

2017 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions

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NOTE: The views expressed in this Study are solely those of Nordicity Group Limited and do not necessarily represent the views of ISED.



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Overview

This Study, commissioned by the Department of Innovation, Science and Economic Development (ISED), Government of Canada, and prepared by Nordicity Group Limited, is the tenth (2017) edition of the annual telecommunications services price comparison report¹. 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.

Key Parameters

As in previous years, the telecommunications services examined in this Study were classified in five categories. Individual service baskets were defined according to increasing levels of service usage and feature availability under each category. The total number of service baskets under each category was based on distinct levels of service usage, the availability of feature offerings, as well as their associated prices. Prices were measured for different pre-defined service baskets under each category.

Five service baskets used for each category of telecommunications services are listed below:

- 1) **Fixed Telephony:** *Level 1 to Level 3* – same as last year; however, for this year the international price comparison was removed. As a result, the prices were compared only among six Canadian cities.
- 2) **Mobile Wireless Telephony:** *Level 1 to Level 6* – same as last year;
- 3) **Fixed Broadband Internet:** *Level 1 to Level 5* - same as last year;
- 4) **Mobile Wireless Internet**²: *Level 1 to Level 3* - same as last year; and
- 5) **Bundled Services:** *Level 1 to Level 3* - same as last year.

As in the previous year's Study, country specific average prices in equivalent Canadian dollars were determined for the above service baskets³, based on a survey of known service providers in principal cities of eight jurisdictions: Canada, the US, and six other countries:

- 1) **Canada:** *Halifax (NS), Montreal (QC), Toronto (ON), Winnipeg (MB), Regina (SK) and Vancouver (BC)*
- 2) **United States of America (USA):** *Boston (MA), Kansas City (MO), Minneapolis (MN), and Seattle (WA)*
- 3) **Australia:** *Sydney*; **United Kingdom (UK):** *London*; **France:** *Paris*; **Italy:** *Rome*; **Germany:** *Berlin* and **Japan:** *Tokyo*

¹ The previous editions (2008 to 2016) were prepared for the Canadian Radio-television and Telecommunications Commission (CRTC).

² Mobile Wireless Internet refers to Mobile Wireless Broadband Internet.

³ For this year the price comparison of *Fixed Telephony* services was based on Canadian markets.

Key Findings – International Price Comparison

This section summarizes Nordicity’s key findings in each of the four categories of international telecommunications services prices⁴. For the purpose of comparing international price data, foreign currency prices were converted to Canadian dollars (CAD) using the Bank of Canada’s monthly average exchange for the month of May 2017. The prices were further adjusted for the purchasing power parity (PPP) differences between countries using Organization for Economic Development and Cooperation (OECD) PPP comparative price level indices for May 2017.

Mobile Wireless Telephony – International Price Comparison

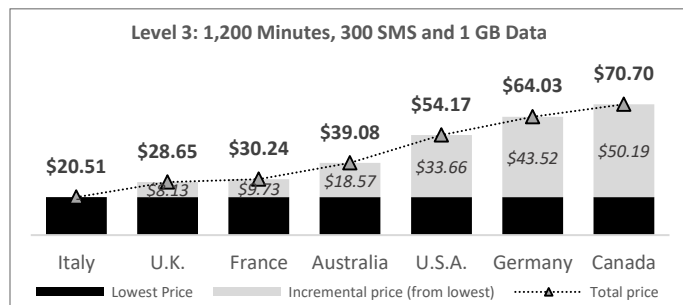
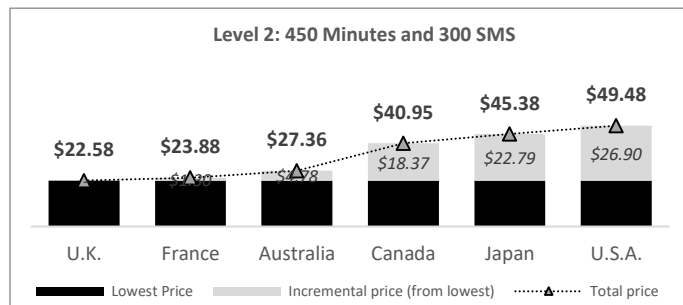
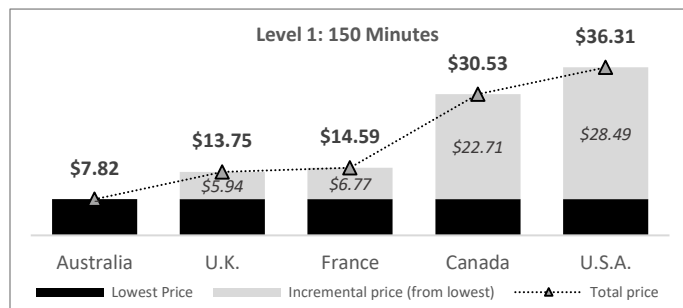
The Mobile Wireless Telephony international price comparison covers eight countries for six service levels, including:

- Level 1: 150 minutes;
- Level 2: 450 minutes and 300 SMS;
- Level 3: 1,200 minutes, 300 SMS and 1 GB Data;
- Level 4: unlimited minutes, SMS and 2 GB Data;
- Level 5: unlimited minutes, SMS and 5 GB Data; and
- Level 6 (Family Plan): unlimited minutes, SMS and 10 GB Data with 3 Lines.

For most of the Mobile Wireless Telephony services, the UK, France, Italy, and Australia were among the lowest priced markets.

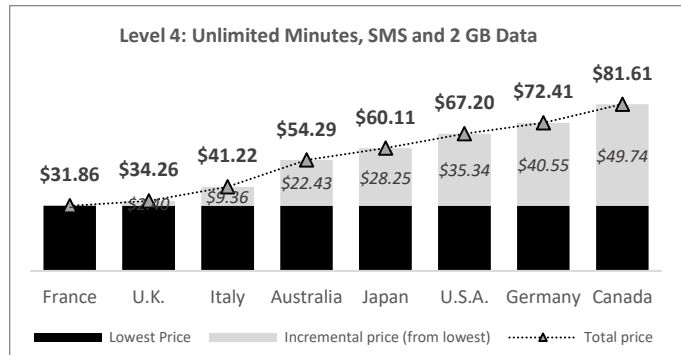
Canadian Mobile Wireless Telephony prices were, however, among the highest along with the USA, Japan, and Germany, as explained below:

- Level 1: Canadian prices were the second highest followed by the USA.
- Level 2: Canadian prices were the third highest followed by Japan and the USA.



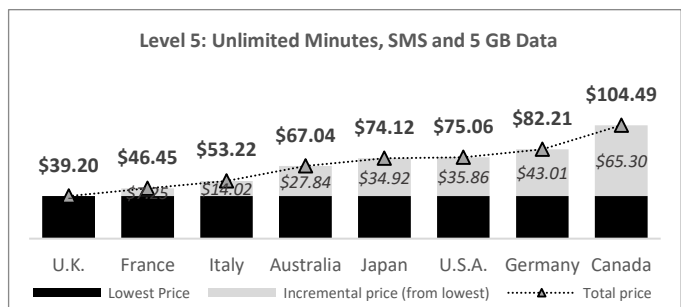
⁴ Includes Mobile Wireless Telephony, Fixed Broadband Internet, Mobile Wireless Internet, and Bundled Services. Fixed Telephony was not included in the international price comparison for this Study.

- Level 3: Canadian prices were the highest, preceded by Germany and the USA.
- Level 4: Canadian prices were the highest, preceded by Germany and Japan.
- Level 5: Canadian prices were the highest, preceded by Germany and the USA.
- Level 6: Canadian prices were the second highest, preceded by the USA and followed by Germany.

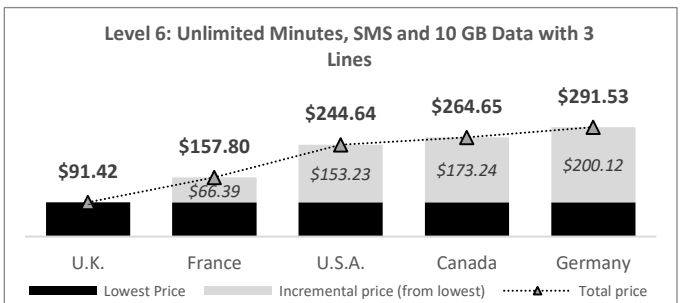


As compared to 2016, average Mobile Wireless Telephony prices increased in four countries, as detailed below:

- USA - prices increased by 34.5% (Level 1), and 18.6% (Level 6);
- Canada - prices increased by 0.7% (Level 4), 8.2% (Level 5), and 14.1% (Level 6);
- Australia - prices increased by 26.4% (Level 3), 21.3% (Level 4), and 0.6% (Level 5); and
- Germany - prices increased by 13.9% (Level 3), 6.3% (Level 4), and 2.6% (Level 6).



Decreases in average Mobile Wireless Telephony prices occurred in all countries, as detailed below:



- USA – prices decreased by 4.2% (Level 2), 25.8% (Level 3), 24.9% (Level 4), and 36.0% (Level 5);
- Canada – prices decreased by 25.7% (Level 1), 16.0% (Level 2), and 5.3% (Level 3);
- UK – prices decreased by 12.4% (Level 1), 4.9% (Level 2), 3.6% (Level 3), 7.2% (Level 4), and 8.0% (Level 5);
- France – prices decreased by 35.1% (Level 1), 1.2% (Level 2), 20.6% (Level 3), 48.3% (Level 4), and 33.8% (Level 5);
- Italy – prices decreased by 41.0% (Level 3), 16.6% (Level 4), and 12.8% (Level 5);
- Germany – prices decreased by 6.8% (Level 5); and
- Japan – prices decreased by 7.0% (Level 1).

Table 1 below shows the difference between Canadian prices and those in the selected seven foreign jurisdictions. Three countries had prices higher than Canada's, including the USA, Japan, and Germany. For example, in case of:

- Level 1 Canada's average price was \$30.53, and the USA price was higher by \$5.78 (19%);
- Level 2 Canada's average price was \$40.95 and the price in Japan was higher by \$4.43 (11%), and the price in the USA was higher by \$8.54 (21%); and
- Level 6 Canada's average price was \$264.60, and the price in Germany was higher by \$26.88 (10%).

Table 1: Price Difference Between Canada and Foreign Jurisdictions in Mobile Wireless Telephony

Service Level	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Countries higher than Canadian prices	U.S.A. \$ 5.78 19%	U.S.A. \$ 8.54 21% Japan \$ 4.43 11%				Germany \$ 26.88 10%
Canadian Average Prices	\$30.53	\$40.95	\$70.70	\$81.61	\$104.49	\$264.65
Countries lower than Canadian prices	France (\$15.94) (52%) U.K. (\$16.77) (55%) Australia (\$22.71) (74%)	Australia (\$13.59) (33%) France (\$17.06) (42%) U.K. (\$18.37) (45%)	Germany (\$6.67) (9%) U.S.A. (\$16.53) (23%) Australia (\$31.62) (45%) France (\$40.46) (57%) U.K. (\$42.05) (59%) Italy (\$50.19) (71%)	Germany (\$9.20) (11%) U.S.A. (\$14.40) (18%) Japan (\$21.49) (26%) Australia (\$27.31) (33%) Italy (\$40.39) (49%) U.K. (\$47.34) (58%) France (\$49.74) (61%)	Germany (\$22.28) (21%) U.S.A. (\$29.43) (28%) Japan (\$30.38) (29%) Australia (\$37.45) (36%) Italy (\$51.27) (49%) France (\$58.04) (56%) U.K. (\$65.30) (62%)	U.S.A. (\$20.01) (8%) France (\$106.85) (40%) U.K. (\$173.24) (65%)

In all other cases, average prices in foreign jurisdictions were lower than those in Canada, as explained below:

Level 1: Relative to \$30.53 in Canada, the average price in France was lower by \$15.94 (52%), followed by the UK: \$16.77 (42%), and Australia: \$22.71 (74%).

Level 2: Relative to \$40.95 in Canada, the average price in Australia was lower by \$13.59 (33%), followed by France: \$17.2 (42%), and the UK: \$18.37 (45%).

Level 3: Relative to \$70.7 in Canada, the average price in Germany was lower by \$6.67 (9%), followed by the USA: \$16.53 (23%), Australia: \$31.62 (45%), France: \$40.46 (57%), the UK: \$42.05 (59%), and Italy: \$50.19 (71%).

Level 4: Relative to \$81.61 in Canada, the average price in Germany \$9.20 (11%), followed by the USA: \$14.40 (18%), Japan: \$21.49 (26%), Australia: \$27.31 (33%), Italy: \$40.39 (49%), the UK \$47.34 (58%), and France: \$49.74 (61%).

Level 5: Relative to \$104.49 in Canada, the average price in Germany was lower by \$22.28 (21%), followed by the USA: \$29.43 (28%), Japan: \$30.38 (29%), Australia: \$37.45 (36%), Italy: \$51.27 (49%), France: \$58.04 (56%), and the UK \$65.30 (62%).

Level 6: Relative to \$264.65 in Canada, the average price in the USA was lower by \$20.01 (8%), followed by France: \$106.85 (40%), and the UK: \$173.24 (65%).

Fixed Broadband Internet

The Fixed Broadband Internet analysis compares prices among eight countries for five service levels including:

- Level 1: 3 to 9 Mbps;
- Level 2: 10 to 15 Mbps;
- Level 3: 16 to 40 Mbps;
- Level 4: 41 to 100 Mbps; and
- Level 5: Over 100 Mbps.

Average Fixed Broadband Internet prices were the highest in the USA for all five levels, preceded by Japan (Level 1), Canada (Levels 2 and 5), and Australia (Levels 3 and 4).

The lowest prices were in Italy (Level 1), Germany (Levels 2 and 3), France (Levels 4, and 5).

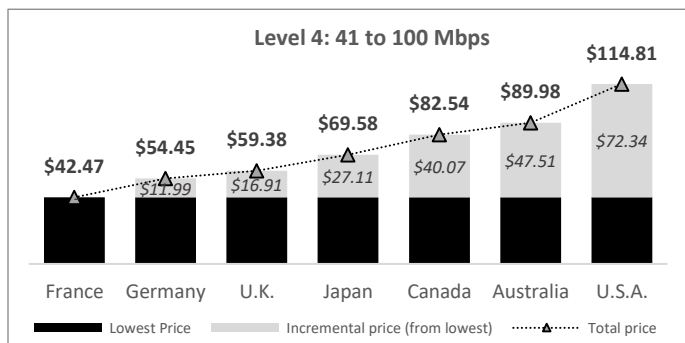
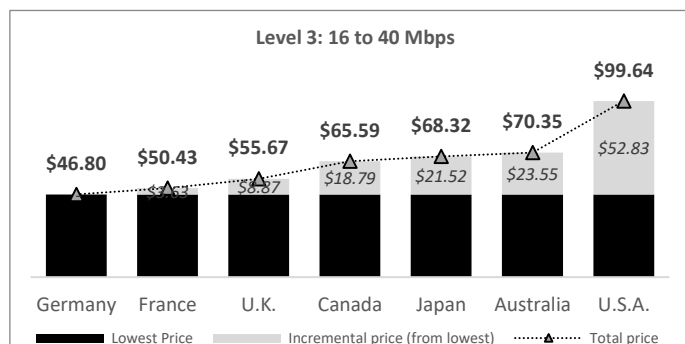
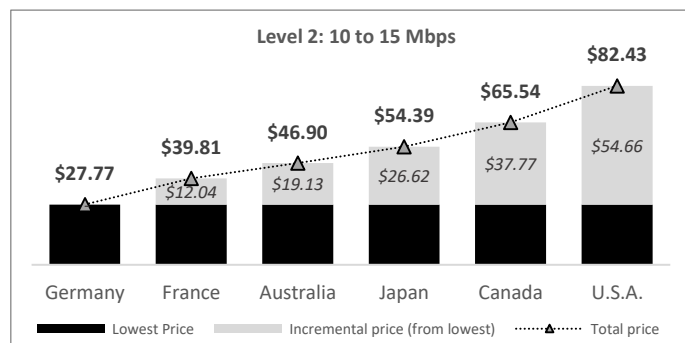
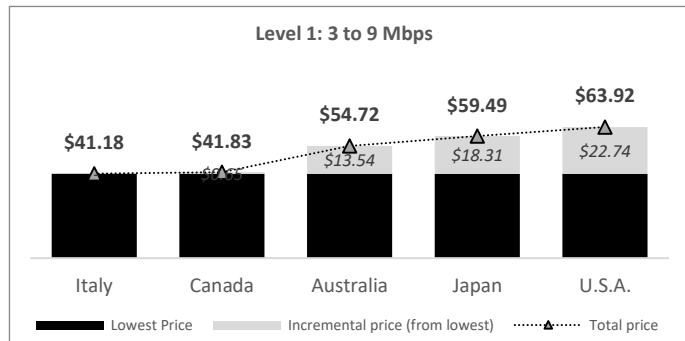
For Level 1, the average Canadian price was the second lowest.

For Level 3, the average Canadian price was in the middle preceded by the UK, France, and Germany and followed by Japan, Australia, and the USA.

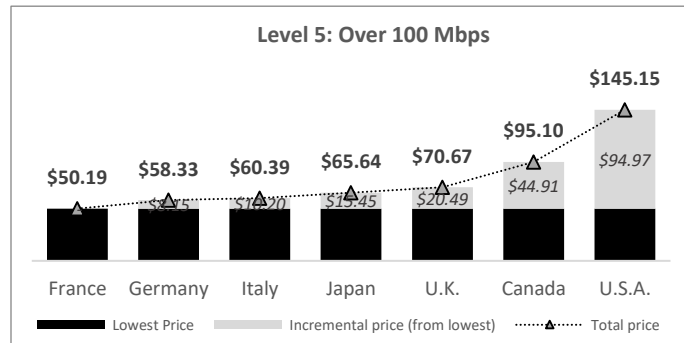
For Levels 2, 4, and 5, Canadian average prices were among the three highest, as detailed below:

- Level 2: Canadian prices were the second highest, preceded by Japan, and followed by the USA.
- Level 4: Canadian prices were the third highest, followed by Australia and the USA.
- Level 5: Canadian prices were the second highest, preceded by the UK, and followed by the USA.

As compared to 2016, average Fixed Broadband Internet prices increased in six countries, as detailed below:



- Canada – prices increased by 11.3% (Level 2), 3.3% (Level 4), and 4.8% (Level 4);
- USA – prices increased by 2.2% (Levels 3, and 4), 0.5% (Level 4), and 13.7% (Level 5);
- Australia – prices increased by 22.5% (Level 3), and 26.7% (Level 3);
- Germany – prices increased by 3.1% (Level 5);



- UK – prices increased by 37.7% (Level 3), 23.2% (Level 4), and 22.8% (Level 5); and
- Japan – prices increased by 5.1% (Level 2) and 39.8% (Level 4).

Decreases in average Fixed Broadband Internet prices occurred in six countries, as explained below:

- Canada – prices decreased by 0.2% (Level 1) and 17.1% (Level 5);
- USA – prices decreased by 19.7% (Level 1) and 1.7% (Level 2);
- Australia – prices decreased by 6.3% (Level 1) and 13.9% (Level 2);
- Germany – prices decreased by 5.9% (Level 3) and 11.9% (Level 4);
- France – prices decreased by 46.1% (Level 2), 33.4% (Level 4), and 28.9% (Level 5); and
- Japan – prices decreased by 4.5% (Level 3) and 8.0% (Level 5).

Table 2, below, shows Canada’s prices relative to the seven foreign jurisdictions.

Three countries had prices higher than those of Canada including Australia, the USA, and Japan. For example, relative to the average Fixed Broadband Internet price of \$41.83 in Canada for Level 1, Australia was higher by \$12.88 (31%), Japan was higher by \$17.66 (42%), and the USA was higher by \$22.08 (53%).

In Level 2, only the USA was higher than Canada’s price (\$65.54) by \$16.89 (26%). In case of Level 3, compared to Canada’s average price of \$65.59, Japan was higher by \$2.70 (4%), Australia was higher by \$4.76 (7%), and the USA was higher by \$34.05 (52%). In Level 4, the Australia was higher by \$7.44 (9%), and the USA was higher by \$32.26 (39%) than Canada’s price of \$82.54. The USA was also higher than Canada’s price (\$95.10) by \$50.06 (53%) in Level 5.

Table 2: Price Differences Between Canada and Foreign Jurisdictions in Fixed Broadband Internet

Service Level	Level 1	Level 2	Level 3	Level 4	Level 5
Countries higher than Canadian prices	U.S.A. \$ 22.08 53%	U.S.A. \$ 16.89 26%	U.S.A. \$ 34.05 52%	U.S.A. \$ 32.26 39%	U.S.A. \$ 50.06 53%
	Japan \$ 17.66 42%		Australia \$ 4.76 7%	Australia \$ 7.44 9%	
	Australia \$ 12.88 31%		Japan \$ 2.7 4%		
Canadian Average Prices	\$41.83	\$65.54	\$65.59	\$82.54	\$95.10
Countries lower than Canadian prices	Italy (\$0.65) (2%)	Australia (\$18.64) (28%)	U.K. (\$9.92) (15%)	Japan (\$12.96) (16%)	U.K. (\$24.43) (26%)
		Japan (\$11.15) (17%)	France (\$15.16) (23%)	U.K. (\$23.17) (28%)	Japan (\$29.46) (31%)
		France (\$25.73) (39%)	Germany (\$18.79) (29%)	Germany (\$28.09) (34%)	Italy (\$34.71) (36%)
		Germany (\$37.77) (58%)		France (\$40.07) (49%)	Germany (\$36.76) (39%) France (\$44.91) (47%)

In all other cases, average prices in foreign jurisdictions were lower than those of Canada, as explained below:

Level 1: Relative to \$41.83 in Canada, the average price in Italy was lower by \$0.65 (2%).

Level 2: Relative to \$65.54 in Canada, the average price in Australia was lower by \$18.64 (28%), followed by Japan: \$11.15 (17%), France: \$25.73 (39%), and Germany: \$37.77 (58%).

Level 3: Relative to \$65.59 in Canada, the UK's average price was lower by \$9.92 (15%), followed by France: \$15.16 (28%), and Germany: \$18.79 (29%).

Level 4: Relative to \$82.54 in Canada, the average price in Japan was lower by \$12.96 (16%), followed by the UK: \$23.17 (28%), Germany: \$28.09 (34%), and France: \$40.07 (49%).

Level 5: Relative to \$95.10 in Canada, the UK's price was lower by \$24.43 (26%), followed by Japan: \$29.46 (31%), Italy: \$34.71 (36%), Germany: \$36.76 (39%), and France: \$44.91 (47%).

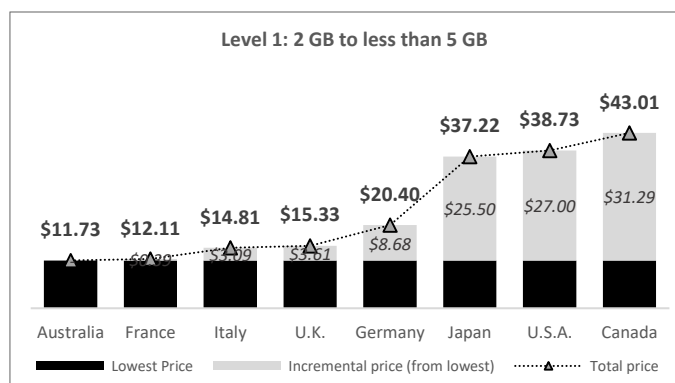
Mobile Wireless Internet

The analysis of Mobile Wireless Internet provides a price comparison among eight countries for three service levels, namely:

- Level 1: 2 GB to less than 5 GB;
- Level 2: 5 GB to less than 10 GB; and
- Level 3: 10 GB and more.

The USA, Canada, and Japan were the highest-priced markets in Mobile Wireless Internet in all three levels.

The lowest-priced countries included Australia (Level 1), France (Level 2), and the UK (Level 3).



Canadian average prices ranked as follows:

- Level 1: Canadian prices were the highest, preceded by the USA, Japan, and Germany.
- Level 2: Canadian prices were the second highest, preceded by Japan and Australia, and followed by the USA.
- Level 3: Canadian prices were the second highest, preceded by Japan and France, and followed by the USA.

As compared to 2016, average Mobile Wireless Internet prices decreased for all three levels across all countries except Italy (Level 1), Australia (Level 2), and Canada (Level 3), as illustrated below:

- Canada – average prices decreased by 7.4% (Level 1) and 4.0% (Level 2);
- USA – average prices decreased by 23.6% (Level 1), 5.8% (Level 2), and 16.2% (Level 3);
- UK – average prices decreased by 12.9% (Level 1), and 2.5% (Level 2);
- Australia – average prices decreased by 24.7% (Level 1), and 24.0% (Level 3);
- Germany – average prices decreased by 13.4% (Level 1), and 20.5% (Level 2);
- Italy – average prices decreased by 3.9% (Level 2), and 8.8% (Level 3);
- France – average prices decreased by 19.2% (Level 1), 33.9% (Level 2), and 38.4% (Level 3); and
- Japan – average prices decreased by 28.2% (Level 1), 25.7% (Level 2) and 26.2% (Level 3).

Only in three cases did the average prices increase: Italy by 3.2% in Level 1, Australia by 3.9% in Level 2, and Canada by 1.6% in Level 3.

Table 3 below shows Canada’s average prices for Mobile Wireless Internet relative to the selected seven foreign jurisdictions. Only the USA had prices higher than Canada’s. For example, relative to the average price of \$60.79 in Canada for Level 2, the USA’s average price was higher by \$11.65 (19%). At Level 3, Canada’s average price was \$82.28, while the USA’s was higher by \$10.19 (12%).

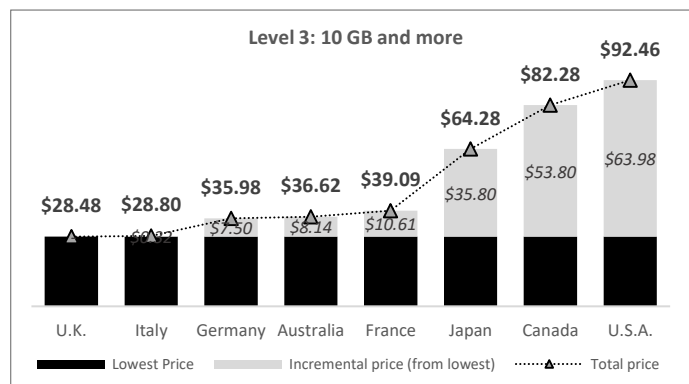
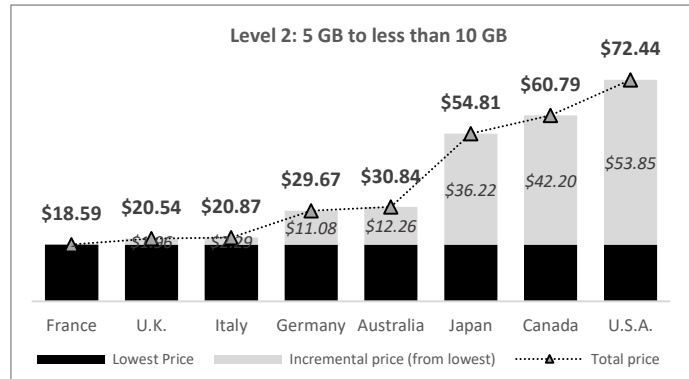


Table 3: Price Differences Between Canada and Foreign Jurisdictions in Mobile Wireless Internet

Service Level	Level 1	Level 2	Level 3
Countries higher than Canadian prices →		U.S.A. \$11.65 19%	U.S.A. \$10.19 12%
Canadian Average Prices →	\$43.01	\$60.79	\$82.28
Countries lower than Canadian prices →	U.S.A. (\$4.28) (10%) Japan (\$5.79) (13%) Germany (\$22.61) (53%) U.K. (\$27.68) (64%) Italy (\$28.20) (66%) France (\$30.90) (72%) Australia (\$31.29) (73%)	Japan (\$5.98) (10%) Australia (\$29.94) (49%) Germany (\$31.12) (51%) Italy (\$39.91) (66%) U.K. (\$40.25) (66%) France (\$42.20) (69%)	Japan (\$17.99) (22%) France (\$43.19) (52%) Australia (\$45.65) (55%) Germany (\$46.30) (56%) Italy (\$53.47) (65%)

In all other cases, average prices in foreign jurisdictions were lower than prices in Canada, as follows:

Level 1: Relative to \$43.01 in Canada, the USA’s price was lower by \$4.28 (10%), followed by Japan: \$5.79 (13%), Germany: \$22.61 (53%), the UK: \$27.68 (64%), Italy: \$28.20 (66%), France: \$30.90 (72%), and Australia: \$31.29 (73%).

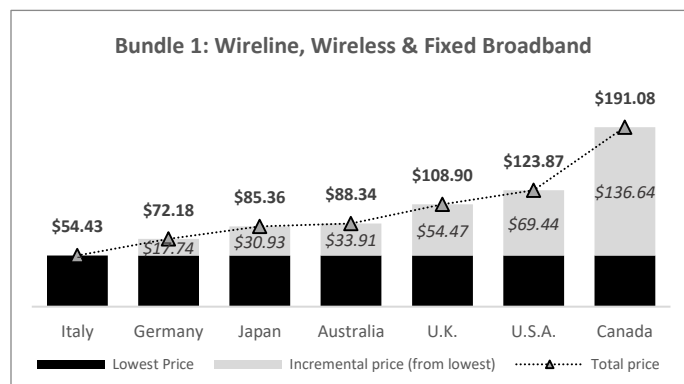
Level 2: Relative to \$60.79 in Canada, Japan’s average price was lower by \$5.98 (10%), followed by Australia: \$29.94 (49%), Germany: \$31.12 (51%), Italy: \$39.91 (66%), the UK: \$40.25 (66%) and France: \$42.20 (69%).

Level 3: Relative to \$82.28 in Canada, Japan’s average price was lower by \$17.99 (22%), followed by France: \$43.19 (52%), Australia: \$45.65 (55%), Germany: \$46.30 (56%) and Italy: \$53.47 (65%).

Bundled Services

The analysis of Bundled Services provides a price comparison among eight countries for three bundles, defined below:

- Bundle 1: Fixed Telephony, Fixed Broadband Internet, and Mobile Wireless Telephony;
- Bundle 2: Fixed Telephony, Fixed Broadband Internet, and Basic TV package; and
- Bundle 3: Fixed Telephony, Fixed Broadband Internet, Mobile Wireless Telephony, and Basic TV package.



The USA and Canada were the highest-priced markets in three Bundled Services.

The lowest-priced countries included Italy (Bundles 1 and 3) and France (Bundle 2).

Canadian average prices ranked among the top as follows:

- Bundle 1: Canadian prices were the highest, preceded by the USA, the UK, and Australia.
- Bundle 2: Canadian prices were the second-highest, preceded by Japan and Australia, and followed by the USA.
- Bundle 3: Canadian prices were the highest, preceded by the USA and Japan.

As compared to 2016, average Bundled Services prices increased in four countries, as illustrated below:

- Canada – prices increased by 18.2% (Bundle 1), and 7.6% (Bundle 3);
- Germany – prices increased by 3.3% (Bundle 2); and
- UK – prices increased by 62.1% (Bundle 1), 38.5% (Bundle 2), and 60.4% (Bundle 3).

In all other cases, average Bundled Services prices decreased, as described below:

- Canada – average prices decreased by 10.8% (Bundle 2);
- USA – average prices decreased by 12.4% (Bundle 1), 5.2% (Bundle 2), and 1.8% (Level 2);
- Australia – average prices decreased by 21.6% (Bundle 2), and 24.5% (Bundle 3);
- Germany – average prices decreased by 38.1% (Bundle 1), and 40.8% (Bundle 3);
- Italy – average prices decreased by 21.0% (Bundle 2), and 16.0% (Bundle 3);
- France – average prices decreased by 15.1% (Bundle 2), and 15.7% (Bundle 3); and
- Japan – average prices decreased by 44.6% (Bundle 1), 38.0% (Bundle 2), and 36.6% (Bundle 3).

Table 4 below shows Canada's prices relative to the selected seven foreign jurisdictions. Only the USA had prices higher than Canada for Bundle 2. Relative to the average price of \$120.99 in Canada for Bundle 2, the average price in the USA was higher by \$17.41 (14%).

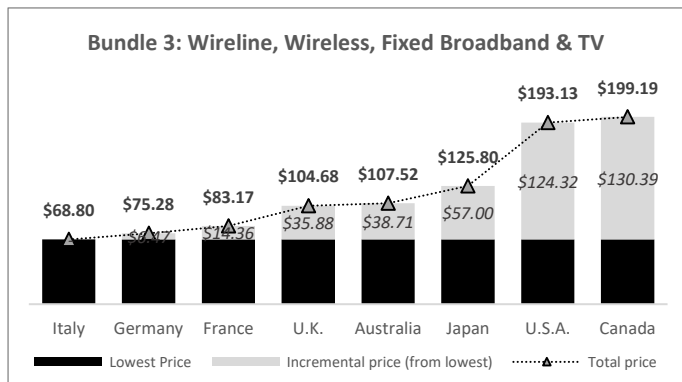
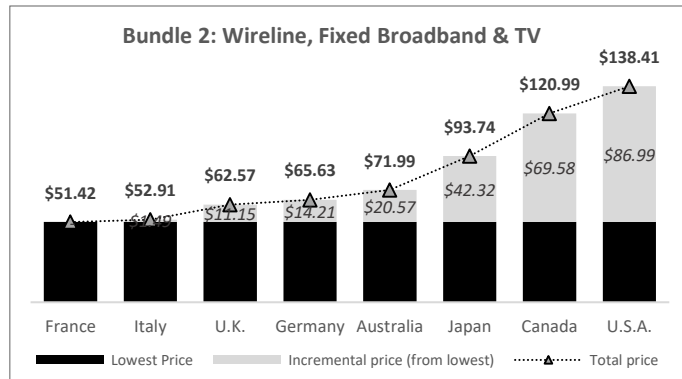


Table 4: Price Differences Between Canada and Foreign Jurisdictions in Bundled Services

Service Level	Bundle 1	Bundle 2	Bundle 3
Countries higher than Canadian prices →		U.S.A. \$17.41 14%	
Canadian Average Prices →	\$191.08	\$120.99	\$199.19
Countries lower than Canadian prices →	U.S.A. (\$67.20) (35%) U.K. (\$82.18) (43%) Australia (\$102.74) (54%) Japan (\$105.71) (55%) Germany (\$118.90) (62%) Italy (\$136.64) (72%)	Japan (\$27.26) (23%) Australia (\$49.01) (41%) Germany (\$55.36) (46%) U.K. (\$58.42) (48%) Italy (\$68.08) (56%) France (\$69.58) (58%)	U.S.A. (\$6.07) (3%) Japan (\$73.39) (37%) Australia (\$91.67) (46%) U.K. (\$94.51) (47%) France (\$116.02) (58%) Germany (\$123.92) (62%) Italy (\$130.39) (65%)

In all other cases, average prices in foreign jurisdictions were lower than those of Canada, as follows:

Bundle 1: Relative to \$191.08 in Canada, the USA was lower by \$67.20 (35%), followed by the UK: \$82.18 (43%), Australia: \$102.74 (54%), Japan: \$105.71 (55%), Germany: \$118.90 (62%), and Italy: \$136.64 (72%).

Bundle 2: Relative to \$120.99 in Canada, Japan was lower by \$27.26 (23%), followed by Australia: \$49.01 (41%), Germany: \$55.36 (46%), the UK: \$58.42 (48%), Italy: \$68.08 (56%), and France: \$69.58 (58%).

Bundle 3: Relative to \$199.19 in Canada, the USA was lower by \$6.07 (3%), followed by Japan: \$73.39 (37%), Australia: \$91.67 (46%), the UK: \$94.51 (47%), France: \$116.02 (58%), Germany: \$123.92 (62%), and Italy: \$130.39 (65%).

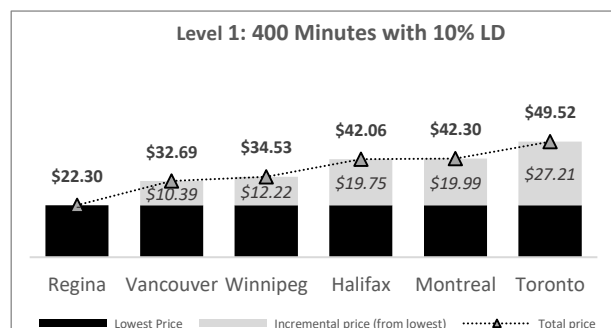
Key Findings – Canadian Price Comparison

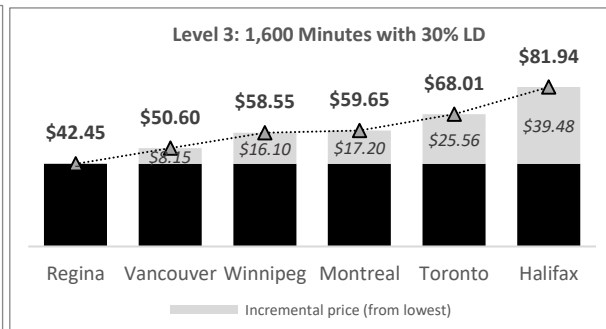
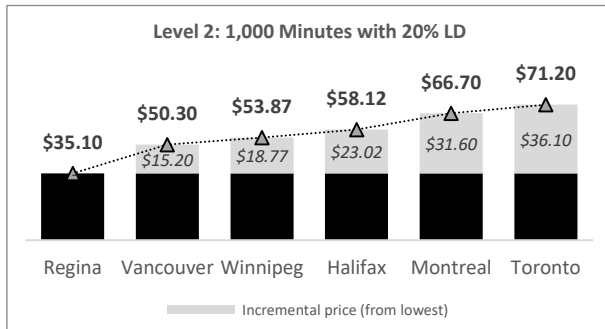
This section summarizes Nordicity’s key findings in each of the five categories of Canadian telecommunications services.

Fixed Telephony – Canadian Price Comparison

The Fixed Telephony price comparison covers six Canadian cities for three service levels, namely:

- Level 1: 400 minutes including 10% for national long-distance calls;
- Level 2: 1000 minutes including 20% for national long-distance calls; and
- Level 3: 1,600 minutes including 30% for national long-distance calls.



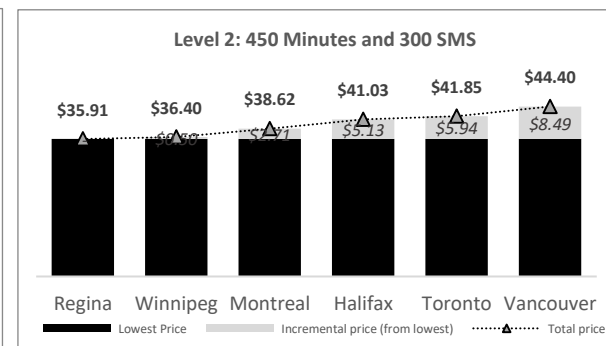
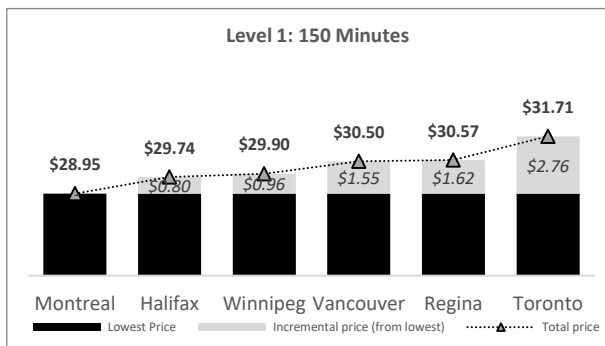


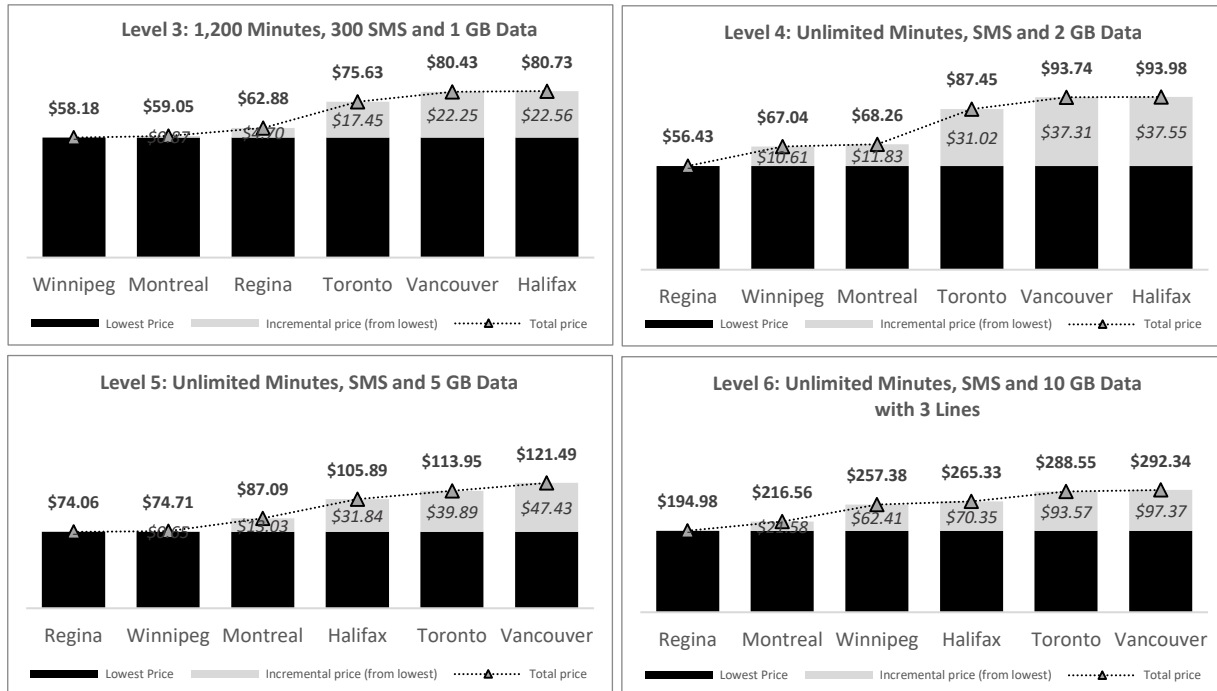
For all three levels of Fixed Telephony, prices in the western Canadian cities (Regina, Vancouver, and Winnipeg) were lower than the three eastern cities (Halifax, Montreal, and Toronto). As in previous years, prices in Regina were lowest, followed by Vancouver and Winnipeg, for all three levels.

