

In the matter of Telecom Notice of Consultation CRTC 2017-259
Call for comments – Reconsideration of Telecom Decision 2017-56 regarding
final terms and conditions for wholesale mobile wireless roaming service

Prepared for
Shaw Communications Inc.

Prepared by
Eric Emch, PhD

An assessment of wholesale roaming policy in Canada

**Response to supplemental intervention of Ice
Wireless in Telecom Notice of Consultation
CRTC 2017-259**

November 3, 2017

Table of contents

I. Scope of charge	1
II. Introduction	2
III. My analysis is largely un rebutted by Ice and Dr. von Wartburg	3
IV. Ice and Dr. von Wartburg misrepresent the economic literature on investment effects of reseller roaming mandates	5
IV.A. The paper by Kim et al. (2011) is the most relevant research on how mandatory reseller access regulation affects investment	5
IV.B. Dr. von Wartburg misrepresents and misapplies the article by Hounghonon and Jeanjean (2016)	7
IV.C. The literature describing the benefits of competition over regulation is robust and relevant	8
V. Ice and Dr. von Wartburg effectively ignore investment incentive effects on smaller carriers	11
V.A. Ice and Dr. von Wartburg focus on investment impact on the large national carriers	11
V.B. Investment incentive effects are likely more significant on smaller carriers than on large national carriers	12
VI. Dr. von Wartburg's comparison of the proposed reseller regulation in Canada to that in other countries is misleading	14
VII. Conclusion	16

I. Scope of charge

- (1) I have been asked by Shaw Communications Inc. (“Shaw”) to respond to the October 27, 2017, supplemental intervention of Ice Wireless Inc. (“Ice”) in the matter of Reconsideration of Telecom Decision 2017-56 Regarding Final Terms and Conditions for Wholesale Mobile Wireless Roaming Service, Telecom Notice of Consultation CRTC 2017-259.¹
- (2) This white paper considers the evidence presented by Ice and its expert economist, Dr. Markus von Wartburg, in that intervention, especially as it relates to the arguments I made in my initial and supplemental white papers.² It is informed by economic theory, the available empirical evidence, and my training and experience as an economist focused on competition issues. My *curriculum vitae* was included as Appendix B in my initial white paper.

¹ Supplemental Intervention of Ice Wireless Inc., *In re: Reconsideration of Telecom Decision 2017-56 Regarding Final Terms and Conditions for Wholesale Mobile Wireless Roaming Service*, Telecom Notice of Consultation CRTC 2017-259 (“TNC 2017-259”), Oct. 27, 2017 [hereinafter “Ice supplemental intervention”].

² Eric Emch, “An Assessment of Wholesale Roaming Policy in Canada: The Interaction of Competition, Regulation, Access, and Investment,” report prepared for Shaw Communications Inc. in the proceeding initiated by TNC 2017-259, Sept. 8, 2017 [hereinafter “Initial white paper”]; Eric Emch, “An Assessment of Wholesale Roaming Policy in Canada: Response to initial interventions in Telecom Notice of Consultation CRTC 2017-259,” report prepared for Shaw Communications Inc. in the proceeding initiated by TNC 2017-259, Oct. 27, 2017 [hereinafter “Supplemental white paper”].

II. Introduction

- (3) This paper addresses points raised in the October 27, 2017, supplemental intervention of Ice in this proceeding, and in particular the economic expert report by Dr. Markus von Wartburg, submitted as Appendix A to that intervention.³
- (4) Given the limited time available to compose a rebuttal, in this paper I focus on the arguments Ice and Dr. von Wartburg make regarding the effects of mandated reseller roaming on investment incentives of facilities-based carriers in Canada. This limitation in scope should not be taken as an endorsement of any other points that Ice and Dr. von Wartburg make.
- (5) Ice and Dr. von Wartburg argue that the investment effects of mandated resale roaming are insignificant, or even positive, and that therefore there are no costs at all to instituting a mandated reseller roaming regime in Canada.⁴ This Panglossian view derives from a misreading of the economics literature and an almost exclusive focus on the investment incentives of the three national carriers, and not on those of the smaller carriers in Canada that are likely to be most impacted by mandated reseller roaming access.
- (6) My initial and supplemental white papers lay out the reasons why a focus on improving facilities-based competition is the correct regulatory approach for improving consumer outcomes in the Canadian wireless sector, and discuss why a reseller roaming mandate risks undercutting that competition and undoing the progress that is being made.⁵ Nothing I have seen in the supplemental intervention of Ice or the report of Dr. von Wartburg leads me to revise that opinion.

