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An Accurate Price Comparison of Communications Services in Canada and Select Foreign Jurisdictions

By Christian M. Dippon, Ph.D.
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Disclosures

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Executive Summary

Since 2008, Innovation, Science and Economic Development (ISED) and the Canadian Radio-television and Telecommunications Commission (CRTC) have hired a consulting firm to conduct an annual international retail price comparison (the Study) for five communications service baskets. Year after year, the results of the Study show that Canadian prices are among the highest in the industrialized world. However, this finding is false because of the poorly designed and executed methodology used to conduct the Study. A properly designed and executed methodology finds that prices for communications services in Canada are *cheaper* than the prices foreign providers would charge for the same plans.

Specifically, ISED seeks a comparison of international prices for (1) fixed telephony, (2) fixed broadband Internet, (3) mobile wireless telephony, (4) mobile wireless Internet, and (5) bundled services. Previously, ISED and the CRTC commissioned two consultancies, Wall Communications Inc. (Wall) (2008–2015) and NGL Nordicity Group Ltd. (Nordicity) (2016–2017), to execute the Study. In February 2018, ISED issued a request for proposal for the 2018 Study, which contained essentially the same specifications as the previous Wall/Nordicity Studies. ISED subsequently retained Wall to conduct the 2018 edition of the Study.

For each communications service basket, ISED requests a comparison of retail prices charged by select providers in six Canadian cities to prices charged by select providers in four U.S. cities and one city in each of the five remaining G7 countries and Australia. Other than in the United States, the select providers in these benchmark countries are all nationwide providers. In Canada, the provider list consists of national providers, providers in the market owned by existing providers (i.e., second-tier wireless or flanker brands), regional providers (including those providers that entered in 2008), and mobile virtual network operators (MVNOs).

In designing and executing the Study, Wall/Nordicity invented hypothetical demand profiles (so-called Levels) that the consultancies used to compare international prices to Canadian prices. For instance, Wall/Nordicity attempts to compare the price paid in each Study country by a hypothetical subscriber who consumes 150 minutes of mobile wireless service per month and nothing more. Wall/Nordicity refers to this as a Level 1 subscriber. However, because providers in Canada and abroad design their retail plans to meet the needs of their subscribers, they typically do not have plans that conform to the Wall/Nordicity artificial Levels.

Wall/Nordicity ignores this fundamental problem and simply compares the prices of the cheapest plan that meets or exceeds a given Nordicity/Wall Level. However, this results in a price comparison of drastically different plans, thus producing meaningless results that do not answer ISED's questions or provide a solid foundation for sound policymaking.

Each Wall/Nordicity Study includes between three and six Levels for each service basket. For instance, Wall/Nordicity established up to six Levels for the mobile wireless telephony basket. Level 1 represents a low-volume usage subscriber, whereas Level 6 is an ultra-high-volume subscriber. Wall/Nordicity then compares the average price of all selected plans for a given Level in Canada to the average price of the same Level in seven benchmark countries *irrespective* of the significant differences between the plans. Thus, Wall/Nordicity averages the prices of different plans on different networks in Canada and then compares these averages to the average prices of even more different plans and different networks in other countries, ignoring that each country has entirely different cost structures.

There is no reason to believe that this repeated apples-to-oranges comparison produces meaningful results. Rather, prices depend on the amount of services purchased (e.g., voice minutes, SMS, data), the service quality (e.g., upload and download speeds), and various characteristics of the country where the network is located.

Consider for instance Wall/Nordicity's Level 3 in the mobile wireless telephony basket that consists of a hypothetical subscriber who consumes 1,200 voice minutes, 300 SMSs, and 1 GB of data each month. The cheapest plan offered by Bell Mobility in Regina that meets Level 3 is CAD 56.04 and includes unlimited voice, unlimited SMS, and 3 GBs of data. The cheapest Level 3 plan offered by Sprint in Boston is CAD 50.40 and includes unlimited voice, unlimited SMS, and 2 GBs of data. Despite the richer plan offered in Canada in this example (the Bell Mobility plan offers 1 GB more data than the Sprint plan), Wall/Nordicity compares these plans as if they were identical and concludes that Canada is more expensive than the United States. This comparison overlooks the fact that the Canadian plan offers an additional 1 GB of data at an additional cost of CAD 5.64. This compares to an additional CAD 18.90 on Sprint's network if a subscriber were to exceed the 2 GB plan allowance and wanted to retain 3G network speeds. The following figure provides a visual overview of the Wall/Nordicity methodology.

Wall/Nordicity Study Methodology

1. For each provider in a given country, city, and service basket, record the retail prices for plans cheapest to meet Level 1.
2. Repeat for all cities in the given country.
3. Calculate the average price using provider market share and city population.
4. Repeat steps 1-3 for all Wall/Nordicity demand levels.
5. Repeat steps 1-4 for all other study countries.
6. Repeat steps 1-5 for all service baskets.
7. Compare average country prices by service basket in seven benchmark countries to Canada.

Despite its deeply flawed design, the Wall/Nordicity Study materially shapes the regulatory and policy environment of the Canadian communications sector as the Government of Canada, ISED, the CRTC as well as market participants and consumer protection agencies rely on its findings.

For example, the Governor in Council relied in part on the 2016 edition of the Study in requesting that the CRTC reconsider its decision to limit access to regulated domestic wholesale roaming rates. Various parties have also used editions of the Study to advance their own causes by attempting to convince the CRTC and ISED to provide them with preferential regulatory treatment. Finally, the media routinely and indiscriminately cites the Study.

Based on the Wall/Nordicity Study, the Canadian media publicized the erroneous conclusion that prices in Canada are among the highest prices in the industrialized world.

This report examines why the Wall/Nordicity Study is unsound and provides the correct methodology to evaluate the price levels of wireless telephony, wireless Internet, and fixed broadband in Canada. More important, it demonstrates that if correctly evaluated Canadian prices are consistently below international benchmarks, which directly contradicts the conclusion reached by Wall/Nordicity.

The analysis herein reviews the Wall/Nordicity methodology and its implementation in responding to ISED's request. This analysis reveals that the Wall/Nordicity Study contains multiple defects and thus is not acceptable for assessing price levels in Canada or anywhere else for that matter. Specifically, the Study (1) lacks a stated objective that is critical to any proper economic analysis, (2) suffers from a severely flawed methodology, and (3) contains factual and mathematical errors. Consistent with this conclusion, the 2016 edition of the Study warned readers not to reach conclusions about market performance, noting that the prices cited for Canada, the United States, or international jurisdictions were not statistically representative of the individual countries as a whole.

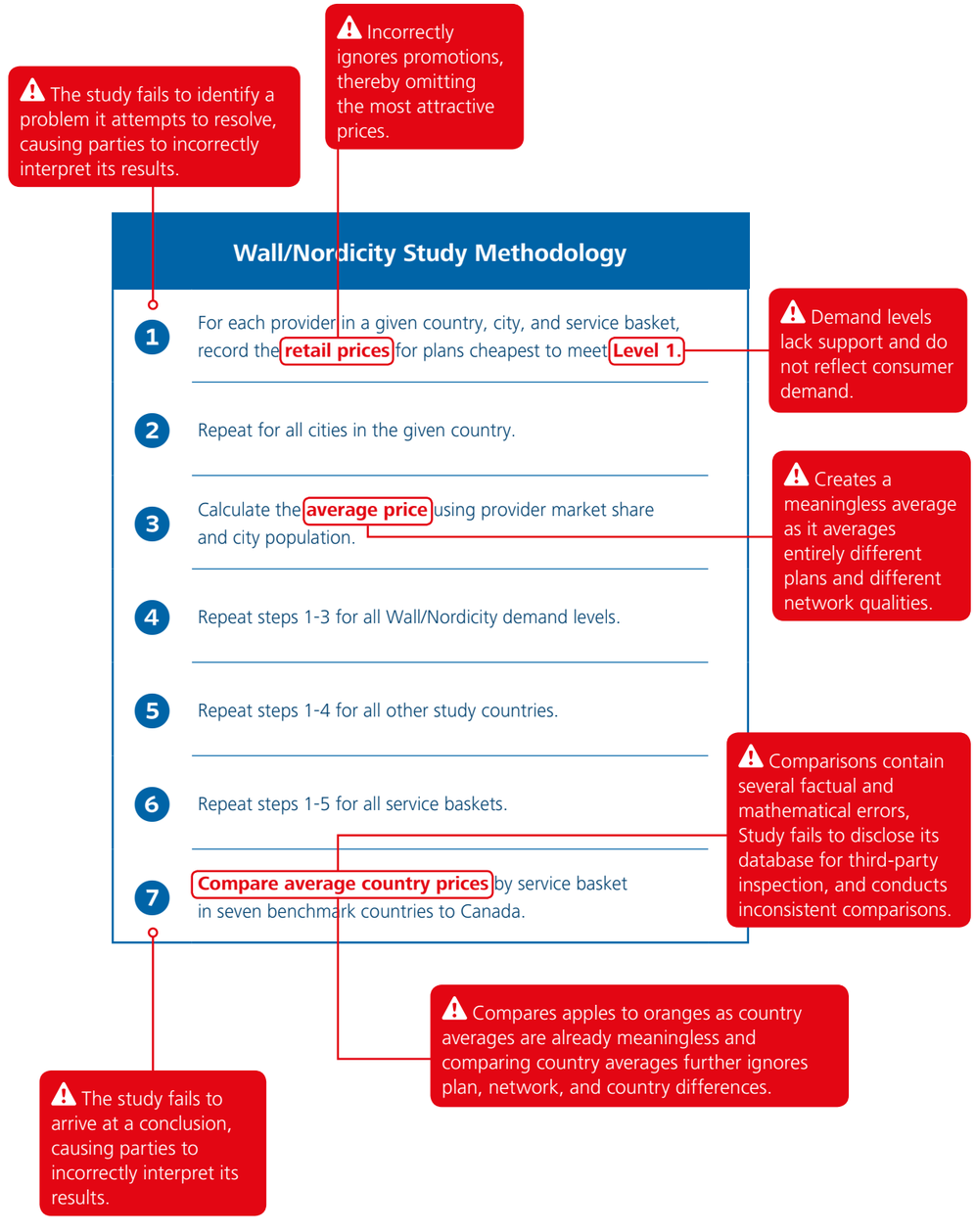
A proper economic study sets out to test a hypothesis. The hypothesis that a study attempts to test, in turn, determines the study design and allows the analyst to reach a conclusion. Without an objective, it is not surprising that the Wall/Nordicity Study does not compare prices in a meaningful way and lacks any type of conclusion. The unspecified nature of the Study has led to widespread confusion, causing parties to misinterpret the comparisons and to make unsubstantiated and incorrect claims that the Study demonstrates a lack of competition, the unaffordability of communications services, and excessively high retail prices in Canada. The Wall/Nordicity Study does not and cannot support these conclusions because it does not test any of these hypotheses—or any hypothesis at all.

The Wall/Nordicity Study employs a comparison method that provides little useful information about Canadian retail prices relative to international benchmarks. As one would expect in competitive markets, retail plans differ across providers, cities, and countries depending on the providers' underlying cost structures, pricing strategies, and demand conditions. Thus, it is rare for two plans to be identical. Wall/Nordicity ignores this important fact and instead compares the prices of plans that most closely meet a set of artificial demand levels, *irrespective of whether the plans are the same or even similar.* In doing so, the Study compares the prices of often drastically different services. Along these same lines, Wall/Nordicity does not differentiate between countries with calling party pay plans (all but the United States and Canada) and wireless party pay plans (the United States and Canada), which affects the type of plan that a subscriber would select. The Study's type of comparison is meaningless because it attributes all price differences to higher price levels instead of different (e.g., richer) service plans.

The Wall/Nordicity Study is also lacking in quality. The 2017 edition of the Study incorrectly calculates averages and mistakenly counts Comcast and Xfinity as separate companies when the latter is simply the tradename of the former.

The 2017 Study also contains inconsistent comparisons to previous reports; that is, it shows a price increase relative to previous years when the higher number is nothing but the result of differing treatment of the data. The following figure provides a visual overview of the errors in the Wall/Nordicity methodology.

An Accurate Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions



Considering the significant shortcomings of the Wall/Nordicity Study, this report introduces a proper statistically based price comparison of communications services in Canada and ISED's select foreign jurisdictions. The revised methodology is consistent with the economic literature and the most recent international comparison study performed by the U.S. Federal Communications Commission (FCC). Specifically, the revised study tests the hypothesis that prices for communications services in Canada are higher relative to ISED's list of benchmark countries. It reduces the five service baskets to three (mobile wireless telephony, mobile wireless Internet, and fixed broadband Internet) because the fixed telephony basket cannot be compared in a reasonable manner across countries as it is continuously shrinking in size, and the bundled services basket is different in each country, making it unsuitable for an accurate comparison. Furthermore, it is unlikely that comparing the prices of bundled services would yield different results than comparing standalone prices. For the remaining services, the revised study relies on a database consisting of three (entry, mid, and high consumption) plans for each provider, city, and service basket identified by ISED.

A three-step evaluation is performed on the resulting database of 358 mobile wireless telephony, 214 mobile wireless Internet, and 152 fixed broadband Internet plans. First, for each of the three service baskets, the statistical relationships between retail prices and the corresponding plan, network, and country attributes (explanatory variables) in the seven benchmark countries is established.

These analyses reveal strong relationships between retail prices and these three types of explanatory variables. Second, these relationships forecast the prices an international provider would charge in Canada for the Canadian plans in the database. Third, the forecast benchmark prices are compared to actual prices in Canada. If the actual prices are lower than the forecast benchmark, Canada performs better than the benchmark countries and vice versa. Two robustness checks on the econometric models confirm the initial results. The first check expands the pricing database from three to seven plans per Canadian provider, and the second check adds TELUS' most popular plans to ensure that the Canadian plans are representative of the plans that Canadian consumers actually purchase. The following figure provides a visual overview of the revised price study.

NERA Proper Price Comparison

1. State the hypothesis to be examined (i.e., prices in Canada are higher than in G7 + Australia benchmark countries).
2. Build a database of retail prices for ISED's study baskets, countries, cities, and providers, including promotions.
3. Determine the statistical relationship between prices and plan, network, and country characteristics in the benchmark countries (i.e., using regression analysis, find out what explains differences in prices abroad).
4. Based on this relationship, forecast the retail prices that the average international provider would charge for the Canadian plans in the study.
5. Compare forecast benchmark prices to actual prices for Canadian plans in the study. If actual prices are above the benchmark, the Canadian plan is more expensive than the international benchmark and vice-versa.
6. Examine results at the country, provider, and city level.
7. Perform robustness tests on results by comparing international benchmark prices against additional Canadian plans and TELUS' most popular plans.
8. Present the study conclusion, which rejects the stated hypothesis – i.e., prices in Canada are generally lower, not higher, than what an international provider would charge for the same plans on the same networks in Canada.
9. Present supporting documentation and assumptions including access to the electronic database for third-party inspection.

For mobile wireless telephony, the analysis demonstrates that prices in Canada are *lower* than the international benchmark. Specifically, of the 246 Canadian plans in the study, 197 plans (80 percent) have prices that are below international benchmarks. This strong result dispels claims that Canadians pay some of the highest prices in the industrialized world.

At the provider level, the study demonstrates that, except for Rogers and Eastlink, all providers price most of their plans in the study below international benchmarks. This disproves the claims that regional providers offer cheaper prices relative to international benchmarks and that nationwide providers engage in tacit collusion by silently agreeing on retail prices. It also demonstrates that the long-standing government subsidies to regional providers (formerly entrants) do not translate into lower prices for Canadian consumers relative to international norms. Similarly, there is no evidence that MVNOs price below the benchmark more often than the nationwide providers do. This suggests that the market is competitive because none of the market participants has reduced its prices despite the rich regulatory aids (i.e., spectrum set-asides and cost-based domestic wholesale roaming) mandated by ISED and the CRTC. Finally, at the city level, Canadian prices are below international benchmarks for *all* cities regardless of the number of providers, which disproves the Competition Bureau's allegation of coordinated behavior among the three nationwide providers that allegedly created lower prices in cities with four providers. The data simply do not support this allegation.

For mobile wireless Internet service, the results are similar. At the country level, 89 of the 111 Canadian plans in the study (80 percent) are below forecast international benchmarks, indicating that Canada outperforms its international peers. At the provider level, there is also no evidence that the regional providers price more attractively relative to international norms than the nationwide providers do. The results also do not vary significantly across cities regardless of the number of providers, which again dispels the claim of coordinated behavior in areas where there is no fourth provider.

For fixed broadband Internet service, 54 of the 68 plans (79 percent) of Canada's sample plans have prices that are lower than international benchmarks. The regional providers' prices are much the same as the nationwide providers' prices. Moreover, there is no variation across cities regardless of the number of providers present, which is an indication that an increase in the number of non-incumbent providers would not drive retail prices down.

Two robustness checks confirm these results. First, expanding the database from three to seven plans for each Canadian provider and city does not change the overall conclusion that Canadian prices are generally lower than the international benchmark. Second, examining the most popular plans purchased by TELUS subscribers confirms that TELUS prices are generally less expensive than what an international provider would charge for the same plan if offered in Canada.

Considering the evidence presented above, one can reject the hypothesis that Canadian communications providers charge excessively high prices relative to a set of benchmark countries. Canadian prices are clearly below international benchmarks, implying that Canadian consumers face relatively favorable price levels given the specific market offerings, networks, and country conditions. These are strong signs that the communications markets under study are competitive and hence do not require regulatory intervention. The following table provides a summary of the corrected price study and demonstrates that prices in Canada are cheaper than the prices that providers in the G7 plus Australia benchmark countries would charge for the same plans.

Service Basket	Cheaper than international benchmark		More expensive than international benchmark	
Canadian Plan Evaluation	**COUNT**	**PERCENTAGE**	**COUNT**	**PERCENTAGE**
✓ Mobile Wireless Telephony	197	80.1	49	19.9
✓ Mobile Broadband Internet	89	80.2	22	19.8
✓ Fixed Broadband Internet	54	79.4	14	20.6

The recommendation is for ISED to adopt the methodology presented herein because it adheres to the economic literature and is consistent with the approach used by the FCC. The methodology used by Wall/Nordicity is deeply flawed and riddled with errors and provides Canadian regulators with an incorrect impression of the Canadian communications market—leading to unnecessary and even harmful policy and regulatory decisions that jeopardize the public interest.