Mobile Wireless Telephony – Canadian Price Comparison

The Mobile Wireless Telephony price comparison covers six Canadian cities for six service levels, namely:

- Level 1: 150 minutes;
- Level 2: 450 minutes and 300 SMS;
- Level 3: 1,200 minutes, 300 SMS and 1 GB Data;
- Level 4: unlimited minutes, SMS and 2 GB Data;
- Level 5: unlimited minutes, SMS and 5 GB Data; and
- Level 6 (Family Plan): unlimited minutes, SMS and 10 GB Data with 3 Lines.





For all of the Mobile Wireless Telephony services, Vancouver, Toronto, and Halifax (except Level 1) were the most expensive cities:

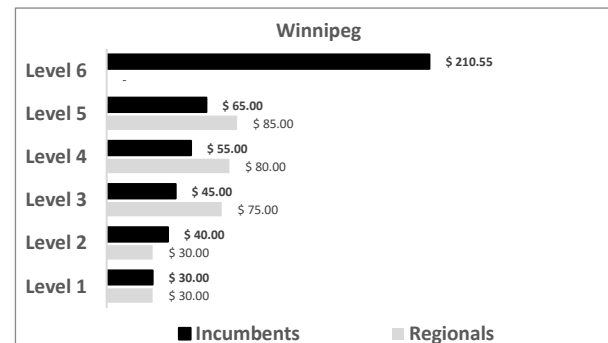
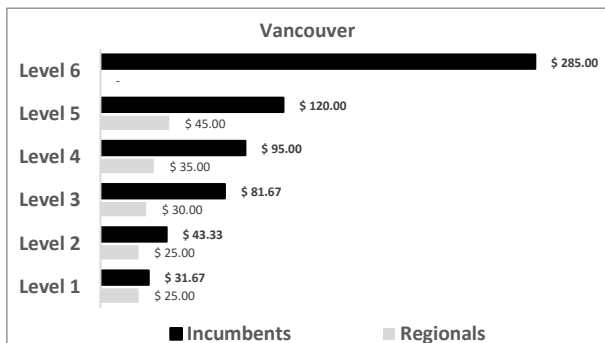
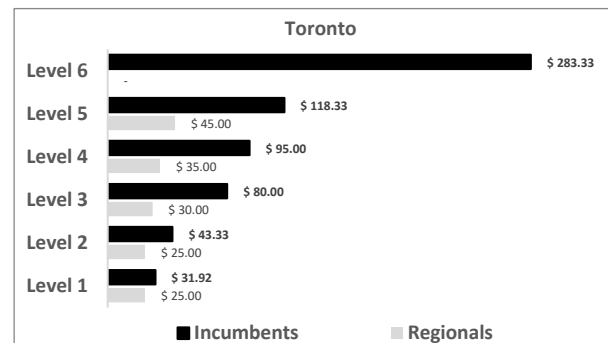
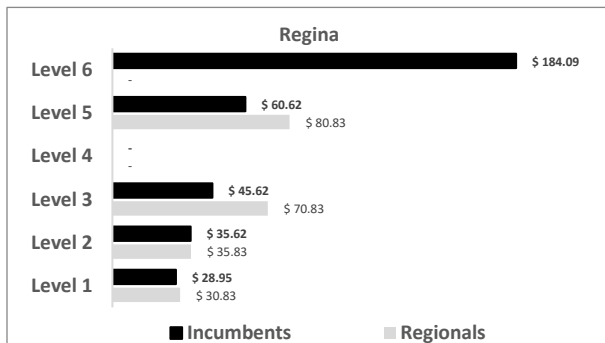
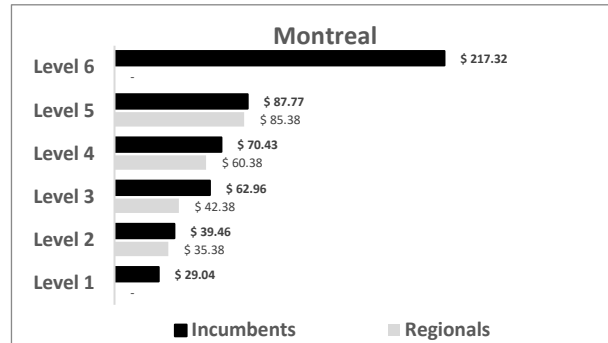
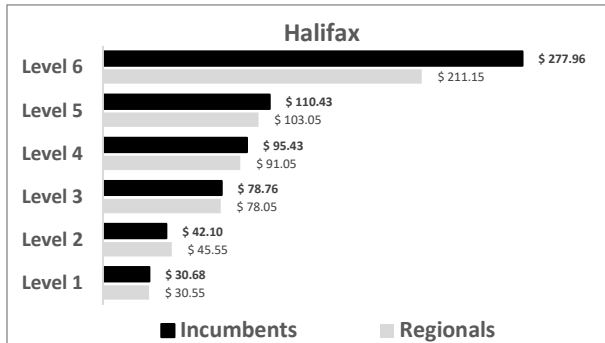
- Vancouver was the highest-priced for Levels 2, 5, and 6;
- Halifax was the highest-priced for Levels 3 and 4; and
- Toronto was the highest-priced for Level 1.

The lowest-priced Canadian cities were Regina (Levels 2, 4, 5, and 6); Montreal (Level 1); and Winnipeg (Level 3).

It is worth noting that overall, the prices of regional operators – *Eastlink (Halifax)*, *Videotron (Montreal)*, *Freedom Mobile (Toronto and Vancouver)*, *SaskTel (Regina)*, and *Bell-MTS (Winnipeg)*, were lower than those of national incumbents - *Bell*, *Telus*, *Rogers*.

As depicted below, regionals prices in Toronto and Vancouver were significantly lower, compared to Halifax, and Montreal.

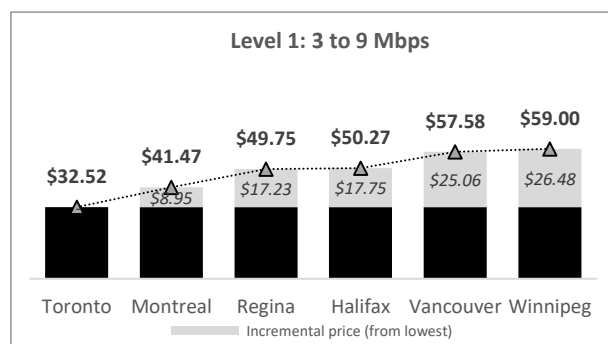
In case of Regina and Winnipeg, the prices of regionals were generally higher than the incumbents

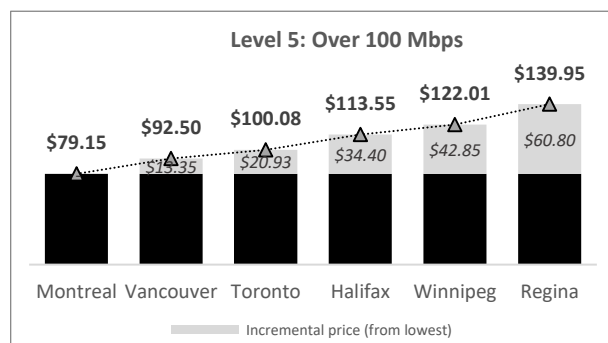
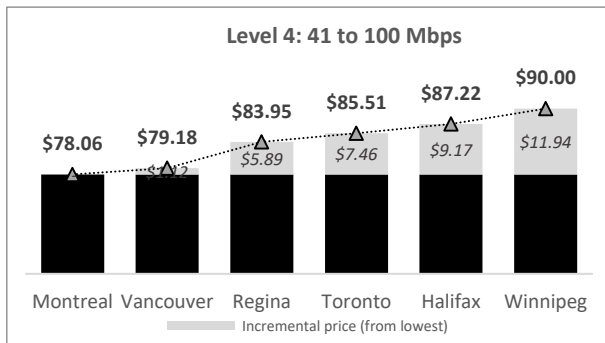
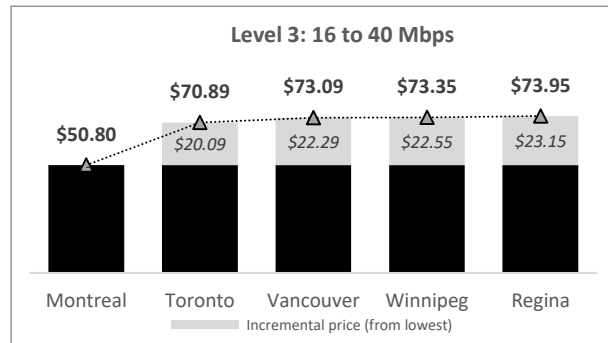
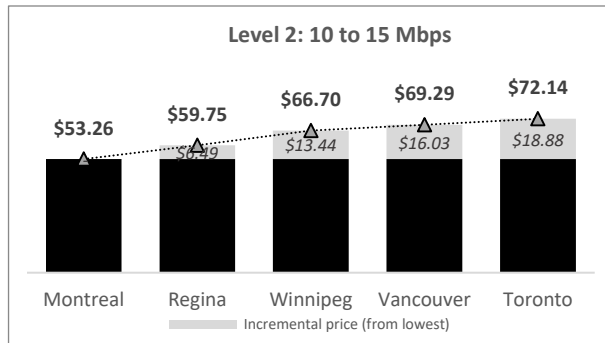


Fixed Broadband Internet – Canadian Price Comparison

The Fixed Broadband Internet analysis compares prices among six Canadian cities for five service levels, including:

- Level 1: 3 to 9 Mbps;
- Level 2: 10 to 15 Mbps;
- Level 3: 16 to 40 Mbps;
- Level 4: 41 to 100 Mbps; and
- Level 5: Over 100 Mbps.





The highest-priced cities were Winnipeg (Levels 1 and 4), Toronto (Level 2), and Regina (Levels 3 and 5). Montreal was the lowest-priced city for Levels 2-5. For Level 1, Toronto had the lowest prices and Montreal the second-lowest.

As shown below, the overall prices of Canadian Fixed Broadband Internet resellers – *Primus*, *Distributel*, and *TekSavvy*, were generally lower than those of the incumbent telecommunications service providers (TSPs) and cable companies: *Bell Aliant* and *Eastlink* in Halifax; *Bell Canada* and *Videotron* in Montreal; *Bell Canada* and *Rogers* in Toronto; *SaskTel* and *Access* in Regina; *Telus* and *Shaw* in Vancouver; and *MTS-Bell* and *Shaw* in Winnipeg.⁵

Service Provider	Fixed Broadband Internet Service Basket				
	Level 1	Level 2	Level 3	Level 4	Level 5
Incumbent	\$ 46.57	\$ 63.37	\$ 66.18	\$ 83.47	\$ 100.63
Reseller	\$ 37.20	\$ 41.62	\$ 49.95	\$ 57.60	\$ 82.61
Difference	-20.12%	-34.33%	-24.52%	-30.99%	-17.91%

Based on simple average of minimum incumbent's and minimum reseller's price in each city.
Resellers include *Primus*, *TekSavvy*, and *Distributel*.

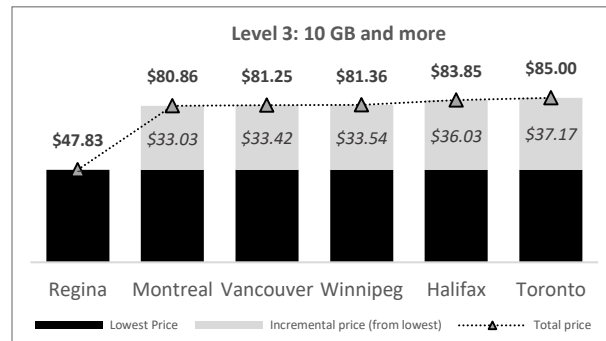
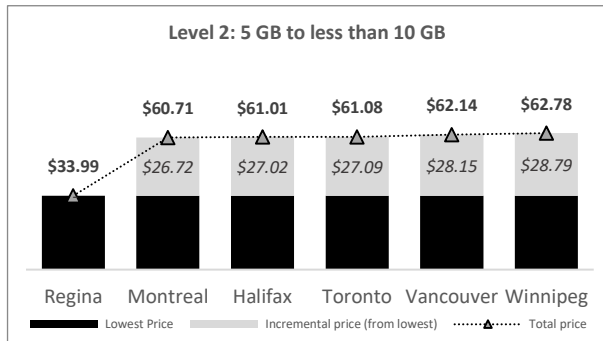
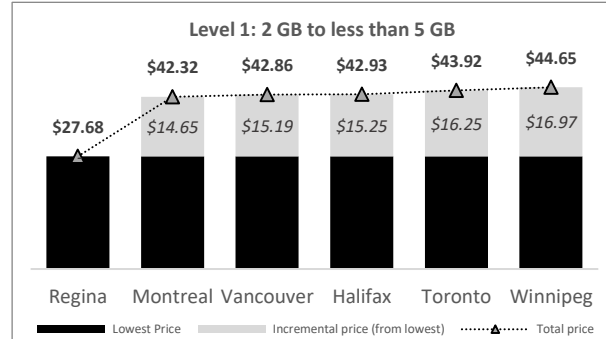
⁵ Resellers' offers were not available in Regina, and Winnipeg.

Mobile Wireless Internet – Canadian Price Comparison

The analysis of Mobile Wireless Internet provides a price comparison among six Canadian cities for three service levels, namely:

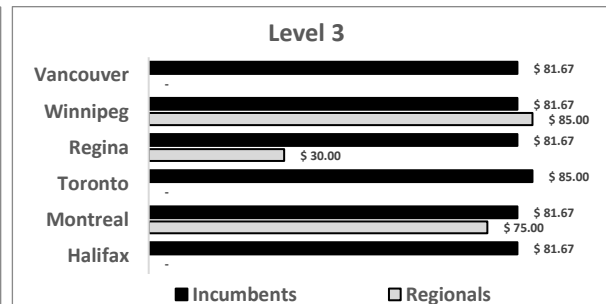
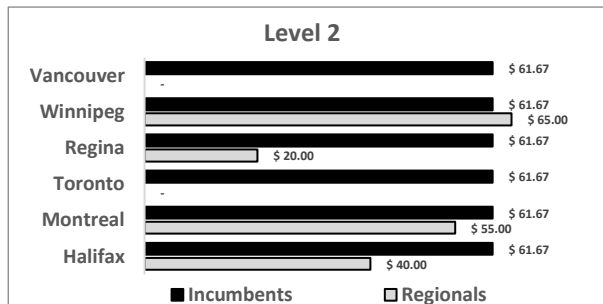
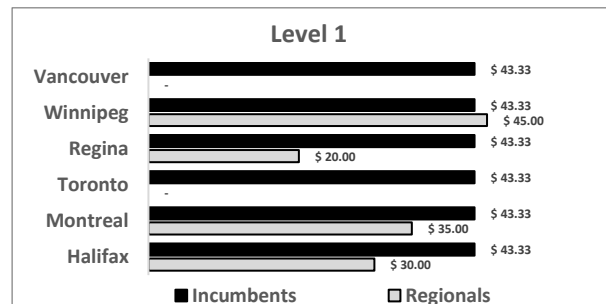
- Level 1: 2 GB to less than 5 GB;
- Level 2: 5 GB to less than 10 GB; and
- Level 3: 10 GB and more.

For all three services, Regina was the lowest-priced city by a significant margin, followed by Montreal. Winnipeg was the highest-priced for Levels 1 and 2, and Toronto for Level 3.



It is worth noting that except in Winnipeg, overall Mobile Wireless Internet prices of regional operators – Eastlink (Halifax), Videotron (Montreal), Freedom Mobile (Toronto and Vancouver), SaskTel (Regina), and Bell-MTS (Winnipeg), were lower than those of national incumbents - Bell, Telus, Rogers.

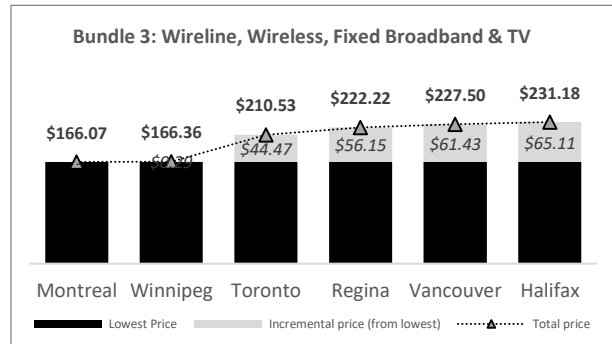
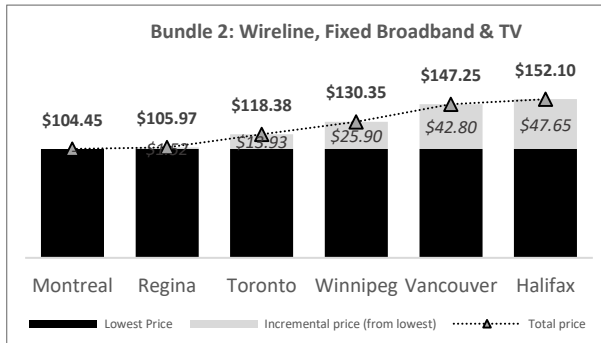
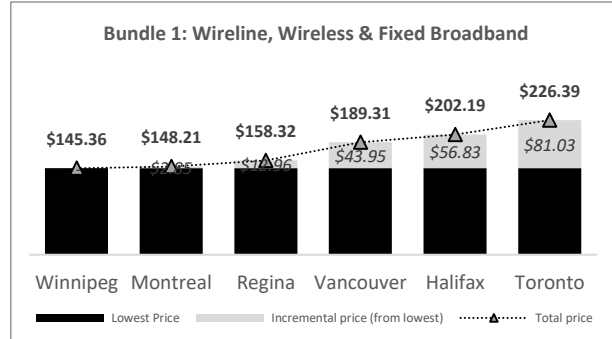
As shown above, regionals' offers were not available in Toronto, and Vancouver for the Mobile Wireless Internet prices. In Halifax (Levels 1 and 2) Regina (Levels 1-3), the prices of regionals were exceptionally lower than those of incumbents. In case of Regina and Winnipeg, the prices of regionals were generally higher than the incumbents.



Bundled Services – Canadian Price Comparison

The analysis of Bundled Services provides a price comparison among six Canadian cities for three bundles, defined below:

- Bundle 1: *Fixed Telephony, Fixed Broadband Internet, and Mobile Wireless Telephony;*
- Bundle 2: *Fixed Telephony, Fixed Broadband Internet, and Basic TV package; and*
- Bundle 3: *Fixed Telephony, Fixed Broadband Internet, Mobile Wireless Telephony, and Basic TV package.*



The cities with the lowest bundled service prices were Winnipeg (Bundle 1) and Montreal (Bundles 2, and 3). Toronto (Bundle 1), Halifax (Bundles 2 and 3) were the highest-priced cities.

1. Introduction

This is the tenth (2017) edition of the annual telecommunications services price comparison Study since its inception in 2008. This Study was prepared by Nordicity for ISED. 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 foreign jurisdictions.

As in previous years, telecommunications services in this Study are classified into five main categories including:

- Fixed Telephony;
- Mobile Wireless Telephony⁶;
- Fixed Broadband Internet;
- Mobile Wireless Internet; and
- Bundled Services.

Prices were measured for different pre-defined service baskets under each category. Individual service baskets were defined according to increasing levels of service usage and feature availability under each category. The total number of service baskets under each category were established according to the availability of distinct levels of service usage and features offered, as well as their associated prices.

In comparison to last year's Study, no major changes were made with respect to the Study design or the scope of analysis. However, the following changes were made this year:

- 1) International prices comparison of Fixed Telephony three service levels was removed - this Study now only provides the Fixed Telephony price comparison within Canadian markets.
- 2) For Mobile Wireless Services, redefined "New Entrant" as "Regional" service providers including *Eastlink* (Halifax), *Videotron* (Montreal), *Freedom Mobile* (Toronto and Vancouver), *SaskTel* (Regina), and *Bell-MTS* (Winnipeg)⁷.
- 3) New service providers were added to different service baskets, while no existing service providers were removed from their previous service basket:

Service Basket	Service Providers Added
Fixed Broadband Internet	<ul style="list-style-type: none"> – <u>Canada</u>: Distributel (Montreal and Toronto) – <u>USA</u>: RCN (Boston), Wave (Seattle), Windstream (Kansas City), Xfinity (Kansas City, Minneapolis, Seattle) – <u>Foreign Jurisdictions</u>: Bouygues Telecom (Paris), EE (London)
Mobile Wireless Telephony	<u>Foreign Jurisdictions</u> : FREE Mobile - Iliad S.A (Paris), Vodafone (Sydney)
Bundled Services	<u>Foreign Jurisdictions</u> : Bouygues Telecom (Paris), iTSCOM (Tokyo)

⁶ Refers to Mobile Wireless Telephony, Text Messaging Services (TMS), and Mobile Wireless Data for service Levels 3-6

⁷ For this Study MTS (Manitoba Telecom Services) has been referred to as Bell-MTS, following the completion of its acquisition by Bell in 2017. Freedom Mobile was formerly branded in Canada as WIND Mobile.

- 4) Removed comparative analysis of Bring Your Own Device (BYOD) versus Mobile Wireless Term Contract options; and
- 5) Removed Canadian Voice over Internet Protocol (VoIP) bundle (Voice + Internet) price comparison.

This Study is organized as follows: Section 2 describes the study design as well as the methodology behind both the practices of data collection and data analysis. Sections 3 to 7 are dedicated to each of the five service categories. These sections provide a detailed definition of the service baskets, a description of changes made between last year's Study and this year's Study, a list of service providers surveyed in different jurisdictions and a detailed price comparison amongst both Canadian cities and between Canada and international jurisdictions in each respective service category. Section 8 provides a comparative analysis of Canadian VoIP bundled services.

2. Methodology

2.1 Service Basket Design

The methodology for the service basket design and prices in this year's Study has been kept consistent with that used in last year's Study with the exception of some modifications to reflect the increasing level of consumer usage among telecommunications services. These modifications are described below in greater detail. The price comparison methodology used in this Study is based on a service basket approach, where separate telecommunications service baskets are defined on the basis of increasing levels of service usage, features and, where applicable, performance. These baskets, described in general terms, are as follows:

- **Level 1:** Entry-level or low-volume usage.
- **Level 2:** Average or medium usage.
- **Level 3:** Above average or high-volume usage.
- **Levels 4 and 5:** Very high-volume or unlimited usage.
- **Level 6:** Ultra high-volume or unlimited usage.

The number of defined service basket levels for each of the **stand-alone** telecom services considered in this Study varies from three to six.

- **Fixed Telephony:** Basket Levels 1 to 3.
- **Mobile Wireless Telephony:** Basket Levels 1 to 6.
- **Fixed Broadband Internet:** Basket Levels 1 to 5.
- **Mobile Wireless Internet:** Basket Levels 1 to 3.

The three levels of **bundled** services were defined as follows:

- **Bundle 1:** Fixed Telephony, Fixed Broadband Internet, and Mobile Wireless Telephony.
- **Bundle 2:** Fixed Telephony, Fixed Broadband, and Digital TV.
- **Bundle 3:** Fixed Telephony, Fixed Broadband, Mobile Wireless Telephony, and Digital TV.

Table 5, below, summarizes the service baskets that have been considered in the 2017 Study vis-à-vis last year’s Study. No changes were made in the service basket levels for the Fixed Telephony and Bundled Services.

Table 5: Summary of Service Baskets in the 2017 Study in Comparison to 2016

Fixed Telephony		Mobile Wireless Telephony		Fixed Broadband Internet		Mobile Wireless Internet		Bundled Services	
2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1
Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2
Level 3	Level 3	Level 3	Level 3	Level 3	Level 3	Level 3	Level 3	Level 3	Level 3
		Level 4	Level 4	Level 4	Level 4				
		Level 5	Level 5	Level 5	Level 5				
		Level 6	Level 6						

Consistent with last year’s Study, Level 2 stand-alone service baskets are generally used in each of the bundles. In some cases, however, there are restrictions on the specific service elements that are eligible for bundling discounts. In such cases, eligible service elements are included instead (which can involve including a Level 3 or 4 rather than Level 2 service element). For the Digital TV service component, a “basic” digital television service package option is selected for inclusion in the applicable bundles.

The specific service elements included in each service basket are described in the following sections.

2.2 Canadian Price Data Collection

The Canadian price comparisons included in this year’s Study are based on the measurement of prices of pre-defined distinct service baskets, in six Canadian cities (**Halifax, Montreal, Toronto, Winnipeg, Regina, and Vancouver**). Between two and eight service providers per service category were examined in each city, covering stand-alone and bundled service baskets, as applicable to each service provider.

The Canadian price data were collected from a wide range of telecommunications service providers (TSPs) including incumbent telephone companies (for example *Bell Canada, SaskTel, and Telus*) and incumbent cable companies (for example *Eastlink, Videotron, Rogers, and Shaw*). For Mobile Wireless

(Telephony and Broadband), the Study includes service price data from four resellers, including *Primus*, *PC Mobile*, *Petro-Canada Mobile* and *7-Eleven Speakout*. Furthermore, the Study includes services provided by Mobile Wireless flanker brands such as *Koodo*, *Public Mobile*, *Chatr*, *Fido*, and *Virgin*, as well as more regional operators in the mobile market such as *SaskTel*, *Bell-MTS*, *Videotron*, *Eastlink* and *Freedom Mobile*⁸. Table A.1 in Appendix A provides a list of the Canadian service providers surveyed in this year's Study, broken down by city and by service basket.

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.⁹ Similarly, in calculating Canada-wide market prices, city-specific prices were aggregated and weighted according to city population. Weighted average prices for each surveyed city and for Canada are provided in Appendix B for each of the service baskets and bundles included in this Study.

In order to maintain consistency with previous years' studies (2011 to 2016), the incumbents' flanker brand service prices were not included in the calculation of the aforementioned city-specific or national aggregate prices. However, Section 4.2 provides an additional analysis of the incumbents' flanker brand prices with incumbents' and regional operators' mobile wireless prices.

The price data collected for this Study were drawn from the surveyed service providers' websites and, where necessary, supplemented with further clarifications from consumer service representatives (CSRs).¹⁰ The price data reflect currently advertised prices that are available to new consumers or existing consumers changing service plans. In all cases, the lowest available currently advertised regular or standard price was used to determine the price of each service basket. Short-term promotional offers and prices were not taken into account.

2.3 International Price Data Collection

This year's Study included seven foreign jurisdictions for the purpose of comparing telecommunications service prices with those offered in Canada. These seven jurisdictions included: the **USA (four cities)**, the **UK (London)**, **France (Paris)**, **Germany (Berlin)**, **Italy (Rome)**, **Japan (Tokyo)** and **Australia (Sydney)**. With the exception of the USA, price data were collected for the services available in each country's largest city.

For the USA, the following four cities were selected for analysis: **Boston, MA**; **Kansas City, MO**; **Minneapolis, MN**; and **Seattle, WA**. Price data were collected for the services provided by the major service providers in those cities.

⁸ For this Study MTS (Manitoba Telecom Services) has been referred to as Bell-MTS, following the completion of its acquisition by Bell in 2017. Freedom Mobile was formerly branded in Canada as WIND Mobile.

⁹ 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. Mobile Internet market shares were based on mobile wireless market shares and the service bundle shares were based on the combination of the wireline, mobile wireless and broadband market shares.

¹⁰ The 2017 Canadian price data were captured in March and April 2017.

Table A.2 in Appendix A provides a list of the international service providers included in the Study, by city and service basket.

For the purpose of comparing international price data, foreign currency prices were converted to Canadian dollars (CAD) using the Bank of Canada's monthly average exchange for the month of May 2017¹¹. The prices were further adjusted for the purchasing power parity (PPP) differences between countries using the OECD's PPP comparative price level indices for May 2017.¹²

3. Fixed Telephony Service

3.1 Fixed Telephony Service Baskets

Consistent with last year's Study, the following service element charges, as applicable, were considered for Fixed Telephony service baskets:

- Access line charges (including, as applicable, free calling allowances);
- Local usage/calling charges (where applicable);
- Long distance (LD) charges for both domestic and international calls;
- Optional feature charges (such as voicemail, call display, and other features); and
- Other recurring charges, where applicable, such as 9-1-1, network access fees, and/or other surcharges or regulatory fees.

One-time service charges such as installation and activation fees were excluded from the comparison.

Fixed Telephony service basket definitions in this year's Study are identical to those used in last year's Study, and were defined as follows:

- Level 1 400 incoming and outgoing minutes per month, with 10% of outgoing minutes treated as long distance, and no optional features.
- Level 2 1,000 incoming and outgoing minutes per month, with 20% of outgoing minutes treated as long distance, and two optional features (voice mail and call display).
- Level 3 1,600 incoming and outgoing minutes per month, with 30% of outgoing minutes treated as long distance, and a full set of optional features.

Table B.1 in Appendix B provides a detailed summary of the service elements used for the fixed telephony price comparison.

¹¹The Bank of Canada's foreign currency conversion rates are available at <http://www.bankofcanada.ca/rates/exchange/>

¹² The OECD's latest data on PPP are available at: <http://www.oecd.org/std/prices-ppp/purchasingpowerparitiespppsdata.htm>.

3.2 Canadian Fixed Telephony Service Prices

Figure 1, below, provides an overview of the changes in Level 1, 2 and 3 service basket prices since 2016. On average, Fixed Telephony prices portray an increasing trend. That is, overall prices increased by 8.6% (Level 1), 7.9% (Level 2), and, 2.7% (Level 3). The increases are reflected across all surveyed cities, except Regina (Levels 1, 2 and 3) and Winnipeg (Levels 1 and 2).

Figure 1: Year-over-Year (YoY) Change in Canadian Fixed Telephony Prices (2016-2017)

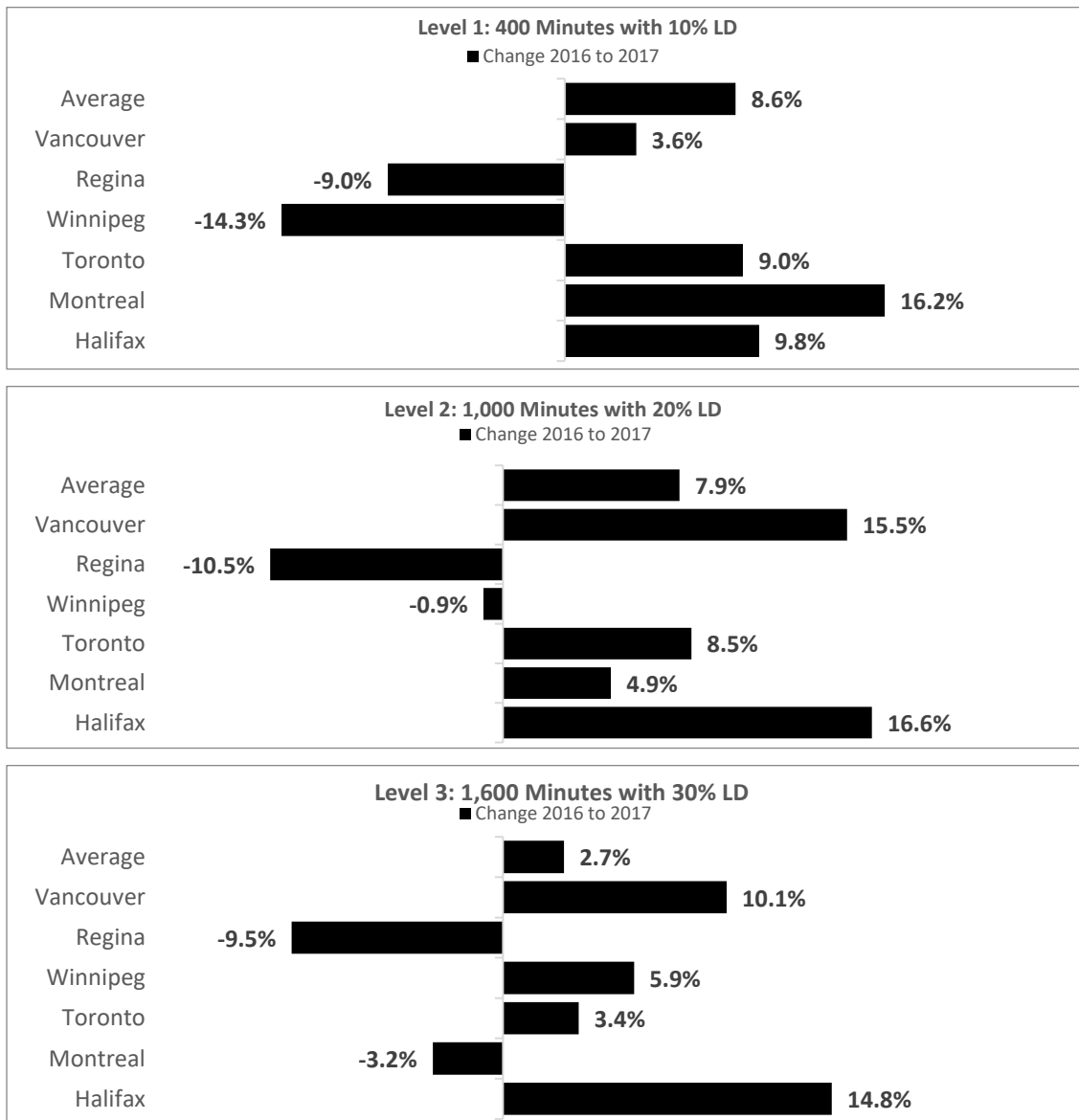
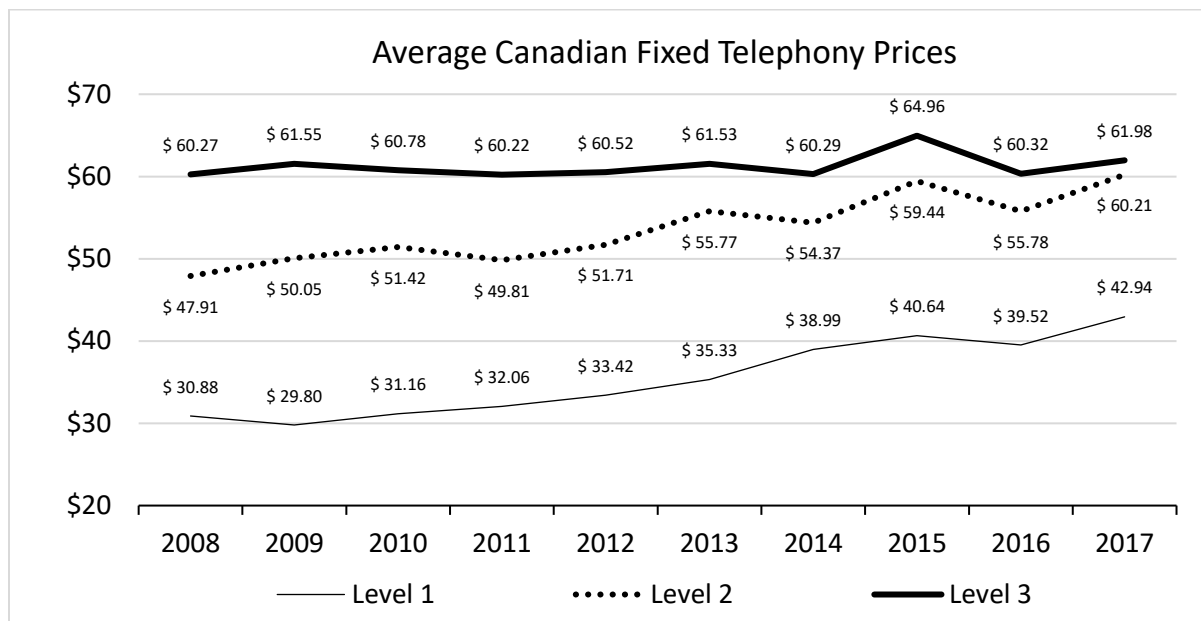


Figure 2, below, provides a summary of the average Canadian monthly prices for each of the three Fixed Telephony service baskets for the period of 2008 to 2017. Detailed Fixed Telephony prices for the period are provided in Figure C.1 and Table C. 1 in Appendix C.

Figure 2: Average Canadian Fixed Telephony Prices by Service Basket (2008-2017)



Key trends in Canadian Fixed Telephony prices for three service baskets over the last several years are summarized below.

- Level 1 prices increased from \$30.88 in 2008 to \$42.94 in 2017, an average annual increase of 3.7%. The overall increase primarily represents price increases by all operators in Canada’s largest markets of Toronto (5.1% per year) and Montreal (3.8% per year). Only in Regina did prices decrease, by an average rate of 2.6% per year. The 2017 Level 1 average prices varied widely by city, ranging from as low as \$22.30 in Regina to \$49.52 in Toronto.
- Level 2 prices increased from \$47.91 in 2008 to \$60.21 in 2017, an average annual increase of 2.6%. The overall increase primarily represents price increases by all operators in Canada’s largest markets of Toronto (3.5% per year) and Montreal (2.8% per year). Only in Regina did prices decrease, by an average rate of 1.8% per year. The 2017 Level 2 average prices also varied widely by city, ranging from \$35.10 in Regina to \$71.20 in Halifax.
- Lastly, Level 3 prices increased from \$60.27 in 2008 to \$61.98 in 2017, an average annual increase of 0.3%. This small increase appears to result mainly from price increases by operators in the large markets of Toronto (0.9% per year) and Montreal (0.1% per year). Regina and Vancouver showed a decreasing trend in Level 3 prices – Regina (1.8% per year), and Vancouver (1.4% per year). The lowest 2017 Level 3 average price was in Regina (\$42.45), while the highest price was in Halifax at \$81.94.

4. Mobile Wireless Telephony Service

4.1 Mobile Wireless Telephony Service Baskets

For Mobile Wireless Telephony, this year's Study included the following six service baskets:

- Level 1: 150 incoming & outgoing minutes per month, with 10% of outgoing minutes treated as long distance and no optional features.
- Level 2: 450 incoming & outgoing minutes per month, with 10% of outgoing minutes treated as domestic long distance; two optional features including voice mail and call display; and 300 text messages.
- Level 3: 1,200 incoming & outgoing minutes per month, with 15% of outgoing minutes treated as domestic long distance; more than two optional features, including voice mail and call display; 300 text messages; and 1 GB data usage per month.
- Level 4: Unlimited nationwide talk and text (no international and US calling included); more than two optional features, including voice mail and call display; and 2 GB data usage per month.
- Level 5: Unlimited nationwide talk and text (no international and US calling included); more than two optional features, including voice mail and call display; and 5 GB data usage per month.
- Level 6: Family Basket - Unlimited nationwide talk and text (no international and US calling included); more than two optional features, including voice mail and call display; 10 GB data usage per month and three lines.

Key factors considered in the current Study include:

- **Devices:** As in previous years, the current Study was based on the least expensive "lite" (basic) devices available from each service operator, rather than premium devices¹³.
- **Family basket (Level 6):** As in the previous year, Level 6 ("Family Basket") was defined to comprise three lines, including one for the main account and two for additional family members.
- **International Long-Distance Calling:** As in previous years, international long-distance calling was excluded from all service baskets.

The following Mobile Wireless Telephony service element charges, where applicable, are considered for price comparison purposes:

- Network access/monthly plan charges, as applicable;
- Additional calling charges, where applicable;
- Optional feature charges, as applicable (e.g., voice mail, call display and others);

¹³ However, in very few instances a premium device was included if the basic device was not available from a service provider(s) for a service basket level. The approach did not have any material impact on the estimated average price in a jurisdiction.