³ Markus von Wartburg, “Economic Review of Mandated Wholesale Access for Wi-Fi First Service Providers, Investment and Competition in the Mobile Wireless Telecommunications Industry in Canada,” report prepared for Ice in the proceeding initiated TNC 2017-259, Oct. 27, 2017 [hereinafter “von Wartburg report”].

⁴ See Ice supplemental intervention, ¶¶ ES-10, 12. See also von Wartburg report, ¶¶ 13, 73, 82.

⁵ Initial white paper, §§ IV–VII; supplemental white paper, §§ III–VI.

III. My analysis is largely unrebutted by Ice and Dr. von Wartburg

- (7) Most of the arguments I laid out in my initial and rebuttal papers are either endorsed or not specifically addressed by the supplemental intervention of Ice and the report of Dr. von Wartburg.⁶ These include:
1. *That wireless competition in Canada is lacking, except in provinces that have a strong facilities-based alternative to the three national carriers.* As I discussed in my earlier white papers and as reiterated multiple times in Dr. von Wartburg’s report, wireless prices in Canada are substantially lower in provinces with a strong facilities-based competitor to the three national carriers. This demonstrates the benefits of improved facilities-based competition in Canada, which is expanding as companies like Shaw acquire spectrum and build out their wireless networks.
 2. *That, in addition to lower prices, increased facilities-based competition leads to more reseller access and participation, both as a matter of theory and empirics.* Dr. von Wartburg does not rebut the economic model that I presented in my initial white paper, which shows why increased facilities-based competition tends to lead naturally to greater reseller access and participation in the market. Indeed, Dr. von Wartburg endorses the idea that improved facilities-based competition leads to improved access by resellers.⁷ This dovetails with the international experience that I discussed in my initial and supplemental white papers—for instance, that robust reseller presence in the United States and the United Kingdom is not due to any reseller access mandate but rather is a result of voluntary relationships spurred by facilities-based competition.⁸
 3. *That reliance on market-based mechanisms is superior to direct regulation as a solution for competition problems.* Ice cites the policy objectives of the Telecommunications Act—including “a reliance upon market forces to the greatest extent possible,” in opposing limitations to roaming mandates applied to Wi-Fi first carriers and claims that Ice’s objective is to bring “real competition” to the Canadian wireless industry.⁹ I agree with that objective but disagree that reseller roaming mandates are a way to achieve that end. Promoting reseller roaming access in a way that harms facilities-based competition can lead to greater regulation as an ongoing substitute for “real competition.”
- (8) The fundamental difference I have with the arguments of Ice and Dr. von Wartburg is their insistence that there are no negative investment effects of mandated reseller roaming and that there may in fact

⁶ Dr. von Wartburg noted that Ice asked him to “review, and rebut as needed, economic evidence submitted on behalf of the three National Wireless Carriers and Shaw Communications Inc.” (von Wartburg report, ¶ 7).

⁷ von Wartburg report, ¶ 67.

⁸ Initial white paper, § VII; supplemental white paper, § V.

⁹ *Telecommunications Act* (S.C. 1993, c. 38), § 7(f); Ice supplemental intervention, ¶ 2.

be positive investment effects.¹⁰ Their analysis on this point is incorrect due to their misrepresentation of the economic literature and because they fail to account for the impact on investment incentives of the new entrants.

- (9) As I discuss in Section IV below, the economic literature on investment effects of wireless reseller roaming mandates supports a concern about reduced investment incentives caused by mandated reseller roaming. Dr. von Wartburg's conclusion to the contrary is based on a flawed interpretation of that literature and a misleading characterization of its conclusions. In addition, as I discuss in Section V, Ice and Dr. von Wartburg focus almost exclusively on the investment incentives of the three national carriers rather than the investment incentives of the smaller facilities-based carriers, which are most likely to be strongly impacted by a reseller roaming mandate.