1 Introduction

Since 2008, Innovation, Science and Economic Development (ISED) and the Canadian Radio-television and Telecommunications Commission (CRTC) have hired a consulting firm to conduct an annual international retail price comparison (the Study) of communications services in Canada and select foreign jurisdictions. The stated purpose of the Study is to compare Canadian retail prices for five types of communications services to those in the remaining G7 countries and Australia.[1]

Specifically, the Study is to compare retail prices offered in the selected cities for five service baskets:

1. fixed telephony;
2. fixed broadband Internet;
3. mobile wireless telephony;
4. mobile wireless Internet; and
5. bundled services.

For the United States, ISED requests collecting prices offered in four cities; however, ISED limits data collection to one specific city in each of the remaining six countries. In Canada, ISED requires price data from six cities across six provinces. In each city and for each of the five service baskets, ISED requests the prices of three to five providers not including short-term promotions offered by the service providers.[2]

Since the inaugural edition in 2008, ISED has been requiring that annual editions allow for a comparison to previous years. Consequently, other than adding Germany and Italy to the Study in 2014, the benchmark countries, cities, and providers have not changed significantly over the years. Table 1 summarizes the benchmark countries, cities, and providers included in the 2017 edition of the Study.

1. See Innovation, Science and Economic Development Canada, "Request for Proposal, #401706, 2018 Price Comparison Study of Communications Services in Canada and Select Foreign Jurisdictions," February 8, 2018, p. 3 (hereafter the RFP).
2. Ibid.

Table 1 **Benchmark Countries, Cities, and Providers**

Study Country	Study City	Service Basket	Service Providers
United States	Boston, MA	Fixed telephony	Verizon, Comcast
		Fixed broadband	Verizon, Comcast, RCN
		Mobile telephony	AT&T, Verizon, Sprint, T-Mobile
		Mobile Internet	AT&T, Verizon, Sprint, T-Mobile
		Service Bundles	Verizon, Comcast, RCN
United States	Kansas City, MO	Fixed telephony	AT&T, Time Warner
		Fixed broadband	AT&T, Time Warner, Google Fiber, Windstream, Xfinity
		Mobile telephony	AT&T, Verizon, Sprint, T-Mobile
		Mobile Internet	AT&T, Verizon, Sprint, T-Mobile
		Service Bundles	AT&T, Time Warner, Google Fiber, Windstream, Xfinity
United States	Minneapolis, MN	Fixed telephony	CenturyLink, Xfinity
		Fixed broadband	CenturyLink, Xfinity
		Mobile telephony	AT&T, Verizon, Sprint, T-Mobile
		Mobile Internet	AT&T, Verizon, Sprint, T-Mobile
		Service Bundles	CenturyLink, Xfinity
United States	Seattle, WA	Fixed telephony	CenturyLink, Xfinity
		Fixed broadband	CenturyLink, Xfinity, Wave
		Mobile telephony	AT&T, Verizon, Sprint, T-Mobile
		Mobile Internet	AT&T, Verizon, Sprint, T-Mobile
		Service Bundles	CenturyLink, Xfinity, Wave
Australia	Sydney	Fixed telephony	Telstra, Optus
		Fixed broadband	Telstra, Optus
		Mobile telephony	Telstra, Optus, Vodafone
		Mobile Internet	Telstra, Optus, Vodafone
		Service Bundles	Telstra, Optus
United Kingdom	London	Fixed telephony	BT, Virgin
		Fixed broadband	BT, Virgin, EE/Orange, TalkTalk
		Mobile telephony	EE, Virgin, Vodafone, O2, 3 (three)
		Mobile Internet	EE, Virgin, Vodafone, O2, 3 (three)
		Service Bundles	BT, EE/Orange, Virgin, TalkTalk
France	Paris	Fixed telephony	Orange, Numericable, SFR
		Fixed broadband	Orange, Numericable, SFR, Bouygues
		Mobile telephony	Orange, SFR, Bouygues
		Mobile Internet	Orange, SFR, Bouygues
		Service Bundles	Orange, Bouygues, SFR
Italy	Rome	Fixed telephony	Telecom Italia, FastWeb
		Fixed broadband	Telecom Italia, FastWeb
		Mobile telephony	Telecom Italia, Vodafone, WIND
		Mobile Internet	Telecom Italia, FastWeb, Vodafone, WIND
		Service Bundles	Telecom Italia, FastWeb
Germany	Berlin	Fixed telephony	Deutsche Telekom; Vodafone
		Fixed broadband	Deutsche Telekom; Vodafone
		Mobile telephony	Deutsche Telekom; Vodafone; E-plus, O2
		Mobile Internet	Deutsche Telekom; Vodafone, O2
		Service Bundles	Deutsche Telekom, Vodafone
Japan	Tokyo	Fixed telephony	Au Hikari, KDDI
		Fixed broadband	NTT, JCom, KDDI, Yahoo!BB
		Mobile telephony	NTT DoCoMo; Softbank, KDDI, Y!Mobile
		Mobile Internet	NTT DoCoMo; Softbank, au KDDI, Y!Mobile
		Service Bundles	NTT, JCom, au KDDI, iTSCOM

Source: NGL Nordicity Group Ltd., "2017 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions," October 5, 2017, Table A2 (hereafter the 2017 Nordicity Study).

1.1. The ISED Price Study as Interpreted by Wall/Nordicity

From 2008–2015 and again in 2018, ISED retained Wall Communications Inc. (Wall) to execute the Study per its guidelines. In 2016 and 2017, ISED retained NGL Nordicity Group Ltd (Nordicity) to conduct the Study. ISED requires that the annual editions be backwards compatible, thus both Wall and Nordicity have adopted identical methodologies with the versions differing only slightly with respect to result presentation. Consequently, the remainder of this report refers to the Wall/Nordicity Study.

Wall/Nordicity implemented ISED's Study requirements by creating hypothetical consumer demand profiles or so-called Levels. As shown in Table 2, higher Levels are associated with higher "service usage, features and, where applicable, performance."[3]

Table 2 **Nordicity Plan Sampling Methodology**

Level	Consumer Demand Profile
1	Entry-level or low-volume usage
2	Average or medium usage
3	Above average or high-volume usage
4	Very high-volume or unlimited usage
5	Very high-volume or unlimited usage
6	Ultra high-volume or unlimited usage

Source: 2017 Nordicity Study, p. 21.

3. 2017 Nordicity Study, p. 21.

The consultancies then attempt to compare average retail prices at each Level across countries. These Levels do not reflect consumer demand in the benchmark countries, and none of the providers included in the Study offer service plans at these hypothetical Levels. Attempting to resolve this dilemma, Wall/Nordicity compares the prices of plans *that most closely meet or exceed the usage levels associated with a given Level*. However, the consultancies' "basket methodology" results in an apples-to-oranges comparison as none of the plans being compared are identical.

Often the plans are fundamentally different in terms of the services they offer (e.g., number of voice minutes included, data allowance, roaming, etc.), the network quality (e.g., upload and download speeds), and the geography in which the services are provisioned (e.g., a network in Japan has a different cost structure than a network in Canada). Such a comparison says nothing about price levels in Canada or elsewhere and only reflects how close or far the select providers' plans are relative to the hypothetical demand levels.

Consider, for instance, Level 1 for the mobile wireless telephony basket. The consumer demand profile underlying Wall/Nordicity's Level 1 is a consumer who uses 60 incoming minutes and 90 outgoing minutes for a total of 150 minutes monthly.[4] This consumer uses no other services. To collect the price charged by AT&T (a provider included in the Study) for this hypothetical subscriber living in Boston (a city included in the Study), Wall/Nordicity researchers presumably visited AT&T's website, entered one of Boston's zip codes, and recorded the price of the cheapest plan that met or exceeded this demand profile. In March 2018, the plan meeting or exceeding Level 1 was AT&T's entry-level prepaid plan. The price for the plan was $30 per month, and it included unlimited talk and text in the United States, 1 GB of data, access to mobile hotspots, and the ability to stream high definition (HD) video.[5] This is significantly more than the Level 1 demand of 150 voice minutes per month. Despite far exceeding Level 1 demand, Wall/Nordicity recorded $30 for AT&T in Boston and repeated this process for the remaining providers in Boston. The consultant then conducted the same exercise for the other three U.S. cities, that is, Kansas City, Minneapolis, and Seattle, again ignoring all deviations from the Level 1 demand. Although the Level 1 plans for each U.S. provider differ, Wall/Nordicity calculates a market share and city population weighted average as the representative price for the United States for Level 1 in the mobile wireless telephony basket.[6] Wall/Nordicity applied the same process to all other Levels and countries and then compared all averages as if the services were identical (which they are not).

Wall/Nordicity then compared these benchmark country prices to prices in Canada. ISED requires that the Study "include prices from six Canadian markets (Halifax, NS; Montreal, QC; Toronto, ON; Winnipeg, MB; Regina, SK; and Vancouver, BC)."[7] Wall/Nordicity applied the same consumer demand profiles and data collection method to Canada as employed in the benchmark countries. Table 3 summarizes the Canadian cities and providers that Wall/Nordicity included in the most recent edition of the Study. Figure 1 provides a summary of the Wall/Nordicity approach.

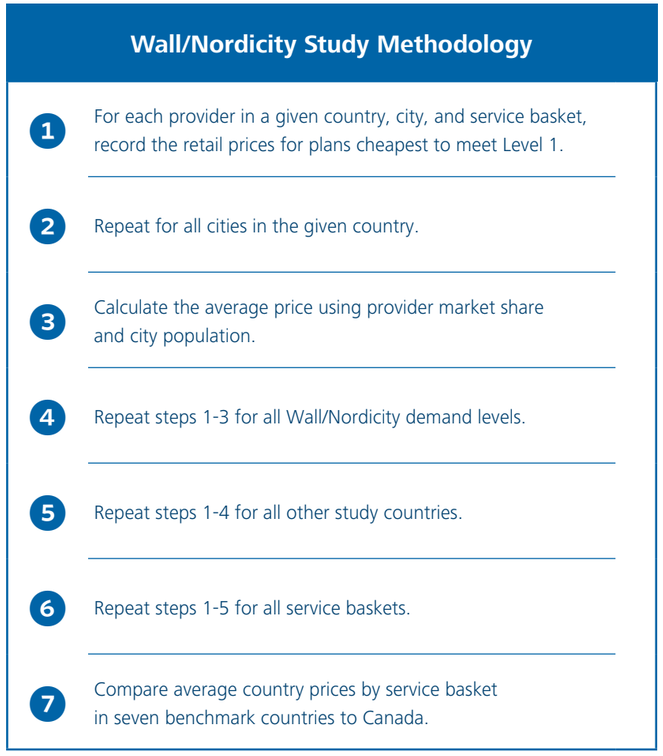
4. Every Wall/Nordicity Study since 2008 has had a Level 1 mobile wireless telephony offering with a limit of 150 voice minutes per month. Under the Wall/Nordicity assumptions of 90 minutes for outgoing calls and an average call lasting three minutes, this gives us an average of one call per day.
5. See AT&T, "Prepaid phone plans from AT&T," https://www.att.com/prepaid/plans.html, accessed September 21, 2018.
6. This assumes that the approach for combining cities in the United States was the same as in Canada as the 2017 Nordicity Study offers no detail on the U.S. approach. The 2018 RFP states, "Weighted average service prices for Canada and the U.S. will be calculated based on relative city population and service provider market share." (RFP, p. 4.)
7. Ibid., p. 3.

Table 3 **Canadian Cities and Providers**

Study City	Service Basket	Service Providers
Halifax, NS	Fixed telephony	Bell, Eastlink, TekSavvy, Primus
	Fixed broadband	Bell, Eastlink, TekSavvy
	Mobile telephony	Bell, TELUS, Rogers, Eastlink, PC Mobile, Petro-Canada, 7 Eleven, Primus
	Mobile Internet	Bell, TELUS, Rogers
	Service Bundles	Bell, Eastlink
Montreal, QC	Fixed telephony	Bell, Videotron, TekSavvy, Primus
	Fixed broadband	Bell, Videotron, TekSavvy, Primus, Distributel
	Mobile telephony	Bell, TELUS, Rogers, Videotron, Primus, PC Mobile, Petro-Canada, 7 Eleven
	Mobile Internet	Bell TELUS, Rogers, Videotron
	Service Bundles	Bell, Videotron, Primus
Toronto, ON	Fixed telephony	Bell, Rogers, Primus, TekSavvy
	Fixed broadband	Bell, Rogers, Primus, TekSavvy, Distributel
	Mobile telephony	Bell, TELUS, Rogers, Primus, PC Mobile, Petro-Canada, 7 Eleven, Freedom
	Mobile Internet	Bell, TELUS, Rogers, Freedom
	Service Bundles	Bell, Rogers, Primus
Winnipeg, MB	Fixed telephony	MTS, Shaw, TekSavvy, Primus
	Fixed broadband	MTS, Shaw
	Mobile telephony	MTS, TELUS, Rogers, Bell, PC Mobile, Primus, Petro-Canada, 7 Eleven
	Mobile Internet	MTS, Bell, TELUS, Rogers
	Service Bundles	MTS, Shaw
Regina, SK	Fixed telephony	SaskTel, Access, TekSavvy, Primus
	Fixed broadband	SaskTel, Access
	Mobile telephony	SaskTel, Bell, TELUS, Rogers, PC Mobile, Primus, Petro-Canada, 7 Eleven
	Mobile Internet	SaskTel, Bell, TELUS, Rogers
	Service Bundles	SaskTel, Access
Vancouver, BC	Fixed telephony	TELUS, Shaw, Primus, TekSavvy
	Fixed broadband	TELUS, Shaw, Primus, TekSavvy
	Mobile telephony	Bell, TELUS, Rogers, Primus, PC Mobile, Petro-Canada, 7 Eleven, Freedom
	Mobile Internet	Bell, TELUS, Rogers, Freedom
	Service Bundles	TELUS, Shaw, Primus

Source: 2017 Nordicity Study, Table A1.

Figure 1 **The Wall/Nordicity Study Methodology**



1.2. The Origin of the Wall/Nordicity Methodology

The general study methodology used by Wall/Nordicity seems to have originated from a 2008 Wall report.[8] In that report, Wall developed the present methodology allegedly based on a review of price comparison approaches by the Organisation for Economic Co-operation and Development (OECD), the British telecommunications regulator Ofcom, the Canadian analyst firm SeaBoard Group, and the financial advisor Merrill Lynch.

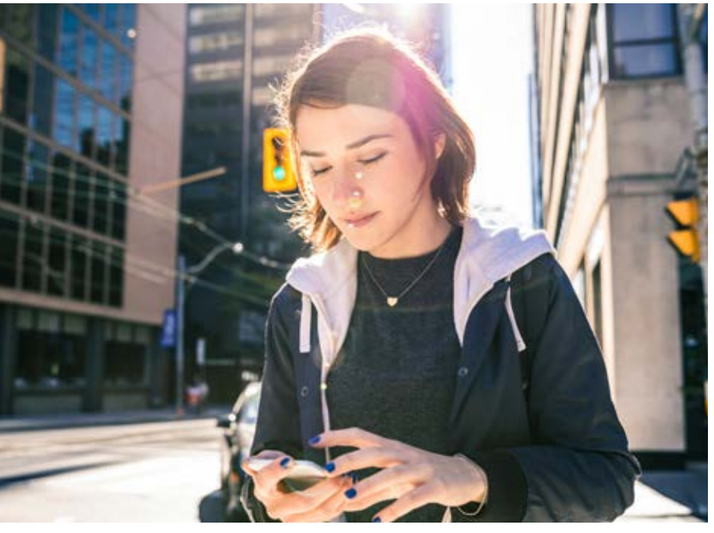
Since the Study's inaugural edition in 2008, the countries and cities have largely remained the same.[9] The providers in the Study have changed to reflect only merger and acquisition activity. More important, the overall data collection methodology that uses artificial consumer demand profiles and that records the prices of the service offerings that most closely meet or exceed these profiles has been in use since 2008, perpetuating the meaningless apples-to-oranges comparison contained in the Study. Presumably, ISED's mandate of backwards compatibility explains why the original Study design has survived the last decade.

8. See Wall Communications Inc., "An Examination of Alternative Approaches for Conducting Prices Comparisons of Wireline, Wireless, Wireless and Internet Services in Canada and with Foreign Jurisdictions," May 5, 2008 (hereafter the 2008 Wall Methodology Report).
9. Besides adding Germany and Italy, the studies added Winnipeg, MB, and Minneapolis, MN (USA).

1.3. Purpose and Structure of Present Report

The purpose of the present report is threefold. First, it examines the Wall/Nordicity price comparison methodology and its execution using the 2017 Nordicity Study as an example. Second, it explains the requirements and structure of an accurate price comparison of communications services in Canada and select foreign jurisdictions. Third, it executes an accurate price comparison and contrasts the results to the 2017 Nordicity Study. As such, this report serves as an instrument of change that allows ISED, the CRTC, or any other regulatory body to access sound economic evidence (i.e., accurate price comparisons) for policy decisions.

The structure of this report is as follows. Section 2 describes why the Wall/Nordicity methodology is unscientific, yields unreliable results, and requires a fundamental redesign before it can provide value to ISED and other authorities when making policy or regulatory decisions. Section 3 describes the fundamental methodological changes that ISED must introduce for the Study to yield valuable results; that is, it introduces the components of an accurate price comparison. Section 4 presents results from a correct price study demonstrating that Canadian prices are below international benchmarks. Section 5 provides additional support that confirms Canadian prices are below international benchmarks. Section 6 provides the report conclusions. Appendix A presents the attributes of the revised study. Appendix B provides the revised study's electronic database. Appendices C1 to C3 show the statistical relationships for each service basket between retail prices and plan features, network quality, and the environment in which providers offer the services. Appendices D1 to D3 and E1 to E3 show the results of robustness checks of additional Canadian plans and TELUS' popular plans in the analysis, respectively.