- Domestic long-distance charges, where applicable;
- Text message service (TMS), where applicable;
- Data service charges, where applicable; and
- Any other applicable monthly service charges such as emergency, universal service and/or other regulatory fees.

The Study excludes several one-time charges such as activation fees, upfront handset or device costs, and roaming charges. Section 4.6 provides a detailed pricing comparison of roaming services available to Canadian and American consumers when traveling to the USA and Canada, respectively.

Table B.2 provides a detailed summary of the service elements used for the Mobile Wireless Telephony service baskets as well as the usage assumptions.

For each of the six service baskets, prices are measured using standard mobile service plan rates offered by surveyed Wireless Service Providers (WSPs). This year's Study was primarily based on post-paid service plans. Pre-paid plans were only included in the comparison if post-paid price plans were not available for a particular service basket. In addition, in the pre-paid plans that were selected, monthly device costs were added in order to reflect the implicit device cost present in post-paid plans. This additional device cost was based on the particular service provider's least expensive "lite" device amortized over a twenty-four-month period¹⁴.

Many WSPs offer post-paid plans on a no-contract or term-contract basis (the most common term being 24 months). Term-contract service plans typically provide a means for subscribers to purchase a new handset or device at a discounted price. Such plans generally include an implicit or explicit handset cost recovery component in the service plan price. No-contract-term, bring-your-own-device or SIM card-only service plans are also often available at lower price points given that they do not include a handset cost recovery component. Consistent with previous years' studies, as applicable, the post-paid service plan prices collected for this Study are based on term-contract service plans.

4.2 Canadian Mobile Wireless Telephony and Prices

Figure 3, below, provides a historical view of the Canadian Mobile Wireless Telephony service baskets Levels 1 to 5¹⁵.

Level 6, which is a family share service basket as described above and introduced last year is shown separately in Figure 4.

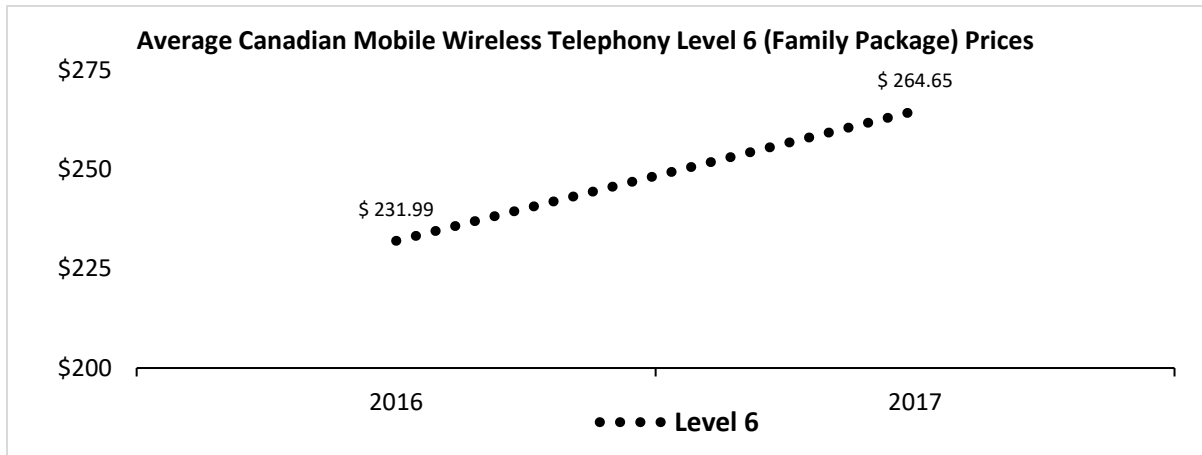
¹⁴ In case pre-paid plans, a consumer may choose to have a basic (low-priced) device. For example, for Level 1 most of the service providers offered pre-paid plan, for which a very basic device is required. Since, such basic device offers were not provided by service providers, it was decided not to include arbitrary device cost in the Level 1 price comparison.

¹⁵ Levels 3, 4, and 5 were introduced in 2014, 2015, and 2016 respectively, and are therefore not shown for preceding years.

Figure 3: Average Canadian Mobile Wireless Telephony Prices by Service Basket Levels 1 to 5 (2008-2017)



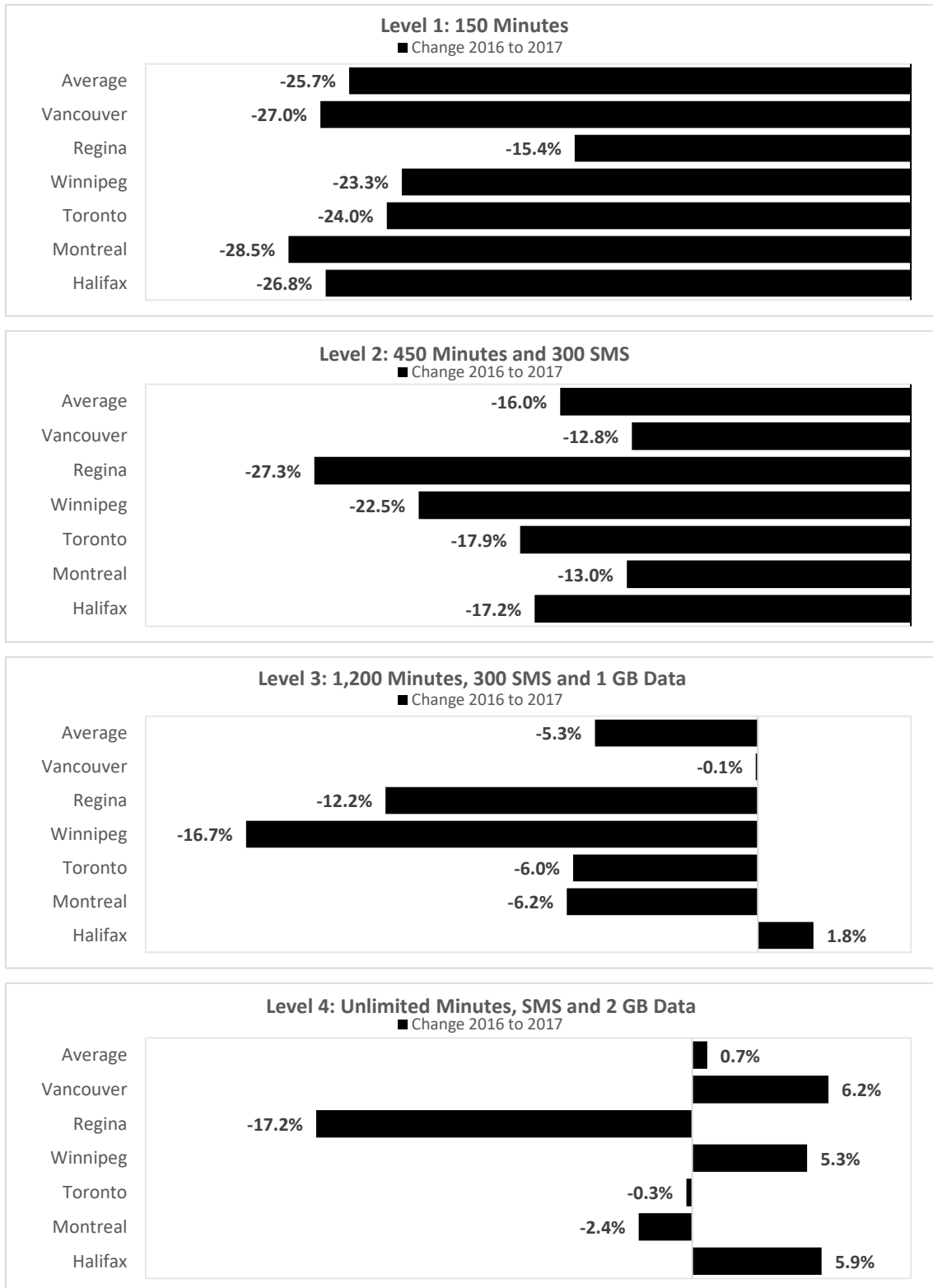
Figure 4: Average Canadian Mobile Wireless Telephony Prices of Family Share Service Basket Level 6 (2008-2017)

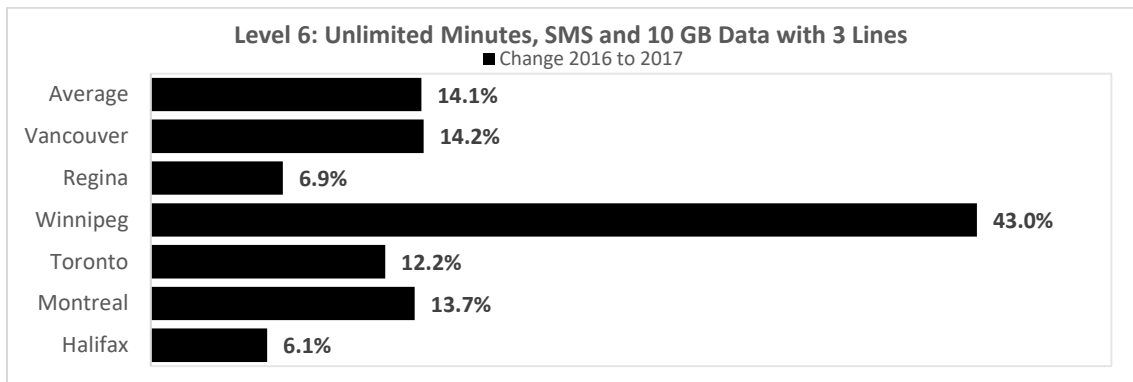
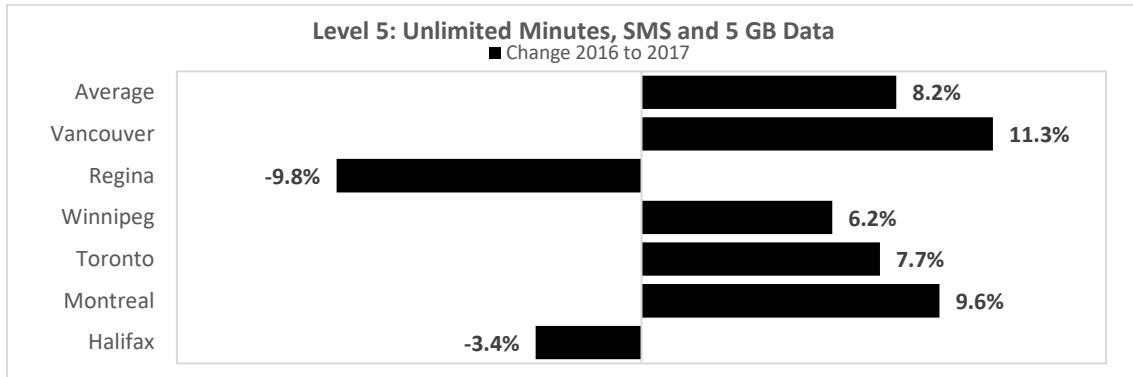


Mobile Wireless Telephony prices showed mixed trends across Canadian cities. For example, within the past year, average prices decreased for lower usage services: Level 1 decreased by 25.7%, Level 2 decreased by 16.0% and decreased Level 3 by 5.3%. Average prices increased for higher usage services: Level 4 increased by 0.7%, Level 5 increased by 8.2%, and Level 6 increased by 14.1%.

Year-over-Year (YoY) average price changes in the six Canadian cities are presented in Figure 5 below.

Figure 5: YoY Change in Canadian Mobile Telephony Prices (2016-2017)





Major price reductions occurred in all six cities for Level 1, with the average prices decreasing by 15.4% (in Regina) to 28.5% (in Montreal). Similar trends were shown for Level 2 – average prices decreased by 12.8% (in Vancouver) to 27.3% (in Regina). The changes appear to primarily result from price decreases by all operators for their Levels 1 and 2 service offerings.

Most cities, except Halifax, also witnessed price decreases for Level 3, ranging from 6.0% (Toronto) to 16.7% (Winnipeg). The price decreases occurred across the board for most operators, although in some markets operators left their prices unchanged from last year.

In contrast, at Levels 4 and 5, most cities saw price increases, except Regina (Levels 4, and 5), Montreal and Toronto (Level 4) and Halifax (Level 5). At Level 6, there were price increases in all cities. At Level 5 the highest price increase was in Vancouver (11.3%). At level 6, the highest price increase of 43.0% was in Winnipeg. Price increases for these higher-level services reflect price increases introduced by virtually all surveyed operators.

Figure C.2 and Table C.2, in Appendix C, provide a detailed overview of the Canadian wireless telephony service baskets prices for 2008 to 2017.

4.2.1 Comparison of Incumbent and Regional Operators' Prices¹⁶

With respect to the price difference between Mobile Wireless Telephony incumbents and regional operators' offerings, the trends were generally similar to those of a year ago. This comparison is based on the unweighted average of the price offerings of the three incumbents (Telus, Rogers, and Bell) for each city, and the respective regional operator: Eastlink, Videotron, SaskTel, Freedom Mobile, and Bell-MTS. Table 6 below, provides a summary of the price differences.

Table 6: 2017 Mobile Wireless Price Comparison - Incumbent versus Regional Operator

City	Service Provider Type	Mobile Wireless Service Level						Average (City)
		Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	
Halifax	Incumbents	\$ 30.68	\$ 42.10	\$ 78.76	\$ 95.43	\$ 110.43	\$ 277.96	\$ 105.89
	Regionals	\$ 30.55	\$ 45.55	\$ 78.05	\$ 91.05	\$ 103.05	\$ 211.15	\$ 93.23
	Differential	-0.4%	8.2%	-0.9%	-4.6%	-6.7%	-24.0%	-12.0%
Montreal	Incumbents	\$ 29.04	\$ 39.46	\$ 62.96	\$ 70.43	\$ 87.77	\$ 217.32	\$ 84.50
	Regionals	n/a	\$ 35.38	\$ 42.38	\$ 60.38	\$ 85.38	n/a	\$ 55.88
	Differential	n/a	-10.3%	-32.7%	-14.3%	-2.7%	n/a	-33.9%
Regina	Incumbents	\$ 28.95	\$ 35.62	\$ 45.62	n/a	\$ 60.62	\$ 184.09	\$ 70.98
	Regionals	\$ 30.83	\$ 35.83	\$ 70.83	n/a	\$ 80.83	n/a	\$ 54.58
	Differential	6.5%	0.6%	55.3%	n/a	33.3%	n/a	-23.1%
Toronto	Incumbents	\$ 31.92	\$ 43.33	\$ 80.00	\$ 95.00	\$ 118.33	\$ 283.33	\$ 108.65
	Regionals	\$ 25.00	\$ 25.00	\$ 30.00	\$ 35.00	\$ 45.00	n/a	\$ 32.00
	Differential	-21.7%	-42.3%	-62.5%	-63.2%	-62.0%	n/a	-70.5%
Vancouver	Incumbents	\$ 31.67	\$ 43.33	\$ 81.67	\$ 95.00	\$ 120.00	\$ 285.00	\$ 109.44
	Regionals	\$ 25.00	\$ 25.00	\$ 30.00	\$ 35.00	\$ 45.00	n/a	\$ 32.00
	Differential	-21.1%	-42.3%	-63.3%	-63.2%	-62.5%	n/a	-70.8%
Winnipeg	Incumbents	\$ 30.00	\$ 40.00	\$ 45.00	\$ 55.00	\$ 65.00	\$ 210.55	\$ 74.26
	Regionals	\$ 30.00	\$ 30.00	\$ 75.00	\$ 80.00	\$ 85.00	n/a	\$ 60.00
	Differential	0.0%	-25.0%	66.7%	45.5%	30.8%	n/a	-19.2%
Average (Level)	Incumbents	\$ 30.38	\$ 40.64	\$ 65.67	\$ 82.17	\$ 93.69	\$ 243.04	\$ 92.29
	Regionals	\$ 28.28	\$ 32.79	\$ 54.38	\$ 60.29	\$ 74.04	\$ 211.15	\$ 54.62
	Differential	-6.92%	-19.31%	-17.19%	-26.63%	-20.97%	-13.12%	-40.82%

Telus, Rogers, and Bell offer same price plan for Vancouver and Toronto
Regionals included - Eastlink (Halifax), Videotron (Montreal), Freedom Mobile, (Toronto and Vancouver), SaskTel (Regina), and Bell-MTS (Winnipeg)
Service providers' (Incumbent, Regional) prices represent the unweighted averages
If a service provider's (Incumbent, Regional) price was not available for a City/Level, it was not included in the average

Overall, regional operators' prices were lower than incumbents' by a range of 6.92% to 26.63% for all service basket levels.¹⁷

¹⁶ In 2016 this was comparison was between Incumbent and New Entrants: Eastlink (Halifax), Videotron (Montreal), Freedom Mobile (Toronto and Vancouver). For this Study, since "New Entrants" were redefined as "Regionals", SaskTel (Regina), Bell-MTS (Winnipeg) were also included in the comparison.

¹⁷ However, Level 2 regional operators' prices were higher in Halifax.

4.2.2 Comparison of Incumbents and Incumbent Flanker Brand Prices

This section further expands the analysis by including incumbents' flanker brands such as Fido (Rogers), **Chatr** (Rogers), Virgin (Bell), Public Mobile (Telus) and Koodo (Telus)¹⁸. Chatr is available in only three cities (Montreal, Toronto, and Vancouver). Table 7 below, provides a summary of the price comparison between incumbents versus flanker brands and flanker brands versus regionals for service baskets Level 1 to 5.

Table 7: Mobile Wireless Price Comparison - Incumbent versus Flanker Brands, and Flanker Brands versus Regional Operators

City	Service Provider Type	Mobile Wireless Service Basket Level					
		Level 1	Level 2	Level 3	Level 4	Level 5	Average (City)
Halifax	Incumbents (I)	\$ 30.68	\$ 42.10	\$ 78.76	\$ 95.43	\$ 110.43	\$ 71.48
	Flankers (F)	\$ 28.85	\$ 36.94	\$ 64.40	\$ 72.33	\$ 83.58	\$ 57.22
	Regionals (R)	\$ 30.55	\$ 45.55	\$ 78.05	\$ 91.05	\$ 103.05	\$ 69.65
	Differential (F Vs. I)	-5.96%	-12.26%	-18.24%	-24.21%	-24.32%	-19.95%
	Differential (R Vs. F)	5.88%	23.32%	21.20%	25.89%	23.30%	21.73%
Montreal	Incumbents (I)	\$ 29.04	\$ 39.46	\$ 62.96	\$ 70.43	\$ 87.77	\$ 57.93
	Flankers (F)	\$ 26.80	\$ 35.65	\$ 45.60	\$ 53.86	\$ 62.57	\$ 44.90
	Regionals (R)	n/a	\$ 35.38	\$ 42.38	\$ 60.38	\$ 85.38	\$ 55.88
	Differential (F Vs. I)	-7.71%	-9.66%	-27.57%	-23.52%	-28.72%	-22.50%
	Differential (R Vs. F)	n/a	-0.75%	-7.06%	12.10%	36.47%	24.47%
Regina	Incumbents (I)	\$ 28.95	\$ 35.62	\$ 45.62	n/a	\$ 60.62	\$ 42.70
	Flankers (F)	\$ 30.42	\$ 35.67	\$ 54.86	\$ 58.11	\$ 51.12	\$ 46.03
	Regionals (R)	\$ 30.83	\$ 35.83	\$ 70.83	n/a	\$ 80.83	\$ 54.58
	Differential (F Vs. I)	5.05%	0.14%	20.26%	n/a	-15.68%	7.80%
	Differential (R Vs. F)	1.36%	0.45%	29.11%	n/a	58.13%	18.56%
Toronto	Incumbents (I)	\$ 31.92	\$ 43.33	\$ 80.00	\$ 95.00	\$ 118.33	\$ 73.72
	Flankers (F)	\$ 26.26	\$ 39.53	\$ 55.82	\$ 64.94	\$ 73.77	\$ 52.06
	Regionals (R)	\$ 25.00	\$ 25.00	\$ 30.00	\$ 35.00	\$ 45.00	\$ 32.00
	Differential (F Vs. I)	-17.73%	-8.79%	-30.22%	-31.65%	-37.66%	-29.38%
	Differential (R Vs. F)	-4.79%	-36.75%	-46.26%	-46.10%	-39.00%	-38.53%
Vancouver	Incumbents (I)	\$ 31.67	\$ 43.33	\$ 81.67	\$ 95.00	\$ 120.00	\$ 74.33
	Flankers (F)	\$ 25.92	\$ 37.55	\$ 54.38	\$ 64.87	\$ 74.31	\$ 51.41
	Regionals (R)	\$ 25.00	\$ 25.00	\$ 30.00	\$ 35.00	\$ 45.00	\$ 32.00
	Differential (F Vs. I)	-18.13%	-13.33%	-33.41%	-31.71%	-38.08%	-30.84%
	Differential (R Vs. F)	-3.57%	-33.43%	-44.83%	-46.05%	-39.44%	-37.75%
Winnipeg	Incumbents (I)	\$ 30.00	\$ 40.00	\$ 45.00	\$ 55.00	\$ 65.00	\$ 47.00
	Flankers (F)	\$ 29.84	\$ 35.83	\$ 52.02	\$ 56.33	\$ 59.24	\$ 46.65
	Regionals (N)	\$ 30.00	\$ 30.00	\$ 75.00	\$ 80.00	\$ 85.00	\$ 60.00
	Differential (F Vs. I)	-0.52%	-10.42%	15.59%	2.41%	-8.86%	-0.74%
	Differential (N Vs. F)	0.53%	-16.27%	44.18%	42.03%	43.48%	28.61%
Average (Level)	Incumbents (I)	\$ 30.38	\$ 40.64	\$ 65.67	\$ 82.17	\$ 93.69	\$ 61.19
	Flankers (F)	\$ 28.02	\$ 36.86	\$ 54.51	\$ 61.74	\$ 67.43	\$ 49.71
	Regionals (N)	\$ 28.28	\$ 32.79	\$ 54.38	\$ 60.29	\$ 74.04	\$ 50.69
	Differential (F Vs. I)	-7.77%	-9.30%	-16.99%	-24.87%	-28.03%	-18.76%
	Differential (N Vs. F)	0.93%	-11.03%	-0.25%	-2.35%	9.81%	1.96%

Telus, Rogers, and Bell offer same price plan for Vancouver and Toronto
Regionals included - Eastlink (Halifax), Videotron (Montreal), Freedom Mobile, (Toronto and Vancouver), SaskTel (Regina), and Bell-MTS (Winnipeg)
Five flanker brand included Bell Virgin, Rogers Fido, Telus Koodo, Telus Public Mobile, and Rogers Chatr
Service providers' (Incumbent, Flanker, Regional) prices represent the unweighted averages
If a service provider's (Incumbent, Flanker, Regional) price was not available for a City/Level, it was not included in the average

¹⁸ Mobilicity (Rogers), which was included in the previous year's Study, is not included in the Table 5 comparison above. Mobilicity no longer exists as a Rogers brand: in May 2016, Rogers announced plans to retire Mobilicity and migrate its subscribers to Chatr by the end of 2016.

Flanker brand price plans for service Level 6 (family basket) were not found, and are therefore not included in the above comparison. Overall, flanker prices were 18.76% lower than those of incumbents, and regional operators' prices were 1.96% higher than those of flanker brands. It is worth noting that in Halifax, for all levels (1 to 5) the prices of regional operators were higher than those of flanker brands: on average, regional operators' prices were 21.73% higher than those of flanker brands in Halifax.

4.2.3 Comparison of Incumbent and Reseller or MVNO Prices

Table 8 provides a price comparison of incumbents and resellers/MVNOs by each service basket level.

Table 8: Mobile Wireless Price Comparison - Incumbents versus Resellers/MVNOs

City	Service Provider Type	Mobile Wireless Service Basket Level					Average (City)*
		Level 1	Level 2	Level 3	Level 4	Level 5	
Halifax	Incumbents	\$ 30.68	42.10	78.76	\$ 95.43	110.43	81.68
	Resellers/MVNOs	26.70	30.45	67.95	\$ 56.43	78.43	58.31
	Differential	-12.99%	-27.68%	-13.74%	-40.87%	-28.98%	-28.61%
Montreal	Incumbents	\$ 29.04	39.46	62.96	\$ 70.43	87.77	65.16
	Resellers/MVNOs	25.45	30.45	67.95	\$ 56.43	86.95	60.45
	Differential	-12.36%	-22.83%	7.93%	-19.88%	-0.94%	-7.23%
Regina	Incumbents	\$ 28.95	35.62	45.62	n/a	60.62	47.29
	Resellers/MVNOs	26.74	30.49	67.99	\$ 56.43	87.03	60.49
	Differential	-7.64%	-14.40%	49.04%	n/a	43.56%	27.91%
Toronto	Incumbents	\$ 31.92	43.33	80.00	\$ 95.00	118.33	84.17
	Resellers/MVNOs	25.00	30.00	67.50	\$ 56.00	86.50	60.00
	Differential	-21.67%	-30.77%	-15.63%	-41.05%	-26.90%	-28.71%
Vancouver	Incumbents	\$ 31.67	43.33	81.67	\$ 95.00	120.00	85.00
	Resellers/MVNOs	25.00	30.00	67.50	\$ 56.00	86.50	60.00
	Differential	-21.05%	-30.77%	-17.35%	-41.05%	-27.92%	-29.41%
Winnipeg	Incumbents	\$ 30.00	40.00	45.00	\$ 55.00	65.00	51.25
	Resellers/MVNOs	25.34	30.34	67.84	\$ 56.43	86.72	60.33
	Differential	-15.54%	-24.16%	50.75%	2.60%	33.41%	17.72%
Average* (Level)	Incumbents	\$ 30.38	40.64	65.67	\$ 82.17	93.69	69.09
	Resellers/MVNOs	25.70	30.29	67.79	\$ 56.29	85.35	59.93
	Differential	-15.38%	-25.47%	3.23%	-31.50%	-8.90%	-13.26%
<p>No reseller/MVNO was found for Level 6 (Family Basket). Resellers/MVNOs include Primus, PC Mobile, Petro Canada Mobile and 7-Eleven-Speakout. For service baskets level 3, and 4 only one MVNO was found -PC Mobile. * unweighted averages</p>							

Surveyed resellers/MVNOs include Primus, PC Mobile, Petro-Canada Mobile, and 7-Eleven. For Levels 4 and 5 pricing for only one reseller/MVNO (PC Mobile) was available.

Overall, the price differential between incumbents and resellers/MVNOs increased from 9.90% to 13.26%, in comparison to last year. For example, the prices of resellers/MVNOs for Level 2 were lower by 4.71% in 2016, as compared to 25.47% this year. Similarly, the price differential increased in Level 4 (from 12.05% to 31.50%) and in Level 5 (from 2.29% to 8.90%). For Level 1 the difference decreased from 34.06% to 15.38%. In case of Level 3, the price differential reversed – in 2016 the prices of resellers/MVNOs were lower by 14.25%, whereas their prices were higher than the incumbents by 3.23% in 2017. In this regard, it is worth noting that in 2017 the incumbent prices were significantly lower than resellers/MVNOs at in Regina (Levels 3, and 5), and in Winnipeg (Levels 3 and 5). In 2017 resellers/MVNOs' prices were also higher in Montreal by 7.93% at Level 3, and in Winnipeg by 2.6% at Level 4.

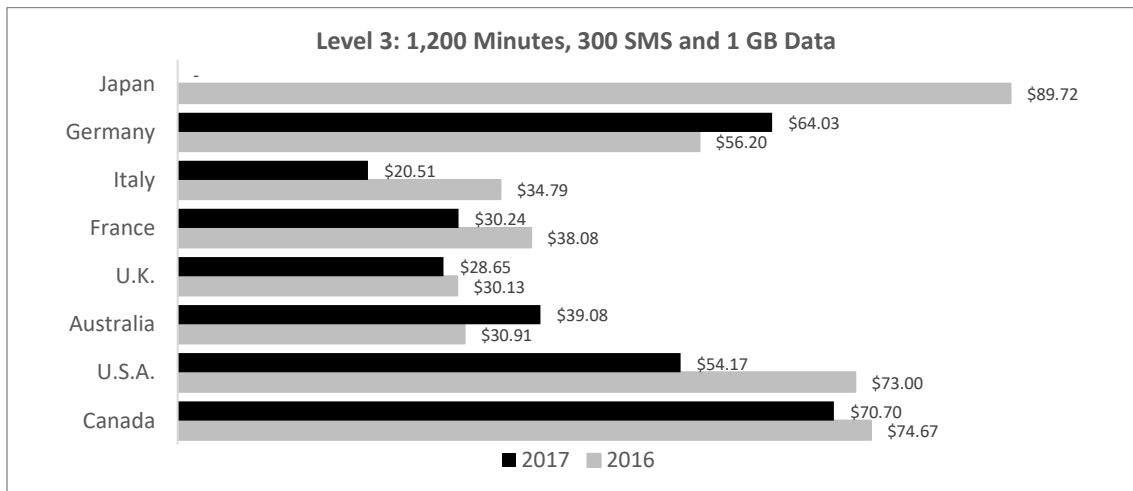
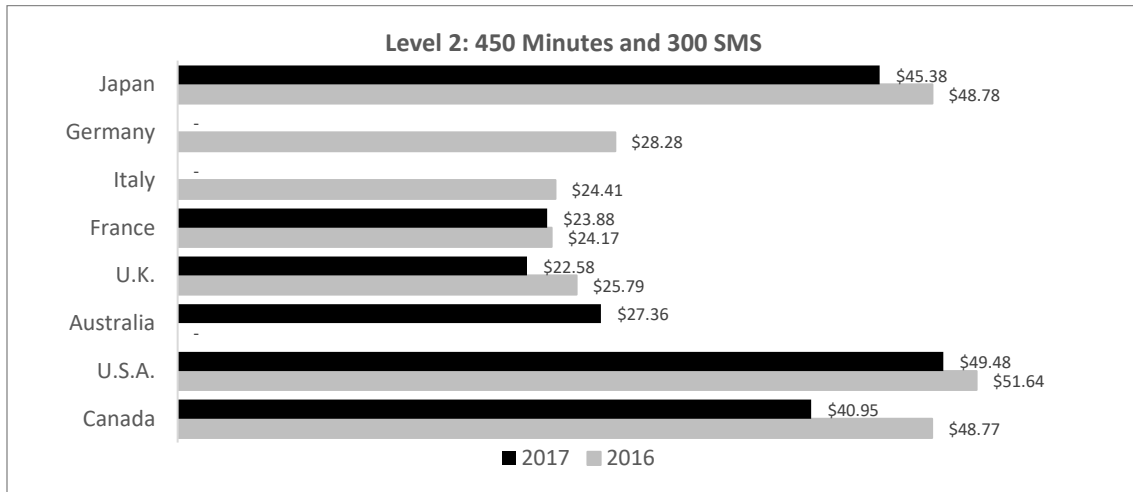
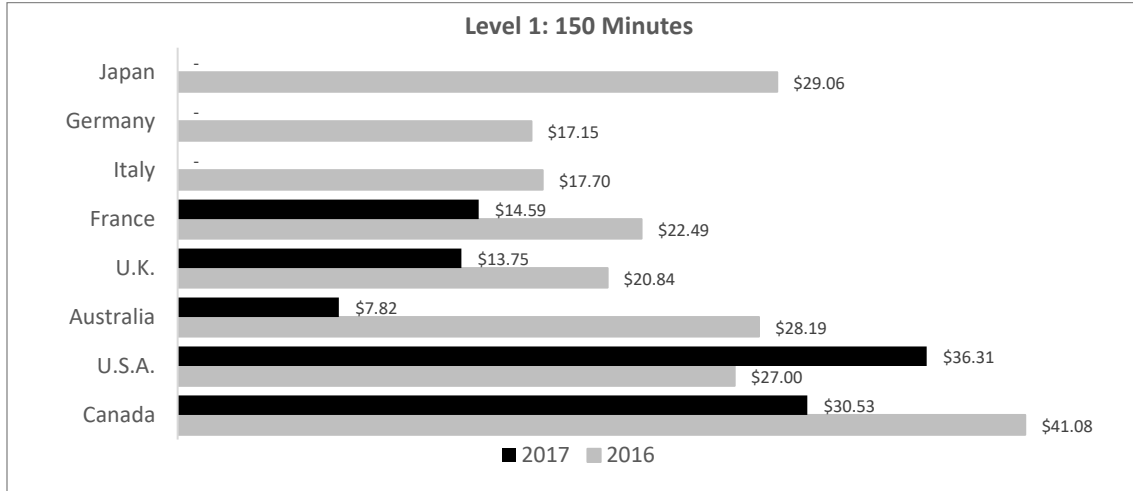
4.3 International Mobile Wireless Telephony

As noted in previous studies, there are a number of important pricing differences that should be considered when comparing Canadian and foreign Mobile Wireless Telephony prices:

- **Price Structure:** The pricing of Mobile Wireless Telephony service plans in the UK, Germany, Italy, France, Australia and Japan differs significantly compared to Canada (as well as the USA). Mobile Wireless Telephony prices in Europe, Australia, and Japan are set on a “calling party pays” (CPP) basis, where consumers pay only for outgoing calls. On the other hand, Canadian and USA pricing plans are based on a “receiving party pays” (RPP) approach, under which consumers pay for incoming and outgoing calls. Unlike Canada and the USA, some Mobile Wireless Telephony service plans in Europe, Australia, and Japan also include per-call setup charges, different per-minute call rates to landline versus to mobile consumers, or different per-minute rates for on-net versus off-net mobile calls. However, as in Canada, unlimited national calling plans and service add-ons that cover calls to both fixed and mobile devices and allow for both on- and off-net mobile lines, are now commonly available.
- **Regulatory Fees:** Regulatory fees of one form or another apply in Canada, Japan, and the USA. In Canada, there is typically an explicit emergency 9-1-1 fee and, in some cases, universal service fees (as in Japan). In the USA, there is a variety of regulatory fees, federal and state Universal Service Fund (USF) surcharges and other fees. For this year's Study, we have estimated these regulatory charges based on updated information on USF fees and carrier-specific regulatory cost recovery charges and, where applicable, information collected in previous pricing studies.

Figure 6 below, provides a comparison of 2017 versus 2016 Mobile Wireless Telephony prices between Canada and the surveyed seven foreign jurisdictions for each of the five service baskets. All prices are expressed in PPP-adjusted Canadian dollars and exclude retail sales taxes.

Figure 6: 2017 International Mobile Wireless Telephony Price Comparison (PPP-adjusted Canadian Dollars)



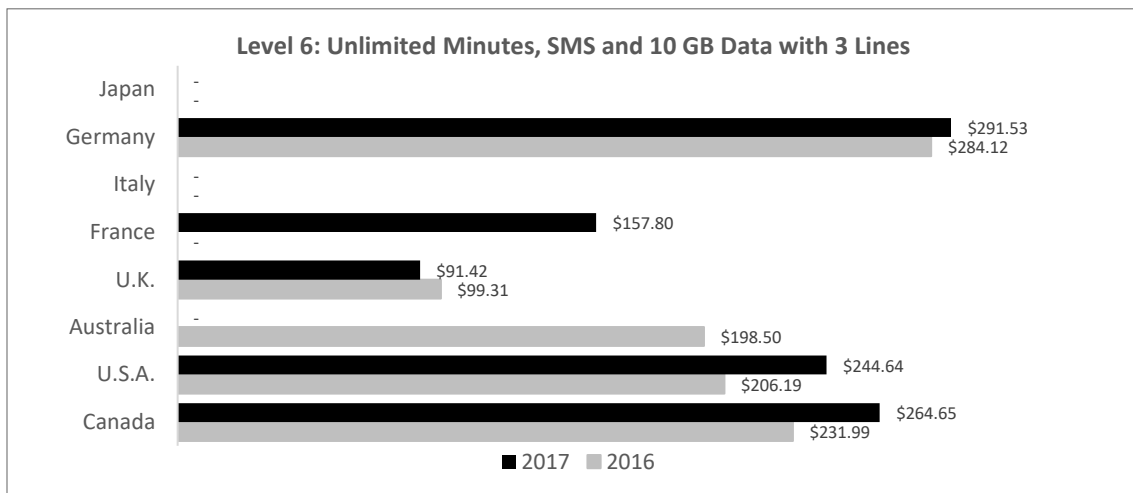
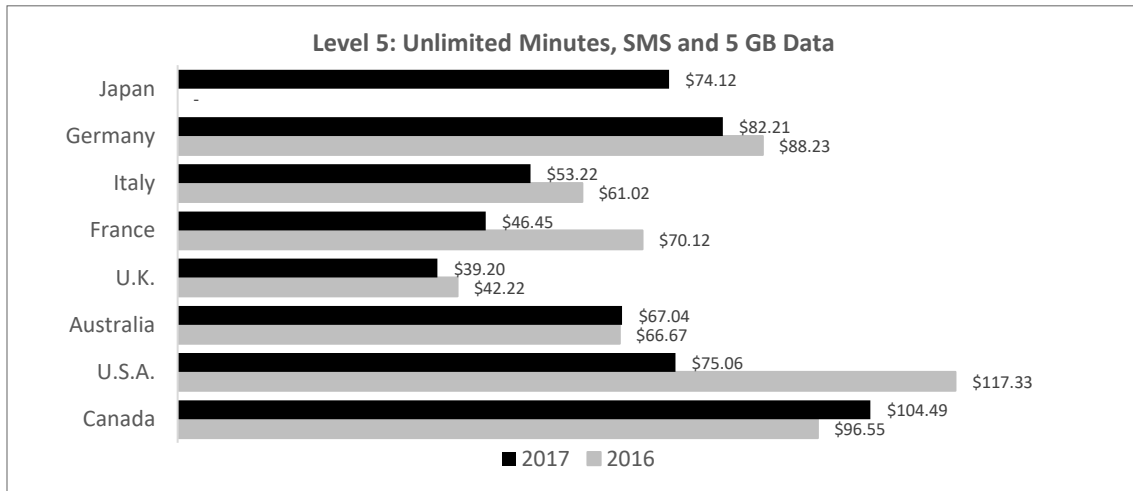
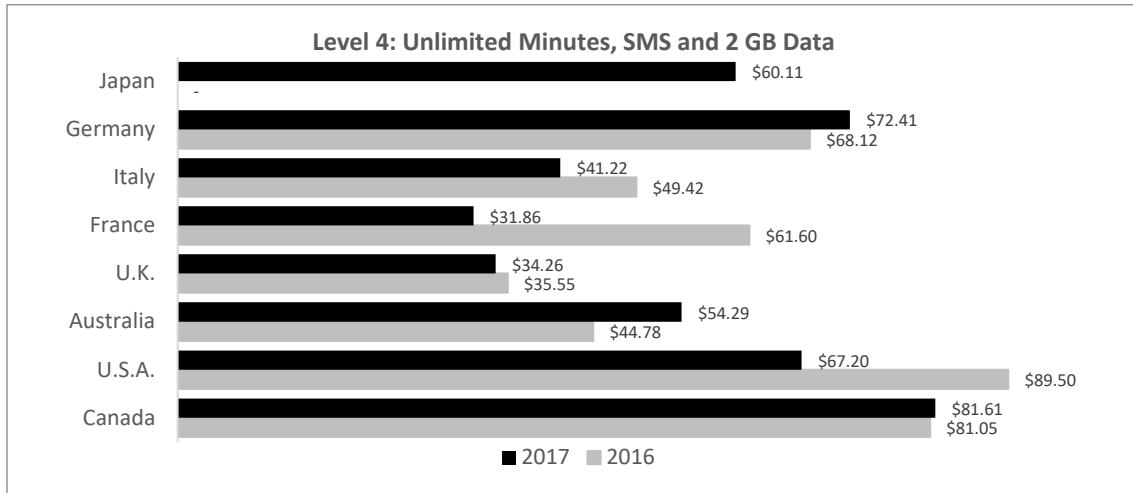


Figure 6 above indicates that a number of jurisdictions saw changes in their service offerings, as described below:

- Level 1: In 2016, average prices for Level 1 were lowest in Italy (\$17.70), and Germany (\$17.15). However, Level 1 offerings were not available in 2017 for these two countries. Also for Japan, Level 1 service offerings that averaged \$29.06 in 2016, were not available to consumers in 2017.
- Level 2: In 2016, average prices for Level 2 were lowest in Italy (\$24.41), and France (\$24.17). However, Level 1 offerings were not available in 2017 for these two countries. For Australia, Level 2 service offerings averaged \$27.36 in 2017, while Level 2 offerings were not available the previous year.
- In 2017 Level 3 offerings were not available in Japan, where Level 3 prices averaged \$89.92 in the previous year. Similarly, Level 4 service offerings in Japan averaged \$60.11 in 2017, but were not available in the previous year; and Japan's Level 5 prices averaged \$74.12 in 2017, but Level 5 offerings were not available in the previous year.
- In France, Level 6 service offerings averaged \$157.80 in 2017 but were not available in the previous year. In 2017 Level 6 offerings were not available in Australia, but 2016 prices averaged \$198.50. There were no Level 6 service offerings in Japan or Italy in 2016 or 2017.

