

Critique of Nordicity’s Report on Equivalence-of-Inputs Regulation in Canadian Telecommunications

Robert Hahn[‡]

I. Introduction

In January 2014, the Canadian Network Operators Consortium (CNOc), which represents wireline entrants,¹ commissioned Nordicity, a consultancy, to write *Implementing an Equivalence of Inputs Regime in Canada’s Telecommunications Market*.² Here, I provide an independent evaluation of the economic analysis contained in the Nordicity report.

Nordicity’s report argues that equivalence-of-inputs regulation (EOI) is the best way to protect competition in what Nordicity views as an uncompetitive market³ for the provision of telecommunications services generally, and Internet access in particular. EOI is a regulatory regime requiring incumbents to provide “internal and third-party clients” wholesale access to “essential facilities” at the same “price, quality, terms and conditions, and timescale, using the same systems and processes.”⁴

Nordicity’s arguments in favor of EOI regulation are not persuasive from a cost-benefit perspective. In fact, it is likely that adopting EOI regulation would undermine innovation in the supply of Internet access, benefiting *competitors* more than *competition*. Nordicity seems to be

[‡] *Mr. Hahn is professor and director of economics at the Smith School of Enterprise and the Environment, University of Oxford; a senior research fellow at the Institute for New Economic Thinking at the Oxford Martin School; a senior fellow at the Georgetown Center for Business and Public Policy, Georgetown University; and a Robert Schuman fellow at the European University Institute. He thanks Billy Schwartz for his research support and Andrea Renda for helpful comments. Funding for this report was provided by Bell Aliant and Bell Canada. The views reflected in this report are those of the author, and do not necessarily represent the views of the institutions with which he is affiliated.

¹ Canadian Network Operators Consortium, website, “About Us,” http://cnoc.ca/pages/objectives/about_us, viewed May 19, 2014 (“The objectives of the CNOc are: 1. To represent the interests of those bodies corporate in Canada that own or operate wireline networks, in whole or in part, and are involved in the competitive provision of communications services to the public over those networks... 3. To influence the development of laws and regulations, regulatory and judicial determinations, as well as public policy affecting communications in Canada...”). Their list of members can be downloaded at http://cnoc.ca/pages/membership_list.

² Nordicity, “Implementing an Equivalence of Inputs Regime in Canada’s Telecommunications Market”, January 31, 2014, p. 1 [hereinafter *Nordicity*].

³ *Id.* ¶ 20 (“When implemented and enforced effectively, an EOI regime can promote downstream competition and improve market outcomes for consumers. Indeed, The European Commission (EC) has identified EOI as the ‘surest way to achieve effective non-discrimination.’”).

⁴ *Id.* ¶ 20.

asking the Canadian Radio-television and Telecommunications Commission (CRTC) to transfer nearly all the benefits of incumbents' facilities to CNOC members without their actual having the responsibilities of ownership.

Nordicity's fear: Duopolistic Discrimination Against Rivals

Even while admitting that copper and coaxial cable technologies compete throughout Canada,⁵ Nordicity views the Canadian market for local delivery of telecommunication services as uncompetitive: “[The] duopoly of incumbent cable company (cableco) and incumbent local exchange carrier (ILEC) infrastructure to deliver telecommunications signals to the premises is likely to endure for the foreseeable future.”⁶ Because cable and telephone operators are each “vertically integrated”⁷ in the sense of operating wholesale facilities and retail services, Nordicity contends, “[the] risk of discriminatory behaviour by either ILECs or cablecos remains one of the biggest threats to the development of a competitive telecom market beneficial for consumers and small businesses in Canada.”⁸ The authors say that “equity” requires that any regulation apply equally to both types of incumbents.⁹

Discriminatory behavior against third-party retailers by incumbents has been a concern for the CRTC since at least as far back as 1994,¹⁰ and Canada already requires “speed matching” between incumbents’ retail and wholesale Internet access services to ensure that incumbents cannot provide slower Internet service to third-party retailers.¹¹ But Nordicity sees other dangers that the CRTC’s long history of regulation has not yet remedied.¹² Indeed, Nordicity faults the

⁵ *Id.* ¶ 128 (“Contrary to the market structure in many industrialized countries, Canada is fortunate in having two competing technologies: cable and telephony and the network infrastructure for each is generally available to the vast majority of homes and businesses.”).

⁶ *Id.* ¶ 14.

⁷ *Id.* ¶ 24 (“The CRTC recognized that vertical integration of ILECs offered opportunities (as well as incentives) for anticompetitive conduct.”). Economists do not traditionally use the term “vertical integration” this way. Instead, it is used to refer to the provision of two *distinct* services, such as programming and distribution. It is not clear whether the network infrastructure (the so-called “wholesale” service) and retail provision of Internet access are distinct services.

⁸ *Id.* ¶ 21.

⁹ *Id.* ¶ 128.

¹⁰ CRTC, Telecom Decision CRTC 94-19, § II.A.2.b. (“The key concern of competitors in this proceeding has been the potential for telephone companies to abuse market power arising from their vertically integrated structure and historically dominant market position. As well, parties have expressed concerns about the potential of the telephone companies to over-invest under earnings regulation, or to cross-subsidize competitive activities from monopoly activities. In this Decision, the Commission has taken a number of steps to address these concerns.”).

¹¹ CRTC, Telecom Regulatory Policy CRTC 2010-632, preamble (“The Commission therefore finds that, at present, there is a continued need to require ILECs and cable carriers to make their existing wholesale high-speed access services – aggregated asymmetric digital subscriber (ADSL) access service and third-party Internet access (TPIA) service, respectively – available subject to a speed-matching requirement. Otherwise, in the Commission’s view, retail Internet service competition would not be sufficient to protect consumers’ interests.”).

¹² *Nordicity* ¶ 31 (“In practice, the service-based competition currently provided by independent ISPs is limited by a number of different factors, including... Financial, technical and procedural barriers... Price and non-price discrimination... Less room for product differentiation.”) (emphasis removed from original).

CRTC for allegedly failing to acknowledge “new business realities” and for “loosening of regulation referring to non-essential wholesale services.”¹³

Nordicity’s Proposed Remedy: Equivalence-of-Inputs Regulation (EOI)

Nordicity proposes *equivalence-of-inputs regulation* (EOI) as “an important alternative model to the CRTC’s current approach.”¹⁴ The CRTC already mandates competitors’ wholesale access to essential facilities at tariffed prices and speeds.¹⁵ EOI regulation would go several steps further: mandating service levels, timescales, and technology;¹⁶ mandating service-level agreements and guarantees with financial penalties;¹⁷ significantly increasing *ex ante* compliance monitoring;¹⁸ requiring publication of trade or technical secrets;¹⁹ exercising control over cable operators’ and telephone companies’ internal management and affairs;²⁰ continuing wholesale price setting;²¹ requiring common IT systems;²² and applying these rules to all retail services currently offered or to be offered in the future.²³

Nordicity goes even further by asking the CRTC for functional separation of incumbents from their wholesale divisions.²⁴ Nordicity acknowledges that “economies of scale and scope”²⁵ imply

¹³ *Id.* ¶ 32 (emphasis removed from original).

¹⁴ *Id.* ¶ 35.

¹⁵ CRTC, Telecom Regulatory Policy CRTC 2011-703, ¶¶ 1-7.

¹⁶ *Nordicity* ¶ 37 (“...based on the same parameters with respect to: i. Service offering; ii. Timescales; iii. Terms and conditions (including price and service levels; and, iv. Using the same systems and processes.”).