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The Wall/Nordicity Price Study is Unsuitable for Policy or Regulatory Decisions

A proper scientific study must include specific elements. As detailed in a widely cited U.S. reference manual on scientific evidence, "science … is based on principles of hypothesis generation, scrupulous study design, meticulous data collection, and objective interpretation of experimental results."[10]

The Wall/Nordicity Study falls short in all four essential elements of a proper scientific study. First, the Study suffers from the lack of "principles of hypothesis generation" because it offers no problem or hypothesis that it intends to resolve. In the 2017 Study, Nordicity states, "The purpose of this Study is to provide a detailed comparative price analysis of telecommunications services in Canada vis-à-vis the USA and six other countries."[11] Although this statement tells the reader what the Study is supposed to do (i.e., compare prices), it does not state why the comparison is being done. Absent an objective, it is no surprise that Wall/Nordicity does not provide conclusions in the annual report versions.

Second, Wall/Nordicity also does not meet the "scrupulous study design" requirement because of the flawed methodology that produces meaningless results. Wall/Nordicity's methodology does not constitute a proper price comparison because it compares the prices of drastically different and unrelated service plans. There is no reason, for instance, to compare the price of an unlimited mobile wireless plan to the price of a plan that has specific monthly allowances for voice, data, or SMS. They are two different products that are priced, among other factors, according to their service and quality levels.

Third, despite ISED's quality control claim, the data collected and its interpretation in the 2017 Nordicity Study is unsound because it contains factual and mathematical errors. The Wall/Nordicity Study also does not properly document its methodology and does not provide the necessary databases to replicate and examine its results.

Fourth, in terms of the objective interpretation of experimental results, Wall/Nordicity offers no interpretation beyond presenting a multitude of figures and tables, thus leaving the reader to guess (often incorrectly so) as to what the results mean.

Ultimately, the Study fails to adhere to the most basic building blocks of a proper scientific study. Consequently, regulators and public policymakers cannot rely on its results to make public policy and regulatory decisions or to assess the level of competition in the Canadian communications sector.

10. Federal Judicial Center and National Research Council of the National Academies, *Reference Manual on Scientific Evidence*, 3rd ed. (Washington, D.C.: The National Academies Press, 2011), p. xiii, https://www.fjc.gov/sites/default/files/2015/SciMan3D01.pdf (hereafter the *Reference Manual on Scientific Evidence*).
11. 2017 Nordicity Study, p. 3.

2.1. The Wall/Nordicity Study Lacks an Objective

Wall/Nordicity does not disclose the objective of the price comparison study. Without a testable hypothesis, the Study is meaningless because its design depends on what is to be tested. For instance, if Wall/Nordicity were to hypothesize that Canadian retail prices are higher than prices abroad, then an accurate study would differ from one that tests whether past regulation decreased retail prices. Similarly, testing the hypothesis of high retail prices requires adjusting (normalizing) for differences in specific retail plans, mobile wireless networks, and the costs of provisioning the services (e.g., climate, population density, and labor rates).

The 2008 Wall Methodology Report seems to be the only source that gives a hint of what the purpose of the Study might have been. Specifically, the 2008 Wall Methodology Report states:

> [T]he purpose of the price comparison data assembled based on the methodology proposed in this report, would be to provide a means to help assess whether policy measures introduced by the Commission, such as local forbearance, have generated benefits such as lower prices or savings for consumers. In addition, the price comparison exercise would also provide a means to identify which consumers are benefiting from those savings – i.e., those with bundles, with standalone services, both, or neither.[12]

However, the Study design and Wall/Nordicity's data collection and interpretation seem clearly at odds with this objective. There is no effort in any iterations of the Study to examine the impact of "policy measures," and none of the Studies properly assesses price levels in Canada relative to international benchmarks. Rather, the Wall/Nordicity reports present a dizzying array of tables that leave the reader guessing as to what the hypotheses were that the Studies reportedly tested.

2.2. Parties Freely Interpret the Results of the Wall/Nordicity Study

Some parties use the Study to claim that retail prices in Canada are too high relative to the benchmark countries. For instance, in a 2017 CRTC consultation on Wi-Fi first service, citing the 2016 Nordicity Study, Ice Wireless states:

> … Canadians pay some of the highest prices in the industrialized world for mobile wireless services….[13]

> … Canada compares very poorly with the industrialized countries examined by the 2016 Price Comparison Report in terms of the price of retail mobile wireless services.[14]

Yet, other parties incorrectly use the Study by claiming that it "demonstrates that prices for mobile services are lower in Canadian cities where there are four strong facilities-based competitors compared to cities where there are only three facilities-based providers."[15]

The misconception of the Study as a competition report is likely also the cause for the Governor in Council's remand of CTRC Decision 2017-56:

> Whereas Canadians continue to pay high rates for mobile wireless telecommunications services;
>
> Whereas Canada has among the lowest adoption rates for mobile wireless telecommunications services among industrialized countries;
>
> Whereas Canadians with low household income in particular face challenges related to the affordability of telecommunications services….[16]

12. 2008 Wall Methodology Report, p. 1.
13. Reconsideration Of Telecom Decision 2017-56 Regarding Final Terms And Conditions For Wholesale Mobile Wireless Roaming Service, Telecom Notice Of Consultation CRTC 2017-259, 20 July 2017: "Intervention of Ice Wireless Inc.," September 8, 2017, ¶ 17. Ice Wireless cites NGL Nordicity Group Ltd., "2016 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions," p. 37 (hereafter the 2016 Nordicity Study).
14. Ibid., ¶ 24.
15. 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: Shaw Communications Inc., "Final Submission," December 1, 2017, ¶ 18, referring to the 2016 Nordicity Study.
16. Appendix to Telecom Notice of Consultation CRTC 2017-259, Order of the Governor in Council, P.C. 2017-0557, June 1, 2017.

Even the popular media misunderstood the purpose of the 2016 Nordicity Study, thinking it was to test the hypothesis of high prices in Canada relative to other countries. After the release of the 2016 Nordicity Study, the *Financial Post* reported:

> Canadians continue to pay more for wireless service than the majority of their peers living in G7 countries and Australia, says a report released by Canada's telecom watchdog on Thursday.[17]

Thus, although the Study fails to state a testable answer to a scientific question, the general impression is that the Study examines whether retail prices in Canada are high relative to other countries. Furthermore, there is a widespread misconception that the cause of these alleged high prices is a lack of competition and that higher prices mean that communications services are not affordable. Citing ISED, the *Financial Post* reported:

> While progress is being made, the government will continue to watch market dynamics and promote more competition so that all Canadians can have high-quality services at affordable prices.[18]

This free interpretation is problematic for several reasons. First, nowhere did the Study set out to examine whether prices in Canada are high or low. In fact, the Wall/Nordicity Study does not even arrive at this specific conclusion. A simple comparison of the prices of different plans from different providers on different networks in different countries does not provide valid information about whether Canadian prices are high, at par, or low because there are numerous reasons why prices in Canada might be different from other countries.[19]

Second, and related, higher prices (even if found) cannot simply be attributed to a lack of competition, particularly when there is strong evidence that the market is competitive.[20] Rather, analysts must investigate the cause of price differentials (high or low), which includes an examination of differences in plan attributes, service quality, and country-specific costs (e.g., labor rates, climate, population density, etc.). In fact, in 2016, Nordicity explicitly warned readers from reaching conclusions about market performance. Specifically, the consultancy noted, "the prices cited for Canada, US or the international jurisdictions are not meant to be statistically representative of the individual countries as a whole."[21]

Third, the concept of affordability is entirely unrelated to the Study. Averaging the prices of different plans offered by a select group of providers relative to some artificial demand level certainly is not a measure of affordability.

A proper study sets out to examine a testable hypothesis. For the remainder of this report, the assumption is that the Study sets out to test the hypothesis that prices for communications services in Canada are higher than prices in the benchmark countries selected by ISED. It is against this hypothesis that the Study methodology and Wall/Nordicity's implementation of that methodology is evaluated. In addition, a price comparison methodology is derived and executed that properly collects and analyzes relevant data in response to this hypothesis while maintaining the general study framework defined by ISED.

17. Emily Jackson, "Canadian mobile phone bills still rank among the most expensive in G7: CRTC report," *Financial Post*, August 11, 2016. Following the release of the 2017 Nordicity Study, the *Financial Post* similarly reported, "Cellphone service is getting cheaper for Canadians who want basic plans, but prices for larger wireless data packages remain high compared with other G7 countries, according to the government's 10th annual international price comparison report." (Emily Jackson, "Canadians pay more for larger data plans than counterparts in G7 countries: ISED report," *Financial Post*, December 12, 2017.)
18. Emily Jackson, "Canadians pay more for larger data plans than counterparts in G7 countries: ISED report," *Financial Post*, December 12, 2017.
19. The 2016 Nordicity Study actually acknowledged this fact in its "Caveats to the Interpretation of the Findings of this Study." (2016 Nordicity Study, p. 12.)
20. See, e.g., "Expert Report of Jeffrey A. Eisenach, Ph.D. on Behalf of TELUS Communications Company," re: CRTC 2017-259 Reconsideration of Telecom Decision 2017-56 Regarding Final Terms and Conditions for Wholesale Mobile Wireless Roaming Service, September 8, 2017, Section V.
21. 2016 Nordicity Study, p. 12.

2.3. The Wall/Nordicity Methodology Is Fatally Flawed

The Wall/Nordicity Study methodology is inadequate to test the hypothesis that prices are high in Canada relative to select other developed countries. The principal reasons for this are the methodology's reliance on unsupported and arbitrary demand levels; omitted plan, network, and country attributes; and poor and opaque study execution.

2.3.1. Unsupported and arbitrary demand levels

Wall/Nordicity created a set of consumer profiles, so-called Levels, to compare prices internationally. The higher the Level, the more services a subscriber consumes. In the 2017 Study, mobile wireless telephony had six Levels, fixed broadband Internet had five Levels, and both mobile wireless Internet and bundled services had three Levels each. The number of Levels as well as the Levels themselves is arbitrary and has no relationship with actual consumption patterns. For instance, Level 1 in the mobile wireless telephony basket is a hypothetical subscriber who consumes 150 minutes of wireless voice per month and nothing else. It is highly questionable whether a significant portion of consumers in Canada or in other countries would find such a plan valuable; therefore, it makes little sense to compare this Level internationally. Even the lifeline program by the U.S. Federal Communications Commission (FCC) that offers free phone service for low-income individuals offers higher service levels than Wall/Nordicity's mobile wireless telephony Level 1. Specifically, the FCC's Lifeline Service Program offers 500 minutes of voice, unlimited text, 100 multimedia messaging service (MMS) messages, 1 GB of wireless data, and unlimited Wi-Fi access to select hotspots.[22] At a minimum, the Study needs to establish why Level 1, or any other Level for that matter, is a relevant marker for an international price comparison.

With no apparent relationship between Wall/Nordicity's Levels and consumer demand, it is not surprising that there are no plans in Canada or in any of the seven benchmark countries that perfectly match these artificial consumer demand levels. Quite simply, most countries do not offer plans with the specifications assumed in the Study's artificial demand levels.

Rather than recognizing that artificial demand levels do not align with actual consumer demand and thus provider retail plans, Wall/Nordicity simply resorted to comparing the prices of plans that *most closely met or exceeded* these arbitrary demand levels. This decision results in a comparison of the prices of potentially drastically different services that meet or exceed some arbitrary threshold. By doing so, the resulting "apples to oranges" comparison implicitly argues that any additional services beyond what a Level defines are worthless (i.e., should be free of charge) to subscribers. There is no support for this assumption, particularly given that the Wall/Nordicity Levels have no market significance.

To illustrate the fundamental and fatal flaws in the Wall/Nordicity approach, consider the following simplified example. For ISED's mobile wireless telephony basket, Wall/Nordicity created a demand Level for a hypothetical subscriber who purchases unlimited voice minutes, unlimited SMS, and 2 GBs of data each month. Wall/Nordicity refers to this as Level 4 demand. As of May 2018, one of the closest services in Canada corresponding to Level 4 is a wireless plan offered by Bell Mobility in Toronto with unlimited voice, unlimited SMS, and 3 GBs of data. Bell Mobility prices this plan at CAD 56.04.[23] One of the closest Level 4 plans offered in the United States is a wireless plan offered by Sprint, which includes unlimited voice, unlimited SMS, and 2 GBs of data. Sprint prices this plan at CAD 50.40.[24] Wall/Nordicity compares these plans as if they were identical. Based on this, Wall/Nordicity incorrectly concludes that the mobile wireless telephony services in Canada are more expensive than in the United States. The comparison is meaningless because it compares two different wireless plans. Among other

22. See Life Wireless, https://www.lifewireless.com/main/plans, accessed March 2, 2018.
23. Bell Mobility, "Family plans, cell phone share plans from Bell Mobility," https://www.bell.ca/Mobility/Cell_phone_plans/Share_plans, accessed March 4, 2018.
24. Sprint, "Cell Phone Plans," https://www.sprint.com/en/shop/plans.html?INTNAV=TopNav:Shop:AllPlans, accessed February 28, 2018.

omissions, this simple comparison overlooks the fact that the Canadian plan offers an additional 1 GB of data at an additional cost of CAD 5.64. This compares to an additional CAD 18.90 on Sprint's network if a subscriber were to exceed the 2 GB plan allowance and wanted to retain 3G network speeds (rather than being downgraded to 2G speeds).[25] Consequently, the Study falsely interprets the introduction of plans at or near the Study's demand levels as lowering the overall prices in the country. Conversely, the Study would report a price increase in a country if providers were to remove plans at or near the demand levels irrespective of the overall prices in the country.

In fact, this type of misinterpretation is clearly present in the 2017 version. This Study version claims that prices in the United States for mobile wireless telephony services "increased by 34.5% (Level 1), and 18.6% (Level 6)" since 2016.[26] This is unbelievable as the FCC in 2017 found the mobile wireless telephony market in the United States to be effectively competitive (i.e., market forces are working properly).[27] In a competitive market, prices do not increase by double-digit percentages above inflation, and there is no record anywhere that prices in the United States increased by the levels reported in the Study.[28] The Study finds similar drastic price fluctuations in other countries, including a claimed price decrease of 48.3 percent in France (for Level 4 plans), a price increase of 26.4 percent in Australia (for Level 3 plans), and a price decrease in Canada of 25.7 percent (for Level 1 plans). Without testing the plausibility of its conclusions against real world data, Wall/Nordicity blindly reports these numbers not realizing that they are simply the result of the flawed design.

The problem with Wall/Nordicity's approach, as described above, is that it creates an omitted variable bias (one of regression analysis' most serious problems). In simple terms, the Study fails to account for the many differences in the service plans it compares. This problem extends beyond differences in plans and includes the omission of differences in network and country attributes. First, as shown above, the Wall/Nordicity approach treats as equal all plans that happen to fall closest to the required demand level. This approach fails to adjust for the differences in these plans, including, but not limited to, differences in the:

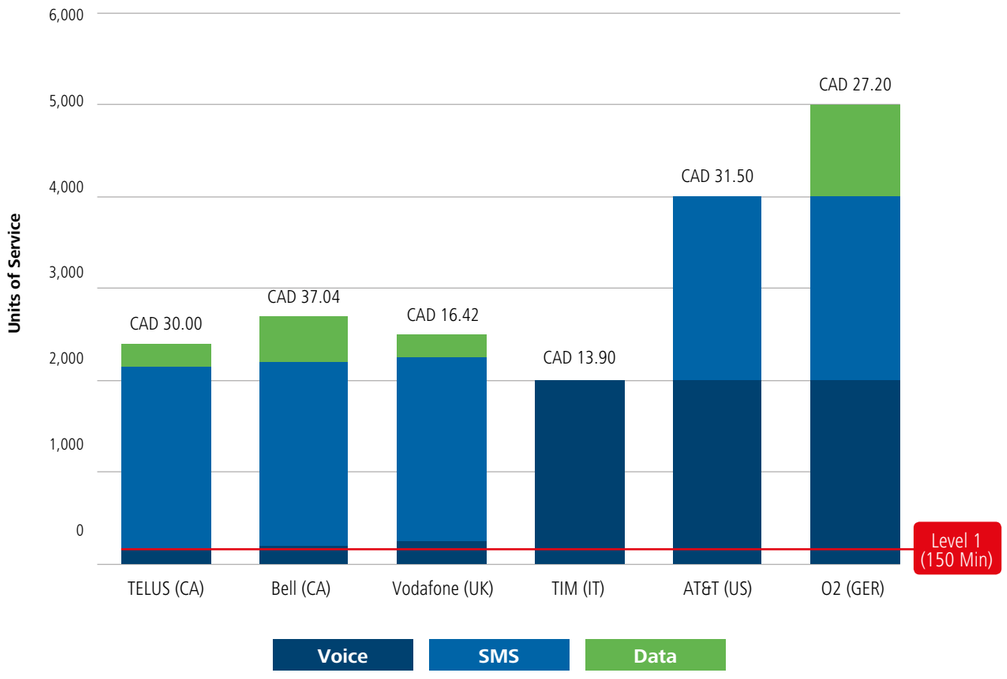
- number of voice minutes per month;
- number of data megabytes per month;
- number of SMSs or MMSs per month;
- number of months of the term contract; and
- megabits per second download speed.

25. Sprint charges an additional USD 15 or CAD 18.90 after adjusting for PPP. "For customers on the $15/GB additional high speed data buy up, customers will receive notifications at 75%, 90% and 100% of additional purchase data bucket." (Sprint, "Account Management Tools and Alerts," https://www.sprint.com/en/legal/account-management-tools-and-usage-alerts, accessed September 19, 2018.
26. 2017 Nordicity Study, p. 5.
27. "For the first time since 2009, the FCC makes an affirmative finding that the metrics assessed in the Report indicate that there is effective competition in the marketplace for mobile wireless services." (FCC News, "FCC Releases 20th Annual Mobile Wireless Competition Report," September 26, 2017.)
28. According to the U.S. Department of Labor, Bureau of Labor Statistics, wireless telephone service prices have been dropping. (See Wireless telephone services in U.S. city average, all urban consumers, not seasonally adjusted, Series ID CUUR0000SEED03.)