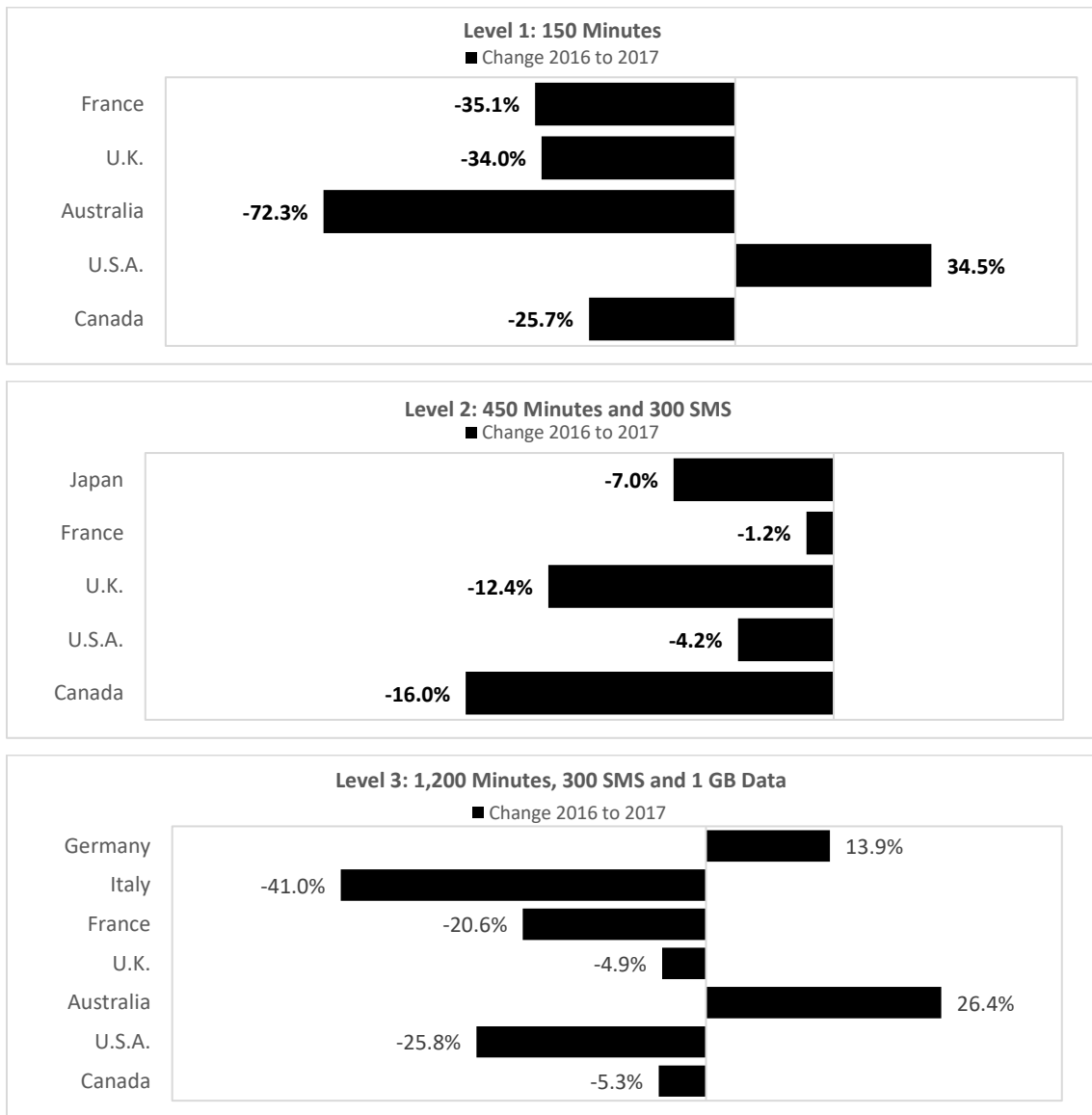
Figure D. 2 and Table D. 2, in Appendix D, provide a detailed historical account of international Mobile Wireless prices for the period of 2008 to 2017 for each country and basket as applicable.

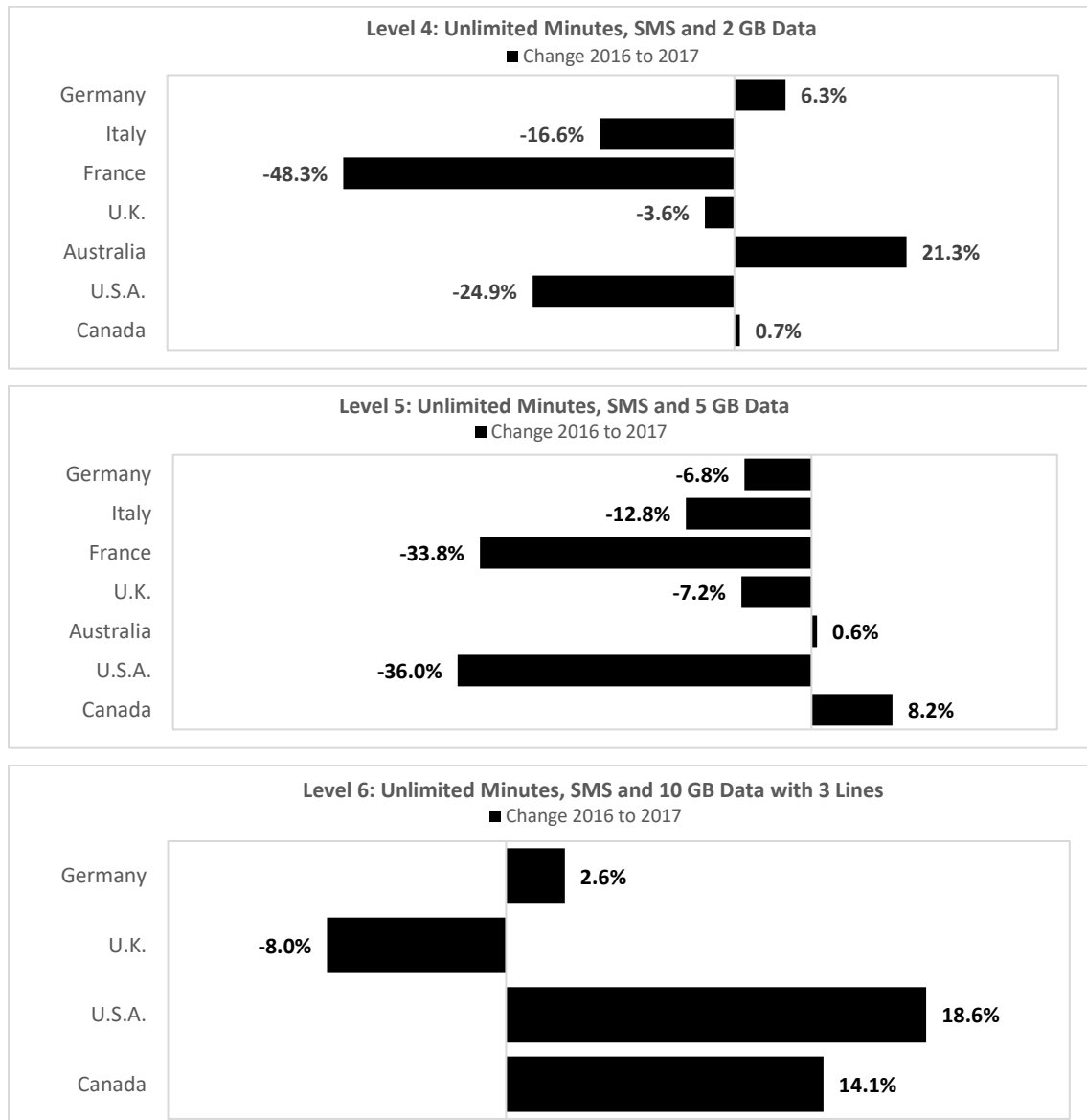
Figure 7, below, provides an overview of the changes in international Mobile Wireless prices since last year.

- Level 1 prices decreased in all countries except the USA. Australia showed the largest price decrease of 72.3% because service offerings were no longer available from the high price operator in the previous year. The USA's average Level 1 price increased by 34.5%. There were no Level 1 service offerings in Japan or Germany.
- Level 2 prices decreased in all countries, with Canada showing the largest price decrease of 16.0% (there were no Level 2 service offerings in Japan or Germany).
- For Level 3, Australia and Germany saw price increases of 26.4% and 13.9% respectively. These increases resulted primarily from changes in market share and operators' price increases. Other jurisdictions experienced price decreases, of which the most pronounced were in Italy (41.0%), the USA (25.8%), and France (20.6%). The changes in Italy and the USA resulted from a lower-cost operator providing Level 3 service in 2017, while higher-cost operators did not offer Level 3 services. In France, both operators providing Level 3 services decreased their prices.
- While Level 4 prices in Canada were virtually unchanged between 2016 and 2017, Australia's average Level 4 prices increased by 21.3%, due to shifts in market share and price changes introduced by both operators offering Level 3 services. Average Level 4 prices decreased by 48.3% in France, where the only operator offering Level 4 service in 2017 decreased its prices from last year. USA operators also decreased their Level 4 prices, yielding an average price decrease of 24.9% for that jurisdiction.

- Most countries saw decreases in Level 5 prices, except for Australia and Canada. In the USA, for example, the average Level 5 price decreased by 36.0%, since all operators decreased their prices in all surveyed cities. In France, where two higher-cost operators no longer offered Level 5 service, Level 5 prices decreased by 33.8%. The average price decrease of 12.8% in Italy resulted from all operators decreasing their Level 5 prices in 2017.
- Canada and the USA saw the highest increases – 14.1% and 18.6% respectively – in Level 6 prices. In both countries, there were price increases in all surveyed cities by all surveyed operators.

Figure 7: Year-over-Year (YoY) Change in International Mobile Wireless Telephony Prices (2016-2017)





In all jurisdictions, the year-over-year price changes in the Mobile Wireless Telephony service baskets were primarily attributable to three factors: (a) increases/decreases in the prices of service offerings, (b) changes in market shares, and (c) changes foreign exchange conversion rates in case of foreign jurisdictions. The general direction of prices (increase or decrease) shown in Figure 7 above is not affected by changes in market shares and foreign exchange conversion rates - with some exceptions. For example, in Germany and Australia changes in market share had a significant impact on prices. If the market share in 2017 remained the same as in 2016, the average price of Level 5 price in Germany would have increased by 5.2% (instead of decreasing by 6.8%), and the Level 3 price would have increased by 29.2% (instead of 13.9%). Similarly, if the market share in 2017 remained the

same as in 2016, the average price of Level 4 in Australia would increase by 30.4% instead of 21.3%, and the Level 5 price would increase by 11.4% instead of 0.6%.

4.4 Canada-USA Roaming Prices

Roaming rates for voice, text, and data roaming were collected to provide an overview of the roaming costs for a Canadian visiting the USA and vice versa. The survey included Canadian incumbents, incumbent flanker brands and regional operators who provide USA roaming services. Likewise, USA incumbents offering roaming services in Canada were included. There is a wide range of roaming options offered by Canadian and American service providers. Consistent with the previous year's Study, this analysis was limited to the two most common roaming options for voice, text, and data: (a) Pay-As-You-Go rates, and (b) Stand-Alone Add-On packages.

Table 9, below, provides a comparison of the Pay-As-You-Go option. With respect to the pricing of the Canadian incumbents, roaming rates have not changed on a year-over-year basis. However, in the case of flanker brands¹⁹, the rates slightly increased for voice and text and decreased for data. For example, roaming rates increased from \$1.02 to \$1.23 (Voice), and from \$0.44 to \$0.55 (Text). Flanker brands' data roaming rates, however, decreased from \$3.75 to \$3.13. For USA carriers (incumbents), the roaming rate decreased for voice (from \$1.08 to \$0.98), and data (from \$5.51 to \$2.76). USA carriers' average roaming rate for text increased from \$0.41 to \$0.47.

Table 9: Base Pay-As-You-Go Roaming Rates

Services	Canadian Carriers				US Carriers
	Incumbents	Flankers	Regional Operators	Resellers	Incumbents
Voice (per minute)	\$1.20	\$1.23	\$0.32	\$0.85	\$0.98
Text (per text)	\$0.61	\$0.55	\$0.23	\$0.75	\$0.47
Data (per MB)	\$3.52	\$3.13	\$0.40	\$1.00	\$2.76
The above roaming rates are Pay-As-You-Go.					
Canadian Carriers' roaming rates (in Canadian \$s) are for their customers while in the USA.					
US Carriers' roaming rates (in PPP-adjusted Canadian dollars) are for their customers while in Canada.					

Table 10, below, provides a comparison of Stand-Alone Add-On roaming rates between Canadian and American service providers. However, in the case of the USA, stand-alone rates for voice, text, and data were not available. Instead, these providers offer a single daily rate including voice, text, and data. Also,

¹⁹ With respect to the flanker brands, it is pertinent to note that although this Study considers them as separate entities, they are owned and operated by the incumbents.

certain USA carriers (e.g., T-Mobile) offer plans that provide unlimited talk, text, and data for Americans in Canada.

In the case of Canadian carriers, the incumbents' implicit voice and text rates remained the same as in the previous year. In case of flanker brands, the implicit rate for voice and text remained the same, and for data, their average rate decreased from \$0.23 to \$0.10.

Table 10: Stand-Alone Add-On Roaming Rates

Services	Canadian Carriers			U.S. Carriers
	Incumbents	Flankers	Regional Operators	Incumbents
Average Add-on Package Price:				
Stand-alone Voice Add-on	\$25.00	\$5.00	n/a	n/a
Stand-alone Text Add-on	\$5.00	\$10.00	\$15.00	n/a
Stand-alone Data Add-on	\$12.50	\$27.50	\$20.00	n/a
Implicit Usage Price:				
Voice (per minute)	\$0.63	\$0.20	n/a	n/a
Text (per text)	\$0.10	\$0.03	\$0.03	n/a
Data (per MB)	\$0.11	\$0.10	\$0.20	n/a

The above rates are a unweighted average of the lowest cost stand-alone add-on package offered by the carriers.
Canadian Carriers' roaming rates (in Canadian \$s) are for their customers while in the USA,
the stand-alone (Voice, Text, and Data) prices were not available. Instead, US carriers offer single daily rate including voice, text, and data.
Implicit prices are per minute rate based add-on package price divided by the corresponding usage allowance, as applicable.

Last year, the three major Canadian incumbents introduced unlimited rates on a daily basis, specifically targeting travelers. Those rates remained the same this year, as shown Table 11 below. In the case of Bell, voice minutes are unlimited as compared to a 1,000-minute cap in the previous year.

Table 11: Canadian Unlimited US Roaming - Daily Package

Daily Package	Rogers	Bell	TELUS
Plan Name	Roam Like Home	Roam Better	US Easy Roam
Price	\$ 5.00	\$ 5.00	\$ 7.00
Voice	Unlimited	Unlimited	Plan cap
Text	Unlimited	Unlimited	Plan cap
Data Allowance (MB)	Plan Cap	100 MB	Plan cap
Data Overage Rate (per/MB)	Plan Cap	Refresh	\$ 5.00

5. Fixed Broadband Internet Service

5.1 Fixed Broadband Internet Service Baskets

As in the previous year, the current Study includes the following five Fixed Broadband Internet service baskets:

- Level 1 Speed: “basic” Internet service with advertised download speeds²⁰ of 3 to 9 Mbps²¹.
Data usage per month: 10 GB.
- Level 2 Speed: “average” (Canadian) high-speed Internet service with advertised download speeds of 10 to 15 Mbps.²²
Data usage per month: 50 GB.
- Level 3 Speed: high-speed Internet service with advertised download speeds of 16 to 40 Mbps.
Data usage per month: 100 GB.
- Level 4 Speed: high-speed Internet service with advertised download speeds of 41 to 100 Mbps.
Data usage per month: 150 GB.
- Level 5 Speed: high-speed Internet service with advertised download speeds of over 100 Mbps (targeted speed in the 100-1,000 Mbps range).
Data usage per month: 500 GB.

Table B.3 in Appendix B provides a detailed summary of the service elements used for the fixed broadband price comparison. The changes in the service definition of each basket level since 2010 are summarized Table 12 below.

Table 12: Summary of Fixed Broadband Internet Service Baskets

Basket	2010	2011	2012 - 2015	2016-2017
Level 1	< 1.5 Mbps	< 1.5 Mbps	< 3 Mbps	3 - 9 Mbps
Level 2	2 – 9 Mbps	2 – 9 Mbps	4 – 15 Mbps	10 – 15 Mbps
Level 3	10 – 19 Mbps	10 – 19 Mbps	16 – 40 Mbps	16 – 40 Mbps
Level 4	-	> 20 Mbps	> 40 Mbps	41 – 100 Mbps
Level 5	-	-	-	> 100 Mbps

²⁰ It should be noted that “advertised” speeds can differ from “actual” speeds for a variety of reasons and that the range of any such differences can vary by technology and geographic location. For the purpose of this Study, any such variations are assumed to be roughly equal on a relative basis across the broadband services included in this Study.

²¹ According to the CRTC 2016 *Communications Monitoring Report (CMR)*, “Approximately 98% of Canadian households can access a download speed of at least 5 Mbps, which is sufficient for streaming high quality audio and video content” (p. 246).

²² The CRTC 2016 *CMR* indicates that 24.1% Canadians subscribed to fixed broadband Internet services with downstream speed between 10 Mbps to 15 Mbps in 2015 (Table 5.3.12, p. 258).

Consistent with last year’s Study, this year’s Study takes into account modem rental fees in the price data for Fixed Broadband Internet service baskets, given that these rental fees are often mandatory. In other cases, where consumers are required to purchase a modem, it is assumed that the cost of the modem is amortized over 24 months. However, one-time installation or activation fees are excluded.

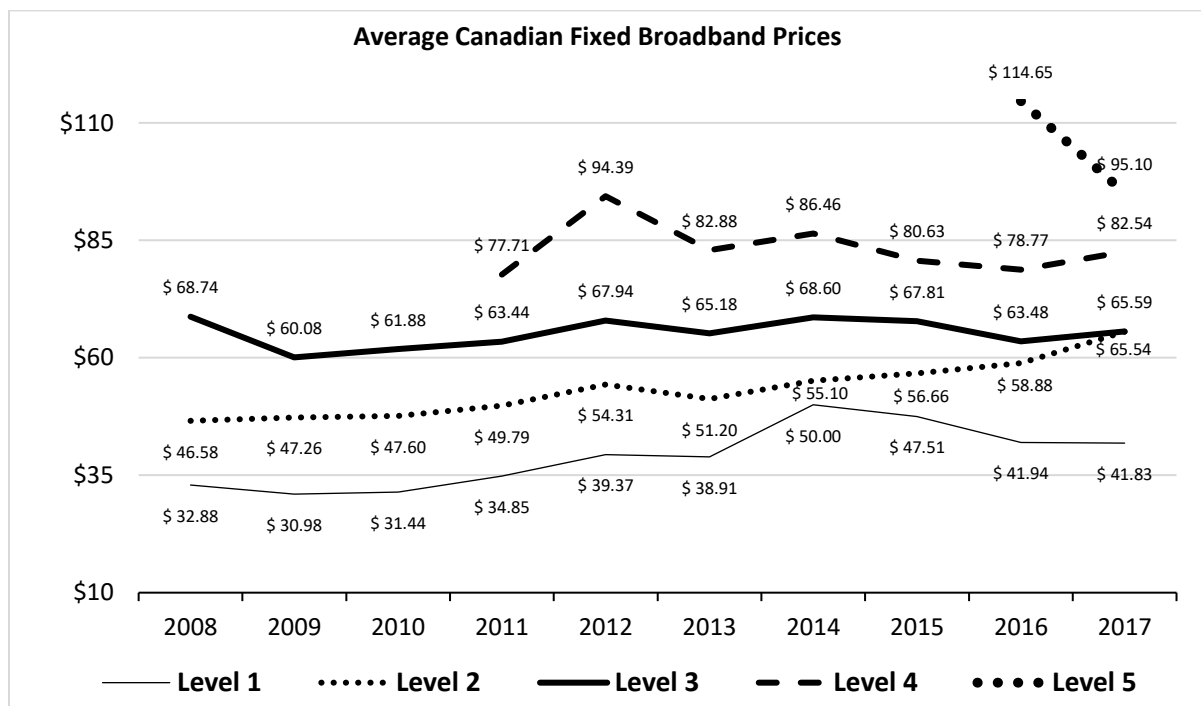
As noted in the previous year’s Study, some ISPs apply data caps to their Fixed Broadband Internet plans. These caps are generally applied on a monthly usage basis (GB/month), and overage fees are charged (\$/GB) for any additional data usage. Among the ISPs surveyed for this Study, only those in Canada, Australia, and the USA apply data caps, whereas none of the ISPs surveyed in Japan, Italy, France, Germany and the UK apply data caps.

In addition, for each of the Fixed Broadband Internet service baskets, plans with the lowest advertised rates that fulfill the data usage assumptions adopted for the defined service baskets were selected.

5.2 Canadian Fixed Broadband Internet Service Prices

Figure 8 below provides an overview of the average price trend (2008-2017) for Levels 1 to 5 of the Fixed Broadband Internet services in Canada.

Figure 8: Average Price Trend of Fixed Broadband Internet Service Baskets in Canada for the period 2008-2017²³



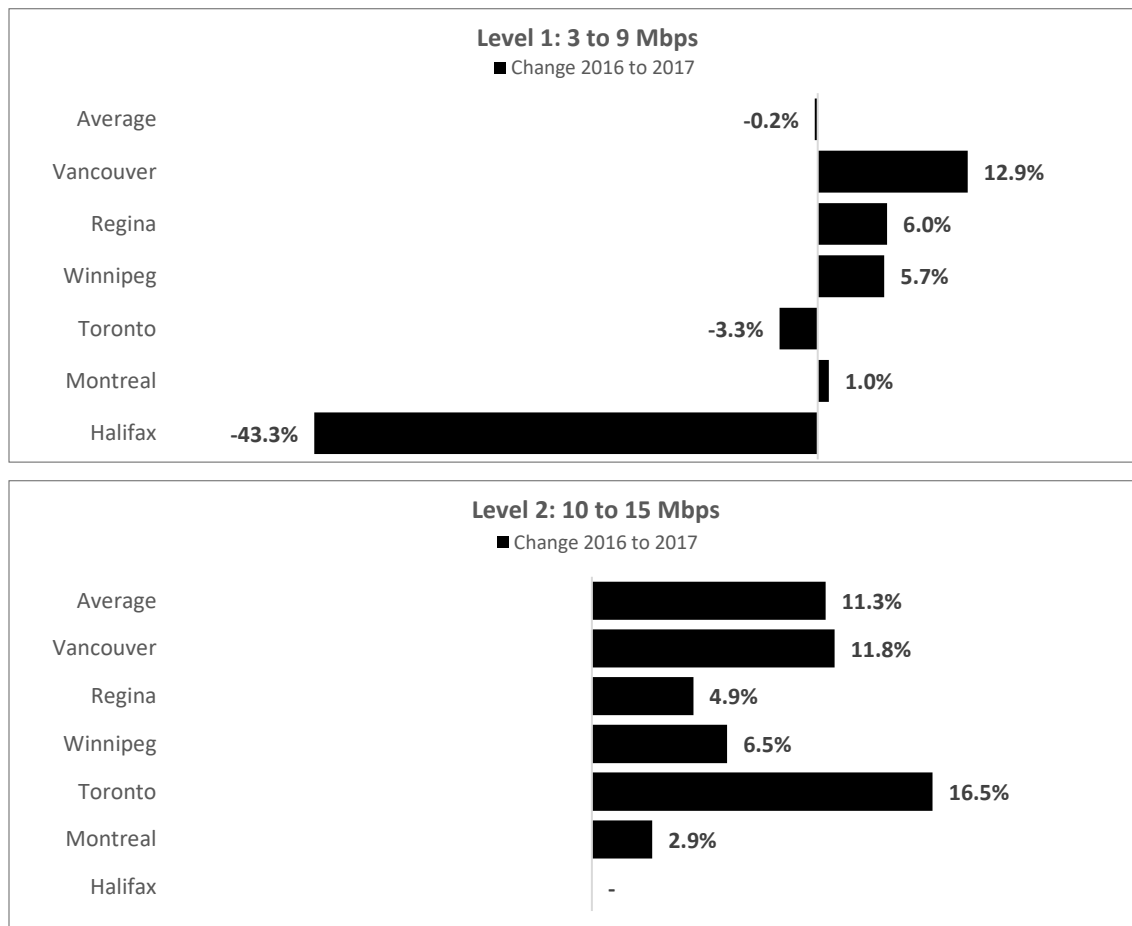
²³ The Level 1 and Level 2 definitions were revised in 2016 in order to reflect current market trends regarding the availability (demand) of fixed broadband Internet service in Canada. Previous years’ revisions are shown in Table 14. The price comparison should be observed with this information in mind.

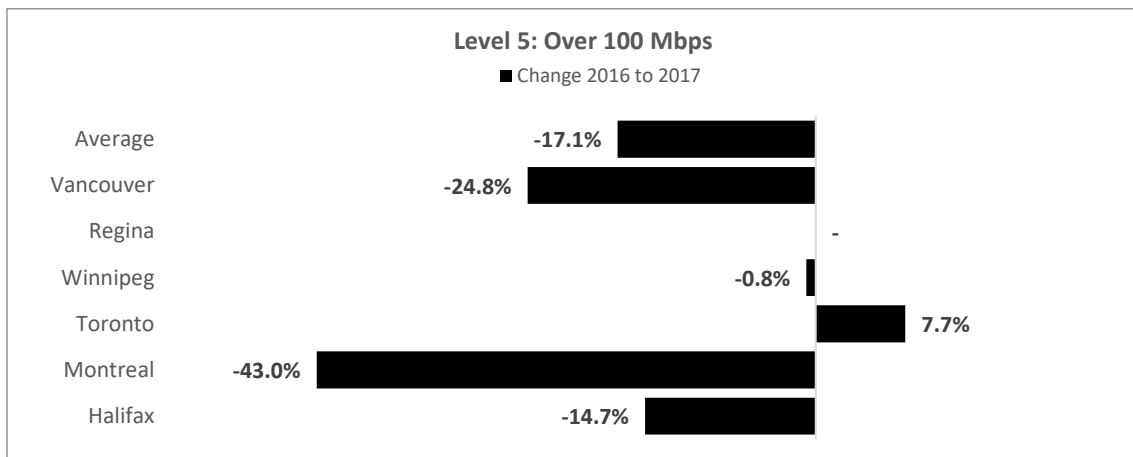
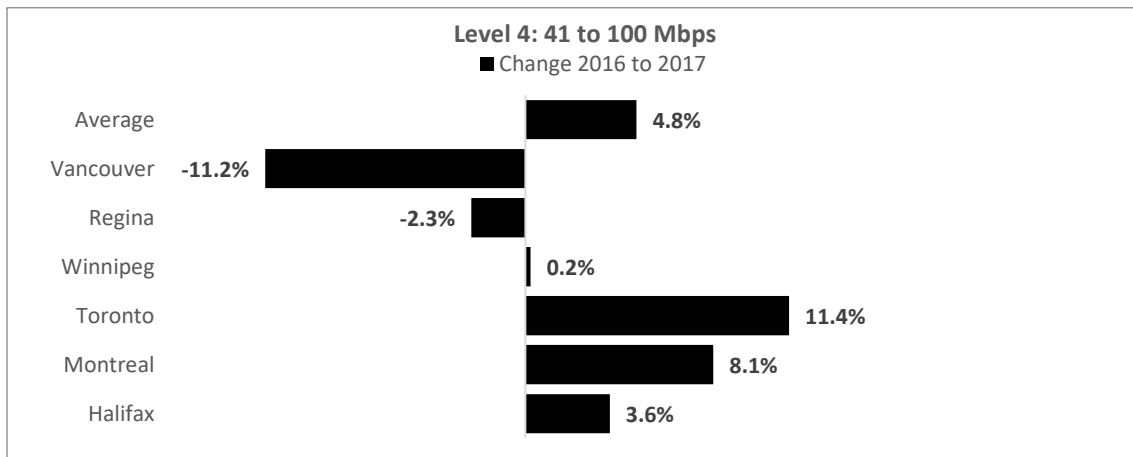
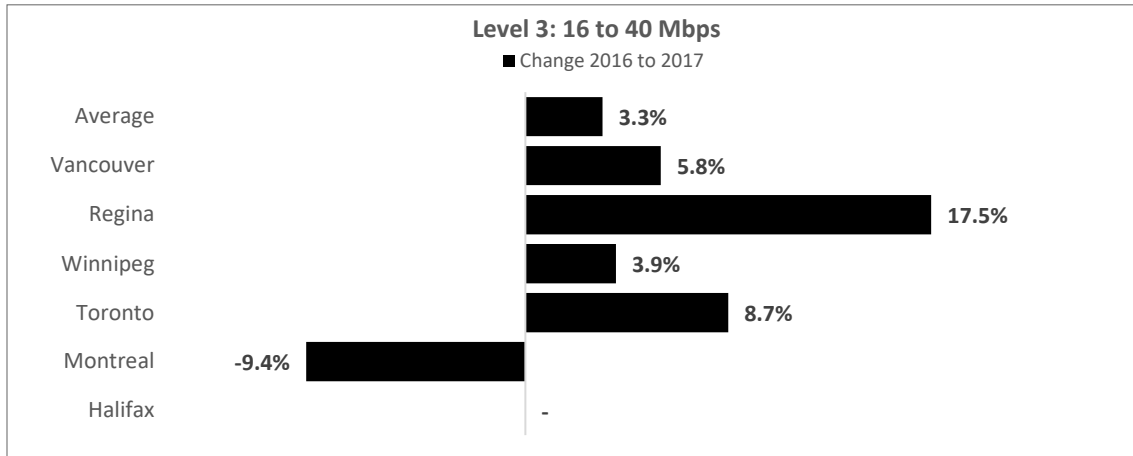
The key trends are as follows:

- Canadian Fixed Broadband Internet service prices generally increased for Levels 2 to 4 over the past year. Relative to 2016, the prices increased by 11.3% (Level 2), 3.3% (Level 3), and 4.8% (Level 4). However, prices decreased by 0.2% (Level 1), and 17.1% (Level 5).
- Over the 2008-2017 period, the average annual increase in prices for Levels 1, 2 and 4 were 2.7%, 3.9%, and 1.0% respectively. However, these increases also reflect a major revision in service levels from 2012. That is, in 2012 the Level 1 definition was revised from <1.5 Mbps to <3 Mbps; Level 2 from 2 Mbps – 9 Mbps to 4 Mbps – 15 Mbps; Level 3 from 10 Mbps – 19 Mbps to 16 Mbps to 40 Mbps; and Level 4 from >20 Mbps to > 40 Mbps.
- Montreal prices were the lowest in Levels 2-5, and the highest prices were in Winnipeg (Levels 1,3, and 4), Toronto (Level 2), and Regina (Level 5).

Year-over-Year (YoY) average price changes in the six Canadian cities are presented in Figure 9, below.

Figure 9: YoY Change in Canadian Fixed Broadband Internet Prices (2016-2017)





Key observations for each Level are as follows:

- Level 1: In comparison to 2016, the average price for Level 1 in 2017 showed a small decrease of 0.2%. The decrease is mainly attributable to a significant decrease in Level 1 prices in Halifax by 43.3% (from \$88.73 to \$50.27), and in Toronto by 3.3% (from \$33.63 to \$32.52). The price decrease in these two cities were offset by price increases in Vancouver by 12.9% (from \$51.00 to \$57.58), Regina by 6.0% (from \$46.95 to \$49.75), Winnipeg by 5.7% (from \$55.80 to \$59.00), and Montreal by 1.0% (from \$41.07 to \$41.47).
- Level 2: In comparison to 2016, the average price for Level 2 in 2017 increased by 11.3%. Except Halifax, where Level 2 offers were unavailable in 2016 and 2017, prices increased in other five cities including Toronto by 16.5% (from \$61.92 to \$72.14), Vancouver by 11.8% (from \$62.00 to \$69.29), Winnipeg by 6.5% (from \$62.60 to \$66.70), Regina by 4.9% (from \$56.95 to \$59.75), and Montreal by 2.9% (from \$51.75 to \$53.26).
- Level 3: In comparison to 2016, the average price for Level 3 in 2017 showed an increase of 3.3%. This results from increases in Level 3 prices in Regina by 17.5% (from \$62.95 to \$73.95), Toronto by 8.7% (from \$65.20 to \$70.89), Vancouver by 5.8% (from \$69.06 to \$73.09), and Winnipeg by 3.9% (from \$70.60 to \$73.35). Montreal showed a decrease of 9.4% in Level 3 prices (from \$56.09 to \$50.80).
- Level 4: In comparison to 2016, the average price for Level 4 in 2017 showed an increase of 4.8%. This increase is attributable to increases in Level 4 prices in Toronto by 11.4% (from \$76.80 to \$85.51), Montreal by 8.1% (from \$72.21 to \$78.06), and Halifax by 3.6% (from \$84.17 to \$87.22). Vancouver showed a decrease of 11.2% in Level 4 prices (from \$89.16 to \$79.18). Regina showed a nominal decrease of 2.3% (from \$85.95 to \$83.93).
- Level 5: In comparison to 2016, the price for Level 5 in 2017 showed a decrease of 17.1%. This decrease is attributable to significant decreases in Level 5 prices in Montreal by 43.0% (from \$138.80 to \$79.15), Vancouver by 24.8% (from \$123.00 to \$92.50), and Halifax by 14.7% (from \$133.10 to \$113.55). Toronto's price increased by 7.7% (from \$92.91 to \$100.08).

Figure C. 3 and Table C. 3 in Appendix C provide a more detailed historical overview of Canadian broadband Internet service prices for the period 2008 to 2017 for each of the five service levels.

5.2.1 Comparison of Incumbent and Reseller ISP Prices

While the previous section discussed the average prices of both incumbents and resellers, this section presents price differences between Canadian Fixed Broadband Internet incumbents and resellers. The resellers include Primus, Distributel, and TekSavvy.²⁴

Table 13 below, provides a summary of the differentials in the prices offered by the incumbents and the resellers. This comparison is based on the simple average of minimum available prices offered by incumbents and resellers for each service basket level in each of the six Canadian cities.

²⁴ These resellers rely on wholesale broadband access services (acquired from the incumbent telephone and cable companies) to provide retail broadband services.

Table 13: Canadian Fixed Broadband Internet Prices – Incumbents versus Resellers

Service Provider	Fixed Broadband Internet Service Basket				
	Level 1	Level 2	Level 3	Level 4	Level 5
Incumbent	\$ 46.57	\$ 63.37	\$ 66.18	\$ 83.47	\$ 100.63
Reseller	\$ 37.20	\$ 41.62	\$ 49.95	\$ 57.60	\$ 82.61
Difference	-20.12%	-34.33%	-24.52%	-30.99%	-17.91%
Based on simple average of minimum incumbent's and minimum reseller's price in each city					
Resellers include Primus, TekSavvy, and Distributel					

The price differential by each city is provided in Table C.3.6 in Appendix C.

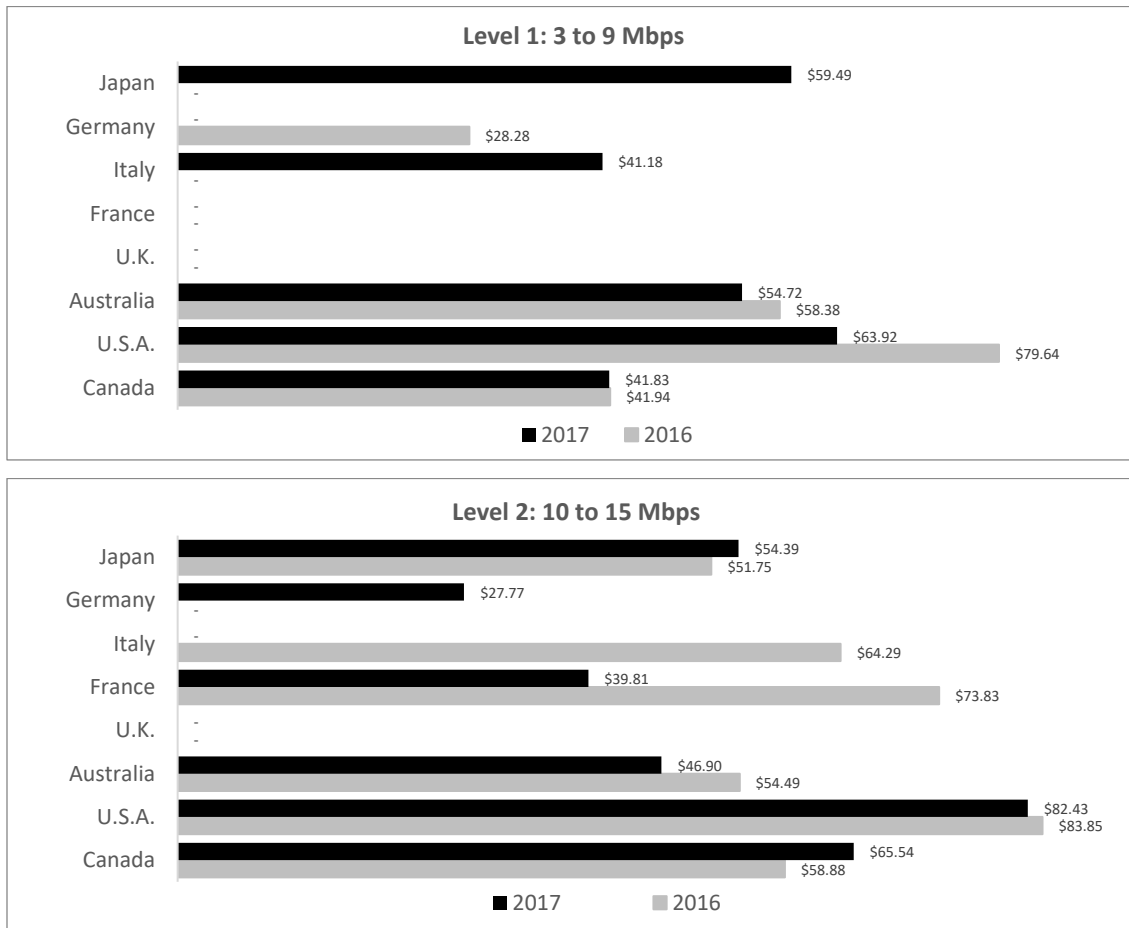
Some of the key findings are:

- No resellers' service offerings were available in Regina and Winnipeg.
- Resellers' service offerings for Level 1 (3 to 9 Mbps) were only available in Halifax.
- Resellers' service offerings for Level 5 (Over 100 Mbps) were only available in Toronto, and Montreal.
- Average prices of resellers increased within the last year for service Levels 1 to 3. For example, for Level 1 resellers' prices increased from \$34.05 to \$37.20. However, incumbents' prices decreased for Level 1 from \$52.89 to \$46.57. As a result, for Level 1 the price differential decreased from 35.61% (2016) to 20.12% (2017).
- Average prices for Levels 2 to 3 increased in case of both incumbents and resellers. On average incumbents' prices increased by approximately \$2.00 to \$3.00, representing changes from 2016 to 2017 for Level 2 (from \$61.30 to \$63.37), Level 3 (from \$62.78 to \$66.18). On average resellers' prices increased by approximately \$5.00, representing changes from 2016 to 2017 for Level 2 (from \$36.10 to \$41.62), Level 3 (from \$44.64 to \$49.95).
- For Level 4 incumbents' prices increased from \$79.13 to \$83.47), whereas resellers' prices decreased from \$66.10 to \$57.60.
- For Level 5, incumbent's average price decreased by \$12.35 from \$112.47 to \$100.12. This decrease may be due to the introduction of Level 5 service offerings by resellers in 2017 in Toronto and Montreal, which averaged \$82.61. In 2016 Level 5 service offerings from resellers were not available.
- Since resellers' prices increased at a higher rate than those of incumbents, the price differentials decreased from 41.11% to 34.33% in Level 2, and from 28.89% to 24.52% in Level 3. In case of Level 4, since incumbents' prices increased and resellers prices decreased the price differential increased from 16.47% to 30.99%.

5.3 International Fixed Broadband Internet Service Prices

This section provides an international comparison of Fixed Broadband Internet prices offered by operators in each of the five service baskets. Figure 10 below, provides a comparison of 2017 versus 2016 Fixed Broadband service prices for Canada and the surveyed seven foreign jurisdictions for each of the five service baskets. All prices are expressed in PPP-adjusted Canadian dollars and exclude retail sales taxes.

