s 500, over the same time period. The choice of time period for this type of calculation will have a material impact upon the result. A Beta calculated on a monthly basis over three months might look very different from one calculated over six, twelve, or twenty-four months. Accounting functions, timing of news releases, and numerous other factors can change a company’s stock price and thus affect its Beta, even though the underlying core business may remain essentially unchanged. The longer the time horizon selected, the less likely the Beta will reflect one-time anomalies.

Aron/Crandall selected two seemingly innocuous time frames – two and five years, respectively – to examine Betas and upon which to identify what they suggest is a trend of increasing risk. Their samples run from July (of 2003 or 2006) to July of 2008. Their report carries a September 15, 2008 date, but was not submitted by TELUS until March 11, 2009. Despite the six-month interval between the completion date of the Aron/Crandall “white paper” and its submission by TELUS, or the seven-plus month interval between the closing date of the Aron/Crandall dataset and the March 11

submission date of their paper, neither the original calculations nor the conclusions based thereon were updated or revised to reflect the most current data. Had they been, the results – and Aron/Crandall’s conclusions regarding the upward trend in risk of dominant telecom firms – would have been dramatically different.

Between July of 2008 and March of 2009, world financial markets experienced a near meltdown, and share prices overall showed a steep decline. Significantly, however, as shown in Table A1 below, the dominant telecom service providers seemed to have fared rather well by comparison with the market generally:

Table A1			
CHANGE IN PRICE SINCE JULY 2008 CLOSE OF ARON/CRANDALL DATASET			
	July 2008	March 2009	% change
S&P 500 Index	1280.00	815.94	–36.25%
AT&T	32.29	26.00	–19.48%
Verizon	33.92	30.62	– 9.73%
BCE	33.72	20.32	–39.74%
TELUS	38.71	27.51	–28.93%
Source:			

The particular choice of July as the base month drives Aron/Crandall’s results to support their claim that ILEC investments are becoming increasingly risky as a direct consequence of their pursuits of broadband. Had March been selected as the base month – and had Aron/Crandall included data between July of 2008 and March of 2009 – the conclusion would have been just the opposite. Table A2 below shows the Betas for AT&T, Verizon, BCE, and TELUS calculated over the period between July 2008 and March 2009, and also for 1- and 5-year periods extending back from March 2009. The results confirm *declining* Betas over time.

Table A2						
CALCULATION OF BETAS OVER ALTERNATIVE TIME PERIODS						
	Aron/Crandall 5-year July 31, 03-July 24, 08 (Note 1)	Aron/Crandall 2-year July 31, 06-July 24, 08 (Note 1)	Feb 1, 00 – Mar 2, 09 (Note 2)	Mar 2, 04 – Mar 2, 09 (Note 2)	Mar 3, 08 – Mar 2, 09 (Note 2)	July 1, 08 – Mar 2, 09 (Note 2)
S&P 500	1.00	1.00	1.00	1.00	1.00	1.00
AT&T	1.07	1.44	0.78	0.73	0.67	0.55
Verizon	1.02	1.26	0.88	0.67	0.61	0.57
BCE	0.75	1.23	82.00	0.94	0.81	0.85
TELUS	1.57	1.91	1.32	1.07	0.78	0.67
Note 1: Aron/Crandall do not specify which market index was used in their calculation; it may have been something other than the S&P 500.						
Note 2: Source data for these calculation are provided in Table A8 below.						

Where Aron/Crandall portray an increase in Beta for their immediately preceding 24 month period vs. their immediately preceding 60-month period for the two largest US and two largest Canadian ILEC parent companies, when the calculations are made using the most recent data, the trend is precisely the opposite.