¹⁷ *Id.* ¶ 41.

¹⁸ *Id.* ¶ 40 (“Compliance monitoring... with respect to: i. Ordering process; ii. Provision of services; iii. Quality of services (i.e. faults); iv. Fault repair times; and, v. Migration between regulated wholesale inputs.”).. Nordicity claims that ILECs already report on quality of service: “Indeed, many of the CRTC’s regulatory policies already in place are designed to achieve EOI. ...the QoS reporting by ILECs are all key elements of an EOI regime.” *Id.* ¶ 163.

¹⁹ *Id.* ¶ 38 (“They must also offer the same commercial information about such products and services to third party competitors and their own retail arm.”).

²⁰ *Id.* ¶ 44 (“In the absence of functional separation, the enforcement of appropriate incentives may require the review of management contracts and compensation practices -- a practice that may not be typical of telecom industry regulators.”). Further, Nordicity would have the CRTC require the incumbents create specific departments such as a “Product Management Organization,” “Sales Order Management Group,” and a “Workforce Management Group.” *Id.* ¶ 145.

²¹ *Id.* ¶¶ 132-133.

²² Canadian Network Operators Consortium Inc., Response to Interrogatory 2 May 2014, CNOC (BELL CANADA) 28Mar14-28, TNC 2013-551, p. 1.

²³ *Id.* ¶ 37 (“Under this principle, when ILECs and cablecos offer or plan to offer to their retail operations network access or other services or products for which they may exercise significant market power -- or which may permit them to exercise significant market power downstream -- they must offer service or product on a wholesale basis to third party competitors and their own retail arm....”).

²⁴ *Id.* ¶ 137 (“A similar approach [as the ones taken in the United Kingdom and New Zealand] could be adopted in Canada, with the CRTC implementing the regime and monitoring its outcomes, using recourse to appropriately selected KPIs, corresponding to the legal obligations of ILECs and cablecos to comply with the EOI regime. In order to ensure that these incumbents are further motivated to comply with the EOI regime, the CRTC would require them to develop *new incentive structures for the managers who will supervise the carriers’ delivery of wholesale services, so that their compensation is aligned to the success of the wholesale operations, rather than that of the entire enterprise.*”) (emphasis added). Moreover, Nordicity gives great detail about British Telecom’s functional separation enforced by Ofcom in Nordicity Appendix A, Table A-1 “Elements of BT functional separation.”

²⁵ *Id.* ¶ 46.

that functional separation “may not be feasible.”²⁶ In essence, Nordicity argues that any time a cable operator or telephone company comes up with a new retail service, it has to let its competitors piggy back off its “essential facilities” to provide the same service.²⁷

Nordicity identifies five states where communications regulators have imposed EOI: the United Kingdom, New Zealand, France, Ireland, and Sweden.²⁸ In the United Kingdom, Ofcom found that British Telecommunications plc (BT), which until 1984 had a government-sponsored monopoly,²⁹ “may have engaged in conduct which has had the effect of restricting competition.”³⁰ In exchange for Ofcom’s not referring BT to the competition authorities for investigation, BT agreed to a number of regulations, including separating wholesale activities into a subsidiary and EOI terms for those wholesale services.³¹ Nordicity goes on to explain that New Zealand’s TelecomNZ held a government-protected monopoly of telecommunication services until 1989. In 2006, New Zealand’s Commerce Commission concluded antitrust enforcement had not achieved competitive telecommunications in New Zealand, and enacted similar functional separation and EOI policies for fixed-access services³² to the United Kingdom³³ with a strict enforcement process.³⁴ Nordicity claims that some of these processes were dismantled upon structural separation of the incumbent in 2011.³⁵ The Swedish regulator also functionally separated retail and wholesale divisions of the incumbent while imposing a light form of EOI regulation, according to Nordicity.³⁶ Ireland applies only limited EOI to wholesale broadband access products to ordering, provisioning, fault reporting, and repair.³⁷

An Economist’s Perspective

The arguments that Nordicity offers in favor of EOI can be usefully assessed applying the economist’s framework of cost-benefit analysis. In doing such an analysis, one should compare the relative costs and benefits of the given policy proposal with those of alternative policy proposals: specifically, those that are both relevant and feasible.

²⁶ *Id.* ¶ 161.

²⁷ This is an example of raising rivals costs through regulation. *See, e.g.*, DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 372 (Prentice Hall 4th ed., 2005) (explaining how regulation can be used to raise a rival’s costs). *Id.* at 634 (explaining entrants’ use of antitrust laws to hurt incumbent competitors).

²⁸ Nordicity ¶ 58.

²⁹ Peter Walker, “Ofcom’s five minute guide to the history of telecommunications regulation in the UK,” available at <http://www.ofcom.org.uk/static/archive/oftel/publications/news/on61/5min0903.htm>, viewed on May 21, 2014.

³⁰ Ofcom, “Notice under Section 155(1) of the Enterprise Act 2002: Consultation on undertakings offered by British Telecommunications plc in lieu of a reference under Part 4 of the Enterprise Act 2002,” 2005, available at <http://stakeholders.ofcom.org.uk/binaries/consultations/sec155/summary/sec155.pdf>, ¶ 1.4.

³¹ Ofcom, “Undertakings given to Ofcom by BT Pursuant to the Enterprise Act 2002”, 2005, available at <http://stakeholders.ofcom.org.uk/binaries/telecoms/policy/bt/btundertakings.pdf>.

³² Mosby and Purre, “Toward Universal Broadband Access in New Zealand,” International Telecommunication Union, 2010, at 29.

³³ Nordicity ¶¶ 74-76.

³⁴ *Id.* ¶ 79.

³⁵ *Id.* ¶ 90.

³⁶ *Id.* ¶ 119.

³⁷ Other services are regulated on an equivalence-of-outputs basis. Nordicity Box 3. Most of Nordicity’s discussion of Ireland is about its incumbent’s voluntary actions, which are not regulations at all. *Id.* ¶¶ 98-110.

Further, breaking down a policy's costs and benefits into questions of efficiency, or the size of the benefits versus the costs, on the one hand, and equity, or their distribution within society, on the other, helps clarify the analysis. An economist typically considers a policy's impact on static efficiency—how the policy changes prices and quality in the short run—and on dynamic efficiency—how a policy changes investment and technology in the long run. Policies often redistribute costs and benefits between consumers and producers with important economic, political, and social implications.

Nordicity mentions several policies that various states have used instead of EOI. The authors reject structural separation and divestiture³⁸ and Canada's status quo,³⁹ but give short shrift to equivalence-of-outputs regulation (EOO).⁴⁰ The European regulatory debate can shed some light on the comparison between EOO and EOI. For example, a recent European *Commission Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment*⁴¹ specifically contrasts EOI (which it considers superior to ensure non-discrimination) to EOO (which is a less costly remedy.). This recommendation provides a good working definition of the EOO model as one where “wholesale inputs provided to alternative operators — while not using the same systems and processes — are comparable, in terms of functionality and price, to those the vertically integrated SMP operator consumes itself.”⁴² EOO represents a less intrusive remedy than EOI.