Figure 10: 2017 International Fixed Broadband Internet Price Comparison PPP-adjusted CDN\$



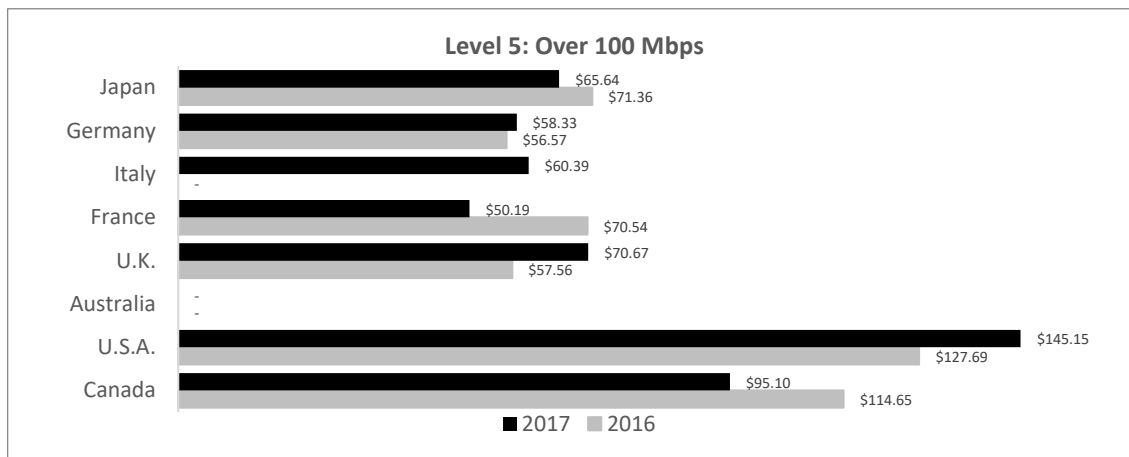
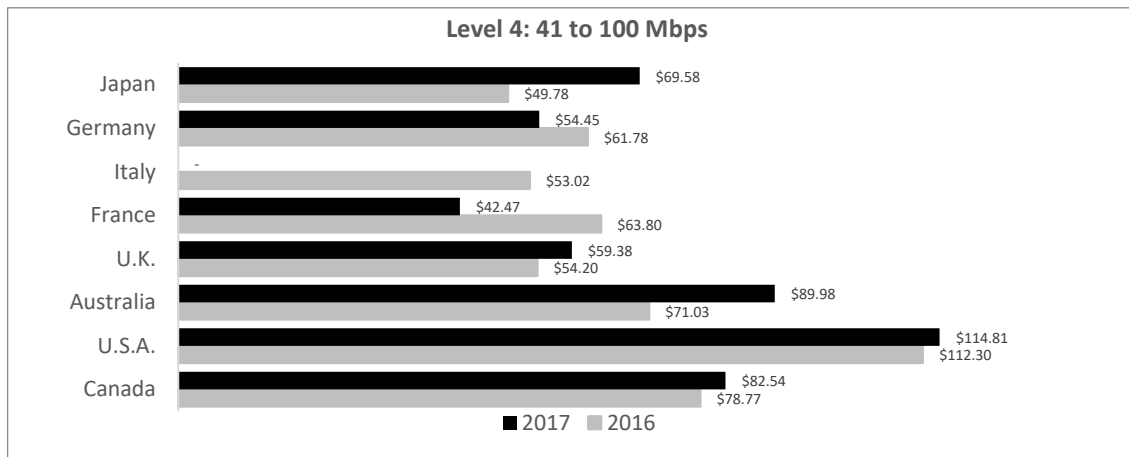
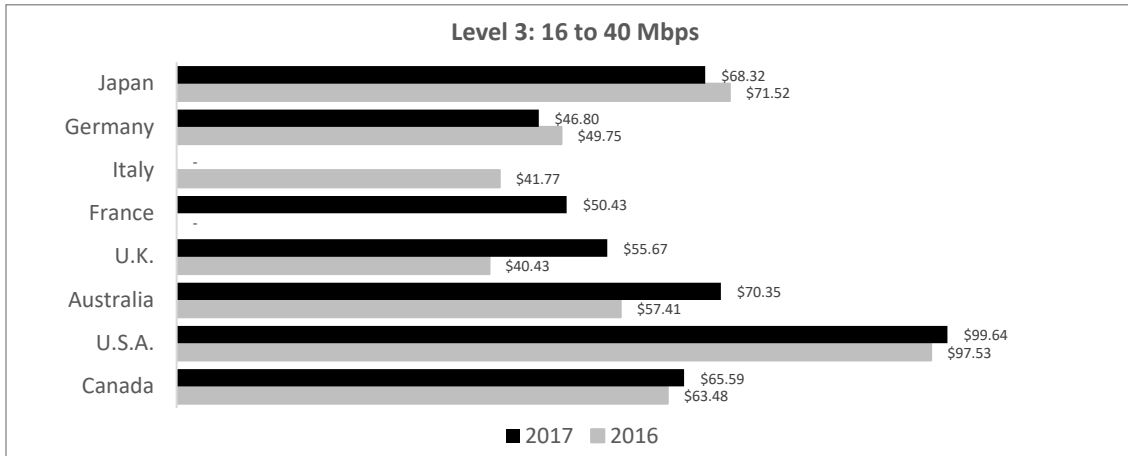


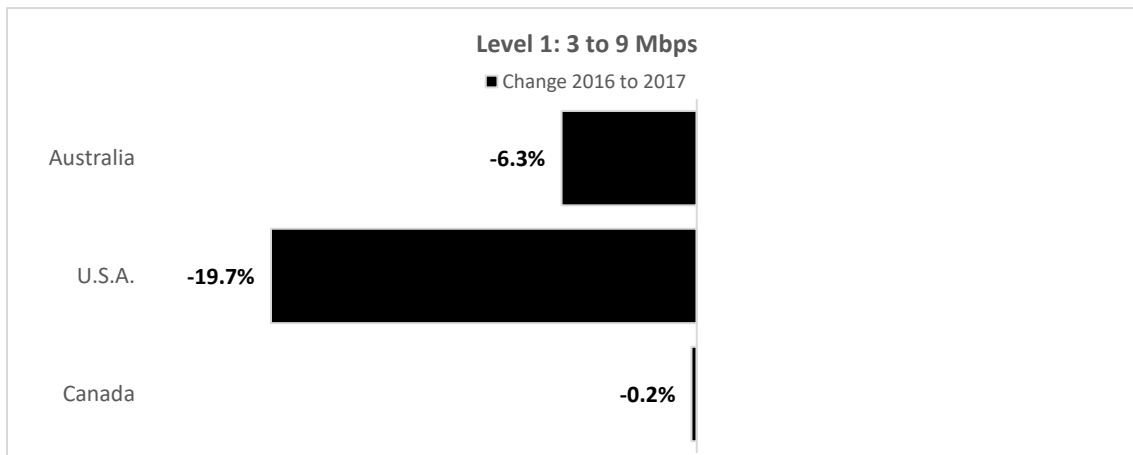
Figure 10 indicates no major changes within the past year in the service portfolio of Fixed Broadband services across all foreign jurisdictions. However, some minor changes may be noted:

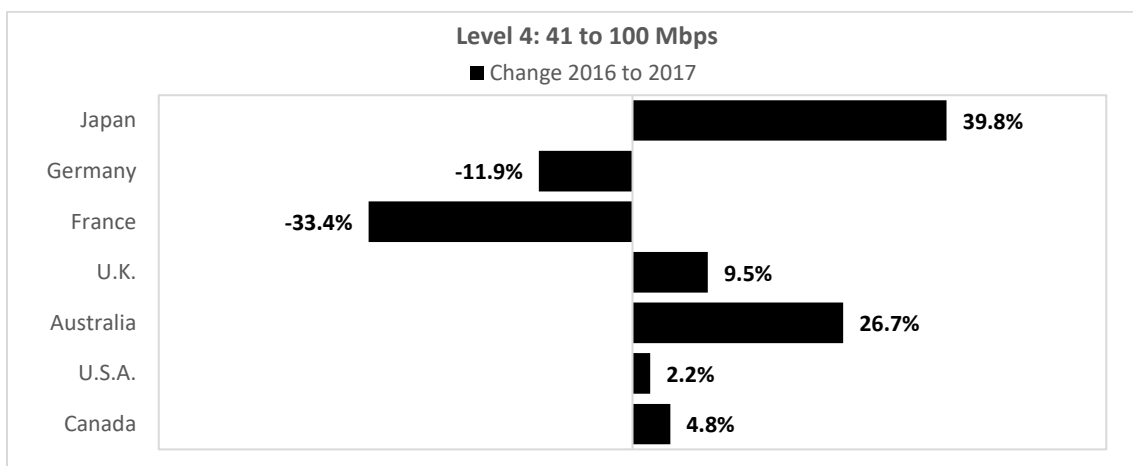
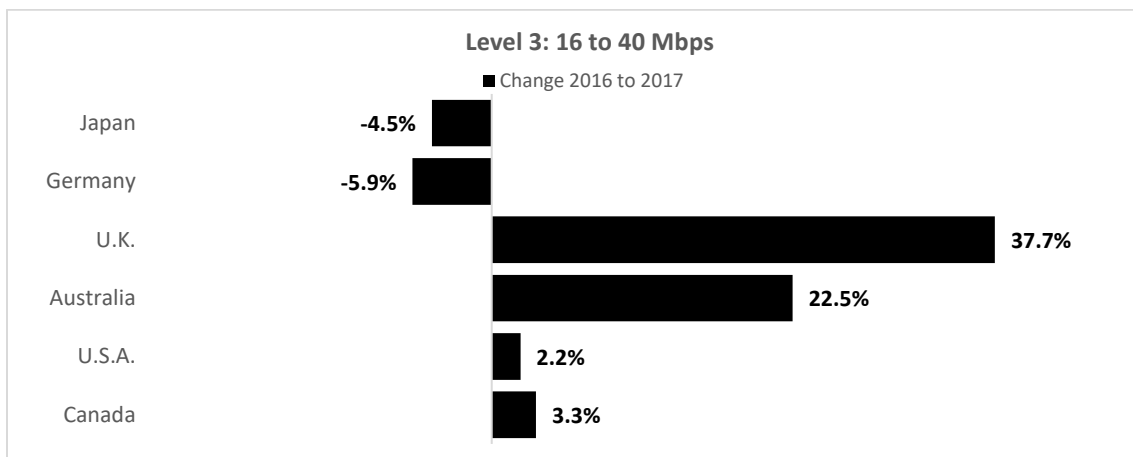
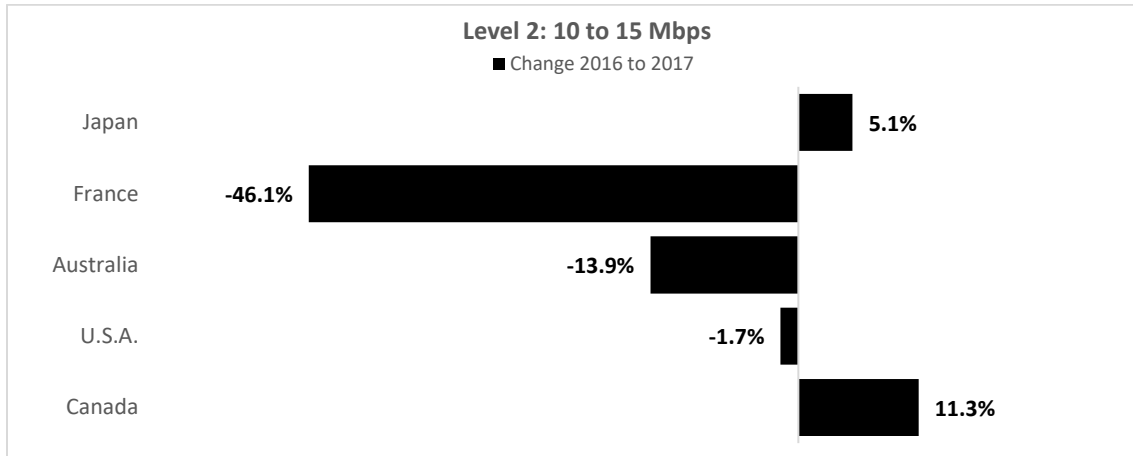
- In 2016 Level 1 offerings were available in four countries (Canada: \$41.94, the USA: \$79.64, Australia: 58.38, and Germany: \$28.28). In 2017, Level 1 offerings also became available in Japan: \$59.49, and Italy: \$41.18. Germany’s Level 1 offering was not available in 2017.
- In 2016 Level 2 offerings were available in six countries (Canada: \$58.88, the USA: \$83.85, Australia: \$54.49, France: \$73.83, Italy: \$64.29, and Japan: \$51.75). In 2017 Level 2 offerings also became available in Germany: \$27.77. Italy’s Level 2 offering was not available in 2017.
- Level 1 offerings were not available in the UK and France for both 2016 and 2017. Level 2 offerings were also not available in the UK for both 2016 and 2017.
- In 2016 Level 3 offerings were available in seven countries (Canada: \$63.48, the USA: \$97.53, Australia: \$57.41, the UK: \$ 40.43, Italy: \$41.77, Germany: \$49.75, and Japan: \$71.52). In 2017 Level 3 offerings also became available in France: \$50.43. Italy’s Level 3 offering was not available in 2017.
- In 2016 Level 4 offerings were available in all eight countries (Canada: \$78.77, the USA: \$112.30, Australia: \$71.03, the UK: \$54.20, France: \$63.80, Italy: \$53.02, Germany: \$61.78, and Japan: \$49.78). Italy’s Level 3 offering was not available in 2017.
- In 2016 Level 5 offerings were available in six countries (Canada: \$114.65, the USA: \$127.69, the UK: \$57.56, France: \$70.54, Germany: \$56.57, and Japan: \$71.38). In 2017 Level 5 offerings also became available in Italy: \$60.39. Level 5 offerings were not available in Australia for both 2016 and 2017

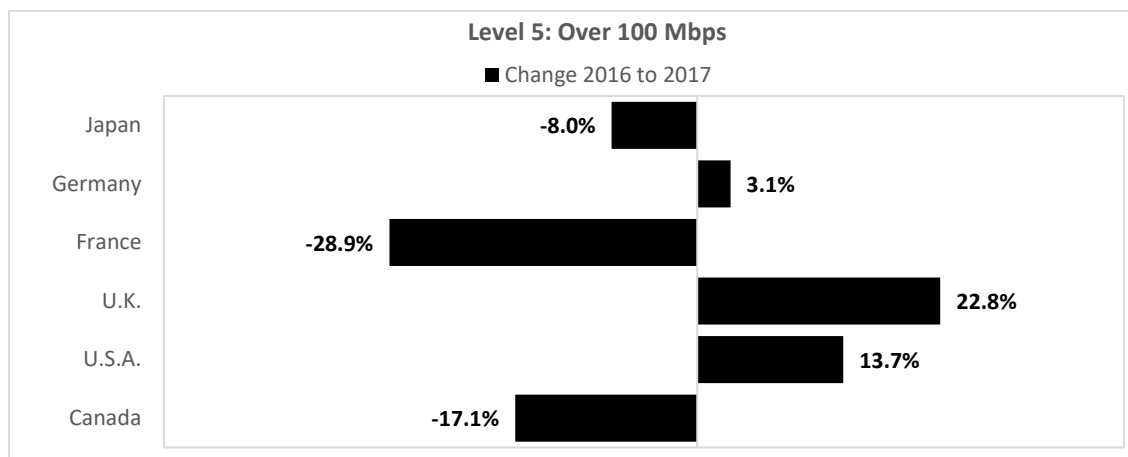
Figure D. 3 and Table D. 3 in Appendix D provide a detailed historical overview of international Fixed Broadband Internet prices for the period of 2008 to 2017, for each of the five service baskets.

Figure 11 below, provides an overview of the changes in the international Fixed Broadband prices since last year.

Figure 11: YoY Change in International Fixed Broadband Internet Prices (2016-2017)







Based on the simple average of Level 1 to 5 prices in the respective countries, prices increased significantly in the UK and Australia, and significant decreases occurred in France.

For example, relative to 2016, in the UK prices increased by 37.7% (Level 3), 9.5% (Level 4), and 22.8% (Level 5); and in Australia, prices increased by 22.5% (Level 3), and 26.7% (Level 4). In France, however, prices significantly decreased by 46.1% (Level 2), 33.4% (Level 4), and 28.9% (Level 5); and in the USA Level 1 prices decreased by 19.7%.

In all jurisdictions, the year-over-year price changes in the Fixed Broadband service baskets, both Canadian and international, were primarily attributable to three factors: (a) increases/decreases in the prices of service offerings, (b) changes in market shares, and (c) changes foreign exchange conversion rates. The general direction of prices (increase or decrease) shown in Figure 11 above is not affected by changes in market shares and foreign exchange conversion rates - with some exceptions. For example, in France, the USA, and the UK, changes in market share had a significant impact on prices. If the market share in 2017 remained the same as in 2016, the average price of Level 2 offerings in France would have shown no change (instead of a decrease of 46.1%). Similarly, in the USA, the Level 3 price would have decreased by 7.0% instead of showing a 2.2% increase; the Level 4 price would have decreased by 0.8% instead of showing 2.2% increase, and the Level 5 price would have increased by 27.8%, instead of by 13.7%. Furthermore, the market share in 2017 remained the same as in 2016 for the UK, the average price of Level 3 would have increased by 26.8% instead of 37.7%, and the Level 4 price would have increased by 7.9% instead of 9.5%²⁵.

Table 14 below provides an overview of the average download/upload speeds and data caps available in Canada versus the USA and six other countries. This comparison is based on the unweighted average of the advertised speeds and data caps of the surveyed service providers for each basket level.

With respect to the minimum and maximum average ranges between countries, the difference was greater within higher service basket levels. For example, within Level 5, the download speed ranged between 151 Mbps (Canada) and 655 Mbps (Japan). For Level 1, the difference in download speed ranged between 5 Mbps (Canada, and the USA) and 8 Mbps (Australia and Japan).

²⁵ Virgin was only one service provider for Level 5 (UK), therefore there was no impact of market share changes on its prices

Table 14: International Fixed Broadband Internet Speed Comparison

Average Speeds (2017)		Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
Level 1	Download Speed	5	5	8	n/a	n/a	7	n/a	8
	Upload Speed	1	2	1	n/a	n/a	3	n/a	8
	Data Caps	109	602	50	n/a	n/a	n/a	n/a	n/a
Level 2	Download Speed	14	12	12	n/a	11	n/a	10	12
	Upload Speed	6	1	1	n/a	7	n/a	1	12
	Data Caps	193	352	n/a	n/a	n/a	n/a	n/a	n/a
Level 3	Download Speed	28	25	29	17	20	n/a	20	26
	Upload Speed	7	5	3	9	1	n/a	2	26
	Data Caps	253	509	500	n/a	n/a	n/a	n/a	n/a
Level 4	Download Speed	51	89	88	51	100	n/a	63	50
	Upload Speed	10	9	35	12	100	n/a	9	50
	Data Caps	374	679	1,000	n/a	n/a	n/a	n/a	n/a
Level 5	Download Speed	151	197	n/a	200	230	280	200	655
	Upload Speed	40	23	n/a	n/a	78	36	12	655
	Data Caps	972	649	n/a	n/a	n/a	n/a	n/a	n/a

The above averages reflect the simple average of speed published by respective country's surveyed operators included in each service basket category.
n/a: service basket not offered / information not available being not published by the operators, and "unlimited" in case of Data Caps

There are some notable differences in the way Fixed Broadband Internet is offered in some of the surveyed countries relative to Canada. These differences are described below.

- Some operators only offer Fixed Broadband Internet in bundles with Fixed Telephony services. This is the case for example of Verizon in Boston.
- Similarly, for some of the surveyed European countries, in order to obtain a Fixed Broadband Internet connection on a stand-alone basis, the consumer must in some cases also lease a Fixed Telephony connection (and, correspondingly, pay an additional access line charge).
- Fibre and/or Digital Subscriber Line (DSL)-based broadband services offered in the UK, France, Germany, and Italy generally include VoIP and/or Internet Protocol Television (IPTV) services for a single bundled price. The option of a pure stand-alone broadband Internet service is not available in some cases.
- In Japan, Fixed Broadband Internet service typically consists of two separate service elements: (i) a network access facility (fibre or asymmetric DSL), often obtained from NTT, and (ii) an Internet access service provided by a third-party ISP. Therefore, there are two fees involved: the broadband access fee and the ISP fee.

5.4 International Rural and Remote Fixed Broadband Internet Service Prices

This section provides a comparison of rural Fixed Broadband Internet prices in Canada relative to three foreign jurisdictions (the USA, the UK and Australia)²⁶. Contrary to urban markets, rural markets are not dominated by a few large players. Recognizing this fact, where possible we have included larger ISPs that cover the broader segment of the rural and remote Canadian population. We retained the four Canadian service providers included in the previous year's Study - Xplornet, Storm, YourLink²⁷, and RuralWave. To better represent the province of Alberta in this Study, we also included Netago. Accordingly, the following Canadian and International rural ISPs were surveyed:

- **Canada:** Xplornet, Storm, RuralWave, and Netago
- **US:** Skybeam, Digis, and Digitalpath
- **Australia:** SkyMesh, Active8me, and Aussie Broadband
- **UK:** Vispa, WiSpire, and eXwavia

For the above service providers, we collected current service data in terms of the following parameters, as applicable:

- Technology: Fixed Wireless (Microwave) technology generation (e.g., 4G or other)²⁸;
- Download and upload speeds: range of service speeds in Mbps;
- Data caps: range of monthly usage allowance (in GB/month);
- Service prices: monthly service fees, equipment rental fees, and the data overage fees; and
- Contract terms: where applicable.

We applied the same service basket definitions specified for the Fixed Broadband Internet Service for this Study. According to our research, the service providers surveyed do not offer service packages with 100 Mbps download speed. Therefore, the Level 5 service basket was not included in this analysis.

Table 15 below provides a summary of the average advertised download speeds and, where applicable, data caps for the surveyed rural and remote fixed wireless broadband services by service basket.

²⁶ Since the population in rural areas is sparse, fixed broadband over fixed wireless (microwave) is considered to be more feasible. There is a large number of fixed wireless providers that offer broadband services to rural and remote areas of Canada as well as in other selected countries. Some fixed wireless ISPs serve more than one community and thus, selecting a representative sample of ISPs serving rural and remote areas is not straightforward.

²⁷ YourLink merged with Xplornet in the past year.

²⁸ All of the surveyed fixed wireless services included in the Study are based on 4G or higher technologies. For Canada, the surveyed fixed wireless services providers cover rural areas in New Brunswick, Quebec, Ontario, Alberta and Saskatchewan. Similarly, the surveyed fixed wireless services for the USA, the UK and Australia are provided for rural locations scattered across each of those countries.

Table 15: Current International Rural Broadband Speed Comparison

Rural Fixed Broadband Average Speeds (2017)		Canada	U.S.A.	Australia	U.K.
Level 1	Download Speed	5	5	n/a	9
	Upload Speed	1	1	n/a	2
	Data Caps	68	113	n/a	58
Level 2	Download Speed	15	n/a	12	n/a
	Upload Speed	2	n/a	1	n/a
	Data Caps	388	n/a	75	n/a
Level 3	Download Speed	24	n/a	25	25
	Upload Speed	4	n/a	5	1
	Data Caps	350	n/a	100	80
Level 4	Download Speed	50	n/a	50	80
	Upload Speed	10	n/a	20	20
	Data Caps	n/a	n/a	375	n/a

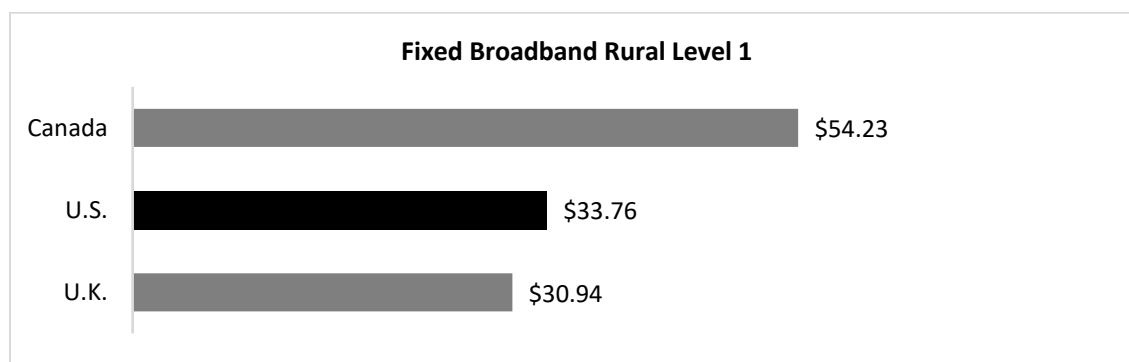
The above averages reflect the simple average of speeds published by each country's surveyed operators included in each service basket category.
n/a: service not offered / information not available (not published by the operators), or "unlimited."

In service Levels 2 and 3 Canada has the highest data caps, and average speeds similar to those of the surveyed foreign jurisdictions. Canada's maximum upload speed (Level 4) averages 50 Mbps, compared to 80 Mbps in the UK.

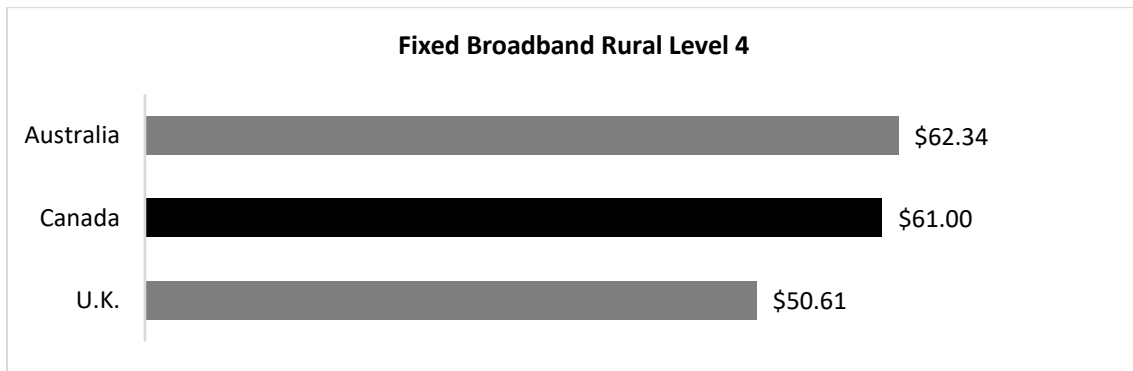
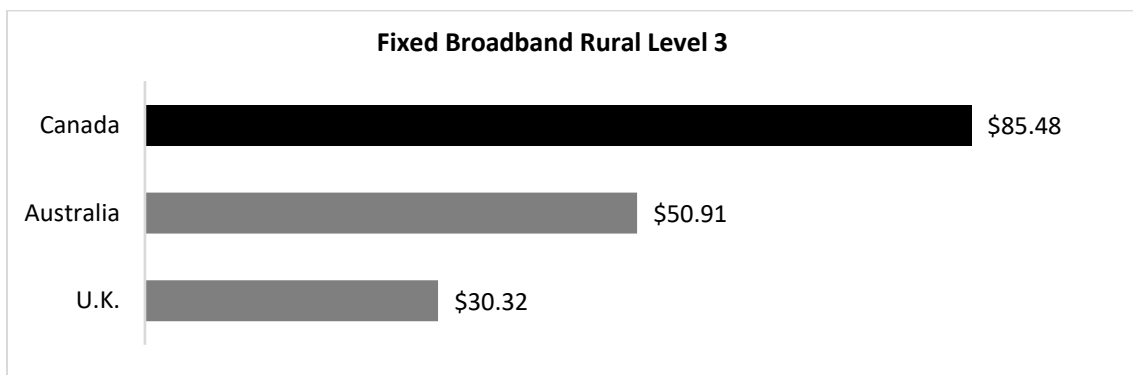
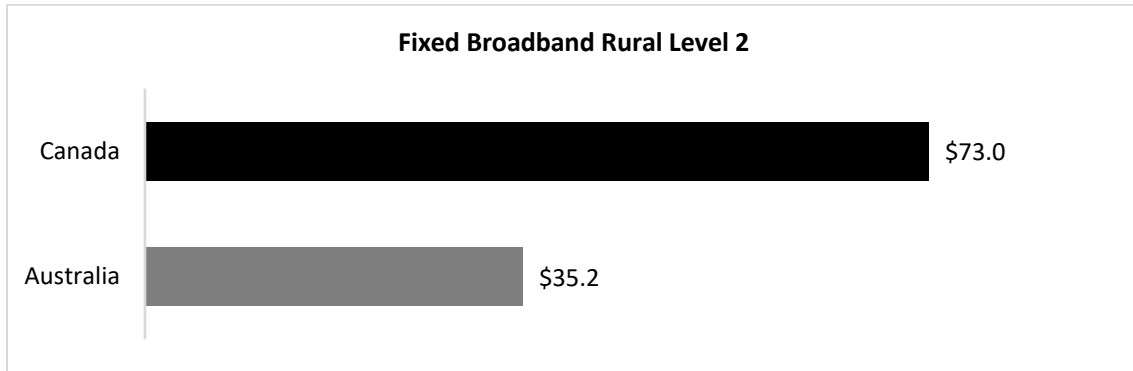
As shown in Figure 12, weighted average prices for rural Fixed Broadband Internet in Canada are the highest in Levels 1, 2 and 3, and the second highest in Level 4.²⁹

For Level 4, Canada's average price (\$61.00) is lower than its Levels 2 and 3 prices.

Figure 12: 2017 International Rural Fixed Broadband Internet Price Comparison PPP-adjusted CDN\$



²⁹ Weighted average prices were calculated based on equal market share distributed among services providers surveyed in each country. This approach was taken because actual market share data by service provider were not available, given the nature of their operations and ownership structure.



6. Mobile Wireless Internet Service

6.1 Mobile Wireless Internet Service Baskets

The Study examines three Mobile Wireless Internet service baskets, as summarized below.

- Level 1 2 GB to less than 5 GB per month.
- Level 2 5 GB to less than 10 GB per month.
- Level 3 10 GB or more per month.

The key Mobile Wireless Internet service information collected for each surveyed Mobile Wireless Internet service provider was based on the following usage-based elements and service features:

- Technology: 3rd or 4th generation (3G, 3G+/4G or 4G/LTE);
- Service Speed: Advertised download speed;³⁰
- Data usage per month; and
- Equipment: USB modem key (included with service on a no-charge, rental or purchase-basis).

One-time charges, such as installation costs, are excluded from price data. Table B.4 in Appendix B provides a detailed summary of the service elements used for the mobile wireless Internet price comparison

6.2 Canadian Mobile Wireless Internet Service Prices

This section provides a summary of Mobile Wireless Internet prices offered in Canada by incumbents and compares these prices with those offered by MVNOs/resellers and regional operators.

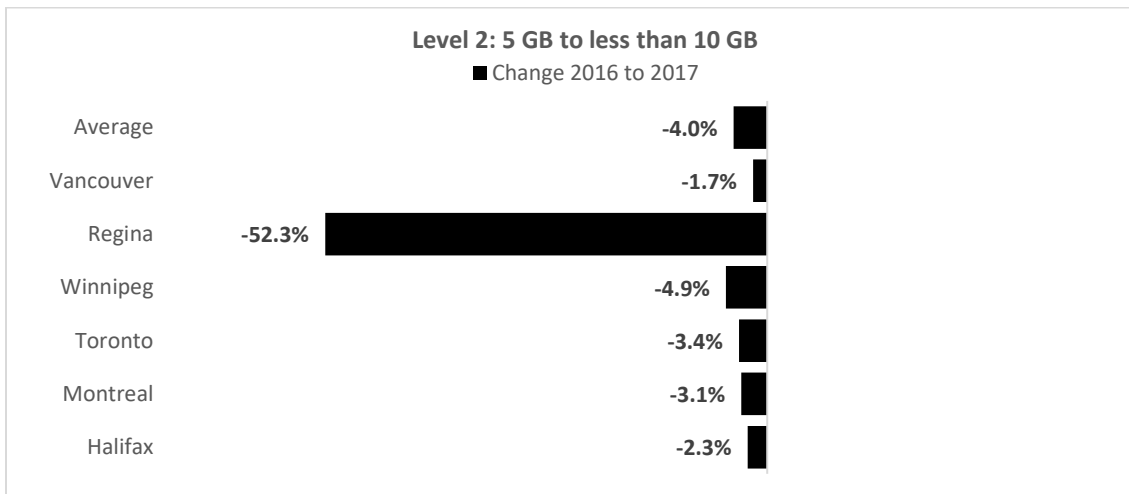
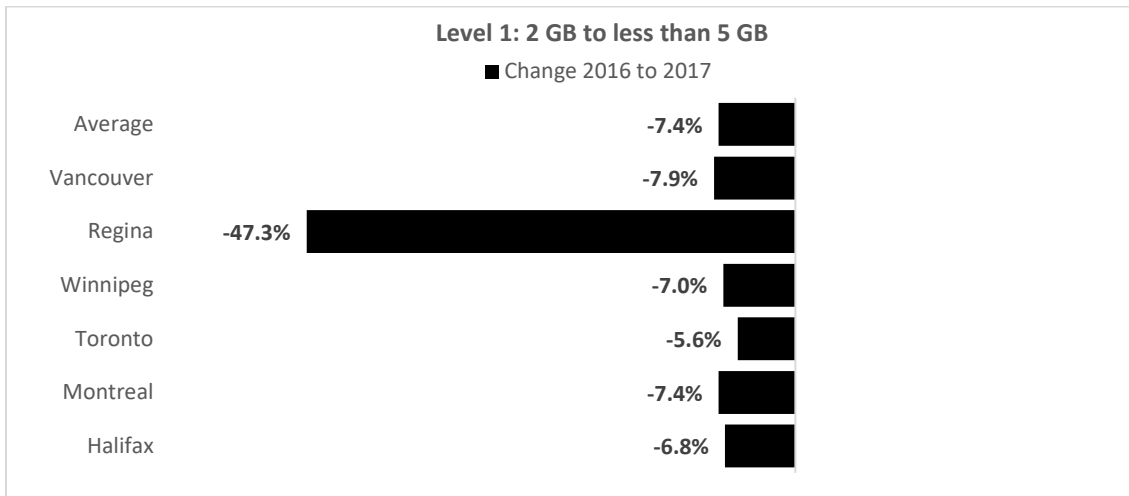
Figure 13 below provides a picture of year-over-year changes in Canadian Mobile Wireless Internet prices for the three levels of service baskets from 2016 to 2017.

- For the Level 1 Mobile Wireless Internet service basket, average prices in Canada showed a decrease of 7.4% from 2016 to 2017. Price decreases occurred in all cities, ranging from an average decrease of 5.6% in Toronto to a decrease of 47.3% in Regina.
- Similarly, for the Level 2 service basket, there were price decreases in all surveyed Canadian cities between 2016 and 2017, averaging 4.0%. The largest decrease, 52.3%, was in Regina, while Vancouver saw an average decrease of 1.7%.
- For the Level 3 service basket, the average price in Canada increased by 1.6% between 2016 and 2017. Halifax saw an average price increase of 6.3%, while Regina saw an average price decrease of

³⁰ Advertised speeds may vary significantly from actual speeds for mobile wireless services. Actual average speeds are sensitive to local network usage levels and users' locations, among other factors. Some wireless service providers include theoretical maximum speeds in their advertising, while others use - or at least note - expected average speeds in their advertising. Consequently, comparing service speeds across service providers and countries is not straightforward even when the same mobile wireless technology is in use.

41.2%. Winnipeg and Montreal also saw slight price decreases, while there were increases in Toronto and Halifax.

Figure 13: Year-over-Year Change in Canadian Mobile Wireless Internet Prices for Three Service Basket Levels (2016-2017)



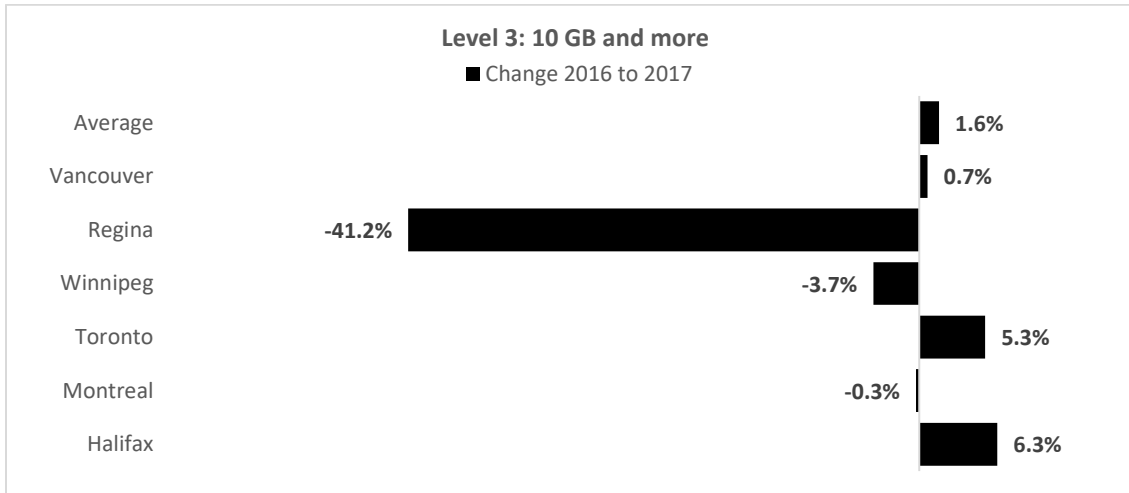
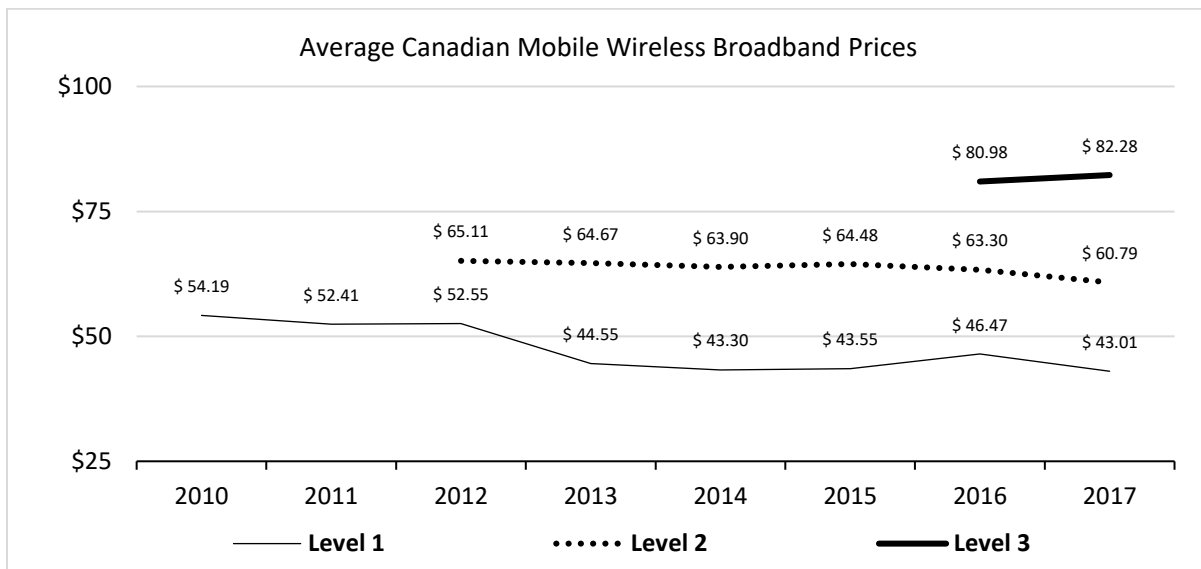


Figure 14, below, compares Canadian Mobile Wireless Internet service basket prices for the period 2010 to 2017. It shows that in 2017, weighted average prices ranged from \$43.01 per month for Level 1 to \$82.28 per month for Level 3. More detailed price information by city is provided in Figure C. 4 and Table C. 4 in Appendix C.

Figure 14: Weighted Average Canadian Mobile Wireless Internet Prices by Service Basket (2010-2017)



6.2.1 Comparison of Incumbents, MVNOs, and Regional Operators' Prices³¹

This section compares the average Mobile Wireless Internet prices offered by incumbents with those of regional operators and MVNOs/resellers.

Table 16 below, compares the 2017 Mobile Wireless Internet service prices offered by Canadian incumbents (Bell, Rogers, and Telus) and regional operators (Eastlink, Videotron, Freedom Mobile, SaskTel, and Bell-MTS) for the three service levels, as applicable, in six Canadian cities.