To visualize the incompatible comparisons that Wall/Nordicity's methodology creates, consider Figure 2 that shows actual plans offered by Bell, TELUS, and international providers Telecom Italia Mobile (TIM), Vodafone, O2, and AT&T. All these mobile wireless telephony plans are Wall/Nordicity "Level 1 plans" in that they are the cheapest plans offered by these providers for a hypothetical subscriber seeking to consume 150 minutes of voice and nothing more.[29] Wall/Nordicity compares these plans as if they are all the same. However, as Figure 2 shows, each plan offers drastically different service levels and prices. A meaningful comparison must consider these differences.

Comparing them as equals leads to incorrect results. For example, consider that a possible Level 1 plan for TIM offers 1,500 minutes of voice for CAD (PPP) 13.90 and a possible Level 1 plan for Vodafone UK offers 250 minutes of voice, 1,000 SMSs, and 500 MBs of data for CAD (PPP) 16.42. The Wall/Nordicity report would lead readers to conclude that TIM is less expensive than Vodafone, even though Vodafone offers significantly more (i.e., 1,000 SMSs and 500 MBs of data) for just CAD (PPP) 2.52 more.

Figure 2 Nordicity's Level 1 Comparison Includes Plans with Varying Amounts of Additional Services beyond the 150 Minutes Threshold

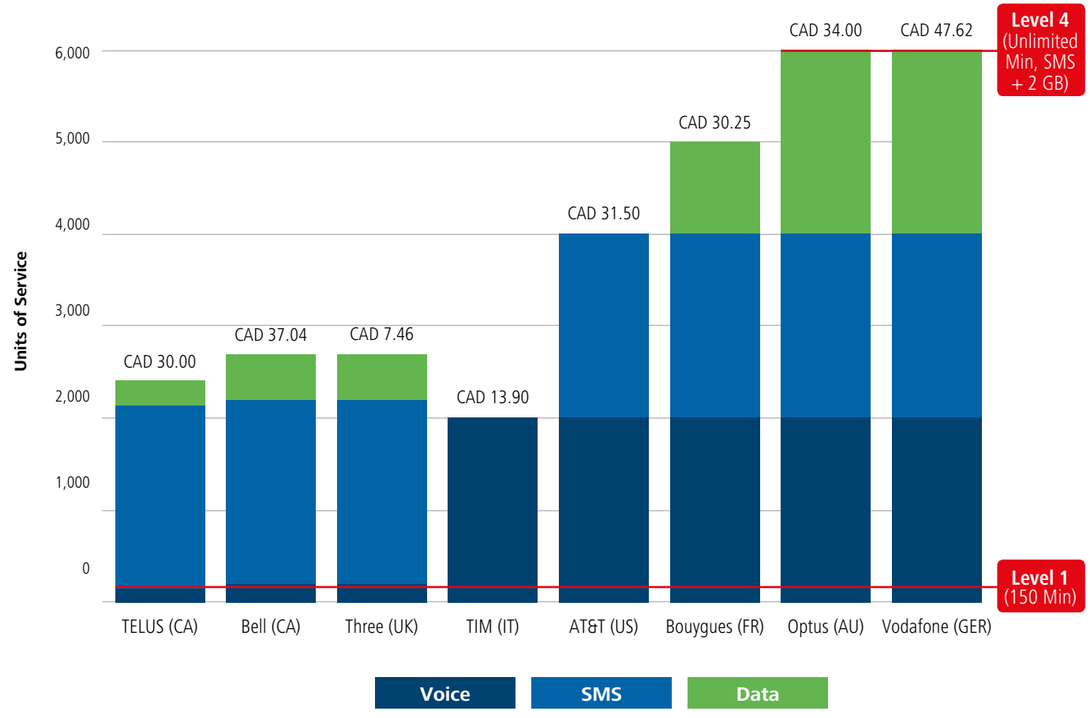


Note: For illustration purposes, 2,000 is considered unlimited for voice and SMS.

29. Note that unlimited voice and text services are shown as 2,000 units of service. For example, Rogers' and AT&T's plans include unlimited SMS.

Relatedly, given that actual plans far exceed the artificial Wall/Nordicity Levels, one plan could apply to several Levels, that is, be the cheapest plan for Levels 1, 2, 3, and 4. Figure 3 lists select Level 1 plans for the mobile wireless telephony basket. Although the plan for TIM is only a Level 1 plan and does not fulfill the requirements for Level 2 and beyond, the plans for Optus Australia and Vodafone Germany apply to Levels 1, 2, 3, and 4. Consequently, these plans appear expensive relative to Level 1 and inexpensive relative to Level 4. However, this does not provide any information about the price levels in Australia and Germany just how close these plans are relative to Wall/Nordicity's demand levels.

Figure 3 The Same Plans Fall within Multiple Levels

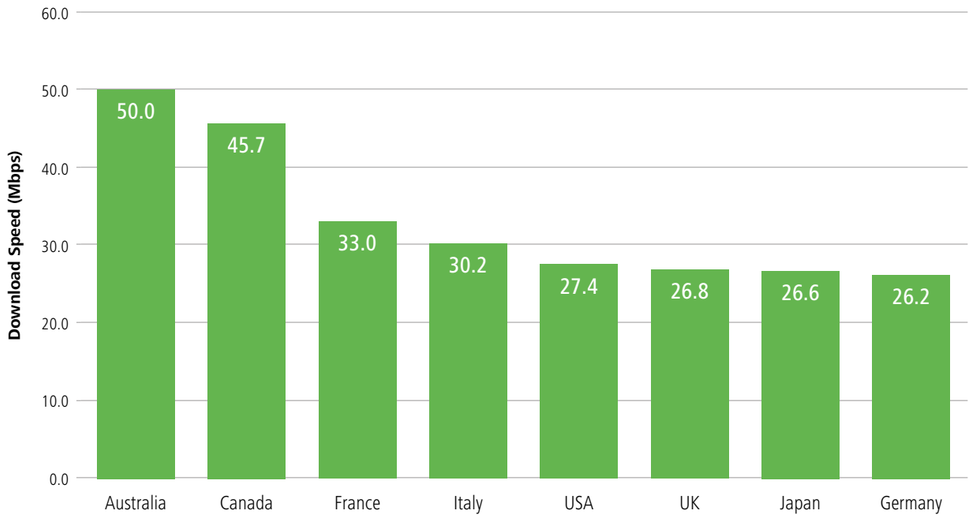


Note: For illustration purposes, 2,000 is considered unlimited for voice and SMS.

2.3.2. Wall/Nordicity ignores all differences in network attributes

The Wall/Nordicity price comparison ignores all differences in network attributes, that is, differences in mobile download speeds and network coverage (e.g., national vs. regional). For instance, as Figure 4 illustrates, there is a significant difference in mobile download speeds with Canada offering the second highest speeds after Australia.

Figure 4 **Wall/Nordicity Ignores Differences in Download Speeds**



Source: Ookla, "Speedtest Global Index," February 2018, http://www.speedtest.net/global-index, accessed March 8, 2018.

The Wall/Nordicity methodology also does not consider that all the surveyed countries except for Canada and the United States use calling party pays (CPP), whereas Canada and the United States operate on the concept of wireless party pays (WPP), often mischaracterized as receiving party pays (RPP).[30] In CPP countries, mobile wireless subscribers pay for outgoing calls but do not pay for incoming calls. In WPP countries, mobile wireless subscribers pay for both outgoing and incoming calls. As noted by Wall:

> Differences in rating regimes (i.e., CPP versus RPP) can significantly affect both wireline and wireless service price comparisons between the countries, which must be borne in mind when comparing wireless (as well as wireline) rates in Canada and the U.S. with those in other OECD countries.[31]

For instance, although in CPP countries there might be a demand for voice plans with fewer minutes (resembling more closely Levels 1 and 2), in WPP countries, consumers might request richer voice plans as they must pay for both incoming and outgoing minutes. Wall/Nordicity ignores these differences and assumes that demand levels regardless of whether a country is CPP or WPP are identical.

30. See 2017 Nordicity Study, ¶ 4.3. According to a study comparing RPP and CPP regimes, "After allowing for various economic and technical [factors] average revenue (price) per call is significantly lower with RPP, average minutes of usage per subscriber are significantly higher and the mobile penetration rate is not significantly different. Handset subsidies seem to be lower in the US (with RPP) than in the UK (with CPP)." (S.C. Littlechild, "Mobile termination charges: Calling Party Pays versus Receiving Party Pays," *Telecommunications Policy* 30 (2006): 242–277.)
31. 2008 Wall Methodology Report, p. 3. This is an example of the mischaracterization of RPP when it is actually WPP, as noted previously.

2.3.3. Wall/Nordicity ignores all differences in country attributes

Retail prices even in the most competitive market will not fall below costs. The Wall/Nordicity Study fails to examine differences in country-specific costs, thereby implying that building a network in Japan costs the same as building a network in Canada.

This is unrealistic as the two countries differ significantly, for example, in terms of size, labor costs, population density, and weather.[32] These differences directly affect costs that, in turn, affect prices. A larger country requires more capital to build a nationwide network than a smaller country. Higher labor costs increase both capital and operating expenditures, whereas low-density geographies require more investment per capita. Even weather can impact prices as extreme temperatures might require specialized equipment and drive up operating expenditures through higher maintenance costs.

Canada has a population density of four people per square kilometer (km2). In contrast, the populations of the European countries range from France's 123 to the UK's 273 per km2, whereas Japan tops the list with 348 people per km2. On the other hand, Australia with 3.2 and the United States with 36 people per km2 are closer to Canada's measure.[33] In a 2011 Study, Nordicity noted, "the population density within the landmass covered by the wireless network – 16.9 people/km2 – would rank [Canada] as the 200th least-densely populated country in the world."[34]

Similarly, Canada's weather conditions also differ significantly from other countries. For example, Canada's average low temperature in the coldest month and the average temperature in that month differ radically from the other countries, as shown in Table 4.

Table 4 **Average Temperature in Each Country's Coldest Month (Celsius)**

Country	Canada	US	Australia	France	Germany	Italy	Japan	UK
Average Low Temperature	-15.6	0.9	6.8	1.3	-2.6	2.6	0.1	1.4
Average Temperature	-11.1	-0.1	12.4	4.1	0.2	5.7	3.9	4.2
Month	January	January	August	January	February	January	January	February

Source: Weatherbase.com.

32. As Nordicity has noted, "factors such as population density, terrain and climate have significant impacts on the cost of service." (2016 Nordicity Study, p. 12.) See also a 2011 statement, "A thorough international benchmarking process should also analyze ... Relative geographic challenges." (Nordicity, International Wireless Market Comparison, Review of the OECD Wireless Rankings, June 2011, p. 4.)
33. See The World Bank Data, Population Density (people per sq. km of land area), Food and Agriculture Organization and World Bank Population Estimates, 2017, https://data.worldbank.org/indicator/EN.POP.DNST, accessed September 21, 2018.
34. Nordicity, "International Wireless Market Comparison, Review of the OECD Wireless Rankings," June 2011, p. 20.

Looking only at the six provinces included in the Wall/Nordicity Study does not change Canada's exceptionalism: average low temperatures in January ranging from –5.8 degrees Celsius in British Columbia to –23.2 in Manitoba and average temperatures in January ranging from –2.7 degrees in British Columbia to –17.9 in Manitoba.[35]

The Wall/Nordicity price comparison ignores all these differences and assumes that an unlimited voice and data WPP mobile wireless telephony plan with a 45 Mbps download speed in Canada offers the same value to a subscriber as a limited CPP mobile wireless telephony plan with 27 Mbps in Japan and should therefore cost the same. The Wall/Nordicity comparison of apples to oranges renders the price comparison meaningless and even harmful when used to assess the competitiveness or affordability of the Canadian market for communications services.

In the 2016 edition of the Study, Nordicity forewarned readers of the Study's limitations in a section titled "Caveats to the Interpretation of the Findings of this Study."[36] Although the section inadequately disclosed the severe limitations of the Study, Nordicity nevertheless admitted, "price increases … may in part, simply reflect better service levels offered to consumers."[37] Nordicity further admitted, "This Study did not take into account the network technologies deployed in the networks nor the speed or quality of service of those networks."[38] Nordicity also noted:

> [T]his Study did not account for any cost of service or socio-economic factors that may be relevant for price differences across different domestic and international jurisdictions. Thus, factors such as population density, terrain and climate have significant impacts on the cost of service. Similarly, socio-economic factors such as affordability indicators (i.e. mobile prices in relation to disposable income), number of handsets per subscriber, number of minutes of usage per subscriber and other factors were not within the scope of this Study.[39]

Surprisingly, although the 2017 Study deviates only minimally from its 2016 predecessor, the authors decided to drop these caveats, further exacerbating the risk of readers misinterpreting and misapplying the Study.

35. See Weatherbase.com, Manitoba, http://www.weatherbase.com/weather/city.php3?c=CA&s=MB&statename=Manitoba, British Columbia, http://www.weatherbase.com/weather/city.php3?c=CA&s=BC&statename=British%20Columbia, accessed April 26, 2018, Celsius = (Fahrenheit - 32) x 5/9.
36. 2016 Nordicity Study, p. 12.
37. Ibid.
38. Ibid.
39. Ibid.

2.3.4. Wall/Nordicity's execution is unsound

In addition to the poor design, the Study also suffers from a lack of proper execution, meticulous data collection, and the objective interpretation of experimental results, which are requirements for a useful study.[40] The most troublesome execution errors include the lack of transparency, inconsistent data comparisons, and factual and mathematical errors.

2.3.5. Lack of transparency

A particularly troublesome issue is the Study's lack of transparency. Critical details are missing from the report. Most important, Wall/Nordicity does not divulge the databases for the annual editions. Thus, it is impossible to ascertain which prices Wall/Nordicity harvested and whether all providers offered plans for each of Wall/Nordicity's Levels. For instance, in Vancouver, there is only one provider, Shaw, that currently offers Level 5 fixed broadband service. The 2017 Study failed to disclose how it dealt with this fact and whether the 2017 Study rests on a single observation in that instance.[41] Similarly, the explanation of how Wall/Nordicity arrived at market shares is seriously lacking. For Canada, Nordicity explains:

> City-specific prices for each of the stand-alone and bundled service baskets offered by the service providers listed in Table A.1 were weighted according to each service provider's estimated subscriber-based market share. Similarly, in calculating Canada-wide market prices, city-specific prices were aggregated and weighted according to city population.[42]

In a footnote to the above, Nordicity elaborates:

> The estimated market shares were drawn from the CRTC's annual Communications Monitoring Report (CMR) for 2016 and 2015. Consistent with the previous year's report, we estimated market shares for wireline services on a city-specific basis whereas for mobile wireless services and residential broadband services, the estimates were based on province-specific, national data respectively.[43]

For mobile wireless telephony services, this claim is simply incorrect. As reported by the CRTC, the 2016 Communications Monitoring Report (CMR) only "displays the market shares owned by the major [mobile wireless service providers], excluding Wind and Eastlink, in Canada's provinces and territories."[44] Thus, it remains unclear how the Study relied on the CMR to derive "province-specific" market shares for a plethora of providers, including Eastlink, PC Mobile, Petro-Canada Mobile, 7-Eleven, Freedom Mobile, Primus, and the second-tier brands Fido and Chatr (both Rogers), Virgin (Bell), and Koodo and Public Mobile (both TELUS).[45] Furthermore, the CMR reports only the national fixed broadband (residential Internet) subscriber data by type of provider (e.g., incumbent telecommunications providers, cable-based providers, etc.).[46] Again, this raises the question of how Wall/Nordicity developed national market shares for companies such as TekSavvy, Primus, Distributel, and others.

Relatedly, the Wall/Nordicity Study does not offer even minimal information about its estimation of the market shares of providers abroad. There is also no discussion of whether the cities in the United States were handled the same as those in Canada, and, if so, what sources were used to estimate city-level shares.[47]

40. See *Reference Manual on Scientific Evidence*, p. xiii.
41. There are examples in the 2017 Nordicity Study of instances of single observations (e.g., for mobile wireless in France, "where the only operator offering Level 4 service in 2017 decreased its prices from last year"), but it is unclear to what extent these instances are recorded. (2017 Nordicity Study, p. 38; see also pp. 48, 53.)
42. Ibid., p. 23.
43. Ibid.
44. CRTC, Communications Monitoring Report 2016, Table 5.5.8.
45. 2017 Nordicity Study, p. 33 for secondary brands.
46. See CRTC, Communications Monitoring Report 2016, Table 5.3.4.
47. See 2017 Nordicity Study, Table A2 for a list of U.S. cities and the service providers for whom shares were estimated.

2.3.6. Inconsistent comparisons

With respect to the international comparison for fixed telephony prices, in its 2017 Study, Nordicity excluded an international comparison of fixed telephony services, simply stating, "for this year the international price comparison was removed."[48] This appears to be the first year that the consultancies did not include an international comparison for fixed telephony services, making it particularly important to provide the reader with an explanation of why it eliminated this comparison.

There are also a series of non-international comparisons included in the Study that one would not expect to be part of an international comparison—at least not without further explanation of how the comparison adds to the Study's hypothesis. For instance, in 2017, Nordicity included domestic price comparisons for all service baskets.

48. 2017 Nordicity Study, p. 3; see also pp. 20, 94.

2.3.7. Factual and mathematical errors

Finally, the Wall/Nordicity Study also suffers from quality problems, including several incorrect factual statements, apparent data issues, and mathematical errors. For instance, the 2017 edition of the Study reports collecting data from both Xfinity and Comcast, raising concerns with respect to factual accuracy because Xfinity is a tradename of Comcast Communications, LLC.