I am not aware of Canada having ever described its regulatory approach in terms of EOI or EOO. Still, I understand that Canadian regulation already mandates wholesale access to essential facilities at tariffed prices, has implemented a speed-matching requirement for broadband, features quality of service indicators (with associated financial penalties) for multiple wholesale services, all of which are under an overarching non-discrimination principle. This is consistent with EOO. However, Canada does not require that competitor services be offered using the same systems and processes, a feature frequently associated with EOI. Like EOO, the current Canadian regime represents a less intrusive remedy than EOI.

Along the continuum of possible regulatory approaches, I believe that Canada's regime and EOO are close in terms of their approach to non-discrimination and compliance costs. I am aware that Nordicity claims that “while retail and wholesale service speeds provided by incumbents usually

³⁸ *Id.* ¶¶ 46-47 (“Since the introduction of the local competition in Canada, the CRTC has been reluctant to implement structural or functional separation.... With structural separation, therefore, there is a risk that average costs will increase and consumer prices will follow.”).

³⁹ *Id.* ¶ 31 (“In practice, the service-based competition currently provided by independent ISPs is limited by a number of different factors....”).

⁴⁰ This regulation has been applied in Ireland. *Id.* Box 3 (“Consequently, Next Generation products, services and facilities, sold with access and voice, provided over legacy technology, must be provided to at least the standard of EoO.”).

⁴¹ Issued 11 September 2013, available at http://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2013/c_2013_5761_en.pdf

⁴² *Id.* ¶ 17

match, speed-matching is not really provided on a true EOO basis⁴³, in Canada. I am not taking a view on whether Canada perfectly applies EOO today for all wholesale services. That is not necessary. For the purpose of my report, which looks at the benefits and costs of a potential move to the more intrusive EOI, I am simply assuming that Canada's current regime and EOO are similar.

I also note in closing that New Zealand's use of "generic competition law (i.e., no industry specific regulation) and courts" for ten years⁴⁴ suggests that policy may also deserve a cost-benefit analysis for comparison with EOI.

Organization of this paper

This paper proceeds as follows. Section II makes the case for economic efficiency as a policy goal and lays out a framework of necessary conditions for judging whether a policy maximizes that objective. The next three sections investigate whether an EOI policy regime satisfies those conditions: Section III asks whether there is a market failure in Canadian telecommunications and whether EOI would address the failure if it were present. Section IV examines the costs and benefits of EOI through the lens of economic theory. Section V compares EOI to alternative telecommunications regulatory regimes, showing that EOI does not fare well in its likely efficiency impacts when compared with other policies. Section VI concludes that Canadian regulators would be well-advised to consider alternatives other than EOI in addressing potential market failures.

II. Economic framework for regulation

When considering economic policy, it is useful to have a criterion for evaluation. Economists often use the idea of economic efficiency.⁴⁵ Below I explain why maximizing economic *efficiency*, i.e., maximizing the difference between society's economic benefits and costs,⁴⁶ ought to be a key goal of regulation.

Goal: Economic efficiency

Economic efficiency is recognized as "one of the fundamental criteria" for evaluating public policy.⁴⁷ Indeed, Canadian law and regulation has upheld an economic efficiency standard.⁴⁸ The

⁴³ CNO(Bell Canada)28Mar14-28 TNC 2013-551

⁴⁴ *Id.* ¶ 74.

⁴⁵ N. GREGORY MANKIW, PRINCIPLES OF MICROECONOMICS 28-29 (Thompson South-Western 4th ed., 2007) ("Positive statements are descriptive.... Normative statements are prescriptive.... [Positive views about how the world works affect normative views about what policies are desirable.... Yet normative conclusions cannot come from positive analysis alone; they involve value judgments as well.... When you hear economists making normative statements, you know they are speaking not as scientists but as policy advisers.").

⁴⁶ *Id.* at 5 ("Efficiency means that society is getting the maximum benefits from its scarce resources.").

⁴⁷ See, e.g., Kenneth J. Arrow, *et al. Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?* 272 SCIENCE 221-222 (1996) ("Most economists would argue that economic efficiency, measured as the difference between benefits and costs, ought to be one of the fundamental criteria for evaluating" policy.).

economic efficiency of a policy can be analyzed using *cost-benefit analysis*. A cost-benefit analysis should concern itself both with the short run or static effects of a policy on price and quantity, as well as the long run or dynamic effects on capital infrastructure investment and technological innovation.⁴⁹

Defining distributive equity is a much thornier issue than efficiency.⁵⁰ Because Nordicity addresses (by implication) the distribution of costs and benefits among incumbents, entrants, and consumers, I restrict discussion of equity to those three groups. In particular, a benefit to competitors does not imply improved efficiency or even improved competition.⁵¹ For example, a policy transferring the incumbents' infrastructure to a cartel of entrants would handily benefit the competitors, but could erode competition.

Consequence: Conditions for more efficient regulation

To maximize economic efficiency, a policy should not be embraced unless each of the following four conditions is satisfied:

- (1) There must exist an identifiable market failure;
- (2) The policy under consideration addresses the failure;
- (3) The policy's benefits outweigh its costs, *i.e.*, it has positive net social benefit; and
- (4) There are no policies satisfying conditions (1) – (3) with greater net social benefit.

Government intervention in the economy is justifiable on efficiency grounds only when there is a market failure. A *market failure* can occur when producers or consumers can influence price, or exercise *market power*, or the market does not exist in the first place, which can occur, for example, in the event of externalities such as pollution.⁵² Economic theory suggests that applying price or quality regulation to markets that are competitive is likely to harm consumers

⁴⁸ CRTC, Telecom Decision CRTC 94-19, § I.B. (“The Act affirms, in section 7, that telecommunications perform an essential role in the maintenance of Canada's identity and sovereignty and that Canadian telecommunications policy has as its objectives the following: ... (2) to render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural areas in all regions of Canada; (3) to enhance the efficiency and competitiveness, at the national and international levels, of Canadian telecommunications; ... (5) to foster increased reliance on market forces for the provision of telecommunications services and to ensure that regulation, where required, is efficient and effective; ... (7) to respond to the economic and social requirements of users of telecommunications services....”).

⁴⁹ RICHARD G. LIPSEY & PETER O. STEINER, *ECONOMICS* 187 (Harper & Row 6th ed., 1981) (“In the short run, what matters is that at least one significant factor is fixed. The factor is fixed in the sense that while the firm may or may not use all that it has, it cannot get more for the duration of the short run. The fixed factor is usually an element of capital (such as plant and equipment), but it might be land, the services of management, or even the supply of skilled labor.”).

⁵⁰ AJIT K. DASGUPTA & D.W. PEARCE, *COST-BENEFIT ANALYSIS: THEORY AND PRACTICE* 62-65 (Cambridge 1972).

⁵¹ CRTC, Telecom Decision CRTC 2008-17 ¶ 39 (“...to safeguard competition and the competitive process, not individual competitors.”).

⁵² MICHAEL L. KATZ & HARVEY S. ROSEN, *MICROECONOMICS* 389-399 (McGraw-Hill 3rd ed., 1998).

by reducing the available supply of the regulated service below what it would have been without the regulation, excluding some consumers who would be willing to pay for the service.⁵³

Even when there is a market failure, economic theory certainly does not require government intervention.⁵⁴ Once a market failure has been demonstrated, the policy must have some mechanism by which it addresses and tries to improve on the market failure. Section III applies the tests in (1) and (2) to EOI.

With regard to the third condition, an advisable policy should try to improve on the status quo. Measured in efficiency terms, expected benefits should exceed expected costs. Section IV explores what economic theory has to say about the benefits Nordicity claims EOI has and the costs the authors fail to mention.