¹⁰ See Ice supplemental intervention, ¶¶ ES-10, 12. See also von Wartburg report, ¶¶ 13, 73, 82.

IV. Ice and Dr. von Wartburg misrepresent the economic literature on investment effects of reseller roaming mandates

- (10) Ice and Dr. von Wartburg claim that the relevant economic literature supports the notion that mandated reseller roaming access will not harm wireless investment in Canada. In claiming this, they criticize the work of Kim et al. (2011), which supports the opposite conclusion, and offer in its place a paper by Hounghonon and Jeanjean (2016).¹¹ As I discuss in Sections IV.A and IV.B, the paper by Kim et al. (2011) is much more relevant for addressing the questions of interest in this proceeding, while the Hounghonon and Jeanjean (2016) paper is off point and misinterpreted by Dr. von Wartburg.
- (11) In addition, Ice criticizes my reliance on the literature on the general relationship between regulation and competition as “outdated” and theoretical and therefore not relevant to the current proceeding.¹² As I discuss in Section IV.C., this literature is both robust and relevant.

IV.A. The paper by Kim et al. (2011) is the most relevant research on how mandatory reseller access regulation affects investment

- (12) The paper by Kim et al. (2011) is the most relevant research that I have identified on the relationship between mandated reseller access regulation and investment intensity of facilities-based network operators. That paper focuses on the effects of mobile virtual network operator (“MVNO”) access regulation on investment intensity of facilities-based carriers; it finds that the “mandated provision of access [to MVNOs] is related to lower investment intensity of MNOs [mobile network operators].”¹³ In contrast, the Hounghonon and Jeanjean article, cited by Dr. von Wartburg as a superior approach, does *not* estimate the impact of mandatory reseller access regulation on investment, as I discuss Section IV.B.
- (13) Dr. von Wartburg criticizes the Kim et al. paper on three main grounds: first, that its results are not statistically significant at the 5% level;¹⁴ second, that it assumes a linear relationship between

¹¹ Jihwan Kim, Yunhee Kim, Noel Gaston, Romain Lestage, Yeonbae Kim, and David Flacher, “Access Regulation and Infrastructure Investment in the Mobile Telecommunications Industry,” *Telecommunications Policy* 35 (2011): 907–19 [hereinafter “Kim et al. (2011)”]; Georges Vivien Hounghonon and François Jeanjean, “What Level of Competition Intensity Maximises Investment in the Wireless Industry?” *Telecommunications Policy* 40 (2016): 774–90 [hereinafter “Hounghonon and Jeanjean (2016)”].

¹² Ice supplemental intervention, ¶ 15.

¹³ Kim et al. (2011), 907. Throughout my white papers, I have used the term “resellers” to encompass MVNOs, and have used the term “facilities-based carriers” to encompass MNOs.

¹⁴ von Wartburg report, ¶ 77. The level of statistical significance indicates the probability of finding the result (or something more extreme) if the null hypothesis (the hypothesis that there is no effect) is true. Roughly speaking, a 5% significance level can be interpreted as saying that, given the range of variation observed, a result showing a negative impact of mandated MVNO access on investment would be observed simply by chance 5% of the time.

“competition” and investment; and third, that it does not account for the potential endogeneity of mandatory reseller access regulation.¹⁵