This is hardly surprising, and actually confirms the overarching investor perception of the dominant telecom firms as wielding significant market power and, in their key ILEC markets, near-monopoly status. Investors do not perceive dominant incumbent telecom service providers as being particularly risky. Consider, for example, Verizon, the US carrier with the most ambitious mass market broadband deployment program – FiOS – involving a fibre-to-the-home (FTTH) architecture. As shown in Table A1 above, between July 2008 and March 2009, the S&P 500 index dropped by more than 36%, whereas Verizon share prices decreased by only 9.75%. Rather than see the dominant telecoms as “risky,” investors see them more as safe havens. Rather than seeing the dominant telecoms as presenting white-knuckle rides through the morass of regulatory uncertainty and intense competition – the portrait being conjured by Aron and Crandall – investors instead see a steady income stream going forward, largely immune from the vagaries of the financial markets and the economic downturn. The *correct* conclusion from a *correct* examination of risk of dominant telecoms equities is that these firms confront low risk and that such nominal “competition” as may exist is of little or no real consequence to the attractiveness of telecoms equities.

The analysis is of parent company risk, not wireline ILEC risk.

In their analysis, Aron/Crandall examine Betas that appear to be calculated based upon total company financial results – i.e., the Beta for BCE represents how the entire company performed relative to the market. This result is useful for investors who are buying a share of stock in BCE, but teaches little

about the specific linkage they seek to draw – the riskiness of ILEC broadband investments. At the parent company level, each of the firms that Aron/Crandall studied is a conglomerate consisting of multiple lines of business – local wireline telephone services, wireless, long distance, retail Internet services, Internet backbone networks, foreign as well as domestic telecom activities, and in some cases non-telecom lines of business as well. Moreover, the relative importance of each business segment in a firm’s overall portfolio is itself subject to wide variation across companies. Each business segment presents its own level of risk, and it is not possible to draw any conclusions with respect to the riskiness of any one segment individually based upon the conglomerate parent company Beta. Comparing Betas across different companies with differing structures and lines of business, confronting different regulatory, competitive, and economic conditions, and across time periods where business structures have changed, all without accounting for these factors, provide meaningless results.

Other factors that affect Beta have also been ignored when viewing results across companies. Most of the companies on the Aron/Crandall list are from countries other than the US. Although Aron/Crandall do not specify which “market” index was used in their calculation, Betas for US companies are commonly calculated using a US share price index, such as the S&P 500. But measuring systematic risk with respect to a US market perspective may produce spurious results where “the market” in the UK, New Zealand, Korea, Europe or Japan exhibits different attributes including perhaps the most obvious one – currency exchange rate fluctuations. Since they have not disclosed any of the details of their actual calculations, it is unclear what Aron/Crandall had used as a measure of “the market” but it would be misleading to calculate a foreign company’s Beta relative to a US-based market. (Where two economies are closely linked, such as the US and Canada, such a substitution would perhaps be less problematic, although currency rates remain an important factor in any event.) Even if a foreign company is traded in the US (e.g., using shares known as American Depository Receipts – “ADRs”), such market substitution would be misleading, since factors external to the performance of the individual company, such as exchange rates, would affect the calculation of Beta.

Aron/Crandall also do not appear to have controlled for other factors that can inflate or deflate Betas, including the percentage of government and institutional ownership, or the financial structure of any one company. Since the Beta is calculated as a function of stock price, a company’s debt load can affect share price volatility, regardless of the inherent risk of the underlying business enterprise.

Lack of reproducibility of Aron/Crandall’s results

There are numerous ways to calculate a Beta for a company, and each choice that is made will change the outcome of the analysis. First, one must define the time horizon over which to measure the risk. This can be three months, a year, ten years, any length of time. A second choice will be the frequency with which the company and the market will be compared. This can be daily, weekly, monthly, or any other (uniform) interval. Aron/Crandall have not provided the reasoning for their choice of time horizons (two and five years beginning in July) or their choice of frequency (monthly), nor have they indicated whether alternative calculations were undertaken. The selection of “the market” will also drive results of the analysis. As mentioned above, a common measure is the S&P 500 Index. Aron/Crandall have not specified which measure of the market they have used, or whether