Relatedly, with Comcast and Xfinity being the same provider, it is unclear how the 2017 Study met ISED's requirement of "a minimum of three providers per service/section."[49] As an example, for Minneapolis, Table A2 of the 2017 Study lists CenturyLink, Comcast, and Xfinity, which are only two separate entities. The same error applies for Seattle. Because of the Study's lack of transparency, it is unclear whether the Study included the same data twice or whether the inclusion of Xfinity is a typo and another service provider was included.

There are also mathematical errors in the Study. These are apparent in the limited areas where sufficient details exist to replicate the work. For instance, consider the data entry for Regina in Table 6 of the 2017 Study, which purportedly compares mobile wireless telephony prices in Regina between incumbents and regional providers on a Level-by-Level basis. For each Level, the incumbents charge lower prices than regional providers do (e.g., the reported differential is positive). However, in the last column in the table, Nordicity erroneously reports that on average the incumbents charge higher prices than regional providers do (e.g., the reported differential is negative). Basic mathematics tells us that the average of a set of positive numbers cannot be negative.[50] Nordicity's result for Regina and its results for the other cities in the table lead Nordicity to conclude erroneously, "Overall, regional operators' prices were lower than incumbents' by a range of 6.92% to 26.63% for all service basket levels."[51] Table 5 summarizes Nordicity's calculations for Regina and adds the necessary corrections, demonstrating that Nordicity reported the exact opposite of what its own data show.

Table 5 **Regina Incumbent and Regional Mobile Wireless Telephony Prices**

City	Provider Type	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Nordicity Average	Corrected Average
REGINA	Incumbents	$28.95	35.62	45.62	n/a	60.62	184.09	$70.98	$42.70
	Regional	$30.83	35.83	70.83	n/a	80.83	n/a	$54.58	$54.58
	Differential	6.5%	0.6%	55.3%	n/a	33.3%	n/a	**-23.1%**	**27.8%**

49. RFP, p. 4.
50. The error occurs because Nordicity included Level 6 in the incumbents' average and did not include it in the regional providers' average because the regional providers did not offer it.
51. 2017 Nordicity Study, p. 32.

The error extends beyond Regina. For instance, in Winnipeg, Nordicity erroneously reports that regional providers offer lower prices (i.e., 19.2 percent lower) than the incumbents do when in fact the regional providers are 27.7 percent more expensive.

Mathematical errors are also present in Table 8 of the 2017 Study that compares prices offered by incumbent mobile wireless service providers and MVNOs. In calculating the city average, it appears that Nordicity did not include Level 1 data for each of the Canadian cities, thereby yielding incorrect averages.

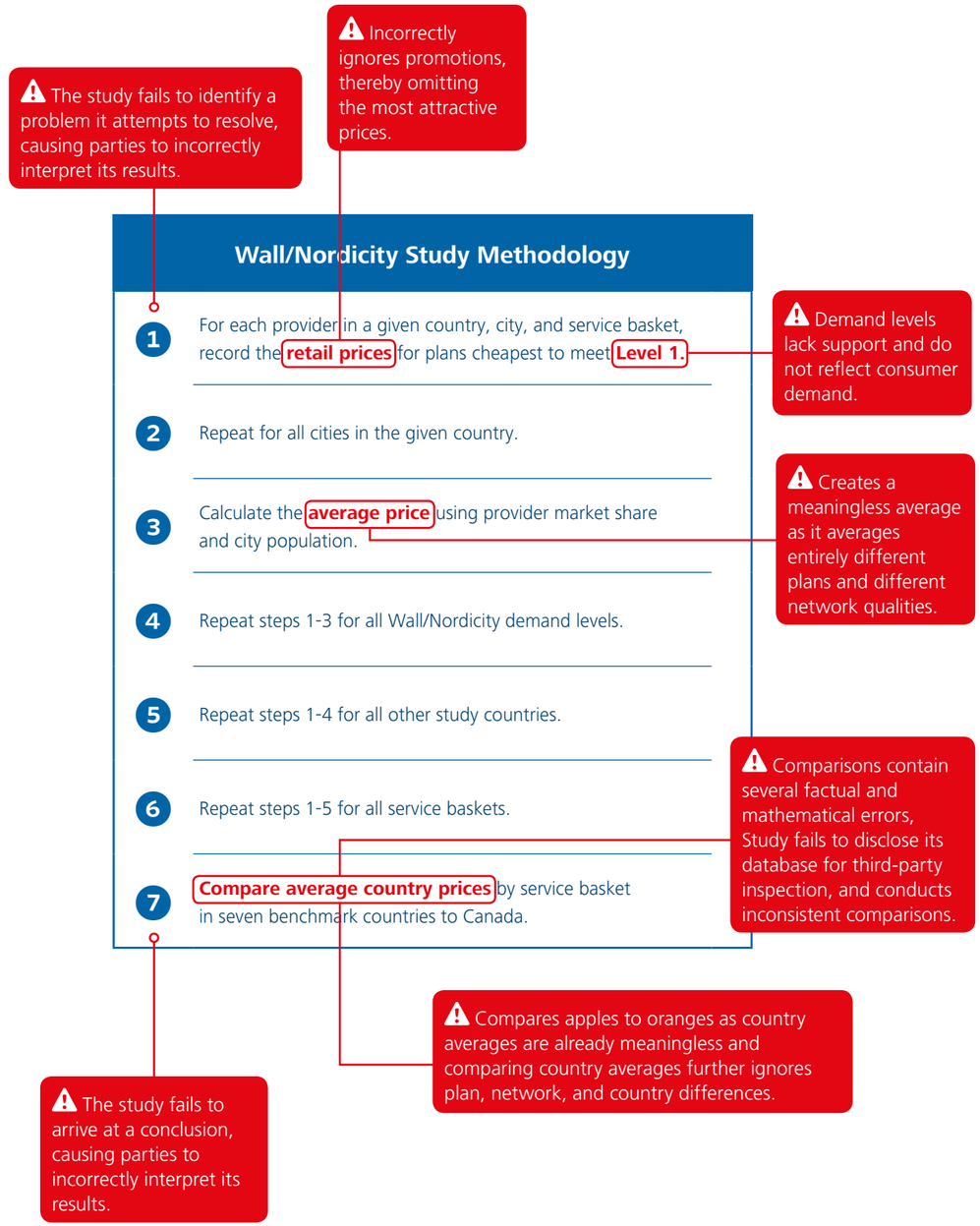
Additionally, in comparing the (incorrect) results in Table 8 to the same table in the 2016 Study, Nordicity concludes, "Overall, the price differential between incumbents and resellers/MVNOs increased from 9.90% to 13.26%, in comparison to last year."[52] Nordicity omits the fact that in 2016 "Primus and Petro-Canada were excluded from the service basket Level 3 average due to their abnormally high prices (Primus: $115.62 and Petro Canada Mobile: $141.25)."[53] However, in the 2017 Study, it appears that Nordicity elected to include the companies as prices for Level 3 are significantly higher than for Level 4—the very issue that caused Nordicity to exclude Primus and Petro-Canada the previous year. Although Wall/Nordicity provides insufficient detail or the database to replicate the results, it appears that the Study relies on inconsistent and random assumptions. It also erroneously reports a price increase when the increase appears to be the result of the Study's inconsistent assumptions.

Although ISED set out to control the quality of the consultancy report, there are errors remaining. The basic errors in the 2017 Study raise additional questions about other errors in the material that Wall/Nordicity elected not to make public. Although an audit of previous editions of the Study was not performed, some of the same errors also appear in previous versions.[54] Chief among them is the pricing database that Wall/Nordicity collected and used as the basis for the analyses.

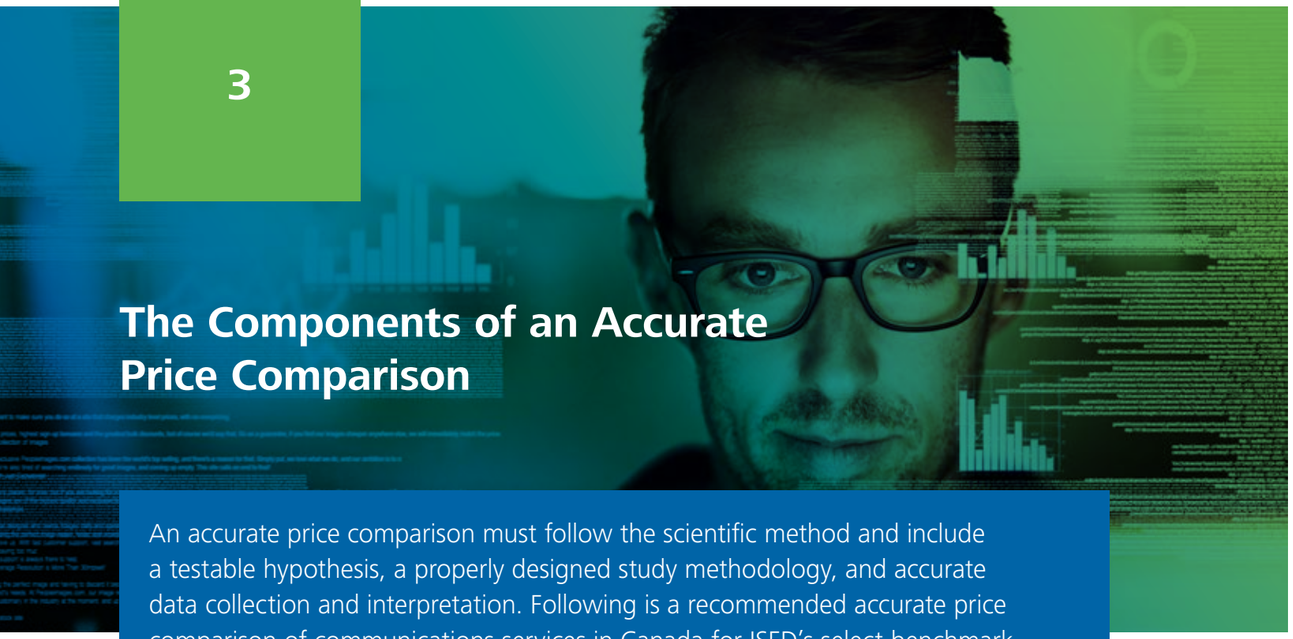
Figure 5 summarizes the errors in the Wall/Nordicity methodology and its execution. It illustrates that the Study is fatally flawed and no remedy is available to address these problems. Rather, to properly interpret the data and provide accurate responses to ISED's questions, a fundamental redesign of the study methodology is required.

52. Ibid., p. 35
53. 2016 Nordicity Study, p. 33.
54. See, for instance, Tables 3 and 4 in the 2015 Study in which the same averaging error appears as in Table 6 of the 2017 Study. In Wall's 2015 report, Level 5 prices should be excluded from Halifax. (See Wall Communications Inc., "Price Comparisons of Wireline, Wireless and Internet Services in Canada and with Foreign Jurisdictions," March 30, 2015, pp. 20, 22.)

Figure 5 **Illustration of the Wall/Nordicity Errors**



3



The Components of an Accurate Price Comparison

An accurate price comparison must follow the scientific method and include a testable hypothesis, a properly designed study methodology, and accurate data collection and interpretation. Following is a recommended accurate price comparison of communications services in Canada for ISED's select benchmark countries.

3.1. Benchmark Countries and Evaluation Methodology

3.1.1. International precedent

International comparisons are not new, and several regulatory bodies conduct them routinely. For instance, the U.S. Broadband Data Improvement Act (BDIA) states:

> [T]he Federal Communications Commission shall include information comparing the extent of broadband service capability (including data transmission speeds and price for broadband service capability) in a total of 75 communities in at least 25 countries abroad for each of the data rate benchmarks for broadband service utilized by the Commission to reflect different speed tiers.[55]

The primary purpose of the comparison is to assess "whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion."[56] The FCC considers price an element of service capability and thus includes a price comparison. More important, price is not the sole or even primary focus of the international comparison. Specifically:

55. 47 U.S.C. Ch.12: Broadband, §1303 – Improving Federal data on broadband, http://uscode.house.gov/view.xhtml?path=/prelim@title47/chapter12&edition=prelim.
56. 47 U.S.C. § 1302 – Advanced telecommunications incentives, (b) Inquiry.

> The BDIA requires the Commission to include as part of its assessment in the annual broadband deployment report "information comparing the extent of broadband service capability (including data transmission speeds and price for broadband service capability) … for each of the data rate benchmarks for broadband service utilized by the Commission to reflect different speed tiers." The BDIA directs the Commission to choose international communities comparable to various communities in the United States with respect to population size, population density, topography, and demographic profile … The Commission must "identify relevant similarities and differences in each community, including their market structures, the number of competitors, the number of facilities-based providers, the types of technologies deployed by such providers, the applications and services those technologies enable, the regulatory model under which broadband service capability is provided, the types of applications and services used, business and residential use of such services, and other media available to consumers" (footnotes omitted).[57]

The FCC uses its international database (which contains at least 25 countries) to make an evaluation using three different methodologies. The first, used by the FCC in previous reports, takes the unweighted average prices for (a) standalone broadband plans within certain download speed ranges and (b) mobile broadband plans within bands of data usage allowances. In its latest report, the FCC added two additional methodologies "[t]o more closely match the characteristics of the comparison communities and their broadband offerings with [in their case] the United States."[58] The two additional methodologies are a broadband price index and a hedonic price index.

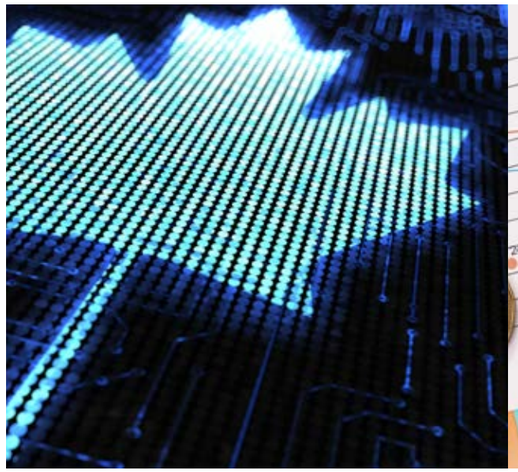
With its annual International Communications Market Report, the British regulator Ofcom also conducts an international comparison. The regulator explains, "The aim of the report is to compare the UK communications sector with a range of countries in order to assess how the UK is performing in an international context."[59] In fact, the rest of the report reads:

> This report is intended to be used in a number of ways: to benchmark the UK's communications sector, to learn from market and regulatory developments in other countries, and to provide the context for Ofcom's regulatory initiatives. It also contributes to the information we draw upon, enabling us to understand how our actions and priorities can influence outcomes for citizens and consumers, and for communications markets generally. This report complements other research published by Ofcom….[60]

Much like the FCC, however, price is not the only variable by which Ofcom conducts this comparison.[61] Ofcom compares the UK "against 16 comparator countries": France, Germany, Italy, the United States, Japan, Australia, Spain, Sweden, The Netherlands, Poland, South Korea, Brazil, Russia, India, China, and Nigeria.[62] Ofcom uses an approach that compares the "best prices available from the leading providers by retail market share in each country to buy a 'basket' of services. Baskets are based on typical usage levels for low, medium, and high users, as defined by the OECD."[63] Although this approach is similar (but not identical) to the method used by ISED, Ofcom clearly lists the limitations of such an approach. The regulator underscores the importance of keeping these limitations in mind when interpreting the results. Ofcom highlights, "Our pricing analysis is based on a limited number of baskets, when actual consumer use will span a much wider range of types of use."[64] For example, consumer take-up differs by plan and consumers might not purchase the cheapest plan for their demand level.

57. FCC, International Comparison Requirements Pursuant to the Broadband Data Improvement Act, GN Docket No. 17-199, *Sixth Report*, DA 18-99, rel. Feb. 2, 2018, ¶ 2.
58. Ibid., ¶ 13.
59. Ofcom, "International Communications Market Report 2017," December 18, 2017, p. 5.
60. Ibid.
61. For example, the Ofcom report ranks the UK with regard to fixed and mobile broadband but notes that population distribution, housing patterns, topography, and regulatory approaches and government intervention can affect rankings. (See Ofcom, "International Communications Market Report 2017," December 18, 2017, pp. 52, 56, https://www.ofcom.org.uk/__data/assets/pdf_file/0032/108896/icmr-2017.pdf.)
62. Ibid., p. 4.
63. Ibid., p. 38.
64. Ibid., p. 39.

An Accurate Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions



3.1.2. Revised objective and properly designed study methodology

The FCC's and Ofcom's approaches provide valuable lessons for an accurate price comparison. First, in contrast to the at least 25 countries in the FCC study and the 16 countries in the Ofcom study, ISED compares Canada to merely seven countries. As explained below, this relatively short list of countries leads to several study limitations. Second, neither the FCC nor Ofcom relies on the price comparison alone to draw competition and regulatory conclusions. Third, as illustrated by the FCC, a proper data analysis requires more sophisticated data evaluation methodologies, including regression analysis.

> Regression analysis has become one of the most widely used statistical tools for analyzing multifactor data. It is appealing because it provides a conceptually simple method for investigating functional relationships among variables. The standard approach in regression analysis is to use a sample of data to compute an estimate of the proposed relationship….[65]

Based on these considerations and basic economic principles, a redesign of ISED's price comparison must rely on an econometric evaluation of the price data to test the hypothesis that prices for communications services in Canada exceed those of ISED's benchmark countries. A regression analysis establishes the relationship between retail prices in the benchmark countries (expressed in Canadian dollars and adjusted for the difference in purchasing power) and a set of attributes that determine the retail price. This relationship can then forecast the price a foreign provider would charge in Canada. Comparing these forecast prices to actual prices in Canada, in turn, determines whether prices in Canada are higher or lower than abroad.

The regression method corrects for the most fundamental error in the Wall/Nordicity Study that compares retail prices without adjusting for differences in plans. Thus, although a Canadian plan might be more expensive in absolute terms (i.e., the monthly out-of-pocket expenses incurred by a subscriber) than a plan abroad, or vice versa, observing absolute prices is meaningless as it fails to recognize that the plans are not identical. The regression methodology adjusts (normalizes) for differences in plans and thus compares identical plans, offered on identical networks, in identical countries.