Table 16: 2017 Canadian Mobile Wireless Internet Service Prices – Incumbents versus Regional Operators

Service Basket Level	Service Provider Type	City						Average (City)*
		Halifax	Montreal	Toronto	Regina	Winnipeg	Vancouver	
Level 1	Incumbents	\$ 43.33	\$ 43.33	\$ 43.33	\$ 43.33	\$ 43.33	\$ 43.33	\$ 43.33
	Regionals	\$ 30.00	\$ 35.00	n/a	\$ 20.00	\$ 45.00	n/a	\$ 32.50
	Difference (%)	-30.77%	-19.23%	n/a	-53.85%	3.85%	n/a	-25.00%
Level 2	Incumbents	\$ 61.67	\$ 61.67	\$ 61.67	\$ 61.67	\$ 61.67	\$ 61.67	\$ 61.67
	Regionals	\$ 40.00	\$ 55.00	n/a	\$ 20.00	\$ 65.00	n/a	\$ 45.00
	Difference (%)	-35.14%	-10.81%	n/a	-67.57%	5.41%	n/a	-27.03%
Level 3	Incumbents	\$ 81.67	\$ 81.67	\$ 85.00	\$ 81.67	\$ 81.67	\$ 81.67	\$ 82.22
	Regionals	n/a	\$ 75.00	n/a	\$ 30.00	\$ 85.00	n/a	\$ 63.33
	Difference (%)	n/a	-8.16%	n/a	-63.27%	4.08%	n/a	-22.97%

Level 1: 2GB to less than 5GB per month; Level 2: 5GB to less than 10GB; and Level 3: 10GB or more
Regionals included: Eastlink (Halifax), Videotron (Montreal), Freedom Mobile, (Toronto and Vancouver), SaskTel (Regina), and Bell-MTS (Winnipeg)
If a service provider's (Incumbent and Regional) price was not available for a City/Level, it was not included in the average
n/a: service basket not offered / information not available being not published by the operators
* unweighted averages

For Level 1, regional operators' prices were 25.00% lower than the average prices offered by the incumbents. For Level 2 Mobile Wireless Internet, regional operators' prices were roughly 27.03% lower than incumbents' average prices. For the higher usage basket – Level 3 - regional operators' prices were 22.97% lower than the average prices offered by incumbents. Mobile Wireless Internet services were not offered by the surveyed MVNOs/resellers. Therefore, the price comparison of Mobile Internet prices between incumbents, regional operators and MVNOs is not provided in this Study.

6.3 International Mobile Wireless Internet Service Prices

Table 17, below, provides a summary of the average Level 1, 2 and 3 advertised monthly data caps (GB/month) and download speeds (Mbps) for Canada and each of the seven surveyed foreign jurisdictions. The upload speeds are often not advertised by wireless service providers and, therefore, are not included in Table 17.

The data in Table 17 indicate that the advertised download speeds for Mobile Wireless Internet service plans vary across countries. For all three Levels, the average advertised download speed of the surveyed Canadian Mobile Wireless Internet services ranged between 112 Mbps to 120 Mbps, which was higher

³¹ In 2016 this comparison was between Incumbent and New Entrants: Eastlink (Halifax), Videotron (Montreal), Freedom Mobile (Toronto and Vancouver). For this Study, since "New Entrants" were redefined as "Regionals", SaskTel (Regina), Bell-MTS (Winnipeg) were also included in the comparison.

than those of the USA, Germany, and Italy. However, advertised download speeds in Japan and the UK were higher than Canada's.

Table 17: International Comparison of Average Download Speeds and Usage Caps (2017)

Service Basket Level		Country							
		Canada	US	Australia	UK	France	Italy	Germany	Japan
Level 1	Download Speed (Mbps)	120	24	n/a	150	n/a	n/a	21	160
	Data Cap (GB/month)	2	3	2	2	2	4	2	5
Level 2	Download Speed (Mbps)	120	16	n/a	150	n/a	n/a	14	164
	Data Cap (GB/month)	6	7	10	5	10	8	5	6
Level 3	Download Speed (Mbps)	112	14	n/a	150	n/a	n/a	n/a	161
	Data Cap (GB/month)	10	17	18	13	15	15	11	20

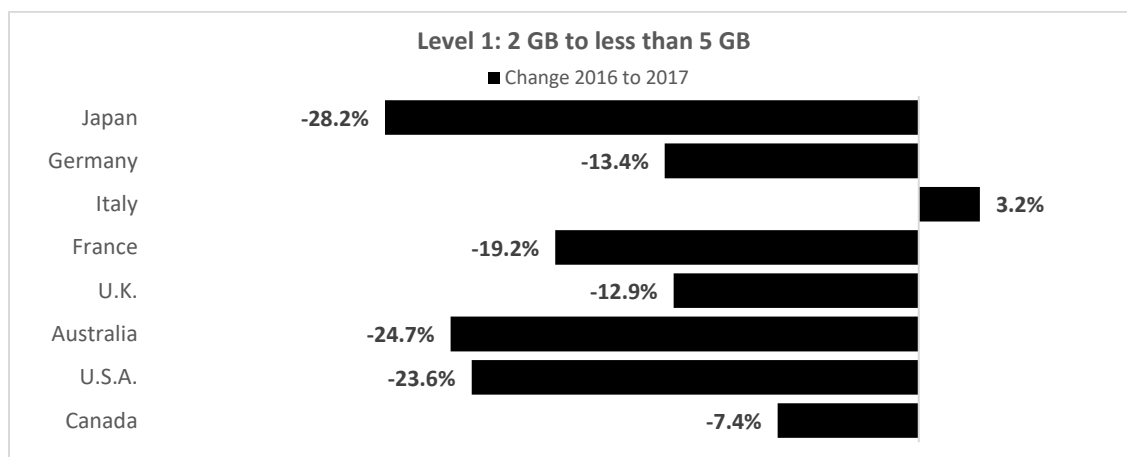
Level 1: 2GB to less than 5GB per month; Level 2: 5GB to less than 10GB; and Level 3: 10GB or more
Download Speed and Data Cap reflect the simple average of speed published by respective country's surveyed operators included in each service basket category
n/a: service basket not offered / information not available because not published by the operators

It is pertinent to note that the comparison provided in Table 17 is based on the advertised speeds of the networks rather than the estimated actual use speeds. The reasoning behind this decision was that the advertised speed represents the speed which the service operator suggests the consumer could reach in optimal conditions rather than estimated actual use speeds, which vary based on device and conditions. This approach is consistent with previous Studies.

Service speeds are dictated largely by technology. Many of the reviewed services use similar technologies. In Canada, the USA, France, Germany, Italy and Japan, most of the surveyed service providers offer 4G LTE mobile Internet service plans.

Figure 15 below, provides an overview of the changes in International Mobile Wireless Internet prices in the past year (2016 to 2017). In most countries, average prices for all levels decreased, with the exception of Italy (Level 1), Australia (Level 2) and Canada (Level 3).

Figure 15: YoY (%) Change in International Mobile Wireless Internet Prices (2016-2017)



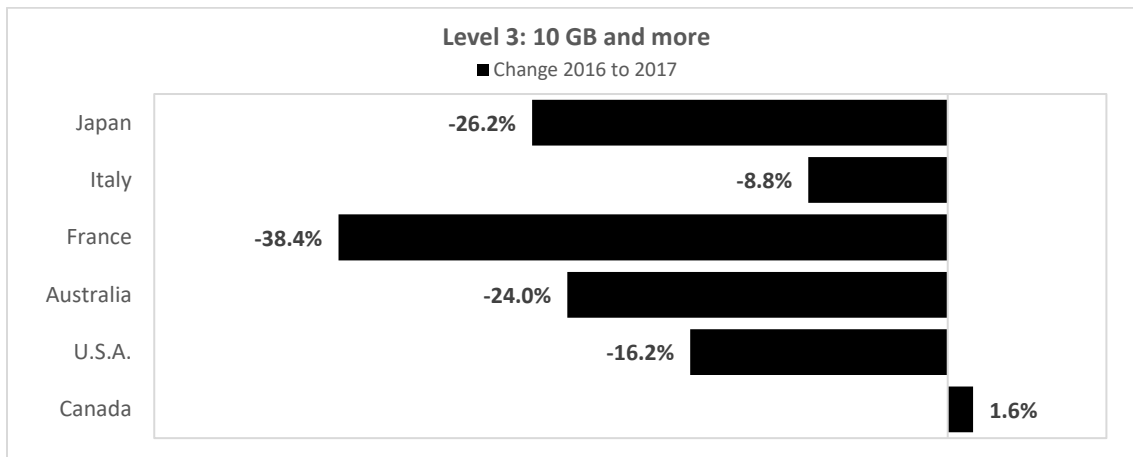
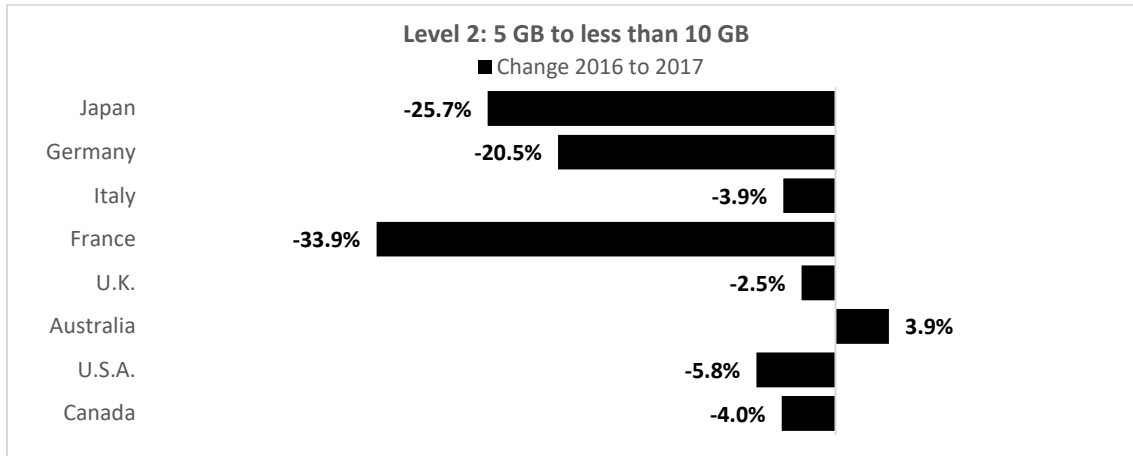
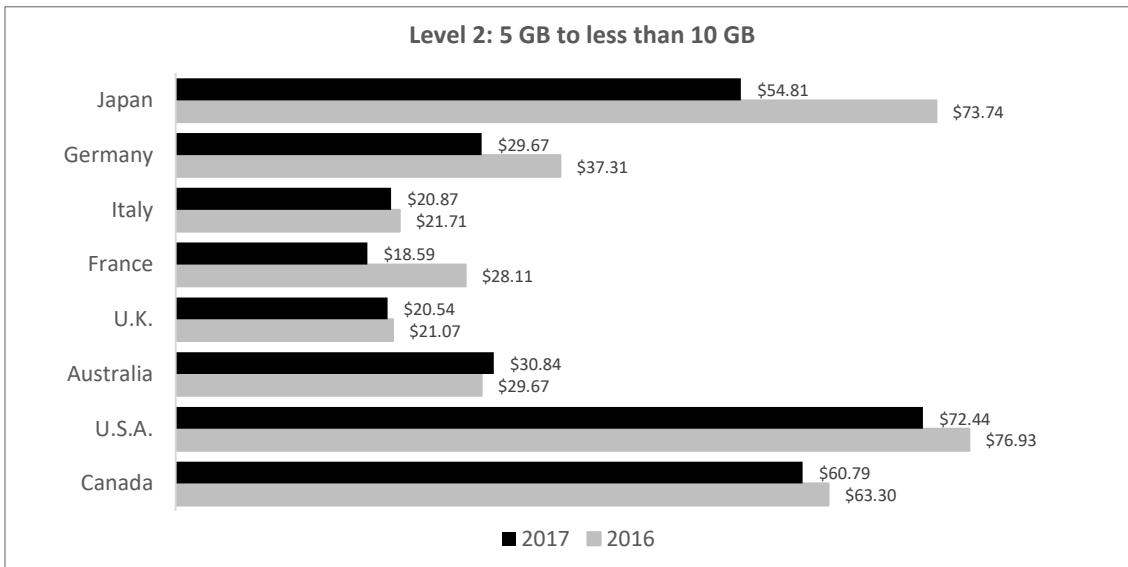
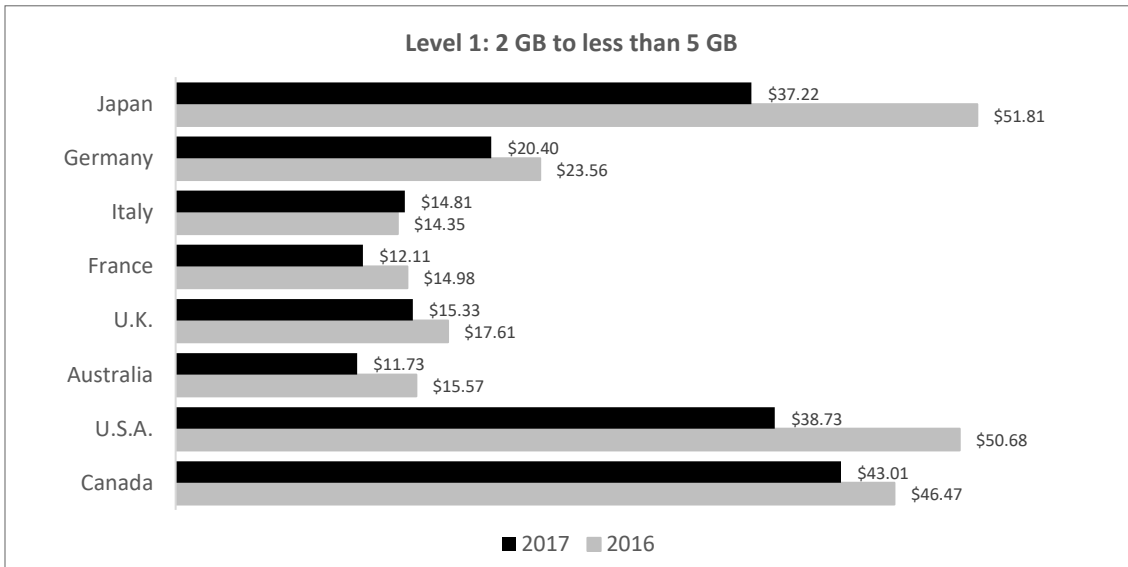
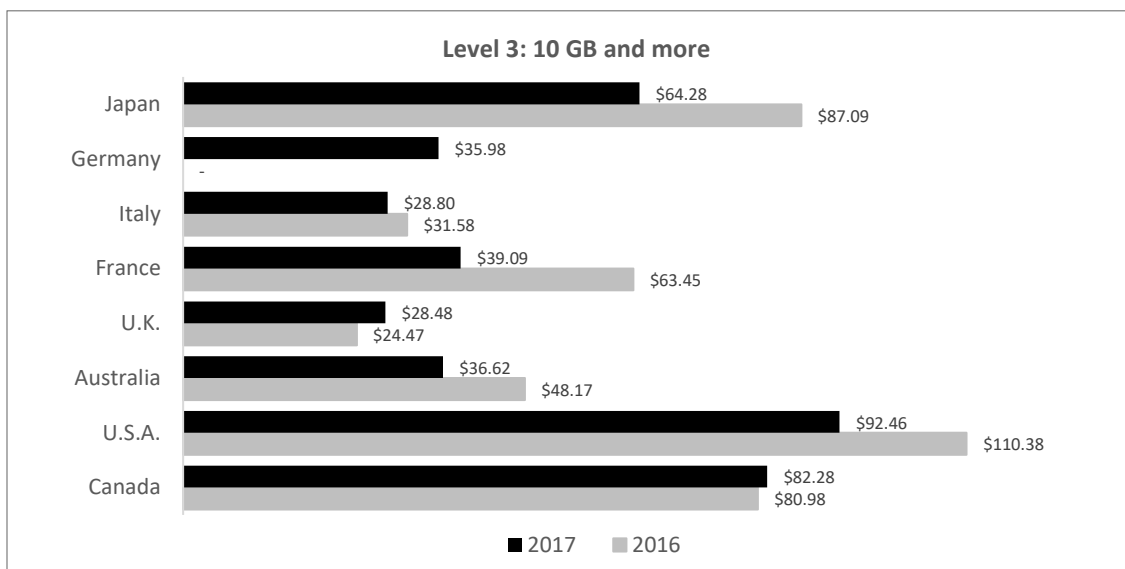


Figure D. 4 and Table D. 4 in Appendix D provide a detailed historical view of international Mobile Wireless Internet prices from 2008 to 2017. Figure 16 below, provides comparisons of 2016 and 2017 international Mobile Wireless Internet prices.

Figure 16: 2017 International Mobile Wireless Internet Price Comparison (PPP-adjusted CDN\$)





The key trends are summarized below:

- Canada's average prices in 2017 ranked among the highest for all three service levels. Canadian prices were the highest of all surveyed countries for Level 1. For Level 2 and Level 3, average prices in Canada were second-highest, after the USA.
- The lowest-priced markets for Mobile Internet services were Australia (\$11.73) in Level 1, France (\$18.59) in Level 2, and the UK (\$28.48) and Italy (\$28.80) in Level 3.
- The changes in international Mobile Internet prices as shown in Figure 16, above, can be accounted for by a number of market factors and a general trend towards changes in service offerings in this sector. For example:
 - Japan experienced significant decreases in prices – 28.2% in Level 1, 25.7% in Level 2 and 26.2% in Level 3. As is the case within other markets with a small number of operators, a change in a single plan can result in significant changes either upward or downward. In Japan, for example, the 2017 analysis showed that one lower-cost operator captured higher market shares in Levels 1 and 2, while a lower-cost operator in Level 3 (au KDDI) increased its Level 3 market share in 2017.
 - In Germany, there were significant price decreases of 13.4% at Level 1 and 20.5% in Level 2. This appears to result from a higher-cost operator O2 losing market share between 2016 and 2017.
 - Lower prices at all levels in France appear to have resulted from incumbent operators Orange and SFR – who dominated the market in 2016 and 2017 – deciding to reduce their prices.
 - Australia's significantly lower prices for Levels 1 and 3 from 2016 to 2017 could be due to the arrival of an additional operator, Vodafone. While Vodafone was also offering a competitively-priced service at Level 2, it was competing with only one incumbent with significantly greater market share and higher prices, and thus the effect of Vodafone's entry in the market for Level 2 was less than at Levels 1 and 3.

7. Bundled Services

7.1 Bundled Service Baskets

As in the previous year, the 2017 Study includes the following three Bundled Service baskets³²:

- Bundle 1: Fixed Telephony, Fixed Broadband Internet, and Mobile Wireless Telephony;
- Bundle 2: Fixed Telephony, Fixed Broadband Internet and TV package; and,
- Bundle 3: Fixed Telephony, Fixed Broadband Internet, Mobile Wireless Telephony and TV package.

For the Fixed Telephony, Fixed Broadband Internet and Mobile Wireless Telephony elements in each bundle, Level 2 stand-alone service standards are used. For the TV package element, a “basic” digital TV service option is included in the bundle. In cases where Level 2 service options (i.e., Fixed Telephony, Fixed Broadband Internet or Mobile Wireless Telephony) were not available, higher-level service options (Level 3 or 4) have been included. Table B.5 in Appendix B provides a detailed summary of the service elements used for the bundled service price comparison.

7.2 Canadian Bundled Service Prices

All Canadian incumbents included in this section offered a variation of all three defined bundled services, with the exception of Rogers in Toronto, which offered bundles only with TV packages. Thus, only Bundles 2 and 3 were considered for Rogers in Toronto. Only Bundle 2 was included for Access Communications and Shaw, as they do not offer Mobile Wireless Telephony services. Furthermore, since Primus does not provide TV services, only Bundle 1 was considered in the comparison. TV packages offered in the Canadian market vary considerably in delivery technologies (cable, IPTV, and satellite), channel inclusions and features. These differences can contribute to price variations. Based on the surveyed plans, Canadian basic digital TV packages, with minimal features, were available on a stand-alone basis with a price range of \$25.00 (Videotron) to \$55.00 (SaskTel, Access). Price variation within TV packages contributed significantly to the price differences in Bundles 2 and 3.

Figure 17 below, provides a summary of Canadian average monthly prices for each of the three Bundled Service baskets for the period 2008 to 2017. More detailed information for the period 2008 to 2017 is provided in Figure C. 5 and Table C. 5 in Appendix C.

Key trends in Canadian bundled services prices are summarized below.

- **Bundle 1:** the average price increased from \$161.63 in 2016 to \$191.08 in 2017, an increase of 18.2%. Average 2017 Bundle 1 prices varied widely by city, ranging from a low of \$145.36 in Winnipeg to a high of \$226.39 in Toronto. The average price in 2008-2017 increased by 3.0% on an annualized basis.

³² The 2016 to 2017 Bundled Service price comparison does not include the “skinny” basic TV service in 2016 average prices. “Skinny” basic was mandated by the CRTC and became effective April 1st, 2016, after the completion of data collection for the previous year’s Study (2016).

- **Bundle 2:** the average price decreased from \$135.60 in 2016 to \$120.99 in 2017, a decrease of 10.8%. Average 2017 Bundle 2 prices also varied widely by city, ranging from \$104.45 in Montreal to \$152.10 in Halifax. Over the period 2008-2017, average prices of Level 2 have increased at a very moderate annualized rate of 0.1%.
- **Bundle 3:** the average price increased from \$185.06 in 2016 to \$199.19 in 2017, an increase of 7.6%. The lowest average Bundle 3 price was found in Montreal at \$166.07, while the highest price was found in Halifax at \$231.18. Since 2008 the Bundle 3 prices increased by 1.1% on an annualized basis.

Figure 17: Average Canadian Bundled Service Prices by Service Basket (2008-2017)

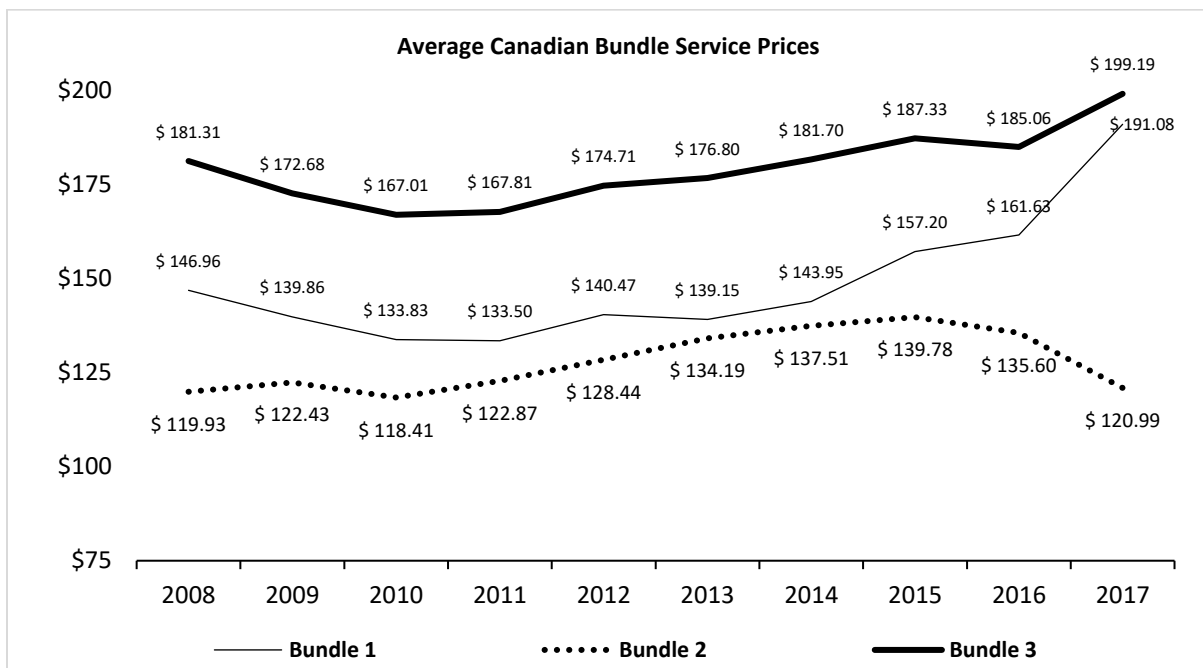
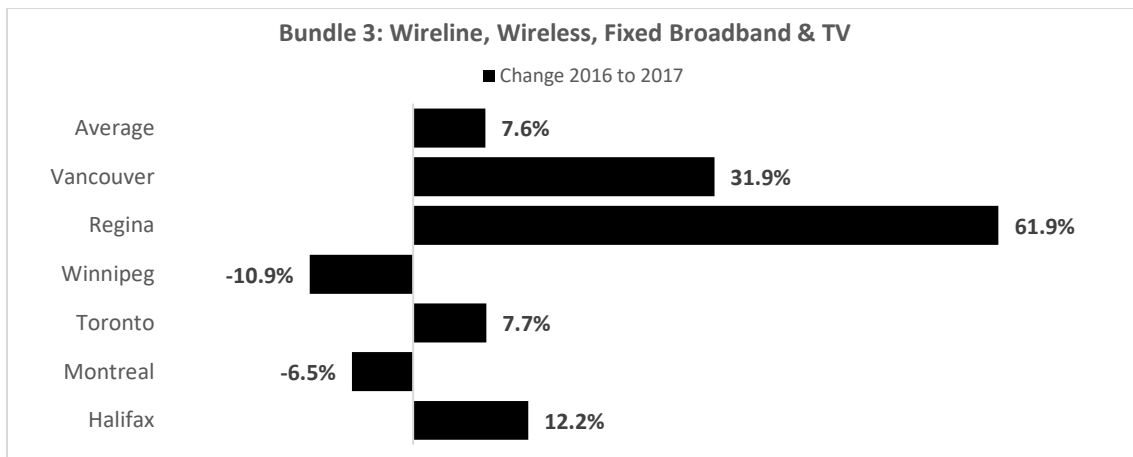
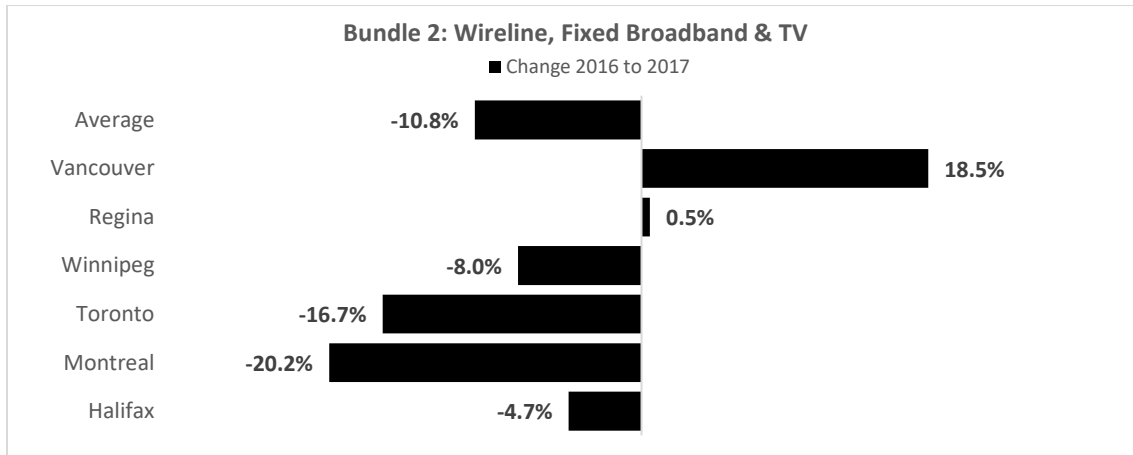
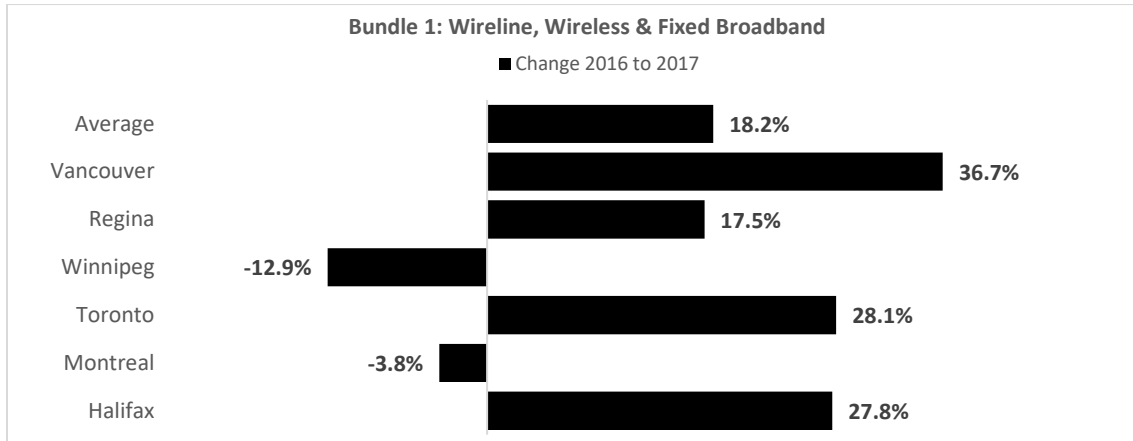


Figure 18, below, provides an overview of the changes in the three bundled service baskets since 2016.

Key highlights are:

- Bundle 1 and Bundle 3 prices increased in most markets, except for Winnipeg and Montreal, where the operators with the largest market share are regional: MTS and Videotron, respectively.
- Bundle 2 prices decreased in most markets, with the largest decreases observed in Montreal, Toronto and Winnipeg.

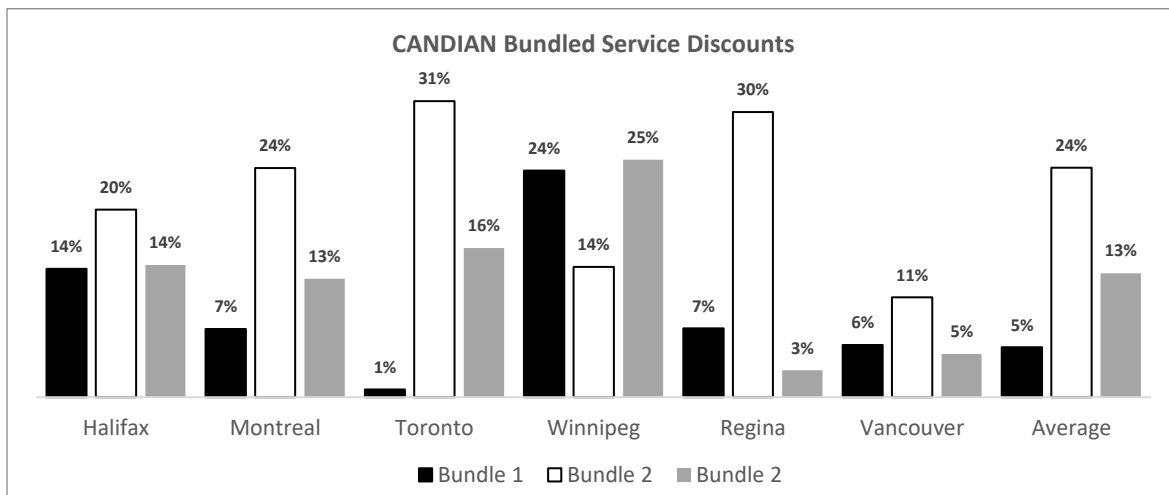
Figure 18: YoY Change in Canadian Bundled Service Prices (2016-2017)



Bundling discounts vary by service providers and with respect to service offerings. Discounts in Canada averaged 5% (Bundle 1), 24% (Bundle 2), and 13% (Bundle 3). As shown in Figure 19, below, bundling discounts varied considerably among Canadian cities.

- Bundle 1 discounts ranged from 1% (Toronto) to 24% (Winnipeg); discounts in Halifax averaged 14% and in Montreal and Regina 7%.
- Bundle 2 discounts ranged from 11% (Vancouver) to 31% (Toronto). Following Toronto, the highest bundling discounts were in Regina (30%), Montreal (24%), and Halifax (20%).
- Bundle 3 discounts ranged from 25% (Winnipeg) to 33% (Regina). – Other bundling discounts were in Toronto (16%), Halifax (14%), and Montreal (13%).

Figure 19: 2017 Canadian Bundled Service Discount Comparison



7.3 International Bundled Service Prices

Not all surveyed international service providers offered all three defined bundled services. For example, in the USA, Comcast does not have in-house Mobile Wireless Telephony service offerings. Thus it does not qualify for comparison in Bundles 1 and 3. Similarly, service providers in other foreign jurisdictions, such as Bouygues in France, NTT and JCom in Japan, and EE and TalkTalk in the UK, do not offer Bundles 1 or 2. As stated above, TV packages offered by Canadian providers vary in delivery technologies, channel inclusions and features. This also applies to international service providers, where price differentials in TV packages from different providers have a substantial impact on the total cost of the bundles.

Figure 20, below, provides an overview of bundle price changes between 2016 and 2017, in Canada and each of the seven foreign jurisdictions, and for each of the three bundled service baskets. More detailed information can be found in Figure D. 5 and Table D. 5 in Appendix D.

Figure 20: Change in International Bundled Service Prices for Level 1 to 3 Service Baskets (2016-2017)

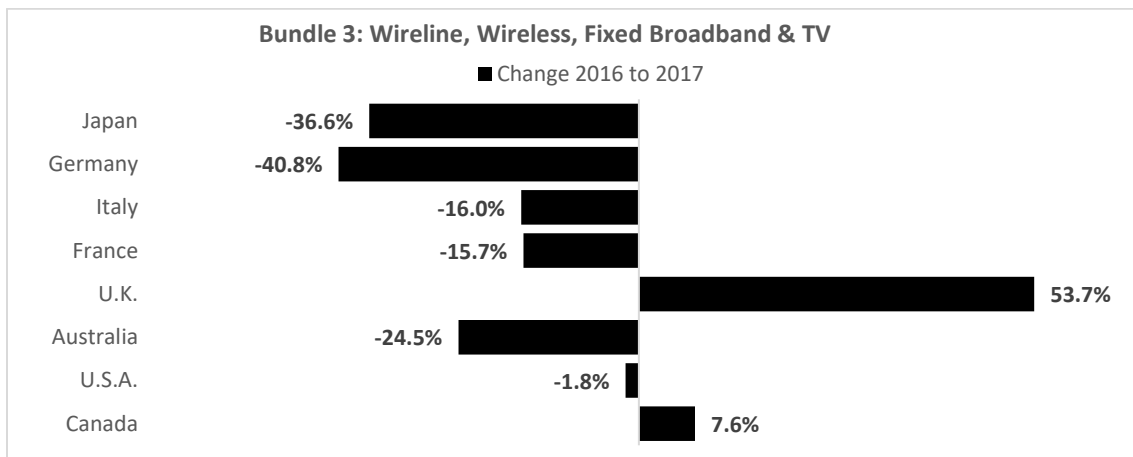
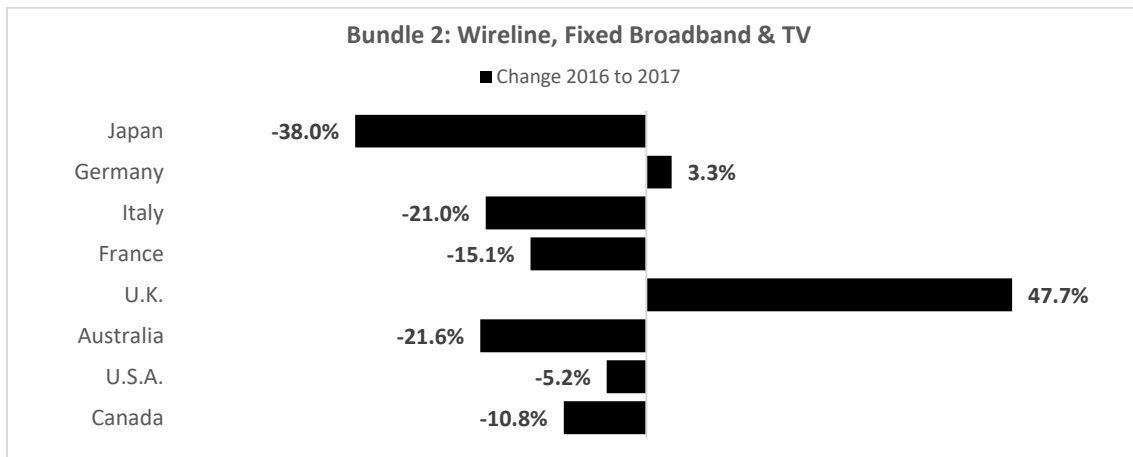
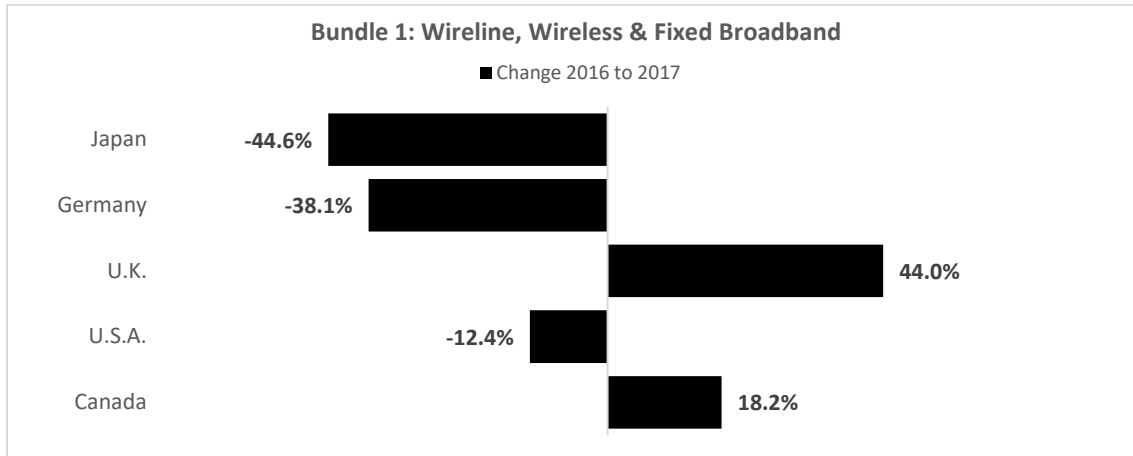
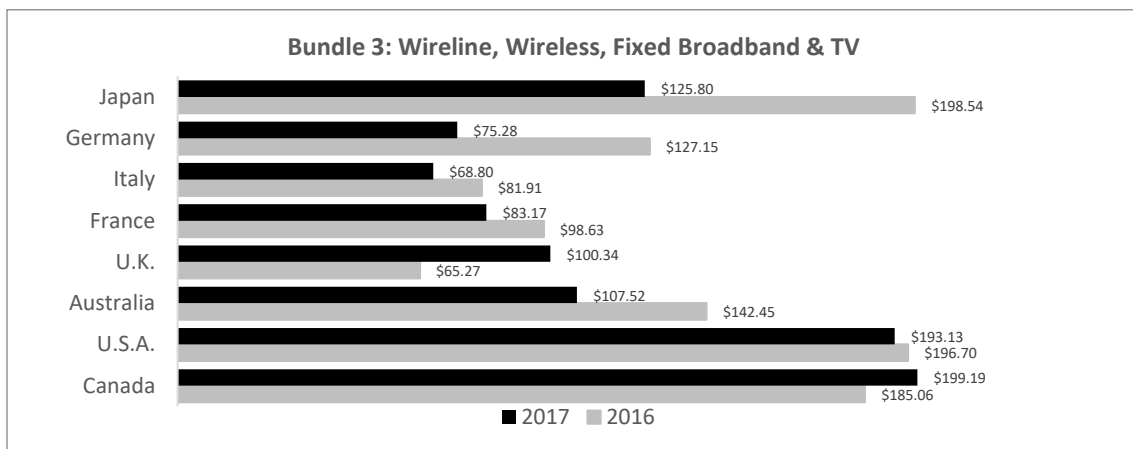
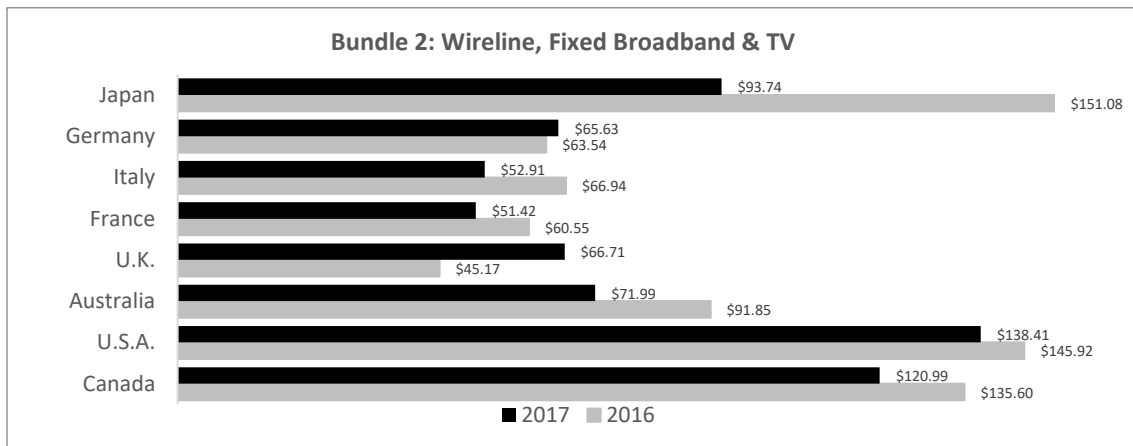
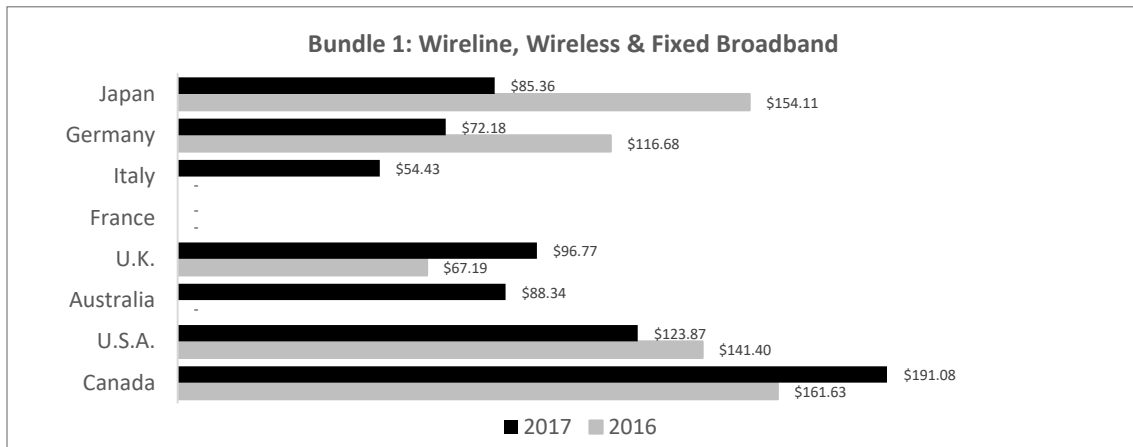


Figure 21 below, provides a comparison of Bundle 1, 2 and 3 prices for Canada and the surveyed international jurisdictions between 2016 and 2017.