they have used different market indicia based upon the geography of each of the studied firms. It is also not clear how Aron/Crandall obtained their share pricing data. While their Table 2 cites Yahoo finance as the source of the data, it is not clear whether Aron/Crandall used stock price data for each foreign company's ADR, or actual stock price from the exchange on which that foreign equity trades. In fact, for a number of these companies, Yahoo finance provides neither the share price nor the US ADR price. As we demonstrated at Table 4 above, the various sources of company Betas will all differ (sometimes dramatically) due to variations in the way that the source conducts its own calculations. None of these methods is necessarily "right" or "wrong," but must be understood and used in context. Table 4 above reproduced Aron/Crandall Table 2, and additionally included the Betas for each company as provided by four sources, Yahoo finance, Google finance, ValueLine Investment Survey, and Scottrade. All four sources come up with different Betas for each company, highlighting the fact that the choice of Beta calculation methodology can alter results quite substantially. Table 4 showed that Aron/Crandall's characterization of ILEC Betas as having become substantially more risky was driven by their specific choice of Beta methodology, because reliable public sources of financial information show significantly lower Betas. Of course, one reason why the four public source Beta value differ from those calculated by Aron/Crandall is attributable to the difference in time periods. However, these additional figures certainly cut against Aron/Crandall's claim that broadband investments and regulatory uncertainty are causing ILEC risks to experience dramatic increases over time. Instead, and as shown in Table A3 above, it is clear that the long term trend in ILEC Betas is heading lower, reflecting the low risk associated with monopoly ILEC wireline (including broadband) operations.

NTT is a perfect example of a company with broadband facilities-sharing regulations that both Aron/Crandall and other sources show as low risk according to their financial Betas

NTT – Nippon Telegraph and Telephone – is the largest telecommunications company in Japan. It was owned and operated by the Japanese government until 1985, but was privatized and is now a publicly traded company and is included in the Nikkei 225 Index of companies traded on the Tokyo Stock Exchange. Aron/Crandall show NTT as having no systematic risk whatsoever,⁵³ while other sources suggest Betas of between 0.53 and 0.36, also on the lower end of the spectrum. NTT is required to lease broadband facilities to competitors at regulated rates⁵⁴ – precisely the regulatory condition that Aron/Crandall oppose and that they cite as undermining a telecom firm's ability to invest in broadband. In many respects, it should come as no surprise that NTT is considered low risk even under these circumstances. By leasing facilities to competitors, NTT realizes revenues and profits whether the customer is served at retail by it or by a rival retail service provider.

53. Aron/Crandall note that for NTT, the Beta "Coefficient is not statistically significantly different from zero." At 26.

54. See Nippon Telephone and Telegraph, 2007 Annual Report, available at http://www.ntt.co.jp/ir/library_e/annual/pdf/annual_report_07.pdf (accessed March 30, 2009).

Explanation of beta calculations

A financial equity beta coefficient can be calculated using two different, but mathematically equivalent, methods, both of which should return the same conclusion. The first method, which is easy to calculate using Microsoft Excel (using the covariance [COV] and Variance of the Population [VARP] functions) calculates the covariance between the Rate of Return (“ROR”) of the Stock and of the Market, and divides that result by the variance in the Market.

$$\beta_S = \frac{COV(R_S, R_M)}{VAR(R_M)}$$

where

β_S = Beta coefficient of Stock S

R_S = ROR of Stock S

R_M = ROR of the Market M

The second method involves using linear regression to estimate the beta coefficient. As in the second formula above, the ROR of the Stock is estimated as a function of the ROR of the Market.

$$R_{S,t} = \alpha_S + \beta_S R_{M,t} + \varepsilon_{S,t}$$

where

α_S = Alpha coefficient of Stock S

β_S = Beta coefficient of Stock S

ε_S = Error term

R_S = ROR of Stock S

R_M = ROR of the Market M

t = Time Period T

ETI utilized both methods and, as expected, obtained identical results.