- (14) On the first point, statistical significance generally depends on the sample size and the level of variability of the underlying data and is not equivalent to economic significance. Kim et al. (2011) show that mandated MVNO access is associated with a lower investment intensity—at least 17% lower, depending on the specification, which is economically meaningful—and the results are statistically significant at the 10% level. Dr. von Wartburg calls the results “relatively weak” because they do not reach the level of 5% statistical significance.¹⁶ The American Statistical Association recommends against using a particular threshold for statistical significance as the sole basis for making policy decisions, noting that “practices that reduce data analysis or scientific inference to mechanical ‘bright-line’ rules (such as ‘ $p < 0.05$ ’) for justifying scientific claims or conclusions can lead to erroneous beliefs and poor decision making.”¹⁷
- (15) On the second point, Dr. von Wartburg conflates many different definitions of wireless competition in his report. He sometimes defines “competition” by whether mandated reseller access regulation is present, sometimes by the level of concentration in a market as measured by the Herfindahl-Hirschman index (“HHI”), sometimes by the profitability of individual firms, or sometimes by some other measure.¹⁸ It is important to clarify what the Kim et al. (2011) paper does and how it relates to Dr. von Wartburg’s critique. The Kim et al. (2011) paper identifies the presence of mandatory reseller access regulation in the market with a discrete 0-1 (“dummy”) variable, not as a particular level of “competition.” If it is the case, as is likely, that when mandatory reseller access regulation is imposed, facilities-based markets are less competitive, then one can interpret their result as “MVNO access regulation has a negative impact on investment when markets lack robust MNO competition.” That result is useful in predicting the result of mandatory reseller roaming regulation in Canada, which lacks robust MNO competition.
- (16) This point is related to Dr. von Wartburg’s third critique, that the presence of “mandated MVNO access regulation” may itself be affected by other factors, such as the underlying level of competition or factors that would lead to voluntary MVNO access agreements.¹⁹ Kim et al. (2011) includes

¹⁵ *Id.*, ¶¶ 78–79.

¹⁶ *Id.*, ¶ 77.

¹⁷ Ronald L. Wasserstein and Nicole A. Lazar, “The ASA’s Statement on p-Values: Context, Process, and Purpose,” *American Statistician* 70, no. 2 (2016): 131.

¹⁸ *See*, for example, von Wartburg report, ¶ 78: “By doing so, they assume that the effect of competition—specifically mandated MVNO access—on investment is the same regardless of the level of competition in the market.”

¹⁹ *Id.*, ¶ 79. “[S]ince mandated MVNO access is typically not random but rather the outcome of regulatory process that evaluate the level of competition in the market and the existence of voluntary MVNO access agreements for MVNO, the [Kim et al. (2011)] study is unable to isolate the causal effect of the regulatory policy on investment.”

controls for these possibly confounding factors raised by Dr. von Wartburg.²⁰ With these controls, Kim et al. (2011) mitigates the endogeneity issue raised by Dr. von Wartburg.

IV.B. Dr. von Wartburg misrepresents and misapplies the article by Houngebonon and Jeanjean (2016)

- (17) Dr. von Wartburg’s report and Ice’s supplemental intervention claim that other interventions failed to consider the “most recent available evidence on investment in the mobile wireless industry,” namely, a 2016 article by Houngebonon and Jeanjean.²¹ This article examines how the intensity of competition faced by facilities-based operators affects investment. The article defines “competition” by a measure of profitability of a facilities-based operator (rather than, for example, profitability of a market or industry, as in prior research they cite).²² The regression analysis includes a variable that indicates whether a particular operator hosts a reseller, regardless of whether that hosting voluntarily or because it is mandatory. The authors find that “there is an inverted-U relationship between competition and investment in wireless networks” and that there is a positive relationship between hosting an MVNO and investment.²³
- (18) At no point does the article explicitly consider the impact of mandatory reseller roaming regulation, as the article by Kim et al. (2011) does. The article also does not explicitly consider the intensity of reseller competition as a factor that may affect investment. In addition, the authors’ finding that “wireless operators which host an MVNO invest more than their rivals” does not distinguish between the impact of voluntary or mandatory hosting on investment.²⁴ For example, it could be that hosting a reseller leads to more investment only when that hosting is voluntary—such a relationship is entirely consistent with the results in the Houngebonon and Jeanjean article. Using Houngebonon and Jeanjean’s result, as Dr. von Wartburg does, to draw lessons on the impact of mandated rates for Wi-Fi first service providers (or resellers in general) is an incorrect application of those results and goes well beyond the scope of the research.²⁵
- (19) Even accepting Dr. von Wartburg’s interpretation at face value, his application of the article’s results ignores the investment incentives of smaller facilities-based carriers in Canada. Smaller carriers may

²⁰ The level of competition is controlled by the HHI of MNOs (“HHI”), and the existence of voluntary MVNO access agreements is partly controlled by a dummy variable that equals 1 if there are voluntary provisions or government threats of regulatory intervention and an MNVO exists in the market (“MVNO*REG_V”). (See Kim et al. (2011), 913).