Consider the following simplified example to illustrate the methodology. Assume that prices abroad for mobile wireless services are the result of the voice, data, and SMS monthly allowances. For example, 100 minutes of voice add CAD 1.00, 100 MBs of data add CAD 2.00, and 1,000 SMSs add 0.50. Thus, a provider offering a plan with 800 minutes of voice, 3,000 MBs of data, and 1,000 SMSs is forecasted to charge (8 x CAD 1) + (30 x CAD 2) + (1 x CAD 0.5) = CAD 68.50 per month. If a Canadian provider, albeit an incumbent, regional, or a reseller, offers that exact plan below CAD 68.50 (holding other aspects constant), the price for this plan is cheaper in Canada than what foreign providers would charge for the same plan. Conversely, if the price is higher, it is more expensive.

As explained below, variables that influence retail prices extend far beyond monthly voice, data, and SMS allowances and include additional plan attributes, network characteristics, and country-specific variables that influence the cost of furnishing the services. Thus, an accurate price comparison for Canada relies on a regression analysis that considers three categories of variables:

(1) plan attributes (e.g., voice, data, SMS, term contract, etc.);

(2) network attributes (e.g., network speed and quality); and

(3) country attributes (e.g., labor cost, size, population density, percentage urban, temperature, etc.).

To stay within the confines of ISED's RFP (which intends to compare Canada to the remaining G7 countries plus Australia), a redesigned study can retain the same countries, cities, and providers as specified by ISED. However, although this allows a comparison to the 2017 Nordicity Study and any subsequent editions, it also limits the analysis. As country variables are identical for each observation (where an observation is a plan offered by a provider in a benchmark city and country), there is only minimal variation in the benchmark dataset, thus making it difficult to evaluate how country attributes affect retail prices. Consequently, a redesign must consider expanding the list of benchmark countries to 25 countries, much as the FCC did.[66]

65. Samprit Chatterjee and Bertram Price, "Regression Analysis by Example," 2nd ed. (John Wiley & Sons, 1977), p. vii.

66. Evaluating how an attribute affects the retail price becomes far more robust when at least 24 observations are present (due to the law of large numbers). Hence, the FCC's number of 25 countries is superior to Ofcom's list of 16 benchmark countries.

3.2. Communications Services Covered

ISED requests a comparison of prices for the following five service baskets.

(1) Wireline telephony
(2) Mobile wireless telephony
(3) Fixed broadband Internet
(4) Mobile broadband Internet
(5) Bundled services

For services to be truly comparable, the providers must sell them in sufficiently similar ways in the study countries, thereby making a comparison meaningful. Wireline telephony does not meet this requirement because there are significantly different business models around the world. Providers in Europe generally distinguish between calls to wireline subscribers and mobile wireless subscribers (i.e., most of Europe has CPP service). Providers often charge metered rates for wireline service, or it is subject to a two-part tariff with a monthly fee that includes a certain number of minutes with additional minutes charged on a metered basis. In the United States, there is a distinction between local, long distance, and international calling. Importantly, long distance calling is mostly domestic. This is not the case in Canada because long distance mostly includes calls to the United States and in many instances other countries. Additionally, in many countries, standalone wireline telephony is subject to regulation and not necessarily representative of market rates.

Based on these characteristics, wireline telephony services do not lend themselves to an accurate international comparison, thus the redesign should eliminate the wireline telephony basket from the Study. With demand for standalone wireline telephony dwindling, this does not materially affect the Study. In fact, the 2017 Nordicity Study opted not to include an international comparison for wireline telephony services.

Evaluating bundled services is similarly challenging. A bundle of communications services can consist of double play, triple play, or quadruple play. Additionally, double-play bundles could combine fixed voice and fixed data, fixed data and TV, or some other combination. Similarly, triple-play bundles can include different services. To compare bundles accurately, only bundles containing the same services can be compared. This, however, would require harvesting data from all of the benchmark countries for each bundle definition for which ISED elects to compare prices. This is not practical and offers little, if any, additional information. An evaluation of standalone services suffices to evaluate retail prices in Canada because it is unlikely that the prices for bundled services follow a different trend than standalone services.

Based on these considerations, the revised pricing comparison study excludes comparisons of the wireline telephony and the bundled services baskets and instead focuses on comparing the prices for mobile wireless telephony, mobile broadband Internet (i.e., mobile data only), and fixed broadband Internet plans.

3.3. Relevant Study Variables

Important shortcomings of the Wall/Nordicity methodology include the omission of key plan attributes, the complete oversight of network qualities, and the absence of country-specific characteristics. The Wall/Nordicity Study incorrectly assumes that all plans at a given (artificial) demand level are identical, all networks in a given service basket are the same quality, and the cost structures for all countries are indistinguishable. To remedy this serious omission, a regression-based study must include the key variables relevant to the purchase decision and thus responsible for forming the retail price. Appendix A provides a comprehensive list of these variables, separated by the service baskets covered under the regression-based study.

3.4. Data Collection

NERA collected the necessary information from the providers' websites from March through June 2018. Occasionally, phone calls to customer service departments were necessary to clarify certain plan features. As summarized in Table 6, NERA tabulated 724 plans of which 425 were Canadian with the residual 299 being plans offered by the international benchmark providers.

Table 6 **NERA Database**

Service Basket	Benchmarks	Canada
Mobile Wireless Telephony	112	246
Mobile Broadband Internet	103	111
Fixed Broadband Internet	84	68
Total	**299**	**425**

Specifically, for each selected provider in each city, the study includes three plans. For the mobile wireless telephony basket, the study includes the plan with the lowest data allowance, the highest data allowance, and a plan in between the highest and lowest. For the fixed broadband Internet basket, the study relies on the plan with the slowest download speed, the fastest download speed, and a plan in between the highest and lowest. For the mobile broadband Internet basket, the Study uses the plan with the lowest data allowance, the highest data allowance, and a plan in between the highest and lowest.

Unlike previous Study iterations, ISED's 2018 RFP calls for the Study to "include flanker brands in the average rates for Mobile Wireless Service (value brands include; Fido, Koodo, and Virgin Mobile)."[67] Thus, the revised study relies on an expanded dataset that includes the following flanker or value brands:

- Virgin Mobile (Bell);
- Lucky Mobile (Bell);
- Chatr (Rogers);
- Fido (Rogers);
- Koodo (TELUS); and
- Public Mobile (TELUS).

Unlike Wall/Nordicity, this revised study includes promotions because they are actual purchase options for consumers. Furthermore, promotions are often available for an extended period and frequently are replaced by other promotions. Consistent with Wall/Nordicity's methodology, the study is limited to plans for new residential subscribers. Activation fees were amortized using straight-line depreciation over the length of the term contract. For plans with no term requirement, an expected subscriber life of 24 months is assumed. If plans were available with or without a handset, the plan without the handset is selected to ensure that the study only captures the value of the plan itself. All prices are pre-tax.

67. RFP, p. 4.

3.5. Data Interpretation

The regression model described above forecasts the prices for each of the 425 plans in the Canadian sample and then compares the forecasts to actual prices. The resulting two price vectors (benchmark prices and actual prices) are compared on three levels. First, on the country level, the revised study contrasts the number of plans that fall below the benchmark (i.e., are cheaper than international benchmarks for the same plan) to those that fall above the benchmark (i.e., are more expensive than what the international benchmarks providers would charge for the same plan). Canadian subscribers face *similar* price levels if there is an approximately even split between the number of plans that fall below and above the international benchmark. Canada is *cheaper* if significantly more plans fall below the international benchmark, and it is *more expensive* if the opposite applies.

Second, on the provider level, the revised study assesses whether national providers differ from regional providers with respect to their pricing relative to the international benchmark. This comparison also identifies providers that are consistently below or above the international threshold. Third, the results are interpreted on the city level, examining whether there is a marked difference in pricing among ISED's list of Canadian cities.

This three-pronged aspect of the revised study results provides answers to the following questions. Do Canadian subscribers face higher, lower, or similar price levels as their benchmark peers? Do regional providers and MVNOs offer cheaper prices relative to international benchmarks than nationwide providers do? Do cities with more providers exhibit lower price levels relative to the international benchmark?

Figure 6 provides a summary illustration of the regression-based study framework that addresses the shortcomings of the Wall/Nordicity Study framework. Table 7 compares the revised study to ISED's study objectives.

Figure 6 **NERA Study Overview**

NERA Proper Price Comparison

1. State the hypothesis to be examined (i.e., prices in Canada are higher than in G7 + Australia benchmark countries).
2. Build a database of retail prices for ISED's study baskets, countries, cities, and providers, including promotions.
3. Determine the statistical relationship between prices and plan, network, and country characteristics in the benchmark countries (i.e., using regression analysis, find out what explains differences in prices abroad).
4. Based on this relationship, forecast the retail prices that the average international provider would charge for the Canadian plans in the study.
5. Compare forecast benchmark prices to actual prices for Canadian plans in the study. If actual prices are above the benchmark, the Canadian plan is more expensive than the international benchmark and vice-versa.
6. Examine results at the country, provider, and city level.
7. Perform robustness tests on results by comparing international benchmark prices against additional Canadian plans and TELUS' most popular plans.
8. Present the study conclusion, which rejects the stated hypothesis – i.e., prices in Canada are generally lower, not higher, than what an international provider would charge for the same plans on the same networks in Canada.
9. Present supporting documentation and assumptions including access to the electronic database for third-party inspection.

Table 7 **ISED Requirements and NERA Implementation**

Study Element	ISED Requirement	NERA Study
Testable Hypothesis	No objective, simply requesting to compare Canadian retail prices for five types of communications services to those in the remaining G7 countries and Australia	Prices for communications services in Canada are high relative to select foreign jurisdictions
Benchmark Countries	USA, Japan, Germany, France, UK, Italy, Australia	Unchanged from ISED requirement
Benchmark Cities	Boston, Kansas City, Minneapolis, Seattle, Sydney, London, Paris, Rome, Berlin, Tokyo	Unchanged from ISED requirement
Canadian Cities	Halifax, Montreal, Toronto, Winnipeg, Regina, Vancouver	Unchanged from ISED requirement
Benchmark Providers	Three to six specific providers by city and country	Unchanged from ISED requirement*
Canadian Providers	Specific nationwide providers, MVNOs, flanker brands	Unchanged from ISED requirement
Service Baskets	Fixed broadband Internet, mobile wireless telephony, mobile wireless Internet, bundled services	Fixed broadband Internet, mobile wireless telephony, mobile wireless Internet

**With the exception of Windstream in the U.S., which no longer serves retail customers.*

4

An Accurate Price Comparison Shows Canadian Prices Below International Benchmarks

4.1. Mobile Wireless Telephony Prices in Canada are Lower than International Benchmarks

As detailed in Appendix C1, there is a strong statistical relationship between the retail prices of mobile telephony plans offered in the benchmark countries (expressed in Canadian dollars and adjusted for purchasing power parity) and their features, quality attributes, and the environments in which providers offer these services. In fact, the following variables explain about 76 percent of the differences in the benchmark countries' retail prices for mobile telephony services (although not all are statistically significant on an individual basis).

- Whether the plan requires a term contract
- Length of term agreement
- Data download speed
- Whether the plan includes unlimited data
- Monthly data allowance
- Whether the plan includes unlimited voice
- Monthly voice allowance
- Whether the plan includes unlimited SMS
- Monthly SMS allowance
- Percentage of subscribers living in urban areas
- Country size (in square kilometers)
- Size of the network relative to country size
- Gross domestic product per capita
- Whether the plan is entry, mid, or top level in terms of the monthly data cap
- Whether the country employs CPP or WPP/RPP

Based on this relationship, the prices that an average international provider would charge for the 246 Canadian mobile telephony plans in the database can be forecast. This forecast accounts for differences in plan, network, and country attributes and thus remedies the principal problem with the Wall/Nordicity basket methodology, which treats all plans in the comparison (including networks and countries) as identical.

4.1.1. Country-level results: Canadian prices are lower than international prices

Comparing the forecasts at the country level demonstrates that of the 246 Canadian mobile telephony plans in the study 197 plans (80 percent) have prices that are *below* the forecast international benchmark prices. The residual 49 plans (20 percent) have prices that are *above* the forecast international benchmark prices. Table 8 summarizes the country-level results.

Table 8 **Country-level Results – Mobile Telephony**

Result	Number of plans	Percentage
Above Benchmark	49	19.9
Below Benchmark	197	80.1
Total	**246**	**100**

Thus, correctly interpreted at the country level, Canada's prices for mobile telephony services are generally cheaper than the prices providers in ISED's seven benchmark countries would charge for the same plans. This result dispels the claims that "Canadians pay some of the highest prices in the industrialized world for mobile wireless services,"[68] and "Canadians continue to pay more for wireless service than the majority of their peers living in G7 countries and Australia."[69] It also illustrates the significant harm that an ill-designed and poorly executed study can do to an industry by inducing market distorting regulatory policies.

68. Reconsideration Of Telecom Decision 2017-56 Regarding Final Terms And Conditions For Wholesale Mobile Wireless Roaming Service, Telecom Notice Of Consultation CRTC 2017-259, 20 July 2017, Intervention of Ice Wireless Inc., September 8, 2017, p. 13.
69. Emily Jackson, "Canadian mobile phone bills still rank among the most expensive in G7: CRTC report," *Financial Post*, August 11, 2016, http://business.financialpost.com/technology/canadian-mobile-phone-bills-still-rank-among-most-expensive-in-g7-crtc-report.

4.1.2. Provider-level results: Regional providers are not cheaper relative to international benchmarks

Table 9 summarizes the provider-level results demonstrating that Canadian providers, with the exception of Rogers and Eastlink, price most of their plans in the revised study *below* international benchmarks. Table 9 also disproves the claim that regional providers always offer cheaper prices, at least as it pertains to the international benchmark. In fact, in several instances, the revised study results for national and regional providers are identical. This finding suggests that the long-standing government subsidies and assistance programs (e.g., spectrum set-asides and cost-based wholesale domestic roaming) do not translate into more regional plans being priced below the international benchmark.

Relatedly, the revised study finds that MVNOs do not offer more lower-priced plans than the national or regional providers do. Again, this casts doubt on the long-standing claim that MVNOs always offer cheaper prices, are an important market force, and are socially desirable. Ultimately, whether it is a national or regional provider or an MVNO, the providers price most of their plans below the international threshold.

Table 9 **Provider-level Results – Mobile Wireless Telephony**

	7-Eleven		Bell		Chatr		Eastlink		Fido	
Result	#	%	#	%	#	%	#	%	#	%
Above Benchmark	6	33	2	11	0	0	2	67	5	28
Below Benchmark	12	67	16	89	18	100	1	33	13	72
Total	**18**	**100**	**18**	**100**	**18**	**100**	**3**	**100**	**18**	**100**

	Freedom		Koodo		Lucky Mobile		MTS		PC Mobile	
Result	#	%	#	%	#	%	#	%	#	%
Above Benchmark	0	0	0	0	0	0	1	33	6	33
Below Benchmark	6	100	18	100	12	100	2	67	12	67
Total	**6**	**100**	**18**	**100**	**12**	**100**	**3**	**100**	**18**	**100**

	Petro-Canada		Primus		Public Mobile		Rogers		SaskTel	
Result	#	%	#	%	#	%	#	%	#	%
Above Benchmark	6	33	0	0	0	0	12	67	0	0
Below Benchmark	12	67	18	100	18	100	6	33	3	100
Total	**18**	**100**	**18**	**100**	**18**	**100**	**18**	**100**	**3**	**100**

	TELUS		Videotron		Virgin		Total	
Result	#	%	#	%	#	%	#	%
Above Benchmark	3	17	0	0	6	33	49	20
Below Benchmark	15	83	3	100	12	67	197	80
Total	**18**	**100**	**3**	**100**	**18**	**100**	**246**	**100**

4.1.3. City-level results: More choice does not create lower prices

In 2017, as part of its review of Bell's acquisition of MTS, the Competition Bureau concluded:

> [T]hat as a result of coordinated behaviour among Bell, TELUS and Rogers, mobile wireless prices in Canada are higher in regions where Bell, TELUS and Rogers do not face competition from a strong regional competitor. Conversely, the Bureau concluded that where Bell, TELUS and Rogers face competition from a strong regional competitor, prices are substantially lower. The Bureau concluded that the lower prices are caused by the presence of a strong regional competitor who can disrupt the effects of coordination among Bell, TELUS and Rogers.[70]

Although the Competition Bureau did not disclose the details of its analysis, the revised study directly contradicts this claim. As shown in Table 10, there are no significant differences relative to the international benchmark across Canadian cities.

Table 10 **City-Level Results – Mobile Wireless Telephony**

Result	Halifax		Montreal		Regina		Toronto		Vancouver	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	13	33	6	15	5	12	9	21	10	24
Below Benchmark	26	67	33	85	37	88	33	79	32	76
Total	**39**	**100**	**39**	**100**	**42**	**100**	**42**	**100**	**42**	**100**

Result	Winnipeg		Total	
	#	%	#	%
Above Benchmark	6	14	49	20
Below Benchmark	36	86	197	80
Total	**42**	**100**	**246**	**100**

ISED includes SaskTel in the city of Regina. The Competition Bureau presumably considers SaskTel "a strong regional competitor" and seems to suggest that Regina would have more plans below the benchmark and the other cities would have more plans above the benchmark.[71] However, not only do all cities have more plans below the benchmark, the results in Regina are almost identical to the results in Montreal. This contradicts the Bureau's claim that regional providers offer lower prices.

The results above present a clear and simple picture: Competitive forces in Canada's mobile wireless market segment are working properly, and there is no evidence that there is individual or collective market power let alone the exercise of such.

70. Competition Bureau, "Competition Bureau statement regarding Bell's acquisition of MTS," Government of Canada, February. 15, 2017, http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/04200.html.
71. Ibid.

4.2. Mobile Broadband Internet Prices in Canada are Lower than International Benchmarks

As detailed in Appendix C2, there is a strong statistical relationship between the retail price of a mobile broadband Internet (or mobile wireless data only) plan (expressed in Canadian dollars and adjusted for purchasing power parity) and its features, quality, and the environment in which the providers offer the service. In fact, the following variables explain about 75 percent of the differences in the benchmark countries' retail prices for mobile broadband Internet services (although not all are statistically significant on an individual basis).