With regard to the fourth condition, an economist should evaluate all reasonable alternatives to the status quo. From those alternatives, the one that maximizes economic efficiency can be selected. Section V briefly explores some alternatives to EOI.

III. Is There a Market-Power Problem to Solve?

Before intervening in a market, there should be demonstration of a clear market failure. As mentioned above, Nordicity claims a market failure of existing Canadian wholesale regulation thereby requiring more regulation, namely EOI. But Nordicity provides no evidence of market power. Instead, it appears content to rely on the CRTC's findings of the essentiality of service incumbents provide.⁵⁵ Nordicity claims, "As a result of the case-by-case approach adopted by the CRTC, however, Canada lags in certain respects when it comes to indicators of competition and development in broadband services."⁵⁶ For example, Nordicity writes that incumbents are guilty of committing "price and non-price discrimination" against independent ISPs,⁵⁷ but gives no data on the prevalence or effect of such supposed discrimination. Nordicity accuses Bell Canada and Telus of "delay tactics" in abiding by speed-matching rules.⁵⁸ But even if the incumbents' actions in Nordicity's account were indeed intended to delay (which Nordicity does not prove), the authors give no data on the frequency of such behavior or the amount of harm it imposes.

⁵³ *Id.* 363-366 (analyzing rent control in a competitive housing market). By setting a maximum price for housing, producer surplus is transferred to consumers who have housing and consumer surplus for those who cannot find housing because of supply's decline under the price cap lose their consumer surplus altogether. Quality regulations have a similar effect: Consumers willing to pay for a good or service at low quality but not willing to pay for a luxury version would be excluded from enjoying the good altogether by quality-minimum regulations.

⁵⁴ *Id.* at 399 ("It must be emphasized that while efficiency problems provide opportunities for government intervention in the economy, they do not require it.").

⁵⁵ *Nordicity* ¶ 27-29.

⁵⁶ *Id.* ¶ 160.

⁵⁷ *Id.* ¶ 31.

⁵⁸ *Id.* at Box 2.

While a full analysis of the degree of competition in Canada's broadband market is beyond the scope of this paper, there is evidence that Canada's broadband market is performing well in comparison with other countries. Nordicity's own presentation of OECD data⁵⁹ shows that Canada led New Zealand, Sweden, and Ireland — three of the five states Nordicity suggests are regulatory exemplars⁶⁰—in the number of wired broadband connections per 100 inhabitants in June 2013. Canada is only a few percentage points behind the other two of Nordicity's example states, France and the United Kingdom. Also in June 2013, Canada led France, New Zealand, and Ireland in fiber-optic connections as a proportion of broadband connections.⁶¹ Relative to these countries, competition in Canada for Internet access appears robust.

Broadband deployment in Canada is nearly ubiquitous, and the majority of households have access to at least two providers. Between 2011 and 2013, broadband service with a download speed of at least five megabits per second (Mbps) have gone from being available to 87 percent to 94 percent of the population.⁶² Nearly all households have access to fixed and mobile broadband,⁶³ and in urban areas, all households have access to non-satellite broadband.⁶⁴ In 2012, speeds of at least five Mbps were available to 83 percent of homes via DSL and 80 percent of homes via cable modem.⁶⁵ Thus, between 63 and 80 percent of homes had at least two wireline choices for five Mbps broadband access.⁶⁶ This range is comparable to the 71 percent of US households with at least two choices for 6 Mbps broadband access at the end of 2012.⁶⁷

Because of the large economies of scale and scope in wired telecommunications, Canada's preponderance of two pipes into the home may be all that the market can support. Nordicity admits the presence of these scale and scope economies.⁶⁸ Such markets often cannot “support a large number of firms.”⁶⁹ For example, economists recognize that electricity distribution requires a small number of firms so that “there is no need to have two sets of wires running from the power plant to the customers.”⁷⁰ Canada's wireline availability must also be considered in the context of its unique topography and relatively low population density.⁷¹ These factors demand

⁵⁹ *Id.* at Appendix A, Figure A-1 “Fixed broadband penetration rates.”

⁶⁰ *Id.* § 4.

⁶¹ *Id.* at Appendix A, Figure A-2 “Percentage of fibre connections in total broadband subscriptions.”

⁶² CRTC Communications Monitoring Report, September 2013 [hereinafter *CRTC Report*], p. iii.

⁶³ *Id.* at 173 (“Fixed and mobile broadband (i.e., HSPA+) are available to over 99% of households.”).

⁶⁴ *Id.* at 173.

⁶⁵ *Id.* at 178.

⁶⁶ Minimal possible overlap is $\max\{(0.83 + 0.80) - 1, 0\} = 0.63$.

⁶⁷ Thirty-four percent of US households had access to three providers of wireline, six-Mbps Internet access, and 37 percent had access to two providers. For 10-Mbps-or-greater access, the numbers were nearly identical. FCC, “Internet Access Services: Status as of December 31, 2012,” 2013, figure 5(a).

⁶⁸ Nordicity ¶ 46.

⁶⁹ KATZ & ROSEN, *supra*, at 432.

⁷⁰ *Id.* at 432.

⁷¹ Statistics Canada gives a picture of Canada's low population density in 2011. Canada's total population density was 3.7 inhabitants per square kilometer in 2011 — 29th of 31 OECD countries relative to 2008 population density figures. Ontario and Quebec, the two most populous provinces, accounting for over 60 percent of the population, held 9.2 inhabitants per square kilometer — still 29th. Considering only the three most densely populated provinces,

relatively higher levels of investment in infrastructure to reach the marginal broadband subscriber.⁷² For example, Canada invested US\$150.30 per communication access path⁷³ in 2011, the second highest level among OECD countries.⁷⁴ Despite low population density and the attendant high cost of deployment, Canada has historically ranked highly (12th of 31 countries surveyed) in terms of overall broadband penetration.⁷⁵

Prices for broadband access in Canada are relatively inexpensive, further undermining any claim of market failure. In 2013, Canadian broadband was cheaper than comparable service in the United States at all speed levels; at speeds up to three Mbps, Canadian broadband is cheaper than Japan; and at speeds between four and 15 Mbps, it is cheaper than Japan and Australia.⁷⁶ These pricing data are corroborated by the OECD, which found that incumbent broadband prices in Canada declined from 2010-12 while incumbent speeds increased.⁷⁷ In 2011, the share of disposable income spent on communications in Canada (2.5 percent) was less than OECD average (2.7 percent).⁷⁸

In light of the weak evidence of market power and relevance of EOI to curing those alleged problems, the CRTC should be wary of Nordicity's insistence that incumbents must share "any

Prince Edward Island, Nova Scotia, and Ontario, accounting for just 41 percent of Canada's population (almost entirely because of Ontario's contribution), the population density is 14.4 inhabitants per square kilometer — still 29th. See Statistics Canada, "Population and dwelling counts, for Canada, provinces and territories, 2011 and 2006 censuses," available at <http://www12.statcan.ca/census-recensement/2011/dp-pd/hlt-fst/pd-pl/Table-Tableau.cfm>, viewed May 27, 2014. Taking Prince Edward Island alone, with its 0.4 percent of Canada's population, the population density is 24.7 inhabitants per square kilometer — 24th (just beating out the United States with 32.8 inhabitants per square kilometer in 2008). See also OECD, *Broadband Portal*, spreadsheet 3a, "Fixed broadband penetration and density," June 2010, available at <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm>, viewed May 23, 2014. The population density of Ottawa was 316.6 inhabitants per square kilometer in 2011 — making the city less dense than the countries of Korea (489.5), Netherlands (405.1), Belgium (353.8), and Japan (337.8) in 2008. See Statistics Canada, *Focus on Geography Series, 2011*, "Census subdivision of Ottawa, CV – Ontario," available at <http://www12.statcan.gc.ca/census-recensement/2011/as-sa/fogs-spg/Facts-csd-eng.cfm?GK=CSD&GC=3506008>, viewed May 27, 2014.