We performed two separate sets of calculations using the closing and adjusted closing prices, respectively, for the S&P 500 and for each individual company. The rates of return reflected in the adjusted closing prices include both capital gains (losses) and dividend income. While the betas calculated from each of these two price series differ slightly, the declining trend in betas holds using either dataset.

Appendix 1: ETI Analysis of Incumbent TSP Equity Betas

Table A3				
Betas Calculated Using Non-Adjusted Close				
	T	VZ	BCE	TU
2/00-3/09	0.78	0.88	0.82	1.32
3/04-3/09	0.73	0.67	0.94	1.07
3/08-3/09	0.67	0.61	0.81	0.78
7/08-3/09	0.55	0.57	0.85	0.67

Table A4				
Betas Calculated Using Adjusted Close				
	T	VZ	BCE	TU
2/00-3/09	0.78	0.89	0.78	1.30
3/04-3/09	0.71	0.66	0.98	1.09
3/08-3/09	0.65	0.60	0.86	0.81
7/08-3/09	0.51	0.54	0.91	0.72

Table A5
Source Data Used in ETI Beta Calculation

Date	S&P		T		VZ		BCE		TU	
	Close	Adj. Close	Close	Adj. Close	Close	Adj. Close	Close	Adj. Close	Close	Adj. Close
1/3/2000	1,394.46	1,394.46	42.88	29.35	61.94	41.04	101.90	15.71		
2/1/2000	1,366.42	1,366.42	37.75	25.84	48.94	32.43	109.63	16.90		
3/1/2000	1,498.58	1,498.58	42.13	28.84	61.13	40.51	125.44	19.40		
4/3/2000	1,452.43	1,452.43	43.81	30.16	60.00	40.00	114.75	17.74		
5/1/2000	1,420.60	1,420.60	43.69	30.07	52.88	35.26	23.00	15.18		
6/1/2000	1,454.60	1,454.60	44.00	30.29	50.81	33.88	23.81	15.91		
7/3/2000	1,430.83	1,430.83	42.56	29.46	46.75	31.43	22.81	15.24		
8/1/2000	1,517.68	1,517.68	41.77	28.91	43.52	29.26	22.39	14.96		
9/1/2000	1,436.51	1,436.51	49.88	34.53	48.44	32.57	23.38	15.82		
10/2/2000	1,429.40	1,429.40	57.69	40.13	57.81	39.17	27.06	18.32	25.38	17.85
11/1/2000	1,314.95	1,314.95	54.94	38.22	56.19	38.08	27.38	18.53	23.62	16.62
12/1/2000	1,320.28	1,320.28	47.75	33.21	50.13	33.97	28.94	19.80	25.94	18.53
1/2/2001	1,366.01	1,366.01	48.35	33.80	54.95	37.50	28.56	19.54	26.21	18.72
2/1/2001	1,239.94	1,239.94	47.70	33.35	49.50	33.78	26.65	18.23	22.80	16.28
3/1/2001	1,160.33	1,160.33	44.63	31.20	49.30	33.65	22.51	15.58	20.17	14.62
4/2/2001	1,249.46	1,249.46	41.25	29.01	55.07	37.88	24.95	17.27	20.15	14.61
5/1/2001	1,255.82	1,255.82	43.05	30.27	54.85	37.73	25.38	17.57	21.22	15.38
6/1/2001	1,224.38	1,224.38	40.06	28.17	53.50	36.80	26.30	18.42	21.00	15.47
7/2/2001	1,211.23	1,211.23	45.03	31.86	54.15	37.51	26.73	18.72	16.54	12.18
8/1/2001	1,133.58	1,133.58	40.91	28.95	50.00	34.64	24.82	17.38	14.03	10.33
9/4/2001	1,040.94	1,040.94	47.12	33.34	54.11	37.48	22.05	15.44	11.30	8.54
10/1/2001	1,059.78	1,059.78	38.11	27.12	49.81	34.75	22.13	15.50	14.38	10.86