²¹ von Wartburg report, ¶ 80. See also Ice supplemental intervention, ¶¶ ES-22, 12, 85, 86, 91.

²² Philippe Aghion, Nick Bloom, Richard Blundell, Rachel Griffith, and Peter Howitt, “Competition and Innovation: An Inverted-U Relationship,” *Quarterly Journal of Economics* 120, no. 2 (2005): 701–28.

²³ Houngebonon and Jeanjean (2016), 783–784.

²⁴ *Id.*, 784.

²⁵ von Wartburg report, ¶ 83. (“This research finding also suggests a lack of policy rationale for subjecting Wi-Fi First service providers (or MVNOs in general) to higher wholesale rates . . .”).

react differently to mandated reseller access than large national carriers, for reasons I discussed in my initial and supplemental white papers.²⁶ In his Figure 7, Dr. von Wartburg lays out the investment intensity of only the large national carriers on his inverted-U-shaped graph. In this figure, Dr. von Wartburg illustrates regions where more competition increases (decreases) investment—when the earnings before interest, taxes, depreciation, and amortization (“EBITDA”) ratio is above (below) 37%–40%.

- (20) Shaw publicly reports a figure for its wireless segment that is very similar to the EBITDA ratio that Houngebonon and Jeanjean (2016) use to measure competition intensity. For the year ending Aug. 31, 2017, the figure was 22.0%.²⁷ According to Dr. von Wartburg’s Figure 7, therefore, Shaw is far into the region where reduced margins arising from reseller roaming mandates would *harm* investment—much less than the 37%–40% cutoff. Dr. von Wartburg’s interpretation of Houngebonon and Jeanjean (2016) therefore would argue that mandated wholesale roaming access diminishes the investment incentives of Shaw. I further discuss Dr. von Wartburg’s failure to assess investment effects on smaller carriers in Section V.

IV.C. The literature describing the benefits of competition over regulation is robust and relevant

- (21) In paragraphs 44–49 of my initial white paper, I discuss the economics literature related to regulation to support two well-established propositions that are relevant to the current proceeding:
1. Competition is generally superior to regulation in achieving efficient outcomes.
 2. Price-cap regulation applied over-broadly can harm the incentive for long-term infrastructure investment.
- (22) These propositions have been within the economics mainstream for some time. Indeed, these ideas form the basis for the statement in the Telecommunications Act that an objective of telecommunications policy should be “to foster increased reliance on market forces for the provision

²⁶ Initial white paper, §§ IV, V.B, VI.B; supplemental white paper, §§ IV.A, IV.B.2, V.

²⁷ Shaw Communications, “Shaw Announces Fourth Quarter and Full Year Fiscal 2017 Results,” news release, Oct. 26, 2017, available at http://assets.aws.newsroom.shaw.ca/uploadedfiles/newsroom/content/news_articles/2017/4th%20qtr%202017%20pr%20final1.pdf, 14 [hereinafter “Shaw Annual Report”]. While Shaw does not report EBITDA, it reports operating margin, which is the operating income before restructuring costs and amortization, divided by revenue. Operating income before restructuring costs and amortization is defined by Shaw as “revenue less operating, general and administrative expenses. It is intended to indicate the Company’s ongoing ability to service and/or incur debt, and is therefore calculated before one-time items such as restructuring costs, amortization (a non-cash expense) and interest” (Shaw Annual Report, 14). Operating income before restructuring costs and amortization also does not include “cash taxes” (Shaw Annual Report, 16). Thus, operating margin is the closest available measure to EBITDA that Shaw reports. This measure was 21.0% for the year ending Aug. 31, 2016.

of telecommunications services and to ensure that regulation, when required, is efficient and effective.”²⁸