- Whether the plan requires a term contract
- Length of the term contract
- Data download speed
- Monthly data allowance
- Percentage of subscribers living in urban areas
- Country size (in square kilometers)
- Size of the network relative to country size
- Gross domestic product per capita
- Whether the plan is entry, mid, or top level in terms of the monthly data cap

Based on this relationship, the prices that an average international provider would charge for the 111 Canadian data only plans in the database can be forecast. This forecast accounts for differences in plan, network, and country attributes and thus remedies the principle problem with the Wall/Nordicity basket methodology, which treats all plans in the comparison (including networks and countries) as identical.

4.2.1. Country-level results: Canadian prices are lower than international prices

Comparing the forecasts at the country level demonstrates that of the 111 Canadian data only plans in the study 89 plans (80 percent) have prices that are *below* the forecast international benchmark prices. The residual 22 plans (20 percent) have prices that are *above* the forecast international benchmark prices. Table 11 summarizes the country-level results.

Table 11 **Country-level Results – Mobile Broadband Internet**

Result	Number of plans	Percentage
Above Benchmark	22	19.8
Below Benchmark	89	80.2
Total	**111**	**100**

Thus, correctly analyzed on the country level, Canada's prices for mobile broadband Internet service are generally *cheaper* than the prices in ISED's seven benchmark countries. This strong result negates the CRTC's claim that there is a need "to improve choice and affordability for mobile wireless services" by introducing "lower-cost data-only plans."[72] Canada's prices for data only plans are already below international benchmarks, making the introduction of additional plans superfluous at best. Once more, the result also illustrates the significant harm that an ill-designed and poorly executed study can do to an industry.

4.2.2. Provider-level results: Regional providers are not cheaper relative to international benchmarks

Table 12 summarizes the provider-level results that demonstrate there is no evidence supporting the claim that non-incumbent providers offer categorically lower prices for mobile broadband Internet service.

Table 12 **Provider-level Results – Mobile Broadband Internet**

	Bell		Fido		MTS		Public Mobile		Rogers	
Result	#	%	#	%	#	%	#	%	#	%
Above Benchmark	12	67	0	0	0	0	0	0	6	50
Below Benchmark	6	33	18	100	3	100	18	100	6	50
Total	**18**	**100**	**18**	**100**	**3**	**100**	**18**	**100**	**12**	**100**

	SaskTel		TELUS		Videotron		Virgin		Total	
Result	#	%	#	%	#	%	#	%	#	%
Above Benchmark	1	33	0	0	3	100	0	0	22	20
Below Benchmark	2	67	18	100	0	0	18	100	89	80
Total	**3**	**100**	**18**	**100**	**3**	**100**	**18**	**100**	**111**	**100**

72. CRTC, Telecom Decision CRTC 2018-97, "Reconsideration of Telecom Decision 2017-56 regarding final terms and conditions for wholesale mobile wireless roaming service," March 22, 2018, https://crtc.gc.ca/eng/archive/2018/2018-97.htm.

In fact, Videotron's three plans are all above the international benchmark. This contrasts with TELUS whose 18 plans are all below the benchmark. This result corrects Wall/Nordicity's incorrect price assessment for mobile broadband Internet plans, which Ice Wireless interpreted as showing that "Canadians pay some of the highest prices in the industrialized world for mobile wireless services."[73] It also disproves Ice Wireless' speculation that the alleged high prices are "perhaps why fully 1/3rd of low-income Canadians do not have mobile wireless service."[74] Prices are not high relative to ISED's benchmark countries, and there is no evidence that Ice Wireless and other regional providers offer lower prices than the nationwide providers do. This implies that the market is already fully competitive with entrants and incumbents unable to undercut each other's prices. Consequently, there is no reason to believe that providing further regulatory assistance to regional providers (through set-aside spectrum and other programs) would provide any consumer benefits.

4.2.3. City-level results: More choice does not create lower prices

Like mobile wireless telephony service, mobile broadband Internet service does not support the Competition Bureau's claim that there are coordinated effects in markets without strong regional competitors. As shown in Table 13, prices are below international norms in all cities.

Table 13 **City-Level Results – Mobile Broadband Internet**

	Halifax		Montreal		Regina		Toronto		Vancouver	
Result	#	%	#	%	#	%	#	%	#	%
Above Benchmark	3	18	6	30	4	20	3	18	3	18
Below Benchmark	14	82	14	70	16	80	14	82	14	82
Total	**17**	**100**	**20**	**100**	**20**	**100**	**17**	**100**	**17**	**100**

	Winnipeg		Total	
Result	#	%	#	%
Above Benchmark	3	15	22	20
Below Benchmark	17	85	89	80
Total	**20**	**100**	**111**	**100**

73. Reconsideration of Telecom Decision 2017-56 Regarding Final Terms and Conditions for Wholesale Mobile Wireless Roaming Service, Telecom Notice Of Consultation CRTC 2017-259, 20 July 2017: "Intervention of Ice Wireless Inc.," September 8, 2017, p. 13.
74. Ibid.

4.3. Fixed Broadband Internet Prices in Canada are Lower than International Benchmarks

As detailed in Appendix C3, there is a strong statistical relationship between the retail price of a fixed broadband Internet plan (expressed in Canadian dollars and adjusted for purchasing power parity) and its features, quality, and environment in which providers provision the service. In fact, the following variables explain about 71 percent of the differences in the benchmark countries' retail prices for fixed broadband Internet service (although not all are statistically significant on an individual basis).

- Whether the plan requires a term contract
- Length of term agreement
- Data download speed
- Whether the Internet service is bundled with another service (e.g., phone)
- City density (population per square kilometer)
- City size (in square kilometers)
- City gross domestic product per capita
- Whether the plan is entry, mid, or top level in terms of the monthly data cap

Based on this relationship, the prices that an average international provider would charge for the 68 Canadian fixed broadband plans in the database can be forecast. This forecast accounts for differences in plan, network, and country attributes and thus remedies the principle problem with the Wall/Nordicity basket methodology, which treats all plans in the comparison (including networks and countries) as identical.

4.3.1. Country-level results: Canadian prices are lower than international prices

Comparing the forecasts at the country level demonstrates that of the 68 Canadian fixed broadband plans in the study 54 plans (79 percent) have prices that are *below* the forecast international benchmark prices. The residual 14 plans (21 percent) have prices that are *above* the forecast international benchmark prices. Table 14 summarizes the country-level results. Thus, correctly analyzed on the country level, Canada's prices for fixed broadband Internet service are generally *cheaper* than the prices in ISED's seven benchmark countries.

Table 14 **Country-level Results – Fixed Broadband Internet**

Result	Number of plans	Percentage
Above Benchmark	14	20.6
Below Benchmark	54	79.4
Total	**68**	**100**

4.3.2. Provider-level results: Regional providers are not cheaper relative to international benchmarks

Table 15 summarizes the provider-level results, demonstrating again that smaller market participants do not offer better prices relative to the international benchmark.

Table 15 **Provider-level Results – Fixed Broadband Internet**

Result	Access		Bell		Distributel		Eastlink		Fido	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	2	67	5	56	0	0	0	0	0	0
Below Benchmark	1	33	4	44	3	100	3	100	3	100
Total	**3**	**100**	**9**	**100**	**3**	**100**	**3**	**100**	**3**	**100**

Result	MTS		Primus		Rogers		SaskTel		Shaw	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	0	0	0	0	1	33	0	0	5	83
Below Benchmark	3	100	9	100	2	67		100	1	17
Total	**3**	**100**	**9**	**100**	**3**	**100**	**3**	**100**	**6**	**100**

Result	TELUS		TekSavvy		Videotron		Virgin		Total	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	0	0	0	0	1	33	0	0	14	21
Below Benchmark	3	100	11	100	2	67	6	100	54	79
Total	**3**	**100**	**11**	**100**	**3**	**100**	**6**	**100**	**68**	**100**

4.3.3. City-level results: More choice does not create lower prices

Like mobile wireless telephony and mobile Internet services, fixed broadband Internet service also does not support the Competition Bureau's claim that there are coordinated effects in markets without strong regional competitors. As shown in Table 16, prices are at or below international norms in all cities selected by ISED.

Table 16 **City-Level Results – Fixed Broadband Internet**

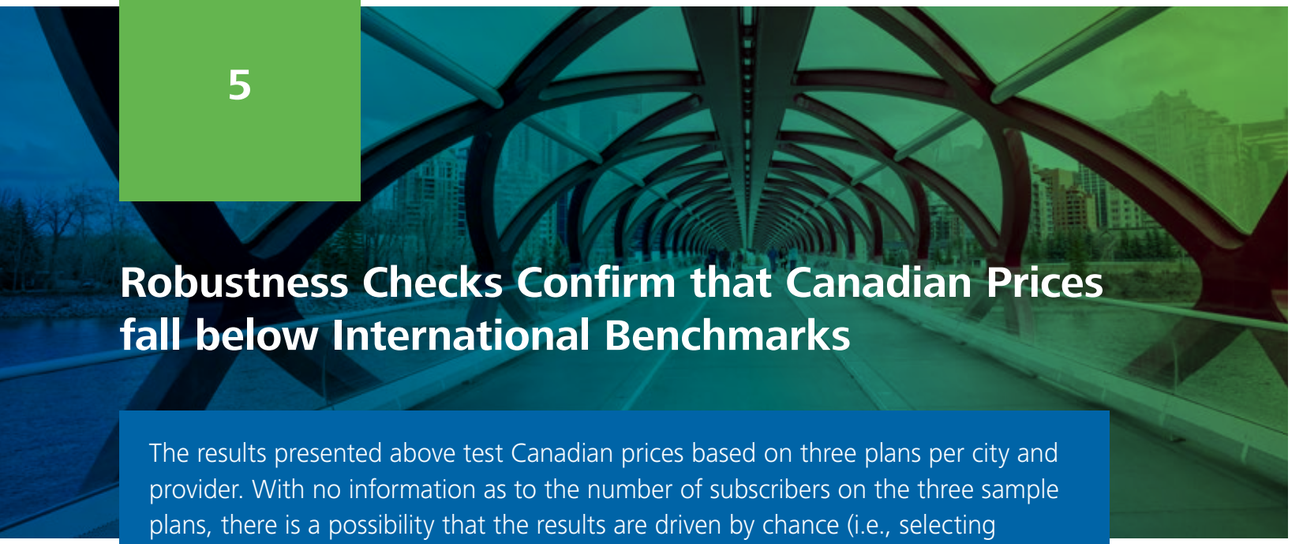
Result	Halifax #	Halifax %	Montreal #	Montreal %	Regina #	Regina %	Toronto #	Toronto %	Vancouver #	Vancouver %
Above Benchmark	3	38	2	13	2	33	2	10	2	17
Below Benchmark	5	63	13	87	4	67	19	90	10	83
Total	**8**	**100**	**15**	**100**	**6**	**100**	**21**	**100**	**12**	**100**

Result	Winnipeg #	Winnipeg %	Total #	Total %
Above Benchmark	3	50	14	21
Below Benchmark	3	50	54	79
Total	**6**	**100**	**68**	**100**

Thus, as summarized in Table 17, correctly designing and executing the international price comparison requested by ISED reveals Canadian prices are mostly below international benchmarks for the three service baskets for which a comparison can be meaningfully undertaken.

Table 17 **Summary Results – Comparable Service Basket**

Service Basket	Cheaper than international benchmark		More expensive than international benchmark	
Canadian Plan Evaluation	**COUNT**	**PERCENTAGE**	**COUNT**	**PERCENTAGE**
Mobile Wireless Telephony	197	80.1	49	19.9
Mobile Broadband Internet	89	80.2	22	19.8
Fixed Broadband Internet	54	79.4	14	20.6



5

Robustness Checks Confirm that Canadian Prices fall below International Benchmarks

The results presented above test Canadian prices based on three plans per city and provider. With no information as to the number of subscribers on the three sample plans, there is a possibility that the results are driven by chance (i.e., selecting alternative plans would yield a different result). The same is true for the results presented in the Wall/Nordicity Study. Thus, to ensure the accuracy of the revised study results, two robustness checks are performed. First, the number of Canadian sample plans is increased from three to seven thereby more than doubling the number of plans by which Canadian market performance is measured. Second, and independently, TELUS prices and offerings of its most popular plans as of May 2018 are evaluated against the international benchmark prices. As discussed in this section, both robustness checks confirm the initial finding that Canadian prices on average fall below international benchmarks.

5.1. Increasing the Canadian Plan Count Confirms the Results

As described above, the database for the underlying study consists of three plans for each Canadian provider in each city. In this robustness check, the plan database is expanded for all Canadian services (mobile wireless telephony, mobile broadband Internet, and fixed broadband Internet) by selecting two additional plans between the entry and mid consumption plans as well as two plans between the mid and high consumption ones, as available.[75] This higher plan count for Canada is then compared against the international benchmark forecasts to examine whether the initial results would change. They did not.

75. Because plan2 and plan3 are included as plan dummies in the initial regression to account for the "entry," "mid," and "high" consumption in the expansion run, plans 1 and 2 are reclassified as "entry"; plans 3, 4, and 5 as "mid" (or dummy variable plan2); and plans 6 and 7 as "high" (or dummy variable plan3).

For the mobile wireless telephony service basket, forecasting Canadian prices using the augmented database results in 79.5 percent of the plans being priced *below* international benchmarks compared with 80.1 percent from the initial run. The percentage of mobile broadband Internet plans less expensive than their international counterparts' plans drops from 80.2 percent in the initial run to 66.5 percent using the augmented database. Although the percentage of Canadian plans that are less expensive than the international benchmark decreases, the overall result still holds as most Canadian plans are still less expensive than the forecast international benchmark prices. The percentage of Canadian fixed broadband plans that are less expensive than the international benchmark prices drops slightly from 79.4 percent to 76.6 percent. Again, despite the slightly different values, these results offer additional support for the study initial conclusion: Plan prices in Canada for mobile wireless telephony, mobile broadband Internet, and fixed broadband Internet are lower than international benchmarks. Moreover, provider-level results show no evidence supporting the claim that non-incumbent providers offer categorically lower prices, and prices are below international norms in all cities. Appendices D1 to D3 provide results that are more detailed.

5.2. TELUS' Most Popular Plans are Less Expensive than the International Benchmark

With no known subscriber count even for the expanded database, the robustness check benchmarks TELUS' most popular plans against the international benchmark for a second sensitivity run.[76] This is to ensure that the revised study results also apply to the plans most frequently purchased by TELUS mobile wireless subscribers. With no access to the same data from other providers, this robustness check is limited to TELUS mobile wireless subscribers only.

TELUS offers its basic wireless telephony plans (which include voice minutes and SMS) separately from its data add-ons. Thus, the most popular voice plans are randomly paired to one of the most popular data plans. Specifically, a random number generator selects a data add-on for each basic phone plan, weighted by the percentage of TELUS subscribers currently using that particular data add-on. For example, if only 10 percent of TELUS subscribers currently have a specific data add-on, the likelihood of that data add-on being matched to any one basic telephony plan is 10 percent. Because subscribers select a voice plan first and a data plan second, the data plans are randomly paired to a voice plan. However, because the data allowance often drives a subscriber's purchase decision, as a separate analysis, the voice plans were also paired to a data plan with no change in the final results.

Evaluating the voice-data combinations against the international benchmark reveals 68.8 percent of TELUS' most popular plans are less expensive than what an international provider would charge for the same plans. Evaluating the data-voice combinations against the international benchmark reveals that TELUS prices 55.0 percent of its most popular mobile wireless plans below the international norm.[77]

Similarly, benchmarking TELUS' most popular mobile broadband Internet plans reveals that 74.8 percent of TELUS' plans are priced below international benchmarks compared with 80.2 percent from the initial run. Finally, benchmarking TELUS' most popular fixed broadband plans results in 76.9 percent below the benchmark compared with an initial result of 79.4.

Appendices E1 to E3 detail the results from this robustness check, which confirms that TELUS offers plans priced below international benchmarks for mobile wireless telephony, mobile broadband Internet, and fixed broadband plans.

76. TELUS' most popular mobile wireless telephony plans cover 40 percent of its subscribers.
77. It is possible that the random assignment creates voice-data plan combinations that were not offered to subscribers at the time of purchase. Repeating the random assignment (and thereby changing the combinations) had no material impact on the results.

An Accurate Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions

6

Conclusions

Considering the evidence presented above, one can reject the hypothesis that Canadian communications providers charge excessively high prices relative to a set of benchmark countries. Canadian prices are below international benchmarks and Canadian consumers face favorable prices given the specific market offerings, networks, and country conditions.

Therefore, the recommendation is that ISED adopt the methodology presented herein because it not only adheres to the economic literature but also is consistent with the approach used by the FCC. The Wall/Nordicity methodology is deeply flawed, and the results produced by this methodology provide Canadian regulators with an incorrect impression of the Canadian communications market. This leads to unnecessary and even harmful policy and regulatory decisions that could harm the public interest.