⁷² Gerald R. Faulhaber & Christiaan Hogendorn, *The Market Structure of Broadband Telecommunications*, 48(3) JOURNAL OF INDUSTRIAL ECONOMICS 205-329, at 311 (2000) ("The costs of passing a home with a broadband network are highly sensitive to the population density of the area surrounding the home. Houses and other buildings that are spread further apart require more cabling and, because signal strength and quality decline over distance, more electronic components.").

⁷³ Communication access paths are analog lines, ISDN lines, DSL, coaxial cable, fiber-optic cable, and mobile subscribers. OECD Communications Outlook 2013 at Table 3.10, available at http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/oecd-communications-outlook-2013/public-telecommunication-investment-per-total-communication-access-path_comms_outlook-2013-table36-en#page1.

⁷⁴ OECD Communications Outlook 2013 at Table 3.10, available at http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/oecd-communications-outlook-2013/public-telecommunication-investment-per-total-communication-access-path_comms_outlook-2013-table36-en#page1.

⁷⁵ OECD Communications Outlook 2013 at Table 4.11, available at http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/oecd-communications-outlook-2013/total-broadband-subscriptions-per-100-inhabitants-in-the-oecd-area_comms_outlook-2013-table77-en#page1.

⁷⁶ Wall Communications Inc., "Price Comparisons of Wireline, Wireless and Internet Services in Canada and with Foreign Jurisdictions: 2013 Update," p. 24.

⁷⁷ OECD Communications Outlook 2013 (July 2013), at 218.

⁷⁸ *Id.* at 304.

new retail service by an ILEC or cableco.”⁷⁹ If the CRTC decides to adopt an EOI regime, it must be careful not to apply the regime to all new services, but only consider this regulatory alternative for services in which market power has been demonstrated and for which there is no alternative remedy that is likely to be superior.

IV. Costs and Benefits of EOI

Even if the Canadian telecommunications market needed intervention, and even if EOI were relevant to the underlying market failure, economic theory and observable facts contradict many of Nordicity’s claimed benefits and also suggest some important costs of an EOI regime that were overlooked.

Benefits claimed by Nordicity

Nordicity makes a variety of claims about the benefits of EOI. The following subheadings provide a list of many of the claimed benefits along with critiques of Nordicity’s claims.

EOI has benefited foreign states

Nordicity’s claim that EOI could benefit Canada as it has benefited other EOI-adopting countries is unpersuasive. First, there is a problem of what constitutes an EOI regime, as is illustrated by the cases of France and Ireland. Second, there is a lack of evidence to suggest that EOI regimes actually provide substantial economic benefits for consumers.

By Nordicity’s classification of France, Canada already has an EOI or EOI-like regime. Nordicity takes an incoherent stance on what constitutes an EOI regime in France. Nordicity misses the parallel between France, which “has not officially adopted EOI per se”⁸⁰ but only “implemented several regulatory measures that can also be found in EOI regimes,”⁸¹ and its claim that “many of the CRTC’s regulatory policies already in place are designed to achieve EOI.”⁸² Apparently, Canada’s EOI-like regulations are not “sufficiently coherent”⁸³ and have “yielded lackluster results,”⁸⁴ but in France, they have a “positive effect on competition.”⁸⁵ Nordicity claims that France’s EOI-like regulations include provisions for monitoring service quality, migration toward unbundling networks, and service level agreements for the unbundled loops.⁸⁶ Because Canada’s EOI-like regulations closely parallel France’s, it is not clear how France may serve as a “treatment” group in this policy experiment.

⁷⁹ *Nordicity* ¶ 165 (emphasis added).

⁸⁰ *Nordicity*, “Information Requested by Bell Canada,” Response to Interrogatory, CNOC(BELL CANADA)28Mar14-30 TNC 2013-551, May 2, 2014, answer (d).

⁸¹ *Id.*

⁸² *Nordicity* ¶ 163.

⁸³ *Id.*

⁸⁴ *Id.* ¶ 32.

⁸⁵ *Nordicity*, “Information Requested by Bell Canada,” Response to Interrogatory, CNOC(BELL CANADA)28Mar14-30 TNC 2013-551, May 2, 2014, answer (d).

⁸⁶ *Id.*

Nordicity claims Ireland as an EOI-regime success story, but next-generation wholesale broadband access and all legacy wholesale broadband products, services, and facilities are subject to EOO, not EOI. The only services subject to EOI in Ireland are next-generation wholesale broadband ordering, provisioning, fault reporting, and repair—not the access itself, which is under EOO.⁸⁷ Because the Irish regulations mix functional separation⁸⁸ with both EOI and EOO, it is difficult to say that Ireland is a story (let alone successful) for any particular policy regime. All that can be said is that it provides precedent for a national regulator using each of the three policies.

Second, based on the analysis presented by Nordicity, it is difficult to find any strong evidence that EOI has had positive economic effects. The authors provide only anecdotal evidence of the alleged benefits to foreign states, without doing careful quantitative analysis. For example, they give statistics on broadband access in the UK in 2012, six years after the enforcement of EOI against the incumbent BT, without giving comparable statistics from before EOI came into effect in the UK, let alone giving comparable changes in those statistics.⁸⁹ Indeed, Nordicity admits that retail, fiber-optic penetration in the UK was *less* than that in Canada in 2012, despite Canada's lack of EOI.⁹⁰ Nordicity does give information about how New Zealand's telecommunication picture changed from before to after the enactment of EOI, but does not control for changes in demand, technology, and other factors. For example, Nordicity cites a decline in the incumbent's share of fixed-line retail revenues from before to after EOI enactment. The authors provide no evidence this decline results from lower monopoly rents rather than changes in technology or scale, even while noting a rise in copper and broadband connections.⁹¹ Nordicity also relies on market share as a measure of market power⁹² even while modern economics has moved away⁹³ from this crude measure.⁹⁴ Even if Nordicity had supplied evidence for improvements in competition flowing from regulation, only one of the five EOI-

⁸⁷ Nordicity at Box 3.

⁸⁸ *Id.* ¶ 102.

⁸⁹ Nordicity ¶ 70.

⁹⁰ *Id.* ¶ 72 (“At the end of 2012, the percentage of UK population with Fibre-to-the-Cabinet (FTTC) networks stood at 48%; this was comparable to the rate of 56% in Canada.”).

⁹¹ *Id.* ¶ 92.

⁹² *Id.* ¶ 122 (“In the UK, for example, BT's share of the retail ADSL/FTTx market in 2012 (39%) was half the share of the ADSL/FTTx market in Canada held by the ILECs (77%).”).

⁹³ ROBERT S. PINDYCK & DANIEL L. RUBINFELD, MICROECONOMICS 281 (Pearson 8th ed., 2013) (“A simple rule of thumb to describe whether a market is close to being perfectly competitive would be appealing. Unfortunately, we have no such rule.... The presence of many firms is not sufficient for an industry to approximate perfect competition. Conversely, the presence of only a few firms in a market does not rule out competitive behavior.... The important point to remember is that although firms may behave competitively in many situations, there is no simple indicator to tell us when a market is highly competitive.”).