11/1/2001	1,139.45	1,139.45	37.38	26.60	47.00	32.79	23.02	16.12	15.77	11.91
12/3/2001	1,148.08	1,148.08	39.17	27.87	47.46	33.11	22.80	16.19	14.45	11.02
1/2/2002	1,130.20	1,130.20	37.45	26.82	46.35	32.59	21.96	15.59	13.50	10.30
2/1/2002	1,106.73	1,106.73	37.84	27.10	46.80	32.90	20.87	14.82	10.87	8.29
3/1/2002	1,147.39	1,147.39	37.44	26.81	46.10	32.41	17.62	12.69	10.60	8.20
4/1/2002	1,076.92	1,076.92	31.06	22.41	40.11	28.44	17.49	12.59	9.46	7.32
5/1/2002	1,067.14	1,067.14	34.29	24.74	43.00	30.49	18.51	13.33	9.25	7.15
6/3/2002	989.82	989.82	30.50	22.00	40.15	28.47	17.42	12.76	6.80	5.34
7/1/2002	911.62	911.62	27.66	20.12	33.00	23.63	16.53	12.10	4.80	3.77
8/1/2002	916.07	916.07	24.74	18.00	31.00	22.20	18.16	13.30	6.49	5.10
9/3/2002	815.28	815.28	20.10	14.62	27.44	19.65	17.70	13.18	6.89	5.55
10/1/2002	885.76	885.76	25.66	18.91	37.76	27.37	17.35	12.92	6.93	5.58
11/1/2002	936.31	936.31	28.50	21.01	41.88	30.35	18.32	13.64	9.49	7.64
12/2/2002	879.82	879.82	27.11	19.98	38.75	28.08	18.01	13.63	10.30	8.41
1/2/2003	855.70	855.70	24.44	18.17	38.28	27.99	18.94	14.34	10.89	8.89
2/3/2003	841.15	841.15	20.80	15.47	34.58	25.29	18.74	14.18	10.80	8.82
3/3/2003	848.18	848.18	20.06	14.92	35.35	25.85	18.32	14.10	10.63	8.81
4/1/2003	916.92	916.92	23.36	17.64	37.38	27.63	19.82	15.25	13.41	11.12
5/1/2003	963.59	963.59	25.46	19.23	37.85	27.98	22.02	16.95	14.50	12.02
6/2/2003	974.50	974.50	25.55	19.29	39.45	29.16	23.11	18.02	16.50	13.76
7/1/2003	990.31	990.31	23.36	17.90	35.00	26.13	22.20	17.31	16.93	14.12
8/1/2003	1,008.01	1,008.01	22.46	17.21	35.32	26.36	21.70	16.92	17.00	14.18
9/2/2003	995.97	995.97	22.25	17.05	32.44	24.21	21.85	17.27	15.78	13.28
10/1/2003	1,050.71	1,050.71	23.98	18.69	33.60	25.37	22.61	17.87	17.47	14.70
11/3/2003	1,058.20	1,058.20	23.28	18.14	32.84	24.80	22.37	17.68	17.95	15.10
12/1/2003	1,111.92	1,111.92	26.07	20.32	35.08	26.49	22.36	17.99	18.61	15.79
1/2/2004	1,131.13	1,131.13	25.50	20.10	36.86	28.13	22.26	17.91	17.82	15.12
2/2/2004	1,144.94	1,144.94	24.01	18.93	38.33	29.25	21.88	17.61	17.61	14.94
3/1/2004	1,126.21	1,126.21	24.54	19.35	36.54	27.88	21.03	17.16	16.79	14.36
4/1/2004	1,107.30	1,107.30	24.90	19.88	37.74	29.10	19.94	16.27	15.73	13.45
5/3/2004	1,120.68	1,120.68	23.70	18.92	34.58	26.66	19.90	16.23	15.86	13.57
6/1/2004	1,140.84	1,140.84	24.25	19.36	36.19	27.90	20.04	16.60	15.03	12.98
7/1/2004	1,101.72	1,101.72	25.34	20.49	38.54	30.03	20.97	17.37	17.39	15.02
8/2/2004	1,104.24	1,104.24	25.79	20.86	39.25	30.59	20.82	17.24	18.76	16.20
9/1/2004	1,114.58	1,114.58	25.95	20.99	39.38	30.69	21.65	18.18	19.23	16.74