- (23) The purpose of citing this literature was to provide a general framework for the debate in the current proceeding. I doubt that Dr. von Wartburg would disagree with these general propositions, and in his report, he does not address the research I cite here and makes no comment on its validity.
- (24) Ice’s supplemental intervention, in contrast, characterizes this evidence as “outdated research, including studies from the 1970s and 1980s that deal with the wireline technologies” or “economic theory” but not the “reality of mobile wireless markets in the twenty-first century.”²⁹
- (25) The Ice response to these points is puzzling. Elsewhere in its supplemental intervention, Ice favourably cites the Telecommunications Act’s admonition for increased reliance on market forces for provision of telecommunications services, which has its basis in this literature.³⁰ In addition, Ice’s response presumes a dichotomy between economic theory and industry “reality” that does not exist. These ideas are borne out of decades of theoretical and applied research in economics, including study of the telecommunications industry, and are applicable to the broad category of industries subject to regulation, including the mobile wireless industry.
- (26) The age of this literature is not a deficiency, but rather indicates the robustness of its ideas. The particular sources I cite include the most prestigious and widely cited reference volumes in industrial organization,³¹ three of the most highly respected and frequently cited economics journals,³² and a book that summarizes the papers given at a National Bureau of Economic Research meeting by experts in the field of economic regulation and its reform.³³
- (27) Economists’ preference for policies that promote competition over regulation are consistent with the current wireless wholesale access policy in Canada, which attempts to remedy insufficient competition in wireless markets there by mandating wholesale access by national incumbent carriers to other facilities-based carriers, to promote facilities-based competition.³⁴ As I’ve explained in my

²⁸ *Telecommunications Act* (S.C. 1993, c. 38) § 7(f).

²⁹ Ice supplemental intervention, ¶¶ 15, 87.

³⁰ *See, e.g., id.*, ¶¶ 110, 112, 116.

³¹ References include the *Handbook of Industrial Organization, Volume III* (Initial white paper, note 57).

³² Journals that are highly respected and highly cited include the *American Economic Review*, *Econometrica*, and the *Journal of Political Economy* among others (Initial white paper, notes 59–60).

³³ Nancy L. Rose, ed., *Economic Regulation and Its Reform: What Have We Learned?* (Cambridge, MA, and Chicago: NBER and University of Chicago Press Book, 2014, Initial white paper, notes 58, 62). The foreword to this book states, “This volume introduces the key issues surrounding economic regulation, provides an assessment of the economic effects of regulatory reforms over the past three decades, and examines how these insights bear on some of today’s most significant concerns in regulatory policy.”

³⁴ Defined in Telecom Regulatory Policy CRTC 2015-177 and clarified in Telecom Decision CRTC 2017-56.

initial and supplemental white papers, a mandated reseller roaming policy risks undercutting this competition in favour of a potentially ill-defined and lengthy regulatory mandate.³⁵

³⁵ Initial white paper § IV; supplemental white paper, § IV.

V. Ice and Dr. von Wartburg effectively ignore investment incentive effects on smaller carriers

- (28) In my initial and supplemental white papers in this proceeding, I argue that planned investment (including facilities buildout and spectrum purchases) by new entrants provides evidence of the success of the Canadian Radio-television and Telecommunications Commission's ("CRTC") current wholesale roaming policy.³⁶ By expanding and building out, new entrants are increasing their scope for further facilities-based competition with the large national carriers. I also argue that the investment incentive effects of a reseller roaming mandate are likely to fall more heavily on smaller carriers than on the national carriers, in part because investments by new entrants are larger relative to the size of their existing network, making these investments more risky.³⁷
- (29) Ice and Dr. von Wartburg incorrectly focus their analysis of the investment incentive effects on the large national carriers.³⁸ By doing so, they ignore a key avenue through which a reseller roaming mandate can harm investment incentives and thereby harm competition.

V.A. Ice and Dr. von Wartburg focus on investment impact on the large national carriers

- (30) The Ice submission limits its consideration of the investment effects of the proposed rule change to the investment of the large national carriers:

Mandated wholesale access for Wi-Fi first service providers is unlikely to reduce investment in mobile wireless network infrastructure **by the national carriers**. In fact, given the unique economic characteristics of Canada's mobile wireless market, increasing the level of competition through the introduction of Wi-Fi first service providers may actually lead to greater levels of investment **by the national wireless carriers**.³⁹ (Emphasis added)

- (31) Dr. von Wartburg's analysis of the investment effects of the proposed change employs financial data from only the three national carriers. He superimposes the EBITDA ratios of the three national carriers onto an exhibit from the Houngebonon and Jeanjean (2016) paper to support the conclusion that the national carriers fall "in the range where . . . additional competition is estimated to increase

³⁶ Initial white paper, ¶ 34.