⁹⁴ Market share is very sensitive (*i.e.*, not robust to) market definition, both in geographic and in product space. US Department of Justice and the Federal Trade Commission, “Horizontal Merger Guidelines,” 2010, § 4 (“Defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares. This is because the competitive significance of distant substitutes is unlikely to be commensurate with their shares in a broad market.”). See also Canadian Competition Bureau, “Merger Enforcement Guidelines,” 2011, ¶ 5.11 (“In all cases, examining market shares and concentration is only one part of the Bureau's analysis of competitive effects.”).

implementing states Nordicity cites have not also imposed the drastic measure of functional separation. Thus any observable changes in the regulated markets not explainable by changes in costs, demand, or technology may be due to functional separation rather than EOI.

EOI increases product differentiation

Nordicity's claim that EOI would increase product differentiation is undermined by basic economics. Nordicity asserts that independent ISPs "are typically not able to provide the full suite of services offered by ILECs and cablecos (e.g., 'triple play' or 'quad play' bundles for residential retail customers),"⁹⁵ which allegedly impairs their ability to compete effectively. Once independent ISPs can provide Internet access at the *same* speeds and quality of service as the incumbents by strict adoption of EOI, the argument goes, independent providers will begin to offer differentiated services.⁹⁶ Such an assertion is not consistent with the idea of *differentiation*. In economics, products are *differentiated* or *heterogeneous* when they are poor substitutes. Products that are (nearly) perfect substitutes are called *homogeneous*.⁹⁷ Access-seeking ISPs want access to incumbents' facilities to make them closer substitutes for incumbents.⁹⁸ The bottom line is that EOI regulation is not likely to result in significant service competition, but could result in some competition on price, where regulators would be heavily involved in setting access charges.

EOI spurs investment in service quality

Nordicity argues that EOI would spur investment in service quality.⁹⁹ Whether more innovation occurs in general under a competitive market, as Nordicity contends, is beyond the scope of this paper, but theory and empirical evidence in the telecommunications market suggests certain aspects of an EOI regime would reduce investment. The goal of EOI is to achieve "equality of access,"¹⁰⁰ which is achieved by reducing the (relative) cost to non-integrated access seekers of purchasing wholesale Internet access from incumbents. An economist would expect that as wholesale becomes cheaper for access seekers, self-provision becomes less attractive.¹⁰¹ Indeed,

⁹⁵ *Id.* ¶ 31.

⁹⁶ *Id.* ¶ 131 ("Otherwise, despite all of the other features of the EOI regime, competitors of the incumbent will not be able to offer a full range of retail services that both compete with and are differentiated from those of the incumbent's retail operations."). *Id.* ¶ 31 ("Independent ISPs are typically not able to provide the full suite of services offered by ILECs and cablecos (e.g., 'triple play' or 'quad play' bundles for residential retail customers) leaving less room for product differentiation except through looser contractual agreements, better customer service and more efficient uses of technology.").

⁹⁷ KATZ & ROSEN, *supra*, at 463.

⁹⁸ This is the *stepping-stone hypothesis* and must be true if Nordicity's assertion in ¶ 52 that EOI could spur investment is true. Jerry A Hausman & J Gregory Sidak, *Did Mandatory Unbundling Achieve its Purpose? Empirical Evidence from Five Countries*, 1(1) JOURNAL OF COMPETITION LAW AND ECONOMICS 173-245, 189 (2005).

⁹⁹ *Nordicity* ¶ 52.

¹⁰⁰ *Id.* ¶ 121.

¹⁰¹ Jerry A Hausman & J Gregory Sidak, *Did Mandatory Unbundling Achieve its Purpose? Empirical Evidence from Five Countries*, 1(1) JOURNAL OF COMPETITION LAW AND ECONOMICS 173-245, 190 ("Of course, if the access rate were set too low, the transition to facilities-based competitor would not occur, as CLECs would never find it in their interests to invest in their own facilities.").

in the United States, investment in facilities by competitive local exchange carriers (CLECs, the access seekers there) decreased with the cost of access to unbundled network elements.¹⁰² Thus, the more attractive EOI makes Canada's already unbundled local loop (or other mandated wholesale elements) for potential competitors, the less facilities-based investment Canadian's can expect to see in the telecommunications industry.

Moreover, competition among Canadian cable and telephone companies causes them to compete over quality, which reduces the prospect of further improvements in that dimension via EOI. Indeed, Nordicity admits that because Canadian broadband wholesale prices are regulated and retail prices are "transparent,"¹⁰³ competition is largely over quality of service. Clearly if the level of competition in Canada is already primarily over quality of service, one should question why regulatory intervention for EOI is required.

EOI reduces incumbents' discriminatory practices and anticompetitive behavior

Nordicity claims that EOI would also limit incumbents' ability to engage in discriminatory and anticompetitive conduct.¹⁰⁴ It is not entirely clear what discrimination or anticompetitive behavior Nordicity is referring to. The authors claim "price and non-price discrimination"¹⁰⁵ even though essential facilities are already subject to both mandatory unbundling at tariffed prices and speed matching.¹⁰⁶ If they view violations of the tariffs as too frequent, they have offered no anecdotes, let alone data, of such behavior. The book chapters Nordicity cites to support its claim of discriminatory behavior give no examples of discrimination after the speed-matching decision.¹⁰⁷

The only concrete or specific incumbent behavior Nordicity refers to as "anti-competitive" is the setting of wholesale tariff rates.¹⁰⁸ Tariff rates are set pursuant to the "Phase II" costing

¹⁰² Two separate teams of researchers came to the same conclusion. See Robert W. Crandall, Allan T. Ingraham, & Hal J. Singer, *Do Unbundling Policies Discourage CLEC Facilities-Based Investment?* 3 TOPICS IN ECONOMIC ANALYSIS, (2004); Hausman & Sidak, *supra*, at 200 ("Figure 5 demonstrates that, contrary to the stepping-stone hypothesis, CLECs are, in the aggregate, increasingly relying on the UNE-P as their preferred mode of entry.").

¹⁰³ Nordicity ¶ 57.

¹⁰⁴ Nordicity ¶ 51 ("A robust EOI regime will promote increased competition in the Canadian broadband market as the risks of discriminatory practices and anti-competitive behaviour wane, thereby creating an environment where entrants (e.g. independent ISPs) can better assess the financial returns from market entry, investment and expansion.").

¹⁰⁵ *Id.* ¶ 31 ("These complaints refer not only to price discrimination -- i.e. incumbents setting wholesale prices higher than the prices charged to their own customer base for the same service -- but also to non-price discrimination tactics such as traffic throttling and slower connection speeds.").

¹⁰⁶ CRTC, Telecom Regulatory Policy CRTC 2011-703, ¶¶ 1-7.

¹⁰⁷ Catherine Middleton, "Structural and functional separation in broadband networks: an insufficient remedy to competitive woes in the Canadian broadband market," and Annemijn van Gorp, "Barriers to Competition in Canada's Residential Broadband Internet Market," *The Internet Tree: The State of Telecom Policy in Canada 3.0*, Marita Moll & Leslie Regan Shade (eds.), 2011, available at http://www.policyalternatives.ca/sites/default/files/uploads/publications/National%20Office/2011/06/Internet_Tree_0.pdf.