Figure 21: 2017 International Bundled Service Price Comparison (PPP-adjusted CA\$)



Key trends in year-over-year international Bundled Services prices are summarized below:

- Bundle 1:** The average Canadian price of \$191.08 was higher than prices in all the foreign jurisdictions. The lowest average price was in Italy, at \$54.43. In France Bundle 1 offers were not available in 2016 and 2017. Japan and Germany saw significant price decreases in the average price of Level 1 bundles – 44.6% and 38.1% decreases, respectively. These appear to be the result of the

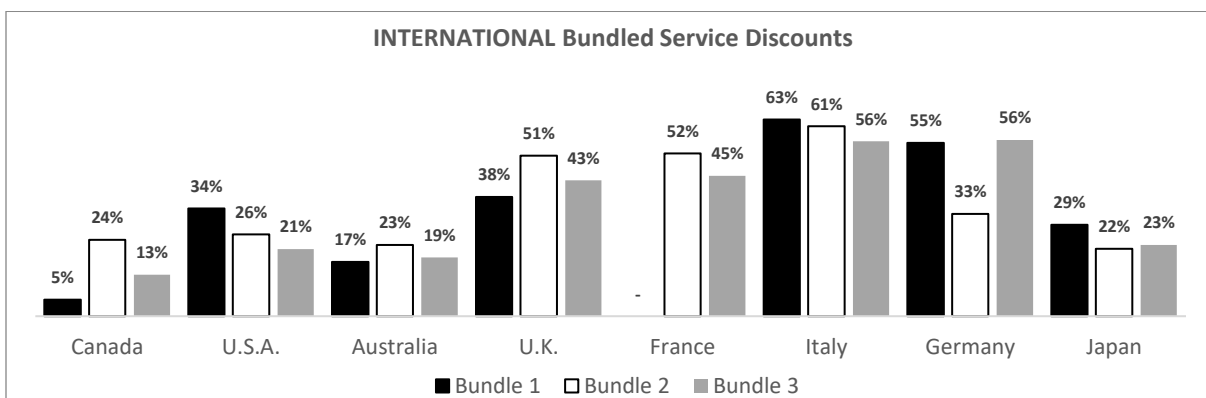
inclusion of additional operators (au Hikari and iTSCOM in Japan, Deutsche Telekom in Germany) in the analysis, offering lower-priced bundles. The converse occurred in the UK, which experienced a price increase of 44.0% between 2016 and 2017, primarily driven by higher-priced BT, which increased its bundle price between 2016 and 2017.

- Bundle 2:** The average Canadian bundle price of \$120.99, which is lower by 10.8% as compared to previous year, was at the higher end of the pricing spectrum among the surveyed countries, although the average price in the USA was higher, at \$138.41. The remaining countries offered Bundle 2 at lower prices. In Bundle 2, Japan, Australia, and Japan experienced the largest price decreases (38.0%, 21.6%, and 21.0%, respectively) between 2016 and 2017, due again to the inclusion of additional, lower-cost operators in the analysis. France also witnessed an average Bundle 2 price decrease of 15.1%, with the largest operator (Orange) decreasing its Bundle 2 bundle price from 2016 to 2017. With regard to the UK, as with Bundle 1, the operator included in the 2017 analysis increased its prices, thus accounting for most of the 47.7% price increase in that market.
- Bundle 3:** The average Canadian price of \$199.19 was higher than prices in all the foreign jurisdictions. The USA Bundle 3 price was slightly lower at \$193.13. The lowest-price jurisdictions were Italy (\$68.80) and Germany (\$75.28). Price changes between 2016 and 2017 were most pronounced in Germany, Japan, and Australia, where prices decreased by 40.8%, 36.6%, and 24.5% respectively. The decreases here occurred for the same reasons as Bundle 1 and 2 price decreases explained above. UK price increases averaging 60.4% are also explained by the same factors identified for Bundles 1 and 2 above.

As shown in Figure 22 below, bundling discounts varied considerably among jurisdictions.

- Bundle 1** discounts ranged from 5% (Canada) to 63% (Italy) – following Italy, the highest bundling discounts were in Germany (55%), the UK (38%), the USA (34%), and Japan (29%).
- Bundle 2** discounts ranged from 22% (Japan), and Italy (61%) - following Italy, the highest bundling discounts were in France (52%), the UK (51%), and Germany (33%).
- Bundle 3** discounts ranged from 13% (Canada) to 56% (Italy and Germany) – following Italy and Germany, the highest bundling discounts were in France (45%), the UK (43%), and Japan (23%).

Figure 22: 2017 International Bundled Service Discount Comparison



APPENDIX A: LIST OF SERVICE PROVIDERS BY SERVICE BASKET

Table A 1: List of Canadian Service Providers Included in the Price Comparison Study

Cities	Service Baskets	List of Service Providers
Halifax, NS	Fixed Telephony	Bell Canada, Eastlink, TekSavvy, Primus
	Fixed Broadband Internet	Bell Canada, Eastlink, TekSavvy
	Mobile Wireless Telephony and text messaging	Bell Canada, TELUS, Rogers, Eastlink, PC Mobile, Petro-Canada Mobile, 7-Eleven Speakout, Primus
	Mobile Wireless Internet	Bell Canada, TELUS, Rogers
	Service Bundles	Bell Canada Aliant, Eastlink
Montreal, QC	Fixed Telephony	Bell, Videotron, TekSavvy, Primus
	Fixed Broadband Internet	Bell, Videotron, TekSavvy, Primus, Distributel
	Mobile Wireless Telephony and text messaging	Bell, TELUS, Rogers, Videotron, Primus, PC Mobile, Petro-Canada Mobile, 7-Eleven Speakout
	Mobile Wireless Internet	Bell, TELUS, Rogers, Videotron
	Service Bundles	Bell, Videotron, Primus (as applicable)
Toronto, ON	Fixed Telephony	Bell, Rogers, Primus, TekSavvy
	Fixed Broadband Internet	Bell, Rogers, Primus, TekSavvy, Distributel
	Mobile Wireless Telephony and text messaging	Bell, TELUS, Rogers, Primus, PC Mobile, Petro-Canada Mobile, 7-Eleven Speakout, Freedom Mobile
	Mobile Wireless Internet	Bell, TELUS, Rogers, Freedom Mobile
	Service Bundles	Bell, Rogers, Primus (as applicable)
Winnipeg, MB	Fixed Telephony	MTS, Shaw, TekSavvy, Primus
	Fixed Broadband Internet	MTS, Shaw
	Mobile Wireless Telephony and text messaging	MTS, TELUS, Rogers, Bell Mobility, PC Mobile, Primus, Petro-Canada Mobile, 7-Eleven Speakout
	Mobile Wireless Internet	MTS, Bell, TELUS, Rogers
	Service Bundles	MTS, Shaw
Regina, SK	Fixed Telephony	SaskTel, Access Communications, TekSavvy, Primus
	Fixed Broadband Internet	SaskTel, Access Communications
	Mobile Wireless Telephony and text messaging	SaskTel, Bell, TELUS, Rogers, PC Mobile, Primus, Petro-Canada Mobile, 7-Eleven Speakout
	Mobile Wireless Internet	SaskTel, Bell, TELUS, Rogers
	Service Bundles	SaskTel, Access Communications
Vancouver, BC	Fixed Telephony	TELUS, Shaw, Primus, TekSavvy
	Fixed Broadband Internet	TELUS, Shaw, Primus, TekSavvy
	Mobile Wireless Telephony and text messaging	Bell, TELUS, Rogers, Primus, PC Mobile, Petro-Canada Mobile, 7-Eleven Speakout, Freedom Mobile
	Mobile Wireless Internet	Bell, TELUS, Rogers, Freedom Mobile
	Service Bundles	TELUS, Shaw, Primus (as applicable)

Table A 2: List of International Service Providers Included in the Price Comparison Study

Cities	Service Baskets	List of Service Providers	
1. United States	Boston, MA	Fixed Telephony	Verizon, Comcast
		Fixed Broadband Internet	Verizon, Comcast, RCN
		Mobile Wireless Telephony and text messaging	AT&T, Verizon, Sprint, T-Mobile
		Mobile Wireless Internet	AT&T, Verizon, Sprint, T-Mobile
		Service Bundles	Verizon, Comcast, RNC
	Kansas City, MO	Fixed Telephony	AT&T, Time Warner
		Fixed Broadband Internet	AT&T, Time Warner, Google Fibre, Windstream, Xfinity
		Mobile Wireless Telephony and text messaging	AT&T, Verizon, Sprint, T-Mobile
		Mobile Wireless Internet	AT&T, Verizon, Sprint, T-Mobile
		Service Bundles	AT&T, Time Warner Google Fibre, Windstream, Xfinity
	Minneapolis, MN	Fixed Telephony	CenturyLink, Comcast
		Fixed Broadband Internet	CenturyLink, Comcast, Xfinity
		Mobile Wireless Telephony and text messaging	AT&T, Verizon, Sprint, T-Mobile
		Mobile Wireless Internet	AT&T, Verizon, Sprint, T-Mobile
		Service Bundles	CenturyLink, Comcast, Xfinity
	Seattle, WA	Fixed Telephony	CenturyLink, Comcast
Fixed Broadband Internet		CenturyLink, Comcast, Xfinity, Wave	
Mobile Wireless Telephony and text messaging		AT&T, Verizon, Sprint, T-Mobile	
Mobile Wireless Internet		AT&T, Verizon, Sprint, T-Mobile	
Service Bundles		CenturyLink, Comcast, Xfinity, Wave	
2. Australia	Sydney	Fixed Telephony	Telstra and Optus
		Fixed Broadband Internet	Telstra and Optus
		Mobile Wireless Telephony and text messaging	Telstra, Optus, Vodafone
		Mobile Wireless Internet	Telstra, Optus, Vodafone
		Service Bundles	Telstra and Optus
3. United Kingdom	London	Fixed Telephony	BT, Virgin
		Fixed Broadband Internet	BT, Virgin, EE/Orange, TalkTalk
		Mobile Wireless Telephony and text messaging	EE, Virgin Mobile, Vodafone, O2, 3 (three) ³³
		Mobile Wireless Internet	EE, Virgin Mobile, Vodafone, O2, 3 (three)
		Service Bundles	BT, EE/Orange, Virgin, TalkTalk
4. France	Paris	Fixed Telephony	Orange (France Telecom), Numericable, SFR ³⁴
		Fixed Broadband Internet	Orange (France Telecom), Numericable, SFR ³⁵ , Bouygues Telecom
		Mobile Wireless Telephony and Text messaging	Orange, SFR, Bouygues Telecom
		Mobile Wireless Internet	Orange, SFR, Bouygues Telecom, FREE Mobile (Iliad S.A.)
		Service Bundles	Orange, Bouygues Telecom, SFR
5. Italy	Rome	Fixed Telephony	Telecom Italia, FastWeb
		Fixed Broadband Internet	Telecom Italia, FastWeb
		Mobile Wireless Telephony and text messaging	Telecom Italia (TIM), Vodafone, WIND
		Mobile Wireless Internet	Telecom Italia (TIM), FastWeb, Vodafone, WIND
		Service Bundles	Telecom Italia, FastWeb
6. Germany	Berlin	Fixed Telephony	Deutsche Telekom (DT), Vodafone
		Fixed Broadband Internet	DT, Vodafone
		Mobile Wireless Telephony and text messaging	DT, Vodafone, E-plus (KPN), O2
		Mobile Wireless Internet	DT, Vodafone, O2
		Service Bundles	DT, Vodafone
7. Japan	Tokyo	Fixed Telephony	Au HIKARI, KDDI
		Fixed Broadband Internet	NTT, JCom, KDDI, Yahoo! BB
		Mobile Wireless Telephony and text messaging	NTT DoCoMo, Softbank, KDDI, Y!Mobile ³⁶
		Mobile Wireless Internet	NTT DoCoMo, Softbank, au KDDI, Y!Mobile

³³ Both O2 and 3 (three) own substantial market share in the UK in the mobile wireless (voice and data) services. Nordicity is cognizant of the proposed combination of O2 and 3 (three), currently under review by the European Commission's competition authority.

³⁴ SFR was acquired by Numericable (www.numericable-sfr.com).

³⁵ SFR was acquired by Numericable (www.numericable-sfr.com).

³⁶ Previously branded as eMobile.

Cities	Service Baskets	List of Service Providers
	Service Bundles	NTT, JCom, au KDDI, iTSCOM (www.itscom.net)

APPENDIX B: SERVICE BASKETS

Table B. 1: Fixed (Wireline) Telephony Service Baskets

Key Elements	Level 1	Level 2	Level 3
Incoming minutes per month (45%)	180	450	720
Outgoing minutes per month (55%)	220	550	880
Outgoing minutes per month	198	440	616
Outgoing long-distance minutes	22	110	264
Total minutes per month	400	1,000	1,600
Long-distance to total outgoing ratio	10%	20%	30%
Voice Mail	No	Yes	Yes
Caller ID	No	Yes	Yes
Additional features (two additional or bundled, if available)	No	No	Yes

Table B. 2: Mobile Wireless Telephony and text Messaging Service Baskets

Key Elements	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Incoming minutes per month	60	180	480	Ult	Ult	Ult
Outgoing minutes per month	90	270	720	Ult	Ult	Ult
Outgoing minutes per month	81	243	612	Ult	Ult	Ult
Outgoing long-distance minutes	9	27	108	Ult	Ult	Ult
Total minutes per month	150	450	1,200	Ult	Ult	Ult
Long-distance to total outgoing ratio	10%	10%	15%	n/a	n/a	n/a
Voice Mail	No	Yes	Yes	Yes	Yes	Yes
Caller ID	No	Yes	Yes	Yes	Yes	Yes
Other Feature(s)	No	No	Yes	Yes	Yes	Yes
TMS	No	300	300	Ult	Ult	Ult
Data	No	No	1 GB	2 GB	5 GB	10 GB *

Ult: Unlimited nationwide talk and text, excluding international calling.
n/a: not applicable.
* Shared data plan among three lines.

Table B. 3: Fixed Broadband Internet Service Baskets

Key Elements	Level 1	Level 2	Level 3	Level 4	Level 5
Download Speed Range (Mbps)	3 to 9	10 to 15	16 to 40	41 to 100	> 100
Monthly Usage *	10 GB	50 GB	100 GB	150 GB	500 GB
Modem	FWC or R	FWC or R	FWC or R	FWC or R	FWC or R

FWC: Free with contract.
R: Monthly rental or amortization (24 months).
* According to our preliminary research, different usage options are available under each of the above five levels, e.g., unlimited usage with 1.5 Mbps download speed by Bell Aliant in Nova Scotia, 800 GB with 120 Mbps download speed by Shaw, and unlimited with 940 Mbps download speed by Bell in Ontario.

Table B. 4: Mobile Wireless (Broadband) Internet Service Baskets

Key Elements	Level 1	Level 2	Level 3
Download Speed Range (Mbps)	≥ 1.5	≥ 1.5	≥ 1.5
Monthly Usage *	2 GB	5 GB	10 GB
Modem	FWC or R	FWC or R	FWC or R
FWC: Free with the contract. R: Monthly rental or amortization (24 months). * According to our preliminary research some service providers also offer a “flex plan” of up to 100 GB by Rogers (Canada) and Verizon (US), and up to 30 GB by Sprint (US).			

Table B. 5: Bundled Service Baskets

Key Elements	Bundle 1	Bundle 2	Bundle 3
Fixed Telephony	Level 2	Level 2	Level 2
Mobile Wireless Telephony	Level 2		Level 2
Fixed Broadband Internet	Level 2	Level 2	Level 2
Television Package		Basic Digital TV	Basic Digital TV

APPENDIX C: CANADIAN PRICE COMPARISONS

Figure C.1. 1: Canadian Fixed Telephony Service

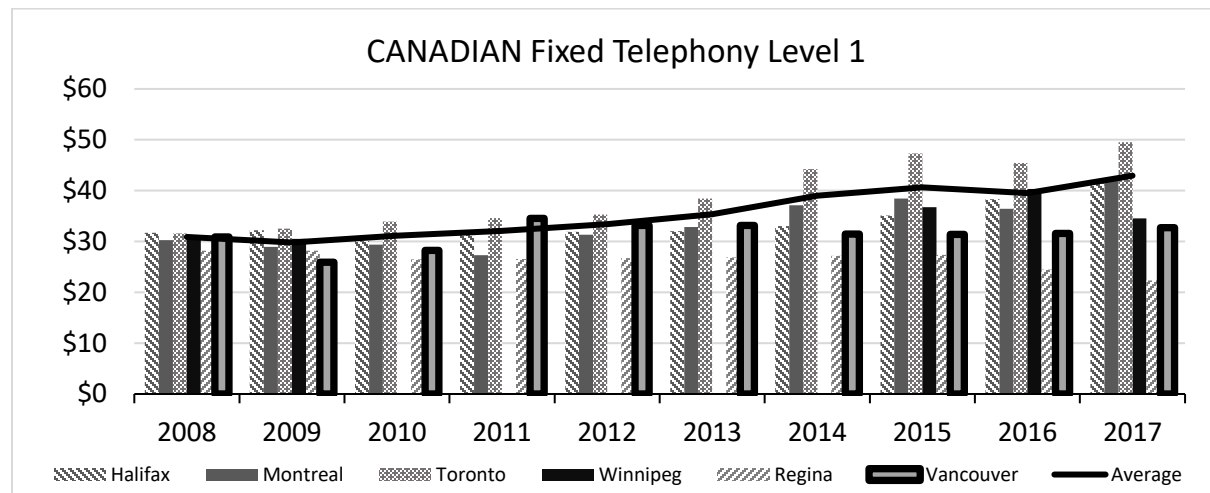


Table C.1. 1: Canadian Fixed Telephony Service

Level 1: 400 Minutes with 10% LD								
Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$31.73	\$30.27	\$31.61	\$30.49	\$28.16	\$30.90	\$30.88	
2009	\$32.23	\$28.92	\$32.51	\$30.48	\$28.16	\$25.92	\$29.80	-3.5%
2010	\$30.08	\$29.39	\$33.88	n/a	\$26.49	\$28.27	\$31.16	4.6%
2011	\$31.79	\$27.33	\$34.63	n/a	\$26.52	\$34.52	\$32.06	2.9%
2012	\$31.89	\$31.31	\$35.30	n/a	\$26.76	\$33.16	\$33.42	4.2%
2013	\$32.04	\$32.85	\$38.45	n/a	\$26.86	\$33.12	\$35.33	5.7%
2014	\$33.06	\$37.10	\$44.24	n/a	\$27.17	\$31.45	\$38.99	10.4%
2015	\$35.07	\$38.47	\$47.30	\$36.73	\$27.34	\$31.39	\$40.64	4.2%
2016	\$38.29	\$36.41	\$45.42	\$40.30	\$24.50	\$31.55	\$39.52	-2.8%
2017	\$42.06	\$42.30	\$49.52	\$34.53	\$22.30	\$32.69	\$42.94	8.6%
CAGR	3.2%	3.8%	5.1%	1.4%	-2.6%	0.6%	3.7%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.1. 2: Canadian Fixed Telephony Service

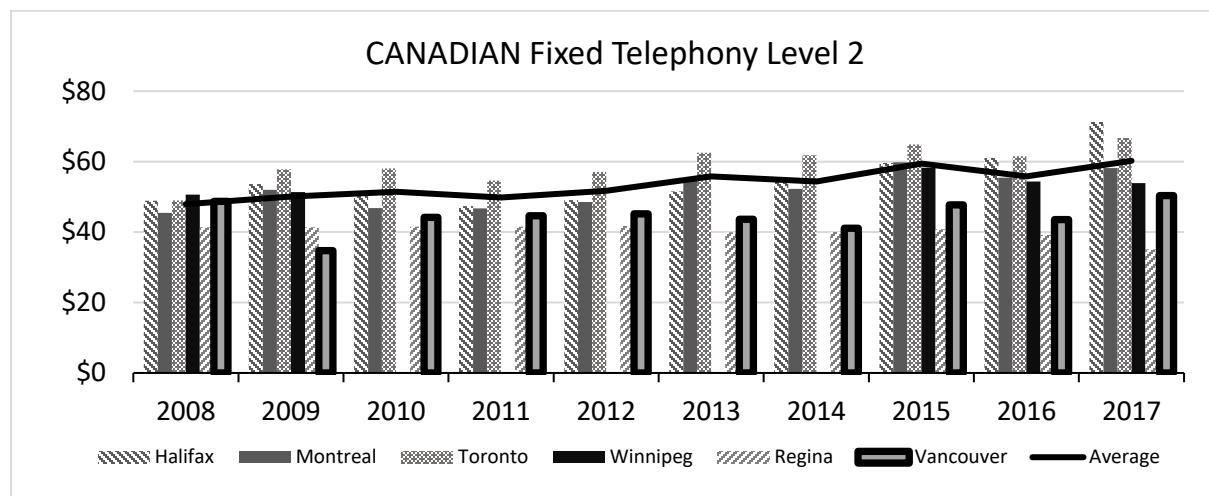


Table C.1. 2: Canadian Fixed Telephony Service

Level 2: 1,000 Minutes with 20% LD								
Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$48.93	\$45.44	\$48.96	\$50.61	\$41.39	\$48.67	\$47.91	
2009	\$53.61	\$52.01	\$57.78	\$51.35	\$41.39	\$34.68	\$50.05	4.5%
2010	\$50.78	\$46.81	\$58.09	n/a	\$41.50	\$44.18	\$51.42	2.7%
2011	\$47.34	\$46.72	\$54.66	n/a	\$41.52	\$44.62	\$49.81	-3.1%
2012	\$49.05	\$48.55	\$57.08	n/a	\$41.71	\$45.19	\$51.71	3.8%
2013	\$51.56	\$54.58	\$62.50	n/a	\$39.94	\$43.63	\$55.77	7.9%
2014	\$55.19	\$52.26	\$61.77	n/a	\$39.97	\$41.11	\$54.37	-2.5%
2015	\$59.57	\$59.83	\$64.88	\$58.23	\$40.81	\$47.69	\$59.44	9.3%
2016	\$61.07	\$55.43	\$61.49	\$54.35	\$39.20	\$43.56	\$55.78	-6.2%
2017	\$71.20	\$58.12	\$66.70	\$53.87	\$35.10	\$50.30	\$60.21	7.9%
CAGR	4.3%	2.8%	3.5%	0.7%	-1.8%	0.4%	2.6%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.1. 3: Canadian Fixed Telephony Service

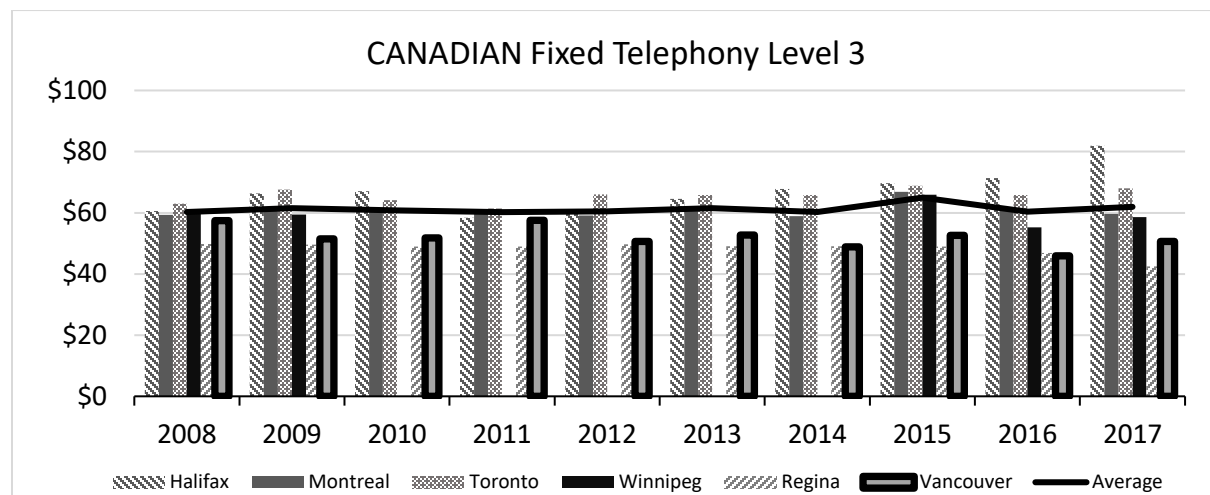


Table C.1. 3: Canadian Fixed Telephony Service

Level 3: 1,600 Minutes with 30% LD								
Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$60.63	\$59.36	\$63.02	\$60.47	\$49.81	\$57.45	\$60.27	
2009	\$66.34	\$61.68	\$67.59	\$59.47	\$49.56	\$51.51	\$61.55	2.1%
2010	\$67.02	\$61.15	\$64.19	n/a	\$48.96	\$51.79	\$60.78	-1.3%
2011	\$58.35	\$60.97	\$61.36	n/a	\$48.99	\$57.59	\$60.22	-0.9%
2012	\$60.33	\$59.08	\$65.97	n/a	\$49.66	\$50.62	\$60.52	0.5%
2013	\$64.58	\$60.94	\$65.84	n/a	\$49.11	\$52.69	\$61.53	1.7%
2014	\$67.85	\$58.95	\$65.80	n/a	\$49.03	\$48.91	\$60.29	-2.0%
2015	\$69.70	\$66.89	\$68.89	\$65.87	\$48.98	\$52.66	\$64.96	7.7%
2016	\$71.38	\$61.60	\$65.77	\$55.29	\$46.91	\$45.98	\$60.32	-7.1%
2017	\$81.94	\$59.65	\$68.01	\$58.55	\$42.45	\$50.60	\$61.98	2.7%
CAGR	3.4%	0.1%	0.9%	-0.4%	-1.8%	-1.4%	0.3%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.2. 1: Canadian Wireless Telephony and Text Messaging Service

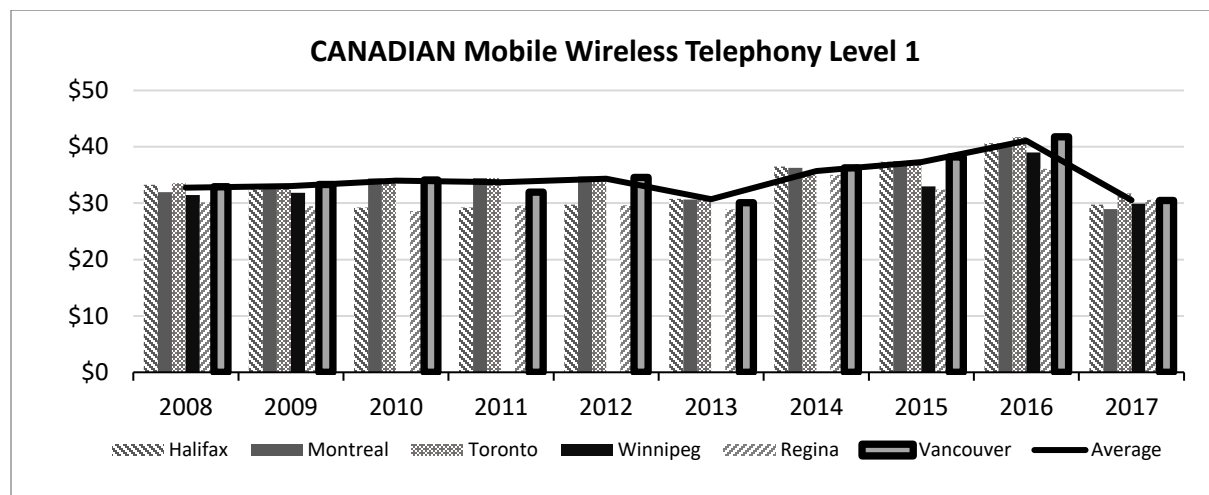


Table C.2. 1: Canadian Wireless Telephony and Text Messaging Service

Level 1: 150 Minutes

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$33.25	\$31.96	\$33.55	\$31.44	\$30.16	\$32.90	\$32.73	
2009	\$32.48	\$33.24	\$33.34	\$31.85	\$29.44	\$33.32	\$33.03	0.9%
2010	\$29.23	\$34.38	\$34.33	n/a	\$28.64	\$34.10	\$34.03	3.0%
2011	\$29.24	\$34.47	\$34.45	n/a	\$29.59	\$31.94	\$33.73	-0.9%
2012	\$29.75	\$34.72	\$34.44	n/a	\$29.66	\$34.58	\$34.32	1.8%
2013	\$30.76	\$30.63	\$31.09	n/a	\$28.88	\$30.06	\$30.71	-10.5%
2014	\$36.50	\$36.28	\$35.04	n/a	\$35.05	\$36.29	\$35.70	16.3%
2015	\$37.37	\$37.46	\$37.54	\$32.98	\$32.43	\$38.21	\$37.29	4.4%
2016	\$40.62	\$40.46	\$41.71	\$38.98	\$36.12	\$41.79	\$41.08	10.2%
2017	\$29.74	\$28.95	\$31.71	\$29.90	\$30.57	\$30.50	\$30.53	-25.7%
CAGR	-1.2%	-1.1%	-0.6%	-0.6%	0.1%	-0.8%	-0.8%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.2. 2: Canadian Wireless Telephony and Text Messaging Service

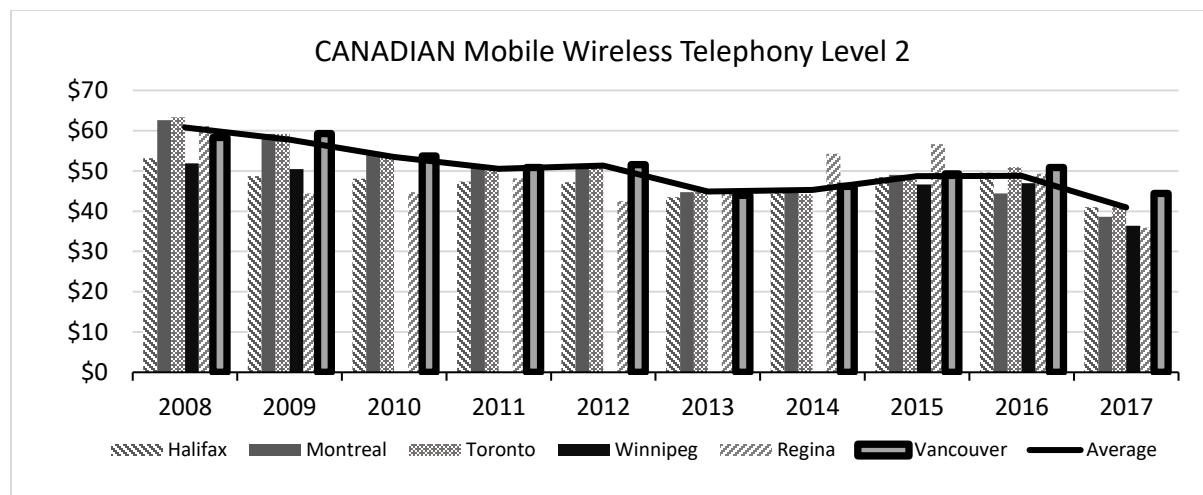


Table C.2. 2: Canadian Wireless Telephony and Text Messaging Service

Level 2: 450 Minutes and 300 SMS

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$53.14	\$62.62	\$63.37	\$51.91	\$61.20	\$58.34	\$60.81	
2009	\$48.73	\$59.17	\$59.20	\$50.49	\$44.44	\$59.30	\$57.78	-5.0%
2010	\$48.05	\$54.34	\$53.56	n/a	\$44.77	\$53.74	\$53.49	-7.4%
2011	\$47.39	\$51.50	\$49.99	n/a	\$48.19	\$50.86	\$50.51	-5.6%
2012	\$47.22	\$51.04	\$51.97	n/a	\$42.54	\$51.61	\$51.31	1.6%
2013	\$43.44	\$44.78	\$45.40	n/a	\$44.86	\$43.93	\$44.86	-12.6%
2014	\$45.40	\$45.59	\$44.29	n/a	\$54.29	\$46.20	\$45.26	0.9%
2015	\$48.45	\$49.04	\$48.15	\$46.65	\$56.70	\$49.28	\$48.68	7.6%
2016	\$49.56	\$44.39	\$50.96	\$46.98	\$49.38	\$50.89	\$48.77	0.2%
2017	\$41.03	\$38.62	\$41.85	\$36.40	\$35.91	\$44.40	\$40.95	-16.0%
CAGR	-2.8%	-5.2%	-4.5%	-3.9%	-5.8%	-3.0%	-4.3%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.2. 3: Canadian Wireless Telephony and Text Messaging Service

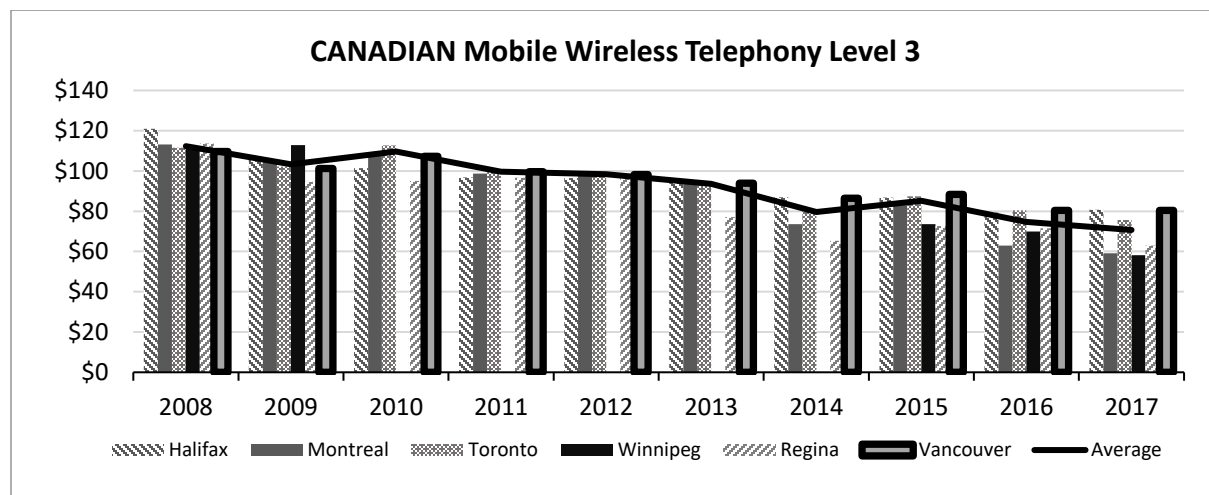


Table C.2. 3: Canadian Wireless Telephony and Text Messaging Service

Level 3: 1,200 Minutes, 300 SMS and 1 GB Data

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$121.04	\$113.21	\$111.51	\$111.51	\$113.67	\$109.68	\$112.34	
2009	\$105.61	\$104.38	\$102.20	\$112.82	\$94.64	\$101.24	\$103.24	-8.1%
2010	\$101.44	\$108.37	\$112.63	n/a	\$94.97	\$107.27	\$109.59	6.2%
2011	\$96.73	\$98.73	\$100.76	n/a	\$96.69	\$99.61	\$99.69	-9.0%
2012	\$96.44	\$98.92	\$98.26	n/a	\$96.42	\$98.22	\$98.37	-1.3%
2013	\$94.40	\$93.78	\$93.89	n/a	\$77.07	\$93.96	\$93.59	-4.9%
2014	\$86.91	\$73.59	\$81.00	n/a	\$65.33	\$86.46	\$79.69	-14.9%
2015	\$86.76	\$82.96	\$87.36	\$73.54	\$72.56	\$88.32	\$85.22	6.9%
2016	\$79.29	\$62.98	\$80.48	\$69.86	\$71.59	\$80.48	\$74.67	-6.3%
2017	\$80.73	\$59.05	\$75.63	\$58.18	\$62.88	\$80.43	\$70.70	-5.3%
CAGR	-4.4%	-7.0%	-4.2%	-7.0%	-6.4%	-3.4%	-5.0%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.2. 4: Canadian Wireless Telephony and Text Messaging Service

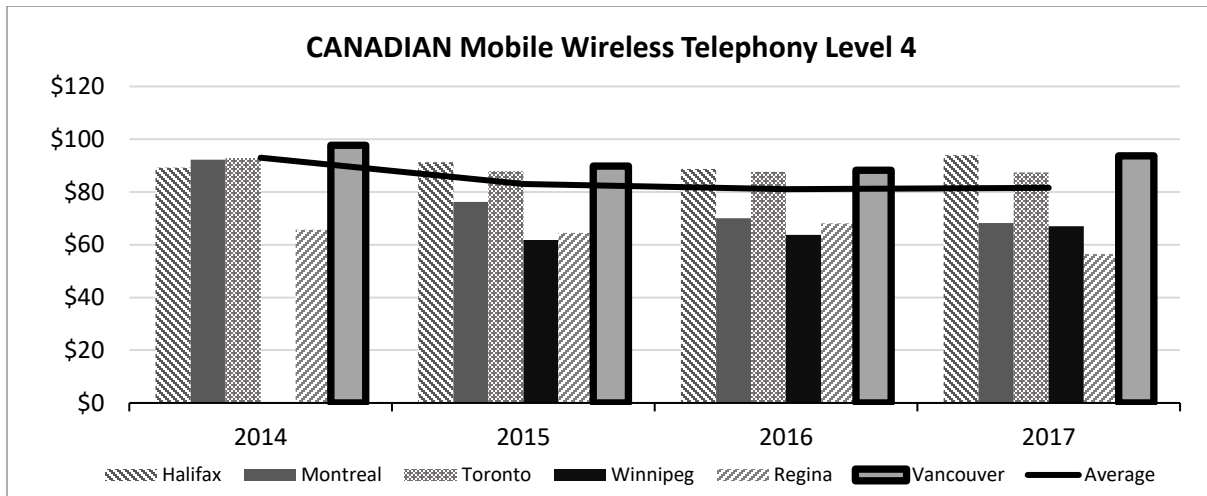


Table C.2. 4: Canadian Wireless Telephony and Text Messaging Service

Level 4: Unlimited Minutes, SMS and 2 GB Data

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2014	\$89.23	\$92.29	\$92.81	n/a	\$65.62	\$97.69	\$92.99	
2015	\$91.23	\$76.22	\$87.83	\$61.82	\$64.43	\$89.78	\$83.08	-10.7%
2016	\$88.73	\$69.98	\$87.69	\$63.69	\$68.15	\$88.24	\$81.05	-2.4%
2017	\$93.98	\$68.26	\$87.45	\$67.04	\$56.43	\$93.74	\$81.61	0.7%
CAGR	1.7%	-9.6%	-2.0%	4.1%	-4.9%	-1.4%	-4.3%	

CAGR: Compound Annual Growth Rate from 2014 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.2. 5: Canadian Wireless Telephony and Text Messaging Service