³⁷ *Id.*, ¶ 35.

³⁸ Dr. von Wartburg defines national wireless carriers as Bell, Rogers, and TELUS collectively (von Wartburg report, note 1).

³⁹ Ice supplemental intervention, ¶ ES-10.

investment.”⁴⁰ From the EBITDA ratios of the three national incumbents, Dr. von Wartburg draws inferences about the impact on wireless infrastructure investment, across the board, in Canada.

Instead, the evidence on the Canadian market indicates that no trade-off exists between increased competition and network investment. Given the low intensity of competition in the Canadian mobile wireless telecommunications market, any increase in competition is unlikely to depress investment in wireless network infrastructure—instead, investment may even increase with additional competition from Wi-Fi First service providers.⁴¹

- (32) As I note in section IV.B above, if this analysis were undertaken using Shaw’s wireless profitability, Dr. von Wartburg’s conclusion would be reversed. Shaw’s wireless EBITDA ratio places it well within the region where resale roaming mandates would harm investment, according to Dr. von Wartburg’s interpretation of the Hounghonon and Jeanjean (2016) article.

V.B. Investment incentive effects are likely more significant on smaller carriers than on large national carriers

- (33) The focus of Ice and Dr. von Wartburg on investment by the national carriers is misguided. As I discussed in my initial and supplemental white papers, the effects on smaller carriers’ investments and build-out are likely to be more significant than those on the national carriers, and it is the effects on smaller carriers that most risk disrupting increased emerging facilities-based competition in the Canadian wireless industry.⁴²
- (34) In my initial and supplemental white papers, I examined recent and planned investment of new entrants and reported the new entrants’ assessment of the risk of such investments under the proposed rule change.⁴³ I noted that:
- In addition to recently acquiring Freedom Mobile (formerly Wind) for nearly \$1.6 billion, Shaw then invested approximately \$1 billion in upgrading 3G networks to LTE services, improving network performance, and acquiring additional spectrum from Videotron; Shaw has also evaluated numerous markets across Canada as potential targets for additional investment.⁴⁴

⁴⁰ von Wartburg report, ¶ 82. Emphasis in original.

⁴¹ *Id.*, ¶ 84.

⁴² Initial white paper, ¶ 5, §§ IV, V.B; supplemental white paper, § IV.A.

⁴³ Initial white paper, § V.

⁴⁴ *Id.*, § V.A.

- Shaw’s internal investment modelling showed that the effect of increased reseller entry would reduce the likelihood that particular build-out plans will be commercially viable.⁴⁵
- Eastlink’s initial intervention noted, “Expanding the definition of ‘home network’ to include Wi-Fi access would catastrophically undermine the economics for building wireless networks in rural areas.” And “the Commission was correct when it determined that mandating resale of any kind would ‘significantly undermine network investments as a whole.’”⁴⁶
- Videotron similarly argues that its ability to invest and innovate would be seriously undercut by the arrival of new reseller entrants via mandated reseller roaming.⁴⁷

(35) This evidence indicates that it is a mistake to ignore the investment incentives of smaller carriers when considering the impact of a resale roaming mandate in Canada.

⁴⁵ *Id.*, § V.B.

⁴⁶ Eastlink initial intervention, Sept. 8, 2017, in the proceeding initiated by TNC 2017-259, ¶ 20.

⁴⁷ Intervention de Québec Média Inc. (Québec Média) au nom de sa filiale Vidéotron s.e.n.c. (Vidéotron), Sept. 8, 2017, in the proceeding initiated by TNC 2017-259, ¶ 38.