Appendices

APPENDIX A:
Relevant Study Attributes

Mobile Wireless Telephony Variables

NO.	TYPE	VARIABLE
1	Country	Country
2	City	City
3	Company	Company name (mother company)
4	Brand	Brand
5	Plan attribute	Plan (entry, mid, high usage)
6	Plan attribute	Monthly price
7	Plan attribute	Activation fee
8	Calculation	Activation fee depreciated
9	Calculation	Total monthly price
10	Calculation	Total monthly price (tax adjusted)
11	Calculation	Canadian PPP adjusted pre-tax price
12	Plan attribute	Contract term
13	Plan attribute	Plan type (prepaid vs. postpaid)
14	Plan attribute	Geographic reach (national vs regional)
15	Plan attribute	Voice allowance
16	Plan attribute	Data allowance
17	Plan attribute	SMS allowance
18	Network Attribute	Provider type (MNO vs non-MNO)
19	Network Attribute	4G network coverage
20	Country Attribute	Download speeds
21	Network attribute	Provider subscribers
22	Country attribute	Total subscribers
23	Country attribute	Party pay
24	Country attribute	Mobile wireless penetration rate
25	Country attribute	GDP per capita
26	Country attribute	GDP per capita (in CAD)
27	Country attribute	Size of country
28	Country attribute	Purchasing power parity (U.S.)
29	Country attribute	Purchasing power parity (CAN)
30	Country attribute	Exchange rate
31	Country attribute	Population density
32	Country attribute	Temperature high
33	Country attribute	Temperature low
34	Country attribute	Urban population percent
35	Country attribute	Taxes

Mobile Broadband Internet Variables

NO.	TYPE	VARIABLE
1	Country	Country
2	City	City
3	Company	Company name (mother company)
4	Brand	Brand
5	Plan attribute	Plan (entry, mid, high usage)
6	Plan attribute	Monthly price
7	Plan attribute	Activation fee
8	Calculation	Activation fee depreciated
9	Calculation	Total monthly price
10	Calculation	Total monthly price (tax adjusted)
11	Calculation	Canadian PPP adjusted pre-tax price
12	Plan attribute	Contract term
13	Plan attribute	Plan type (prepaid vs. postpaid)
14	Plan attribute	Geographic reach (national vs regional)
15	Plan attribute	Data allowance
16	Network Attribute	Provider type (MNO vs non-MNO)
17	Network Attribute	4G network coverage
18	Country Attribute	Download speeds
19	Network attribute	Provider subscribers
20	Country attribute	Total subscribers
21	Country attribute	Mobile wireless penetration rate
22	Country attribute	GDP per capita
23	Country attribute	GDP per capita (in CAD)
24	Country attribute	Size of country
25	Country attribute	Purchasing power parity (U.S.)
26	Country attribute	Purchasing power parity (CAN)
27	Country attribute	Exchange rate
28	Country attribute	Population density
29	Country attribute	Temperature high
30	Country attribute	Temperature low
31	Country attribute	Urban population percent
32	Country attribute	Taxes

Fixed Broadband Internet Variables

NO.	TYPE	VARIABLE
1	Country	Country
2	City	City
3	Company	Company name (mother company)
4	Carrier	Carrier
5	Plan attribute	Plan (entry, mid, high usage)
6	Plan attribute	Monthly price
7	Plan attribute	Equipment lease
8	Plan attribute	Activation fee
9	Calculation	Activation fee depreciated
10	Calculation	Total monthly price
11	Calculation	Total monthly price (tax adjusted)
12	Calculation	Canadian PPP adjusted pre-tax price
13	Plan attribute	Contract term
14	Plan attribute	Download speeds
15	Plan attribute	Data allowance
16	Plan attribute	Mandatory bundling
17	City attribute	GDP per capita
18	City attribute	Size of country
19	City attribute	Population density
20	City attribute	Temperature high
21	City attribute	Temperature low
22	Country attribute	Purchasing power parity (U.S.)
23	Country attribute	Purchasing power parity (CAN)
24	Country attribute	Exchange rate
25	Country attribute	Taxes

APPENDIX B:
Electronic Version of the Database

Electronic database is available upon request from author.

APPENDIX C1:
Regression Results – Mobile Wireless Telephony

Source	SS	df	MS
Model	81438.634	16	5089.915
Residual	26323.288	95	277.087
Total	**107761.922**	**111**	**970.828**

Number of obs	=	112
F(16, 95)	=	18.37
Prob > F	=	0.000
R-squared	=	0.756
Adj R-squared	=	0.715
Root MSE	=	16.646

price_ppp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
term	1.385563	0.5515101	2.51	0.014	0.2906771	2.480449
term_no	28.44941	12.10619	2.35	0.021	4.415587	52.48323
mspeed	3.366044	2.073607	1.62	0.108	-0.7505854	7.482674
data	-0.0000679	0.0002257	-0.3	0.764	-0.0005159	0.0003802
data_unlimited	3.797988	7.944506	0.48	0.634	-11.97385	19.56983
voice	0.0047446	0.0080064	0.59	0.555	-0.0111502	0.0206394
voice_unlimited	13.23659	7.906552	1.67	0.097	-2.4599	28.93308
sms	-0.0157889	0.0215312	-0.73	0.465	-0.0585337	0.0269559
sms_unlimited	-30.78659	13.31315	-2.31	0.023	-57.21653	-4.356642
urban	0.8521896	0.6600776	1.29	0.2	-0.4582302	2.162609
size	-0.0000135	7.95E-06	-1.70	0.092	-0.0000293	2.24E-06
gdp_can	0.002321	0.0014285	1.62	0.108	-0.000515	0.0051571
plan2	12.45998	4.666921	2.67	0.009	3.194968	21.72499
plan3	48.29965	7.635776	6.33	0	33.14072	63.45858
coverage	-0.3258069	0.3866325	-0.84	0.402	-1.093369	0.4417556
partypay_d	87.82418	51.17408	1.72	0.089	-13.76921	189.4176
_cons	-226.9931	112.8385	-2.01	0.047	-451.0058	-2.980457

APPENDIX C2:
Regression Results – Mobile Broadband Internet

Source	SS	df	MS		
Model	83969.8276	10	8396.98276	Number of ob	= 103
Residual	27842.2906	92	302.633593	F(10, 92)	= 27.75
				Prob > F	= 0.0000
				R-squared	= 0.7510
				Adj R-squared	= 0.7239
Total	**111812.118**	**102**	**1096.19724**	Root MSE	= 17.396

price_ppp	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
term	-0.3949857	0.537296	-0.74	0.464	-1.462102	0.6721305
term_no	-11.56305	13.07385	-0.88	0.379	-37.52885	14.40275
mspeed	-2.215987	0.366164	-6.05	0	-2.943221	-1.488754
data	0.000213	0.0001449	1.47	0.145	-0.0000748	0.0005008
urban	1.842857	0.3880047	4.75	0	1.072247	2.613468
size	7.72E-06	1.90E-06	4.05	0	3.94E-06	0.0000115
gdp_can	-0.0019288	0.0006843	-2.82	0.006	-0.0032878	-0.0005697
plan2	19.3923	4.482417	4.33	0	10.48984	28.29477
plan3	54.99758	4.997187	11.01	0	45.07274	64.92243
coverage	-0.091681	0.4234215	-0.22	0.829	-0.9326326	0.7492706
_cons	30.29959	51.25858	0.59	0.556	-71.50438	132.1036

APPENDIX C3:
Regression Results – Fixed Broadband Internet

Source	SS	df	MS		
Model	638427.974	9	70936.4416	Number of obs	= 84
Residual	260375.085	74	3518.58223	F(9, 74)	= 20.16
				Prob > F	= 0.0000
				R-squared	= 0.7103
				Adj R-squared	= 0.6751
Total	**898803.059**	**83**	**10828.9525**	Root MSE	= 59.318

price_ppp	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
no_term	108.8288	29.41003	3.70	0.000	50.22806	167.4296
term	7.930782	1.438124	5.51	0.000	5.065257	10.79631
dspeed	0.0816127	0.0165931	4.92	0.000	0.0485501	0.1146752
bundling_d	-92.25218	17.53287	-5.26	0.000	-127.1872	-57.31718
density_c	0.0025101	0.0011546	2.17	0.033	0.0002095	0.0048106
size_c	-0.0064068	0.0026626	-2.41	0.019	-0.0117122	-0.0011014
gdp_c	-0.000234	0.0002394	-0.98	0.331	-0.0007109	0.0002429
plan2	3.836307	15.98434	0.24	0.811	-28.01319	35.68581
plan3	25.5188	19.9791	1.28	0.205	-14.29042	65.32802
_cons	-41.65788	39.85549	-1.05	0.299	-121.0717	37.75592

APPENDIX D1:
Expanded Database Results – Mobile Wireless Telephony

Country-Level Results

Result	Number of plans	Percentage
Above Benchmark	107	20.5
Below Benchmark	415	79.5
Total	**522**	**100**

Provider-Level Results

Result	7-Eleven		Bell		Chatr		Eastlink		Fido	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	12	29	5	14	0	0	5	83	4	10
Below Benchmark	30	71	32	86	36	100	1	17	38	90
Total	**42**	**100**	**37**	**100**	**36**	**100**	**6**	**100**	**42**	**100**

Result	Freedom		Koodo		Lucky Mobile		MTS		PC Mobile	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	0	0	0	0	0	0	2	33	14	41
Below Benchmark	13	100	42	100	23	100	4	67	20	59
Total	**13**	**100**	**42**	**100**	**23**	**100**	**6**	**100**	**34**	**100**

Result	Petro-Canada		Primus		Public Mobile		Rogers		SaskTel	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	12	29	6	14	0	0	24	71	0	0
Below Benchmark	30	71	36	86	41	100	10	29	7	100
Total	**42**	**100**	**42**	**100**	**41**	**100**	**34**	**100**	**7**	**100**

Result	TELUS		Videotron		Virgin		Total	
	#	%	#	%	#	%	#	%
Above Benchmark	15	50	0	0	8	20	107	20
Below Benchmark	15	50	5	100	32	80	415	80
Total	**30**	**100**	**5**	**100**	**40**	**100**	**522**	**100**

City-Level Results

Result	Halifax		Montreal		Regina		Toronto		Vancouver	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	28	36	17	20	12	13	16	18	19	20
Below Benchmark	50	64	66	80	80	87	73	82	74	80
Total	**78**	**100**	**83**	**100**	**92**	**100**	**89**	**100**	**93**	**100**

Result	Winnipeg		Total	
	#	%	#	%
Above Benchmark	15	17	107	20
Below Benchmark	72	83	415	80
Total	**87**	**100**	**522**	**100**

APPENDIX D2:
Expanded Database Results – Mobile Broadband Internet

Country-Level Results

Result	Number of plans	Percentage
Above Benchmark	57	33.5
Below Benchmark	113	66.5
Total	**170**	**100**

Provider-Level Results

Result	Bell		Fido		Freedom		Ice Wireless		MTS	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	22	58	0	0	3	100	0	0	1	25
Below Benchmark	16	42	30	100	0	0	2	100	3	75
Total	**38**	**100**	**30**	**100**	**3**	**100**	**2**	**100**	**4**	**100**

Result	Public Mobile		Rogers		SaskTel		TELUS		Videotron	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	4	15	6	50	2	29	16	73	3	100
Below Benchmark	22	85	6	50	5	71	6	27	0	0
Total	**26**	**100**	**12**	**100**	**7**	**100**	**22**	**100**	**3**	**100**

Result	Virgin		Total	
	#	%	#	%
Above Benchmark	0	0	57	34
Below Benchmark	23	100	113	66
Total	**23**	**100**	**170**	**100**

City-Level Results

Result	Halifax		Montreal		Regina		Toronto		Vancouver	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	7	28	11	41	9	31	11	33	9	35
Below Benchmark	18	72	16	59	20	69	22	67	17	65
Total	**25**	**100**	**27**	**100**	**29**	**100**	**33**	**100**	**26**	**100**

Result	Winnipeg		Total	
	#	%	#	%
Above Benchmark	10	33	57	34
Below Benchmark	20	67	113	66
Total	**30**	**100**	**170**	**100**

APPENDIX D3:
Expanded Database Results – Fixed Broadband Internet

Country-Level Results

Result	Number of plans	Percentage
Above Benchmark	25	23.4
Below Benchmark	82	76.6
Total	**107**	**100**

Provider-Level Results

Result	Access		Bell		Distributel		Eastlink		Fido	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	3	50	10	67	0	0	0	0	0	0
Below Benchmark	3	50	5	33	7	100	4	100	3	100
Total	**6**	**100**	**15**	**100**	**7**	**100**	**4**	**100**	**3**	**100**

Result	MTS		Primus		Rogers		SaskTel		Shaw	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	0	0	0	0	2	50	0	0	6	100
Below Benchmark	6	100	14	100	2	50	7	100	0	0
Total	**6**	**100**	**14**	**100**	**4**	**100**	**7**	**100**	**6**	**100**

Result	TELUS		TekSavvy		Videotron		Virgin		Total	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	0	0	0	0	4	80	0	0	25	23
Below Benchmark	3	100	19	100	1	20	8	100	82	77
Total	**3**	**100**	**19**	**100**	**5**	**100**	**8**	**100**	**107**	**100**

City-Level Results

Result	Halifax		Montreal		Regina		Toronto		Vancouver	
	#	%	#	%	#	%	#	%	#	%
Above Benchmark	4	40	8	33	3	23	4	11	3	20
Below Benchmark	6	60	16	67	10	77	32	89	12	80
Total	**10**	**100**	**24**	**100**	**13**	**100**	**36**	**100**	**15**	**100**

Result	Winnipeg		Total	
	#	%	#	%
Above Benchmark	3	33	25	23
Below Benchmark	6	67	82	77
Total	**9**	**100**	**107**	**100**

APPENDIX E1:
Telus Popular Plan Results – Mobile Wireless Telephony

Country-Level Results

Result	Percentage
Above Benchmark	31.2
Below Benchmark	68.8
Total	**100**

Provider-Level Results

Result	7-Eleven	Bell	Chatr	Eastlink	Fido	Freedom
	%	%	%	%	%	%
Above Benchmark	43	30	0	100	12	15
Below Benchmark	57	70	100	0	88	85
Total	**100**	**100**	**100**	**100**	**100**	**100**

Result	Koodo	Lucky Mobile	MTS	PC Mobile	Petro-Canada	Primus
	%	%	%	%	%	%
Above Benchmark	8	0	50	44	36	29
Below Benchmark	92	100	50	56	64	71
Total	**100**	**100**	**100**	**100**	**100**	**100**

Result	Rogers	SaskTel	TELUS	Videotron	Virgin	Total
	%	%	%	%	%	%
Above Benchmark	76	29	39	20	23	31
Below Benchmark	24	71	61	80	78	69
Total	**100**	**100**	**100**	**100**	**100**	**100**

City-Level Results

Result	Halifax	Montreal	Regina	Toronto	Vancouver	Winnipeg	Total
	%	%	%	%	%	%	%
Above Benchmark	43	32	24	32	30	24	31
Below Benchmark	57	68	76	68	70	76	69
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

APPENDIX E2:
Telus Popular Plan Results – Mobile Broadband Internet

Country-Level Results

Result	Percentage
Above Benchmark	25.2
Below Benchmark	74.8
Total	**100**

Provider-Level Results

Result	Bell	Fido	Freedom	Ice Wireless	MTS	Rogers
	%	%	%	%	%	%
Above Benchmark	58	0	100	0	25	50
Below Benchmark	42	100	0	100	75	50
Total	**100**	**100**	**100**	**100**	**100**	**100**

Result	SaskTel	TELUS	Videotron	Virgin	Total
	%	%	%	%	%
Above Benchmark	29	0	100	0	25
Below Benchmark	71	100	0	100	75
Total	**100**	**100**	**100**	**100**	**100**

City-Level Results

Result	Halifax	Montreal	Regina	Toronto	Vancouver	Winnipeg	Total
	%	%	%	%	%	%	%
Above Benchmark	22	32	19	29	22	27	25
Below Benchmark	78	68	81	71	78	73	75
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

APPENDIX E3:
Telus Popular Plan Results – Fixed Broadband Internet

Country-Level Results

Result	Percentage
Above Benchmark	23.1
Below Benchmark	76.9
Total	**100**

Provider-Level Results

Result	Access	Bell	Distributel	Eastlink	Fido	MTS
	%	%	%	%	%	%
Above Benchmark	50	67	0	0	0	0
Below Benchmark	50	33	100	100	100	100
Total	**100**	**100**	**100**	**100**	**100**	**100**

Result	Primus	Rogers	SaskTel	Shaw	Telus	TekSavvy
	%	%	%	%	%	%
Above Benchmark	0	50	0	100	0	0
Below Benchmark	100	50	100	0	100	100
Total	**100**	**100**	**100**	**100**	**100**	**100**

Result	Videotron	Virgin	Total
	%	%	%
Above Benchmark	80	0	23
Below Benchmark	20	100	77
Total	**100**	**100**	**100**

City-Level Results

Result	Halifax	Montreal	Regina	Toronto	Vancouver	Winnipeg	Total
	%	%	%	%	%	%	%
Above Benchmark	40	33	23	11	19	33	23
Below Benchmark	60	67	77	89	81	67	77
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

About the Author

Dr. Dippon is a Managing Director at NERA and a leading authority in complex litigation disputes and regulatory matters in the communications, Internet, and high-tech sectors. He is also the Chair of NERA's Global Energy, Environment, Communications & Infrastructure (EECI) Practice, where he leads over 100 experts in the areas of energy, communications, media, Internet, environment, auctions, transport, and water.

Dr. Dippon advises his clients in economic damages assessments, class certifications and damages, false advertising, antitrust matters, and regulatory and competition issues. He has extensive testimonial and litigation experience, including depositions, jury and bench trials in state and federal courts, domestic (AAA) and international arbitrations (UNCITRAL, ICC), and submissions before international courts. He assists clients with a broad range of litigation disputes related to wireline, wireless, cable, media, Internet, consumer electronics, and the high-tech sector. Dr. Dippon also routinely testifies before US and international regulatory authorities, including the Federal Communications Commission, the International Trade Commission, the Canadian Radio-television and Telecommunications Commission, and the Competition Bureau Canada.

Dr. Dippon has authored and edited several books as well as book chapters in anthologies and has written numerous articles on telecommunications competition and strategies. He also frequently lectures in these areas at industry conferences, continuing education programs for lawyers, and at universities. National and international newspapers and magazines, including the Financial Times, Business Week, Forbes, the Chicago Tribune, and the Sydney Morning Herald, have cited his work.

Dr. Dippon serves on NERA's Board of Directors, the Board of Directors of the International Telecommunications Society (ITS), and on the Editorial Board of Telecommunications Policy. He is a member of the Economic Club of Washington, DC, the American Economic Association (AEA), the American Bar Association (ABA), and the Federal Communications Bar Association (FCBA).

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NERA
ECONOMIC CONSULTING

NERA Economic Consulting
1255 23rd Street, Suite 600, NW
Washington, DC 20037
Tel: +1 202 466 9270
Fax: +1 415 810 9246
www.nera.com