¹⁰⁸ Nordicity ¶ 34 ("While the CRTC has determined that this wholesale pricing regime is fair and reasonable and designed to promote competition and innovation, there is no assurance that the rates struck do not have an anti-

methodology,¹⁰⁹ and are overseen by the regulator. To the extent anti-competitive issues may arise here, the regulator can address them.

EOI increases certainty regarding the rules and environment

Next, Nordicity claims that EOI increases “certainty regarding the rules and environment under which [entrants] must compete.”¹¹⁰ It is not obvious why adding more rules reduces regulatory uncertainty; if anything, the invasive manipulation of incumbents’ management under EOI¹¹¹ would increase regulatory uncertainty as the incumbents’ behavior begins to reflect the political forces regulators are bound to consider, rather than the impersonal forces of supply and demand.

With respect to a more certain competitive “environment,” even if one assumes that EOI would increase service-based competition, and improve entrants’ offerings as closer substitutes for incumbents, then the market will become more homogenous. But this hypothesis would contradict Nordicity’s claim that EOI would bring greater product differentiation. Although EOI may achieve a more certain technological “environment,”¹¹² this is so only because of reduced innovation, as demonstrated below. I next consider the costs of an EOI regime, which I argue will likely exceed the benefits.

Costs that should be considered

The most glaring cost of an EOI regime predicted by economic theory is a reduced incentive and ability for incumbents to invest and innovate. The required immediate sharing of all new retail services¹¹³ means that an incumbent would lose its first-mover advantage from inventing a technology or developing a service faster than rivals.¹¹⁴ Much of the benefit of an incumbent’s technological innovation would benefit its rivals if it cannot capture an economic profit from

competitive effect. In particular, there is no assurance that ILECs and cablecos incorporate the same wholesale cost into their own retail residential HSA offerings.”).

¹⁰⁹ *Id.* ¶ 33.

¹¹⁰ *Nordicity* ¶ 51 (“It is important to note that EOI does not eliminate risks nor guarantee market performance for entrants, but simply means that they have more certainty regarding the rules and environment under which they must compete.”).

¹¹¹ *Id.* ¶ 44 (“In the absence of functional separation, the enforcement of appropriate incentives may require the review of management contracts and compensation practices -- a practice that may not be typical of telecom industry regulators.”). Further, Nordicity would have the CRTC require the incumbents create specific departments such as a “Product Management Organization,” “Sales Order Management Group,” and a “Workforce Management Group.” *Id.* ¶ 145.

¹¹² *Id.* ¶ 157 (“This [auditing and monitoring] would eliminate much of the uncertainty surrounding the provision of new technologies and their impact on competition in the industry.”) (emphasis removed from original).

¹¹³ *Nordicity* ¶ 157 (“[C]oncurrently with the introduction of any new retail service by an ILEC or cableco, that carrier must file a wholesale access tariff that is based on EOI principles, if such a tariff that supports the new retail service does not already exist.”). *Id.* ¶ 130 (“From this stage forward, the auditing and monitoring aspects of compliance would also be fully implemented by the CRTC, in order to ensure that the market continues to evolve as expected, including the automatic introduction of new services into the EOI regime directly. *This would eliminate much of the uncertainty surrounding the provision of new technologies and their impact on competition in the industry.*”) (emphasis in original).

¹¹⁴ CARLTON & PERLOFF, *supra*, at 80.

innovating.¹¹⁵ Without being able to capture the benefits of its own inventions, incumbents would have reduced incentive to invest in research and development.¹¹⁶ Because rivals could immediately offer any service an incumbent developed either by invention or investing in facilities, incumbents would have no incentive to create new services.¹¹⁷ The result is likely to be a reduction in overall innovation, which will likely hurt consumers and businesses that rely on these services.

Not only would an incumbent not want to invest in research and development, but it would not be able to experiment with new technologies even if it wanted to. Because all in-house technology connecting upstream and downstream parts of the network must be made to work with third parties as soon as an incumbent's retail division makes use of it,¹¹⁸ incumbents could not test inventions, for example by in-house use¹¹⁹ or "public beta"¹²⁰ versions.

While the greatest costs of an EOI regime would likely be in terms of dynamic inefficiency, Nordicity readily admits some of the more obvious costs associated with static inefficiency, such as enforcement and compliance costs. Because of EOI's invasive oversight measures, incumbents would face increased compliance costs. Indeed, Nordicity admits that compliance-related activities' "impact on average costs would not be zero...."¹²¹ In addition to compliance costs, implementing the facility modifications necessary to put access seekers on the same technology as the incumbents' retail arms requires capital equipment and labor. For example, when New Zealand started moving toward an EOI regime, it ran into several, unpleasant cost surprises. According to Nordicity, "There were, however, cost and implementation difficulties in specific areas. Costs of migrating legacy services to the EOI system, for instance, were underestimated; the migration to VoIP infrastructure also proved more challenging than first anticipated. These and other circumstances led to variations to the original undertakings...."¹²² EOI regulation ignores the fact that firms are in a better position than outsiders to minimize the

¹¹⁵ Technological inventions are "fundamentally new information," and information is non-rivalrous. If the inventor cannot keep it a secret, it becomes non-excludable, and is thus a public good. *Id.* at 530.

¹¹⁶ LIPSEY & STEINER, *supra*, at 213-14 ("If innovators are allowed to reap large gains from successful innovations, they will be more likely to take the risks of innovation.").

¹¹⁷ CARLTON & PERLOFF, *supra*, at 532 ("Imitation Discourages Research.").

¹¹⁸ Nordicity ¶ 37.

¹¹⁹ Testing a new technology by requiring employees to use it for daily work, called *eating your own dog food*, or *dogfooding*, is used extensively at, e.g., Google. See, e.g., Anthony Vallone, "The Google Test and Development Environment – Pt. 2: Dogfooding and Office Software," *Google testing blog*, January 3, 2014, available at <http://googletesting.blogspot.com/2014/01/the-google-test-and-development.html>, viewed May 28, 2014.

¹²⁰ Software companies make frequent use of their customers as product testers. See, e.g., Andrew Cunningham, "Apple opens OS X beta program to the public for 10.9.3," *Arstechnica*, April 22, 2014, available at <http://arstechnica.com/apple/2014/04/apple-opens-os-x-beta-program-to-the-public-for-10-9-3/>, viewed May 28, 2014.

¹²¹ Nordicity ¶ 49.

¹²² *Id.* ¶ 80 ("There were, however, cost and implementation difficulties in specific areas. Costs of migrating legacy services to the EOI system, for instance, were underestimated; the migration to VoIP infrastructure also proved more challenging than first anticipated. These and other circumstances led to variations to the original undertakings....").

costs of providing their services.¹²³ Nordicity's "building blocks" and internal management manipulation prevent incumbents from internalizing and minimizing operating costs. Indeed, Nordicity recognizes that external meddling in the businesses of cable and telephone companies could cause "disruption."¹²⁴ The authors would have the CRTC decide which wholesale operations should be tied with which retail operations rather than letting the managers of the incumbents, who know the business best and who are incentivized to minimize costs to the provider, make those decisions.¹²⁵ CRTC may find that it needs to employ additional resources and expertise to administer the process, because EOI would require a detailed knowledge of how the regulated firms actually operate.