VI. Dr. von Wartburg's comparison of the proposed reseller regulation in Canada to that in other countries is misleading

- (36) Dr. von Wartburg's report adapts tables from another intervention in this proceeding to argue that the market concentration of Canadian provinces and territories (except Quebec) "exceeds the market concentration of most countries in which MVNO access has been mandated."
- (37) The tables suggest that the regulation at issue in TNC 2017-259 has already been implemented in various countries listed as having "mandated MVNO access."⁴⁸ This is misleading. On the contrary, the regulation in many of the countries listed substantially differs from a broad mandate on wholesale roaming access for Wi-Fi First or other resale-based models. For example:
- Germany: One operator, Telefónica, was required to offer wholesale roaming to resellers as a condition of its merger with E-Plus, with tariffs that were not specifically set.⁴⁹
 - Austria: Wholesale access to resellers was required as a condition of the merger between Hutchinson-3G and Orange, with tariffs that were not specifically set.⁵⁰
 - France: The French regulator awarded 4G spectrum licences based on the candidates' financial bids and commitments to hosting MVNOs.⁵¹
 - Italy: Negotiations between MNO and MVNOs happen on a "voluntary basis."⁵²

⁴⁸ *Id.*, 40–41, Table 3 and Table 4.

⁴⁹ See discussion in supplemental white paper, ¶ 53.

⁵⁰ See discussion in *id.*, ¶ 20. As a condition of the 2012 merger, Hutchison-3G committed to provide wholesale access on agreed terms to its network for up to 30% of its capacity for up to 16 mobile MVNOs over the decade following the merger. Dr. von Wartburg notes that in 2015 prices started to fall and this was coincident with MVNO entry (*see* von Wartburg report, ¶ 64). The study Dr. von Wartburg cites discusses the decline in prices associated with MVNO entry but cautions, "Nevertheless there are alternative explanations for the evolution of prices and it is necessary to account for these effects." (Bundeswettbewerbshörde, "The Austrian Market for Mobile Telecommunication Services to Private Consumers: An Ex-Post Evaluation of the Mergers H3G/Orange and TA/Yesss!" Sectoral Inquiry BWB/AW-393, Final report, Mar. 2016, available at <https://www.bwb.gv.at/Documents/BWB2016-re-Ex-post%20evaluation%20of%20the%20mobile%20telecommunications%20market.pdf>), 9. The Austrian Competition Authority states, "In the course of 2015, several new MVNOs entered the market. Entrants benefited from an increased price awareness of consumers that is also a result of the wide-ranging activities of BWB, RTR and the Austrian Chamber of Labour (AK). In addition, RTR took measures to facilitate switching between operators (e.g. decreased the costs of number portability) . . . Furthermore, it is uncertain how sustainable competition from MVNOs will be in the long run." (Bundeswettbewerbshörde, "BWB and RTR Present Reports on the Telecom Sector Enquiry," news release, available at <https://www.en.bwb.gv.at/News/Seiten/BWB-und-RTR-present-reports-on-the-telecom-sector-enquiry.aspx>).

⁵¹ Hogan Lovells, "France Assigns 4G Licenses in the 2.6 GHz Band," Sept. 27, 2011, available at <https://www.hoganlovells.com/blogs/hlspectrumreview/france-assigns-4g-licenses-in-the-26-ghz-band>.

⁵² Nicoletta Corrocher and Laura Lasio, "Diversification Strategies in Network-Based Services: The Case of Mobile Virtual Network Operators," *Telecommunications Policy* 37, no. 11 (2013): 1114.

- Spain: Tariffs were not specifically regulated in Spain. Also, in February 2017, the current Spanish telecom regulator notified the European Commission of its plan to deregulate reseller access to roaming.⁵³

(38) Thus, while there are indeed a variety of countries that have some regulation on wireless roaming, as Canada does, the regulation at issue in the present proceeding relating to a broad mandate for Wi-Fi First roaming access to national networks at a regulated price is not typical.

⁵³ See supplemental white paper, note 70.

VII. Conclusion

- (39) The supplemental intervention of Ice and its accompanying report by Dr. von Wartburg mischaracterize the available evidence to conclude that a reseller roaming mandate of the type considered in this proceeding would not hurt wireless investment, and would if anything lead to *more* investment.⁵⁴ A review of the evidence they present, with reference to the evidence I presented in my initial and supplemental white papers, shows that this conclusion is incorrect. As I have argued throughout this proceeding, ignoring the investment incentive effects of a reseller roaming mandate, in particular the effects on smaller carriers, risks real harm to competition in the Canadian wireless market.

⁵⁴ See Ice supplemental intervention, ¶¶ ES-10, 12. See also von Wartburg report, ¶¶ 13, 73, and 82.