Table A5
Source Data Used in ETI Beta Calculation

Date	S&P		T		VZ		BCE		TU	
	Close	Adj. Close	Close	Adj. Close	Close	Adj. Close	Close	Adj. Close	Close	Adj. Close
10/1/2004	1,130.20	1,130.20	25.26	20.67	39.10	30.76	23.22	19.50	22.89	19.92
11/1/2004	1,173.82	1,173.82	25.17	20.59	41.23	32.43	24.25	20.36	25.40	22.11
12/1/2004	1,211.92	1,211.92	25.77	21.08	40.51	31.87	24.13	20.53	28.90	25.34
1/3/2005	1,181.27	1,181.27	23.76	19.69	35.59	28.27	23.84	20.28	28.00	24.55
2/1/2005	1,203.60	1,203.60	24.06	19.94	35.97	28.57	23.44	19.94	29.82	26.15
3/1/2005	1,180.59	1,180.59	23.69	19.63	35.50	28.20	24.99	21.26	30.81	27.02
4/1/2005	1,156.85	1,156.85	23.80	19.99	35.80	28.76	24.06	20.47	29.92	26.23
5/2/2005	1,191.50	1,191.50	23.38	19.64	35.38	28.42	23.00	19.56	32.05	28.10
6/1/2005	1,191.33	1,191.33	23.75	19.95	34.55	27.76	23.68	20.37	34.01	30.00
7/1/2005	1,234.18	1,234.18	24.45	20.81	34.23	27.82	24.16	20.78	34.90	30.79
8/1/2005	1,220.33	1,220.33	24.08	20.50	32.71	26.59	26.20	22.54	36.95	32.60
9/1/2005	1,228.81	1,228.81	23.97	20.41	32.69	26.57	27.44	23.90	40.74	36.13
10/3/2005	1,207.01	1,207.01	23.85	20.58	31.51	25.94	24.75	21.55	37.70	33.44
11/1/2005	1,249.48	1,249.48	24.91	21.50	31.98	26.32	23.72	20.66	38.30	33.97
12/1/2005	1,248.29	1,248.29	24.49	21.13	30.12	24.79	23.95	21.11	40.26	35.94
1/3/2006	1,280.08	1,280.08	25.95	22.70	31.66	26.40	24.21	21.34	39.33	35.11
2/1/2006	1,280.66	1,280.66	27.59	24.13	33.70	28.10	24.26	21.38	38.86	34.69
3/1/2006	1,294.87	1,294.87	27.04	23.65	34.06	28.40	24.06	21.46	38.70	34.75
4/3/2006	1,310.61	1,310.61	26.21	23.21	33.03	27.87	24.72	22.05	41.33	37.11
5/1/2006	1,270.09	1,270.09	26.06	23.08	31.21	26.33	24.24	21.62	40.45	36.32
6/1/2006	1,270.20	1,270.20	27.89	24.70	33.49	28.26	23.65	21.35	40.38	36.49
7/3/2006	1,276.66	1,276.66	29.99	26.88	33.82	28.89	22.84	20.61	42.02	37.97
8/1/2006	1,303.82	1,303.82	31.13	27.90	35.18	30.05	24.99	22.56	47.54	42.95
9/1/2006	1,335.85	1,335.85	32.56	29.18	37.13	31.71	27.09	24.72	55.97	50.80
10/2/2006	1,377.94	1,377.94	34.25	31.01	37.00	31.95	28.28	25.80	57.36	52.06
11/1/2006	1,400.63	1,400.63	33.91	30.70	34.94	31.31	24.59	22.44	48.04	43.60