Nordicity apparently does not want incumbents minimizing costs by taking advantage of possible technological efficiencies in providing internal retail divisions access to upstream networks through one technology while tailoring other systems for exposure to third parties—even if wholesale customers see the same quality of service as the retail division. Nordicity places great importance on meddling in the exact implementation of wholesale service regardless of whether wholesale customers would notice a difference. The whole point of firms providing goods and services rather than everyone in society working for himself is to take advantage of within-firm efficiencies to reduce the costs of transactions between suppliers.¹²⁶ Nordicity's technology requirement would negate these efficiencies.

The Nordicity report does not appear to provide any quantitative estimates of firm costs, or additional costs incurred by the regulator, as a result of introducing EOI. BT reports costs associated with implementing EOI regulation of roughly £50 million in 2008, which is not insignificant.¹²⁷ Given the costs for 2006 and 2007 of £30 million and £70 million, respectively, the overall costs for the 2006-2008 period were about £150 million.

¹²³ "It follows from this that central planning based on statistical information by its nature cannot take direct account of these circumstances of time and place and that the central planner will have to find some way or other in which the decisions depending on them can be left to the 'man on the spot.'" Friedrich A. Hayek, *The Use of Knowledge in Society*, 35 (4) AMERICAN ECONOMIC REVIEW 519-530 (1945).

¹²⁴ *Nordicity* ¶ 155 ("As a first step, the CRTC would need to develop a thorough understanding of the business units, systems and processes -- current and planned -- of ILECs and cablecos. Additionally, the CRTC would have to develop a better understanding of the differences between these processes and those used by the retail divisions of each of the operating companies. Ultimately, these due-diligence steps would be essential to ensure there would be no disruption to the core operations of the ILECs and cablecos, and their services to their wholesale and retail customers.").

¹²⁵ *Id.* ¶ 156 ("The CRTC, in collaboration with the industry, should identify those processes and procedures that could readily be combined under the corresponding EOI model.").

¹²⁶ KATZ & ROSEN, *supra*, at 198 ("Why do firms exist in this form? ... The theory of transaction costs predicts that economic exchange will tend to be organized in ways that minimize the costs of those exchanges (Coase 1937). Economists have identified several advantages that firms have over market-based transactions.").

¹²⁷ See BT, Annual Report & Form 20-F 2008, Keeping BT ahead of the game. BT does not provide a precise cost breakdown, but notes that "A charge of £53 million (2007: £30 million, 2006: £70 million) was recognized in relation to further estimated costs required to create Openreach and deliver the Undertakings agreed with Ofcom, particularly with regard to equivalence of input systems, which are due to complete in 2010." p. 47.

Another potential cost of EOI regulation relates the possible squeezing out of other, more productive investments by a regulated firm. This might occur for at least two reasons: first, there are limits on the time senior management can spend on developing new projects. Second, in practice, there are likely to be limits on the capital budgets available for different projects within a firm, such as improvements in the IT system. EOI regulation, because it could be significant, could have a chilling effect on such investment.

V. Costs and Benefits of Other Regulatory Regimes

Even if an EOI policy regime passed all the tests applied to it so far—existence of a market failure, relevance, and positive net benefit—it would likely not to be a better from an economic standpoint than all other alternatives.¹²⁸ Here, I focus on comparing an EOO regime with an EOI regime. An EOO regime differs in at least one important way from an EOI regime. EOO regulation “means that wholesale customers will receive the same product and services outcomes, regardless of how these outcomes are provided.”¹²⁹ I argue that an EOO regime is likely to be superior on economic efficiency grounds.

Equivalence-of-Output regulation

EOO is an attractive alternative relative to EOI on economic grounds. First, it would allow for greater static efficiency because incumbents could deploy the least costly technology for their different wholesale and retail customers.¹³⁰ Second, incumbents would be able to experiment with new technologies to improve cost efficiencies for their retail customers before deploying to wholesale customers. Third, implementation and compliance would be less costly because incumbents would not have to build new IT systems capable of handling both wholesale and retail customers simultaneously, and compliance would be easier to monitor because only external outcomes matter, not internal technology choices.

The point is that economists, politicians, and regulators know much less about building telecommunications networks than engineers whose job it is to minimize costs and maximize quality on behalf of that firm. EOO takes advantage of local knowledge while EOI dispenses with it.

To be fair, EOO still imposes costs relative to no regulation for some of the same reasons as an EOI policy would. Like EOI, EOO’s requirement that incumbents provide wholesale access to

¹²⁸ Nordicity compares EOI to two alternative policies: divestiture (structural separation), and maintaining the status quo. Ireland uses equivalence-of-outputs regulation (EOO) in part,¹²⁸ and New Zealand has used “generic competition law (i.e., no industry-specific regulation) and courts.” *Id.* ¶ 74.

¹²⁹ Nordicity, “Information Requested by Bell Canada,” Response to Interrogatory, CNOC(BELL CANADA)28Mar14-28 TNC 2013-551, May 2, 2014, answer (a).

¹³⁰ Nordicity, “Information Requested by Bell Canada,” Response to Interrogatory, CNOC(BELL CANADA)28Mar14-28 TNC 2013-551, May 2, 2014, answer (a) (“As an example, under EOO, the IT system used to provide a service to wholesalers might be different than the IT system used by the retail arm of the incumbent, but both communications providers will be able to provide the same (or similar) levels of services.”).

new retail services dilutes incumbents' incentives to develop new services or invest as heavily in new facilities. Similarly, EOO dilutes access seekers' incentive to invest in their own, new facilities because of the cheaper access to existing facilities. But because EOO avoids many of the costs imposed by EOI, EOO is preferable from a cost-benefit perspective. Enforcement before the CRTC of violations of EOO terms would suffice to maintain equivalent speeds and service levels between wholesale and retail customers. There is no economic reason why a purchaser should care *how* (within legal and ethical constraints) a supplier provides a good or service.¹³¹

VI. Summary and Conclusion

Economic efficiency is a useful measure by which to compare different regulatory approaches. For a regulatory policy to be economically efficient, there must be an identifiable market failure, the policy must address that failure, the benefits of the policy must outweigh its costs (both in terms of short-run price and quantity effects and long-run effects on investment and innovation), and the policy must be more efficient than any relevant alternative.

There are economic reasons to prefer more light-handed forms of regulation than EOI that are more likely to promote dynamic efficiency. Specifically, EOI's emphasis on mandatory sharing using the same underlying technology would likely inhibit incumbents' investment in telecommunication facilities and their ability to experiment, take risks, and ultimately to innovate. Moreover, because an EOI policy favors service-based competition over facilities-based competition, it would also reduce entrants' incentive to invest in facilities. The adverse effect that EOI would likely have on investment could have significant negative consequences for consumers of telecommunications services and for economic efficiency.

Regulators should be wary of moving to EOI regulation, unless there is a clear finding that such regulation can address a market failure more effectively than other forms of regulation. A review of EOO regulation suggests that it could handle potential problems with market power in a more economically efficient manner.

¹³¹ Hayek, *supra*, ¶ 22 (“The most significant fact about this system is the economy of knowledge with which it operates, or how little the individual participants need to know in order to be able to take the right action. In abbreviated form, by a kind of symbol, only the most essential information is passed on and passed on only to those concerned. It is more than a metaphor to describe the price system as a kind of machinery for registering change, or a system of telecommunications which enables individual producers to watch merely the movement of a few pointers, as an engineer might watch the hands of a few dials, in order to adjust their activities to changes of which they may never know more than is reflected in the price movement.”).