12/1/2006	1,418.30	1,418.30	35.75	32.37	37.24	33.37	27.00	24.91	44.67	40.82
1/3/2007	1,438.24	1,438.24	37.63	34.43	38.52	34.89	26.26	24.22	46.20	42.22
2/1/2007	1,406.82	1,406.82	36.80	33.67	37.40	33.88	26.22	24.19	47.34	43.26
3/1/2007	1,420.86	1,420.86	39.43	36.08	37.92	34.35	28.28	26.40	50.00	46.00
4/2/2007	1,482.37	1,482.37	38.72	35.75	38.18	34.96	33.75	31.50	54.25	49.91
5/1/2007	1,530.62	1,530.62	41.34	38.17	43.53	39.86	36.90	34.45	60.17	55.35
6/1/2007	1,503.35	1,503.35	41.50	38.32	41.17	37.70	37.79	35.61	58.92	54.52
7/2/2007	1,455.27	1,455.27	39.16	36.47	42.62	39.40	37.84	35.65	54.70	50.61
8/1/2007	1,473.99	1,473.99	39.87	37.13	41.88	38.72	38.20	35.99	51.92	48.04
9/4/2007	1,526.75	1,526.75	42.31	39.41	44.28	40.94	40.05	38.07	56.15	52.32
10/1/2007	1,549.38	1,549.38	41.79	39.25	46.07	43.00	43.61	41.46	58.63	54.63
11/1/2007	1,481.14	1,481.14	38.21	35.89	43.21	40.33	39.20	37.26	45.19	42.10
12/3/2007	1,468.36	1,468.36	41.56	39.04	43.69	40.78	39.74	38.13	48.26	45.37
1/2/2008	1,378.55	1,378.55	38.49	36.51	38.83	36.61	34.84	33.43	42.02	39.50
2/1/2008	1,330.63	1,330.63	34.83	33.04	36.32	34.24	36.20	34.73	44.70	42.02
3/3/2008	1,322.70	1,322.70	38.30	36.33	36.45	34.36	33.73	32.67	41.85	39.76
4/1/2008	1,385.59	1,385.59	38.71	37.10	38.48	36.87	36.48	35.33	44.35	42.14
5/1/2008	1,400.38	1,400.38	39.90	38.24	38.47	36.86	35.14	34.03	46.66	44.33
6/2/2008	1,280.00	1,280.00	33.69	32.29	35.40	33.92	34.81	33.72	40.33	38.71
7/1/2008	1,267.38	1,267.38	30.81	29.89	34.04	33.02	37.94	36.75	35.23	33.81
8/1/2008	1,282.83	1,282.83	31.99	31.04	35.12	34.06	37.83	36.64	38.79	37.23
9/2/2008	1,164.74	1,164.74	27.92	27.09	32.09	31.12	34.71	33.62	35.56	34.52
10/1/2008	968.75	968.75	26.77	26.38	29.67	29.24	29.01	28.10	32.60	31.65
11/3/2008	896.24	896.24	28.56	28.15	32.65	32.18	19.79	19.17	28.76	27.92
12/1/2008	903.25	903.25	28.50	28.09	33.90	33.41	20.49	20.16	28.42	27.97
1/2/2009	825.88	825.88	24.62	24.62	29.87	29.87	20.46	20.13	26.76	26.34
2/2/2009	735.09	735.09	23.77	23.77	28.53	28.53	19.57	19.26	25.35	24.95
3/2/2009	815.94	815.94	26.00	26.00	30.62	30.62	20.32	20.32	27.51	27.51