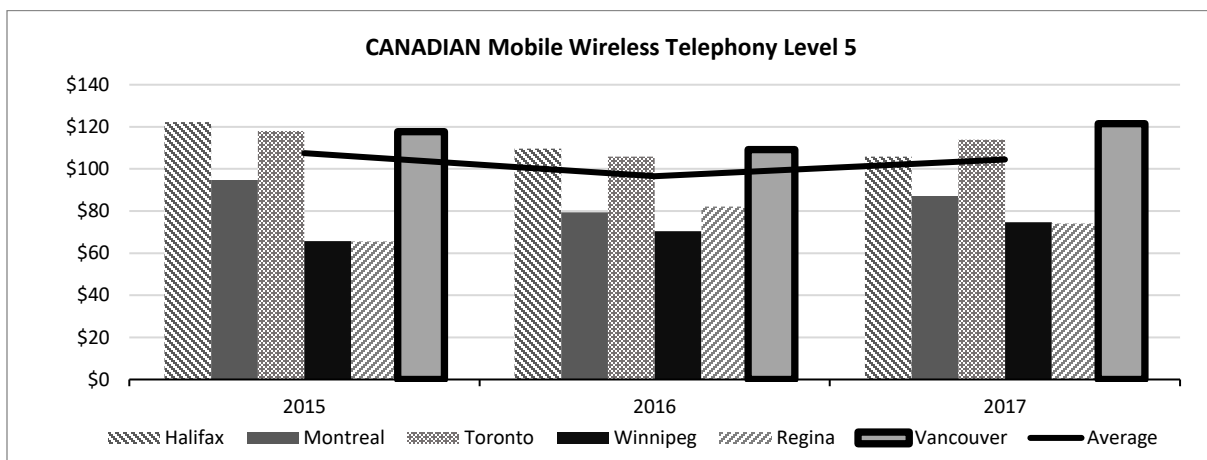


Table C.2. 5: Canadian Wireless Telephony and Text Messaging Service

Level 5: Unlimited Minutes, SMS and 5 GB Data

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2015	\$122.21	\$94.67	\$117.93	\$65.76	\$65.62	\$117.65	\$107.50	
2016	\$109.64	\$79.44	\$105.81	\$70.38	\$82.15	\$109.11	\$96.55	-10.2%
2017	\$105.89	\$87.09	\$113.95	\$74.71	\$74.06	\$121.49	\$104.49	8.2%
CAGR	-6.9%	-4.1%	-1.7%	6.6%	6.2%	1.6%	-1.4%	

CAGR: Compound Annual Growth Rate from 2015 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.2. 6: Canadian Wireless Telephony and Text Messaging Service

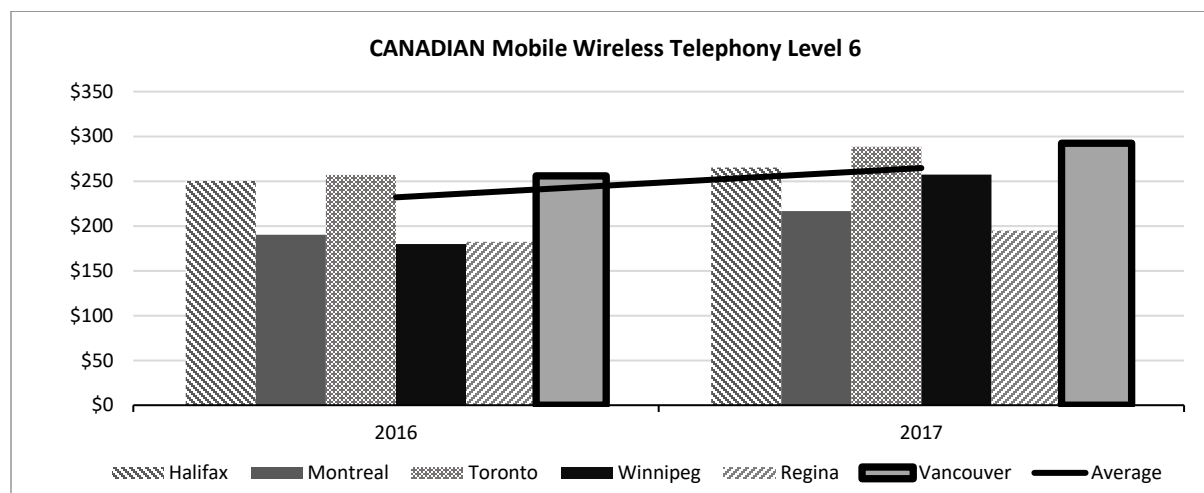


Table C.2. 6: Canadian Wireless Telephony and Text Messaging Service

Level 6: Unlimited Minutes, SMS and 10 GB Data with 3 Lines

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2016	\$250.18	\$190.40	\$257.18	\$180.00	\$182.44	\$256.00	\$231.99	
2017	\$265.33	\$216.56	\$288.55	\$257.38	\$194.98	\$292.34	\$264.65	14.1%
CAGR	6.1%	13.7%	12.2%	43.0%	6.9%	14.2%	14.1%	

CAGR: Compound Annual Growth Rate from 2016 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.3. 1: Canadian Fixed Broadband Internet Service

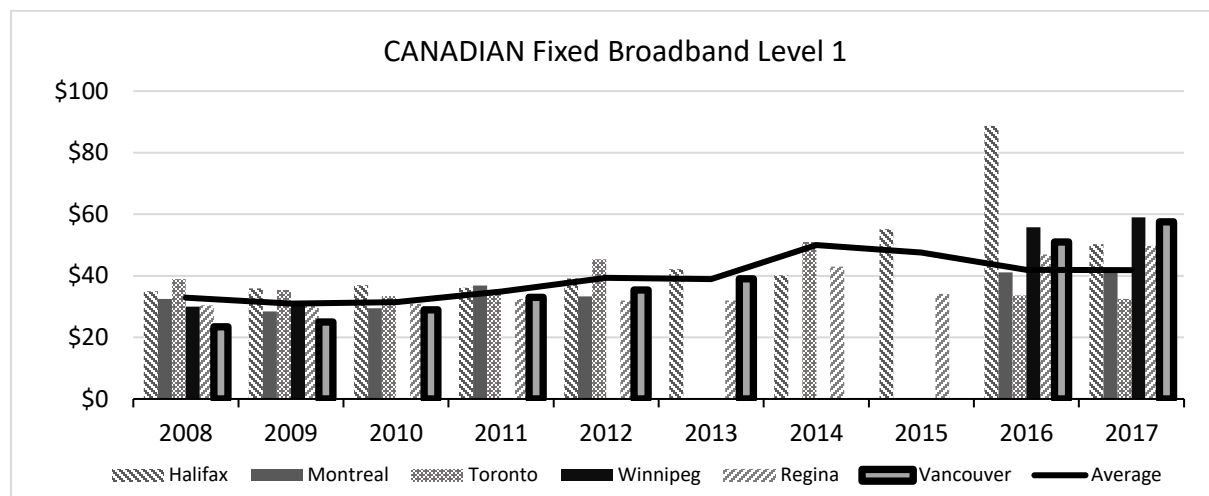


Table C.3. 1: Canadian Fixed Broadband Internet Service

Level 1: 3 to 9 Mbps

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$34.95	\$32.45	\$38.95	\$29.95	\$30.45	\$23.45	\$32.88	
2009	\$35.95	\$28.43	\$35.45	\$30.95	\$30.45	\$24.95	\$30.98	-5.8%
2010	\$36.95	\$29.43	\$33.45	n/a	\$30.95	\$29.00	\$31.44	1.5%
2011	\$36.15	\$36.90	\$34.15	n/a	\$32.52	\$33.00	\$34.85	10.9%
2012	\$39.15	\$33.35	\$45.37	n/a	\$31.95	\$35.40	\$39.37	13.0%
2013	\$42.15	n/a	n/a	n/a	\$31.95	\$39.00	\$38.91	-1.2%
2014	\$40.15	n/a	\$50.95	n/a	\$42.95	n/a	\$50.00	28.5%
2015	\$55.13	n/a	n/a	n/a	\$34.10	n/a	\$47.51	-5.0%
2016	\$88.73	\$41.07	\$33.63	\$55.80	\$46.95	\$51.00	\$41.94	-11.7%
2017	\$50.27	\$41.47	\$32.52	\$59.00	\$49.75	\$57.58	\$41.83	-0.2%
CAGR	4.1%	2.8%	-2.0%	7.8%	5.6%	10.5%	2.7%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.3. 2: Canadian Fixed Broadband Internet Service

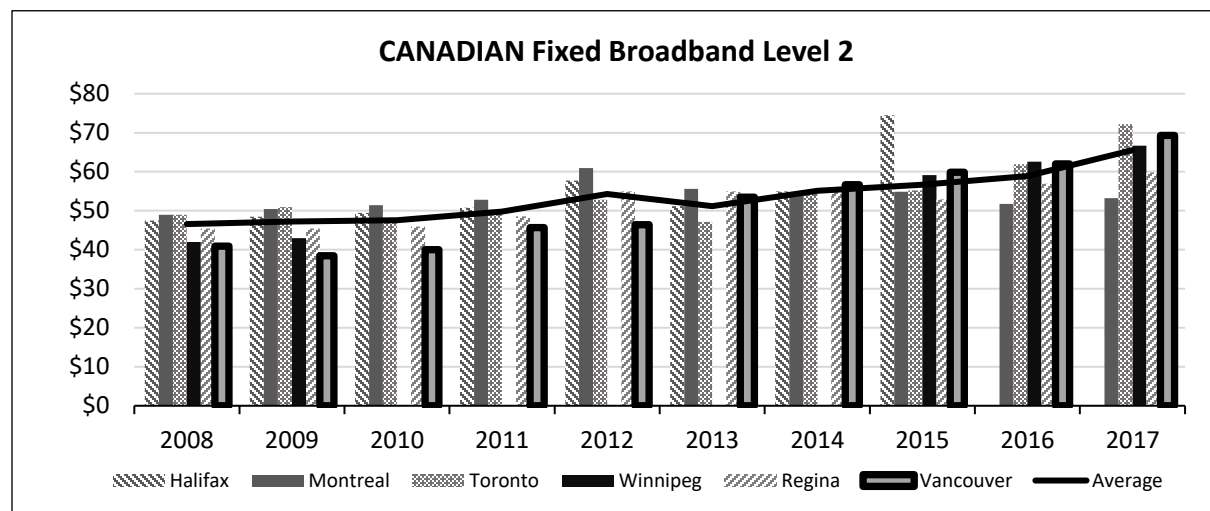


Table C.3. 2: Canadian Fixed Broadband Internet Service

Level 2: 10 to 15 Mbps

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$47.45	\$48.95	\$48.95	\$41.95	\$45.45	\$40.95	\$46.58	
2009	\$48.45	\$50.43	\$50.95	\$42.95	\$45.45	\$38.45	\$47.26	1.5%
2010	\$49.45	\$51.43	\$47.95	n/a	\$45.95	\$40.00	\$47.60	0.7%
2011	\$50.75	\$52.83	\$49.33	n/a	\$48.52	\$45.65	\$49.79	4.6%
2012	\$57.75	\$60.92	\$52.79	n/a	\$54.95	\$46.40	\$54.31	9.1%
2013	\$51.15	\$55.60	\$47.18	n/a	\$54.95	\$53.51	\$51.20	-5.7%
2014	\$54.95	\$53.91	\$55.25	n/a	\$54.95	\$56.68	\$55.10	7.6%
2015	\$74.45	\$54.83	\$55.17	\$59.17	\$52.88	\$59.90	\$56.66	2.8%
2016	n/a	\$51.75	\$61.92	\$62.60	\$56.95	\$62.00	\$58.88	3.9%
2017	n/a	\$53.26	\$72.14	\$66.70	\$59.75	\$69.29	\$65.54	11.3%
CAGR	6.6%	0.9%	4.4%	5.3%	3.1%	6.0%	3.9%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.3. 3: Canadian Fixed Broadband Internet Service

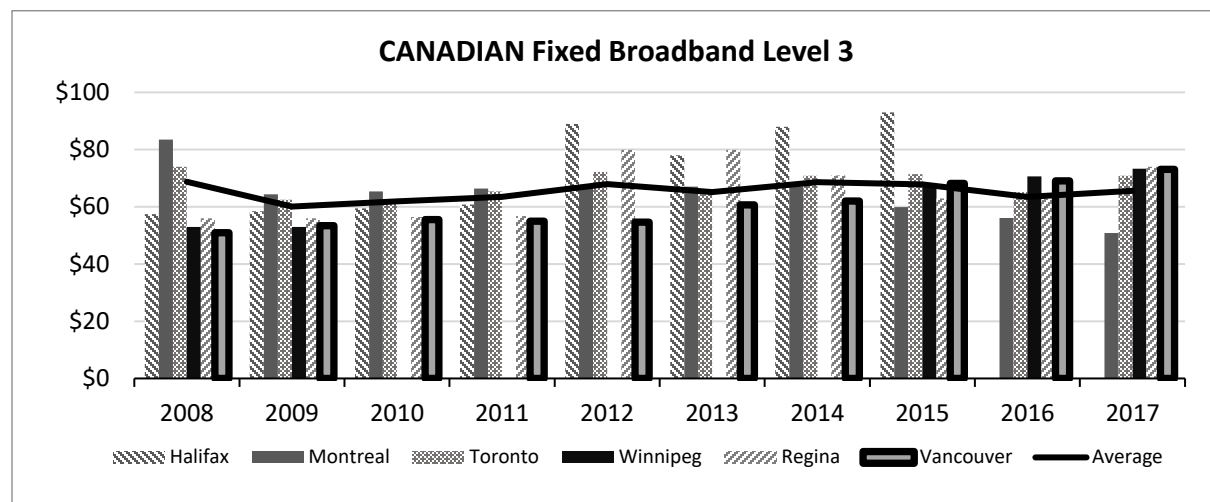


Table C.3. 3: Canadian Fixed Broadband Internet Service

Level 3: 16 to 40 Mbps

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$57.45	\$83.45	\$73.95	\$52.95	\$55.95	\$50.95	\$68.74	
2009	\$58.45	\$64.40	\$62.45	\$52.95	\$55.95	\$53.45	\$60.08	-12.6%
2010	\$59.45	\$65.40	\$62.45	n/a	\$56.45	\$55.48	\$61.88	3.0%
2011	\$60.75	\$66.33	\$65.35	n/a	\$56.75	\$55.00	\$63.44	2.5%
2012	\$88.95	\$66.95	\$72.17	n/a	\$79.95	\$54.60	\$67.94	7.1%
2013	\$77.95	\$67.05	\$64.35	n/a	\$79.95	\$60.69	\$65.18	-4.1%
2014	\$87.95	\$67.15	\$70.87	n/a	\$70.95	\$62.00	\$68.60	5.3%
2015	\$92.95	\$59.93	\$71.39	\$67.93	\$62.88	\$68.17	\$67.81	-1.2%
2016	n/a	\$56.09	\$65.20	\$70.60	\$62.95	\$69.06	\$63.48	-6.4%
2017	n/a	\$50.80	\$70.89	\$73.35	\$73.95	\$73.09	\$65.59	3.3%
CAGR	7.1%	-5.4%	-0.5%	3.7%	3.1%	4.1%	-0.5%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.3. 4: Canadian Fixed Broadband Internet Service

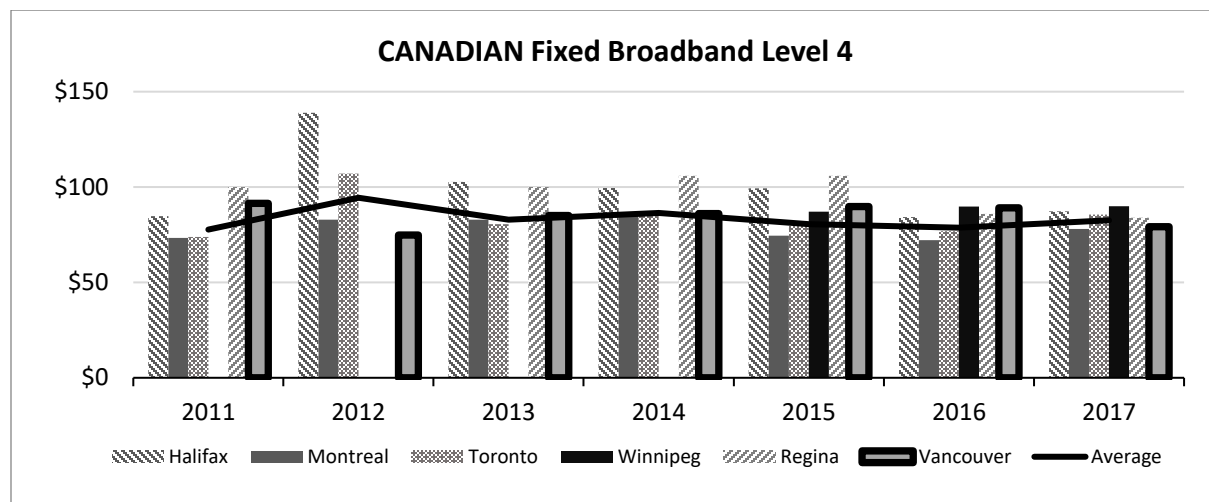


Table C.3. 4: Canadian Fixed Broadband Internet Service

Level 4: 41 to 100 Mbps

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2011	\$84.75	\$73.30	\$73.75	n/a	\$99.95	\$91.40	\$77.71	
2012	\$138.95	\$82.95	\$106.98	n/a	n/a	\$74.90	\$94.39	21.5%
2013	\$102.75	\$82.95	\$80.57	n/a	\$99.95	\$85.00	\$82.88	-12.2%
2014	\$99.55	\$84.75	\$86.87	n/a	\$105.95	\$86.00	\$86.46	4.3%
2015	\$99.26	\$74.51	\$79.68	\$87.10	\$105.80	\$89.79	\$80.63	-6.7%
2016	\$84.17	\$72.21	\$76.80	\$89.80	\$85.95	\$89.16	\$78.77	-2.3%
2017	\$87.22	\$78.06	\$85.51	\$90.00	\$83.95	\$79.18	\$82.54	4.8%
CAGR	0.5%	1.1%	2.5%	1.7%	-2.9%	-2.4%	1.0%	

CAGR: Compound Annual Growth Rate from 2011 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.3. 5: Canadian Fixed Broadband Internet Service

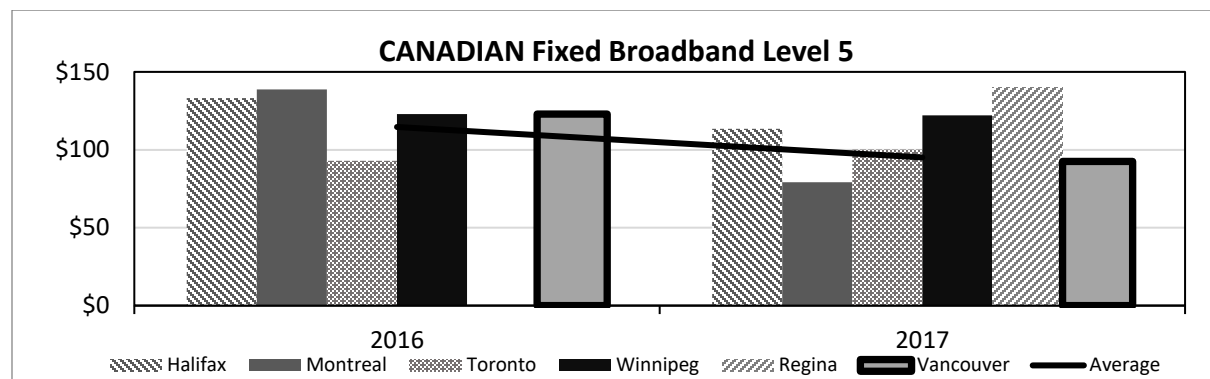


Table C.3. 5: Canadian Fixed Broadband Internet Service

Level 5: Over 100 Mbps

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2016	\$133.10	\$138.80	\$92.91	\$123.00	n/a	\$123.00	\$114.65	
2017	\$113.55	\$79.15	\$100.08	\$122.01	\$139.95	\$92.50	\$95.10	-17.1%
CAGR	-14.7%	-43.0%	7.7%	-0.8%	n/a	-24.8%	-17.1%	

CAGR: Compound Annual Growth Rate from 2016 to 2017.

n/a: not available.

YoY: Year-over-year change.

Table C.3. 6: Canadian Fixed Broadband Internet Rates – Incumbents versus Resellers

City	Service Provider Type	Level 1	Level 2	Level 3	Level 4	Level 5
Halifax	Incumbent	n/a	n/a	n/a	\$ 85.90	\$ 103.95
	Reseller	\$ 50.27	n/a	n/a	n/a	n/a
	Difference	n/a	n/a	n/a	n/a	n/a
Montreal	Incumbent	\$ 39.95	\$ 52.95	\$ 50.95	\$ 79.95	\$ 74.95
	Reseller	\$ 25.95	\$ 38.27	\$ 48.27	\$ 55.27	\$ 81.27
	Difference	-35.04%	-27.72%	-5.26%	-30.87%	8.43%
Toronto	Incumbent	\$ 29.95	\$ 74.95	\$ 69.99	\$ 84.99	\$ 99.95
	Reseller	\$ 34.27	\$ 38.27	\$ 48.27	\$ 55.27	\$ 83.94
	Difference	14.42%	-48.94%	-31.03%	-34.97%	-16.02%
Winnipeg	Incumbent	\$ 59.00	\$ 64.00	\$ 72.00	\$ 90.00	\$ 100.00
	Reseller	n/a	n/a	n/a	n/a	n/a
	Difference	n/a	n/a	n/a	n/a	n/a
Regina	Incumbent	\$ 44.95	\$ 54.95	\$ 64.95	\$ 79.95	\$ 139.95
	Reseller	n/a	n/a	n/a	n/a	n/a
	Difference	n/a	n/a	n/a	n/a	n/a
Vancouver	Incumbent	\$ 59.00	\$ 70.00	\$ 73.00	\$ 80.00	\$ 85.00
	Reseller	\$ 38.31	\$ 48.31	\$ 53.31	\$ 62.27	n/a
	Difference	-35.07%	-30.99%	-26.97%	-22.16%	n/a
Simple Average	Incumbent	\$ 46.57	\$ 63.37	\$ 66.18	\$ 83.47	\$ 100.63
	Reseller	\$ 37.20	\$ 41.62	\$ 49.95	\$ 57.60	\$ 82.61
	Difference	-20.12%	-34.33%	-24.52%	-30.99%	-17.91%

Figure C.4. 1: Canadian Mobile Wireless Broadband Internet Service

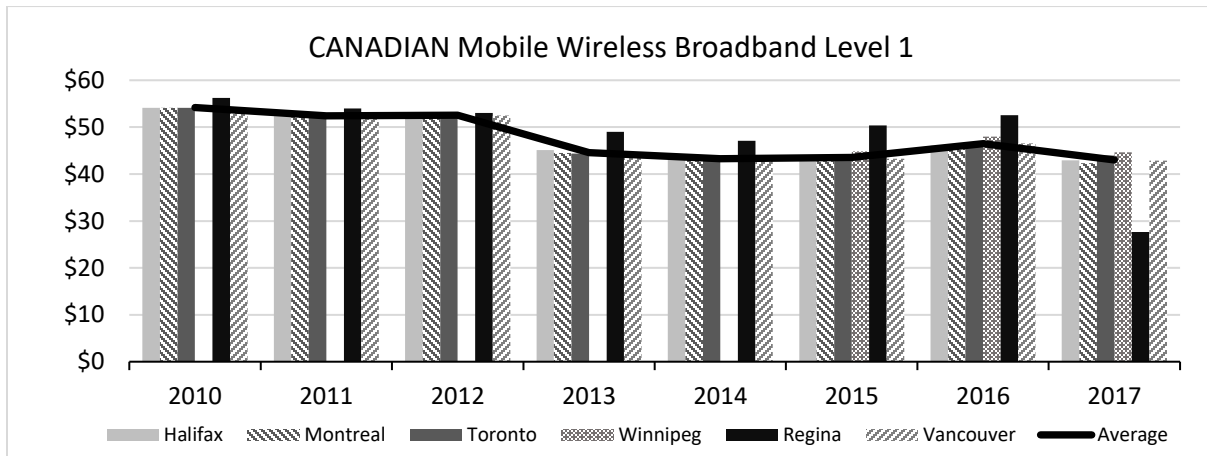


Table C.4. 1: Canadian Mobile Wireless Broadband Internet Service

Level 1: 2 GB to less than 5 GB

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2010	\$54.15	\$54.15	\$54.15	n/a	\$56.23	\$54.16	\$54.19	
2011	\$52.32	\$52.76	\$52.17	n/a	\$53.98	\$52.22	\$52.41	-3.3%
2012	\$53.05	\$52.56	\$52.51	n/a	\$53.05	\$52.51	\$52.55	0.3%
2013	\$45.12	\$44.52	\$44.37	n/a	\$48.99	\$44.52	\$44.55	-15.2%
2014	\$43.75	\$43.22	\$43.19	n/a	\$47.08	\$43.30	\$43.30	-2.8%
2015	\$43.06	\$43.63	\$43.19	\$44.88	\$50.38	\$43.30	\$43.55	0.6%
2016	\$46.07	\$45.72	\$46.53	\$48.00	\$52.56	\$46.53	\$46.47	6.7%
2017	\$42.93	\$42.32	\$43.92	\$44.65	\$27.68	\$42.86	\$43.01	-7.4%
CAGR	-3.3%	-3.5%	-2.9%	-0.3%	-25.9%	-0.5%	-0.6%	

CAGR: Compound Annual Growth Rate from 2010 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.4. 2: Canadian Mobile Wireless Broadband Internet Service

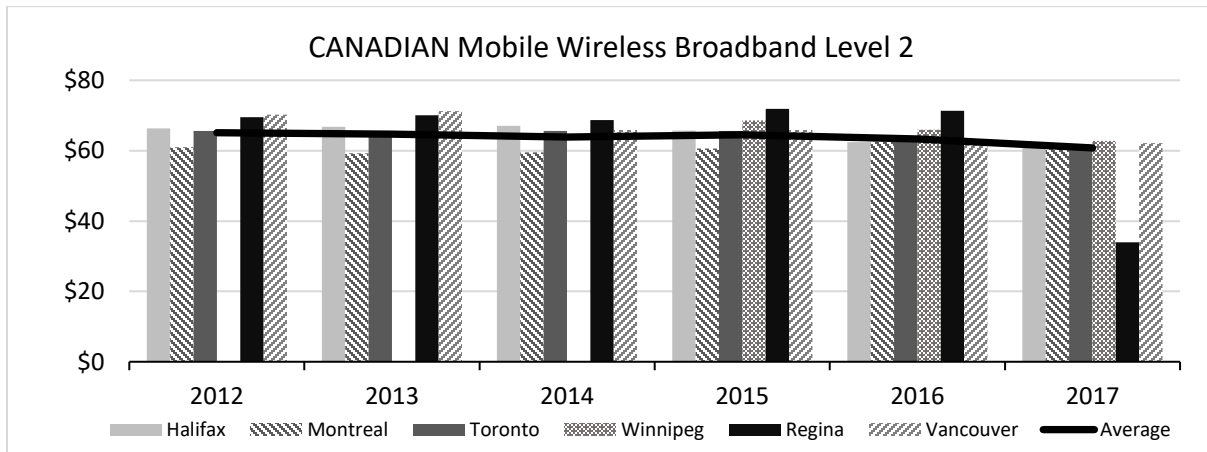


Table C.4. 2: Canadian Mobile Wireless Broadband Internet Service

Level 2: 5 GB to less than 10 GB

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2012	\$66.38	\$60.94	\$65.59	n/a	\$69.55	\$70.22	\$65.11	
2013	\$66.79	\$59.22	\$65.21	n/a	\$70.11	\$71.28	\$64.67	-0.7%
2014	\$67.08	\$59.49	\$65.60	n/a	\$68.75	\$65.90	\$63.90	-1.2%
2015	\$65.73	\$60.57	\$65.60	\$68.63	\$71.88	\$65.90	\$64.48	0.9%
2016	\$62.47	\$62.62	\$63.19	\$66.00	\$71.31	\$63.19	\$63.30	-1.8%
2017	\$61.01	\$60.71	\$61.08	\$62.78	\$33.99	\$62.14	\$60.79	-4.0%
CAGR	-1.7%	-0.1%	-1.4%	-4.4%	-13.3%	-2.4%	-1.4%	

CAGR: Compound Annual Growth Rate from 2012 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.4. 3: Canadian Mobile Wireless Broadband Internet Service

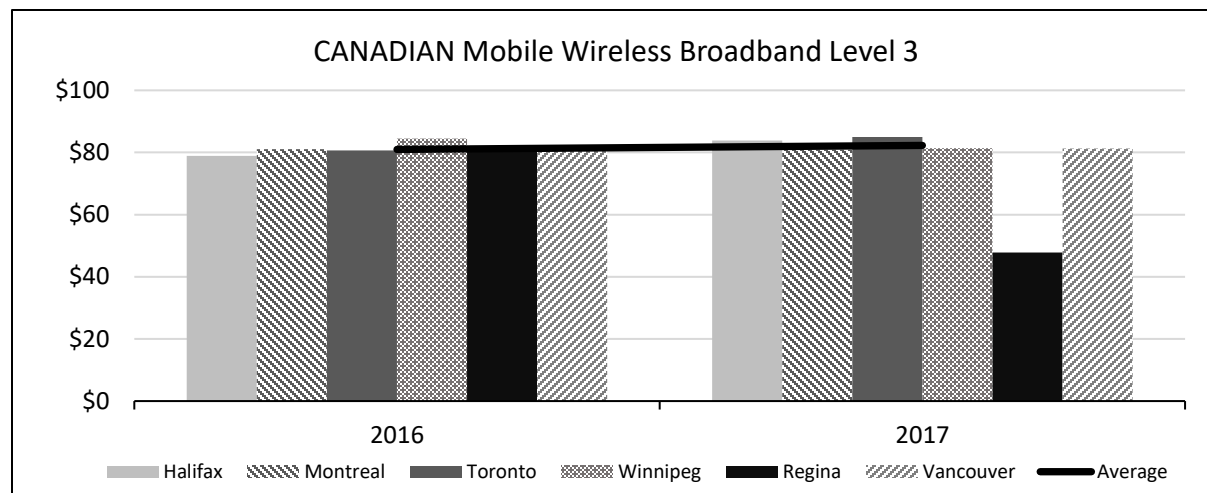


Table C.4. 3: Canadian Mobile Wireless Broadband Internet Service

Level 3: 10 GB and more

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2016	\$78.89	\$81.07	\$80.70	\$84.50	\$81.41	\$80.70	\$80.98	
2017	\$83.85	\$80.86	\$85.00	\$81.36	\$47.83	\$81.25	\$82.28	1.6%
CAGR	6.3%	-0.3%	5.3%	-3.7%	-41.2%	0.7%	1.6%	

CAGR: Compound Annual Growth Rate from 2016 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.5. 1: Canadian Bundled Services

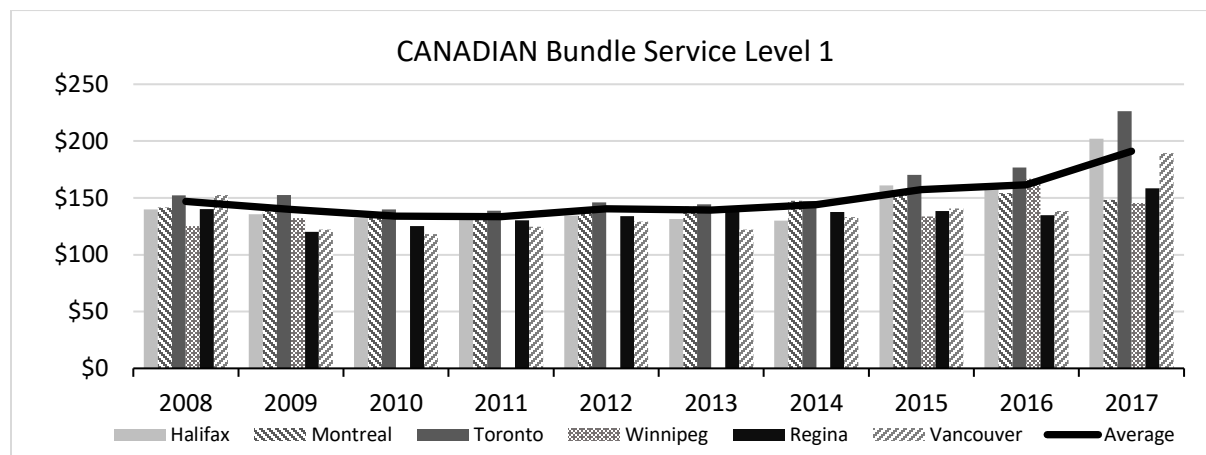


Table C.5. 1: Canadian Bundled Services

Bundle 1: Wireline, Wireless & Fixed Broadband

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$139.86	\$141.61	\$152.20	\$125.07	\$140.02	\$152.47	\$146.96	
2009	\$135.63	\$141.37	\$152.65	\$132.22	\$120.12	\$122.22	\$139.86	-4.8%
2010	\$132.23	\$135.16	\$139.75	n/a	\$125.12	\$118.30	\$133.83	-4.3%
2011	\$132.10	\$131.72	\$138.69	n/a	\$130.36	\$124.54	\$133.50	-0.2%
2012	\$134.44	\$140.06	\$146.09	n/a	\$133.85	\$129.11	\$140.47	5.2%
2013	\$131.27	\$142.46	\$144.41	n/a	\$141.80	\$122.25	\$139.15	-0.9%
2014	\$130.02	\$147.46	\$147.28	n/a	\$137.55	\$133.21	\$143.95	3.4%
2015	\$160.86	\$152.89	\$170.33	\$133.71	\$138.55	\$140.76	\$157.20	9.2%
2016	\$158.19	\$154.14	\$176.67	\$166.80	\$134.72	\$138.46	\$161.63	2.8%
2017	\$202.19	\$148.21	\$226.39	\$145.36	\$158.32	\$189.31	\$191.08	18.2%
CAGR	4.2%	0.5%	4.5%	1.7%	1.4%	2.4%	3.0%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.5. 2: Canadian Bundled Services

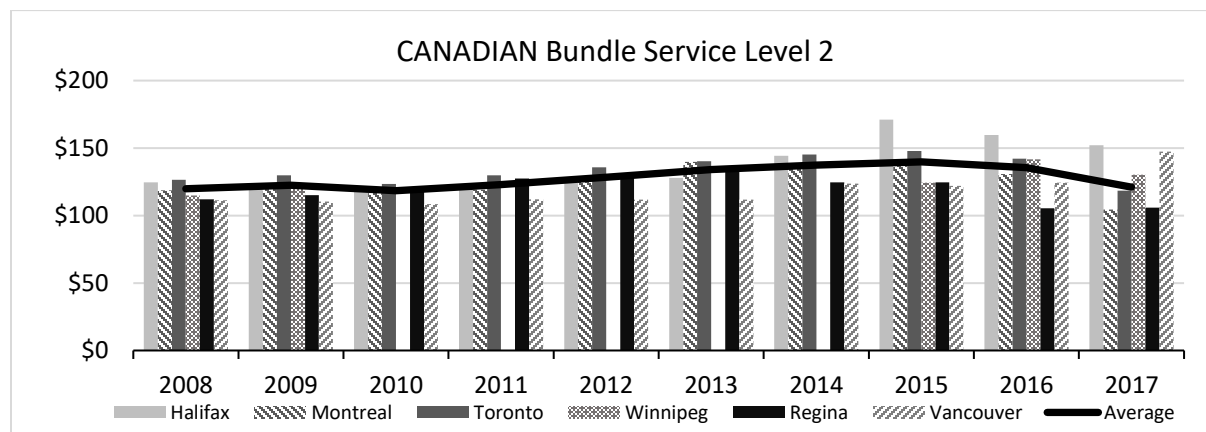


Table C.5. 2: Canadian Bundled Services

Bundle 2: Wireline, Fixed Broadband & TV

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$124.71	\$118.68	\$126.54	\$114.83	\$112.13	\$111.40	\$119.93	
2009	\$121.14	\$123.46	\$129.71	\$121.76	\$115.13	\$110.31	\$122.43	2.1%
2010	\$120.37	\$116.94	\$123.39	n/a	\$119.47	\$108.36	\$118.41	-3.3%
2011	\$121.46	\$119.09	\$129.92	n/a	\$127.52	\$112.05	\$122.87	3.8%
2012	\$124.19	\$127.91	\$135.81	n/a	\$131.56	\$111.81	\$128.44	4.5%
2013	\$127.95	\$139.67	\$140.25	n/a	\$133.57	\$111.87	\$134.19	4.5%
2014	\$144.34	\$134.74	\$145.16	n/a	\$124.63	\$123.57	\$137.51	2.5%
2015	\$171.00	\$139.37	\$147.79	\$124.39	\$124.66	\$121.95	\$139.78	1.6%
2016	\$159.60	\$130.85	\$142.16	\$141.65	\$105.39	\$124.25	\$135.60	-3.0%
2017	\$152.10	\$104.45	\$118.38	\$130.35	\$105.97	\$147.25	\$120.99	-10.8%
CAGR	2.2%	-1.4%	-0.7%	1.4%	-0.6%	3.1%	0.1%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

Figure C.5. 3: Canadian Bundled Services

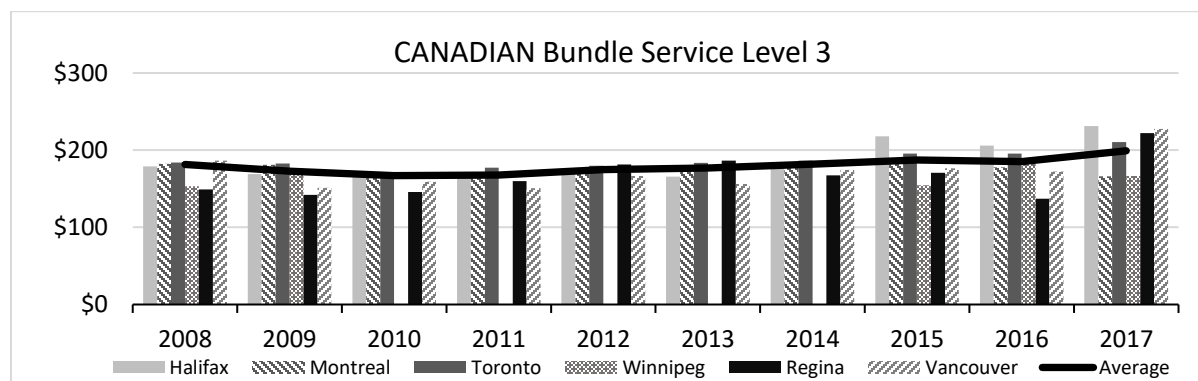


Table C.5. 3: Canadian Bundled Services

Bundle 3: Wireline, Wireless, Fixed Broadband & TV

Year	Halifax	Montreal	Toronto	Winnipeg	Regina	Vancouver	Average	YoY %
2008	\$178.86	\$182.13	\$183.94	\$153.06	\$148.97	\$186.47	\$181.31	
2009	\$169.03	\$181.24	\$182.81	\$168.21	\$142.07	\$151.22	\$172.68	-4.8%
2010	\$169.19	\$168.65	\$169.82	n/a	\$145.81	\$158.98	\$167.01	-3.3%
2011	\$170.01	\$164.24	\$177.48	n/a	\$160.04	\$150.77	\$167.81	0.5%
2012	\$171.85	\$171.99	\$179.85	n/a	\$181.58	\$166.61	\$174.71	4.1%
2013	\$165.50	\$179.99	\$183.73	n/a	\$186.56	\$155.97	\$176.80	1.2%
2014	\$180.02	\$179.87	\$186.56	n/a	\$167.45	\$174.55	\$181.70	2.8%
2015	\$217.93	\$186.00	\$195.47	\$154.39	\$170.48	\$176.51	\$187.33	3.1%
2016	\$206.09	\$177.55	\$195.41	\$186.80	\$137.22	\$172.50	\$185.06	-1.2%
2017	\$231.18	\$166.07	\$210.53	\$166.36	\$222.22	\$227.50	\$199.19	7.6%
CAGR	2.9%	-1.0%	1.5%	0.9%	4.5%	2.2%	1.1%	

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

YoY: Year-over-year change.

APPENDIX D: INTERNATIONAL PRICE COMPARISONS

Figure D.1 1: International Fixed Telephony Service Basket Prices (PPP-Adjusted CA\$) – deleted

- Comparison of International Fixed Telephony Service Basket Prices has been removed in the current Study.

Table D.1. 1: International Fixed Telephony Service Basket Prices (PPP-Adjusted CA\$)

- Comparison of International Fixed Telephony Service Basket Prices has been removed in the current Study

Figure D.2. 1: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

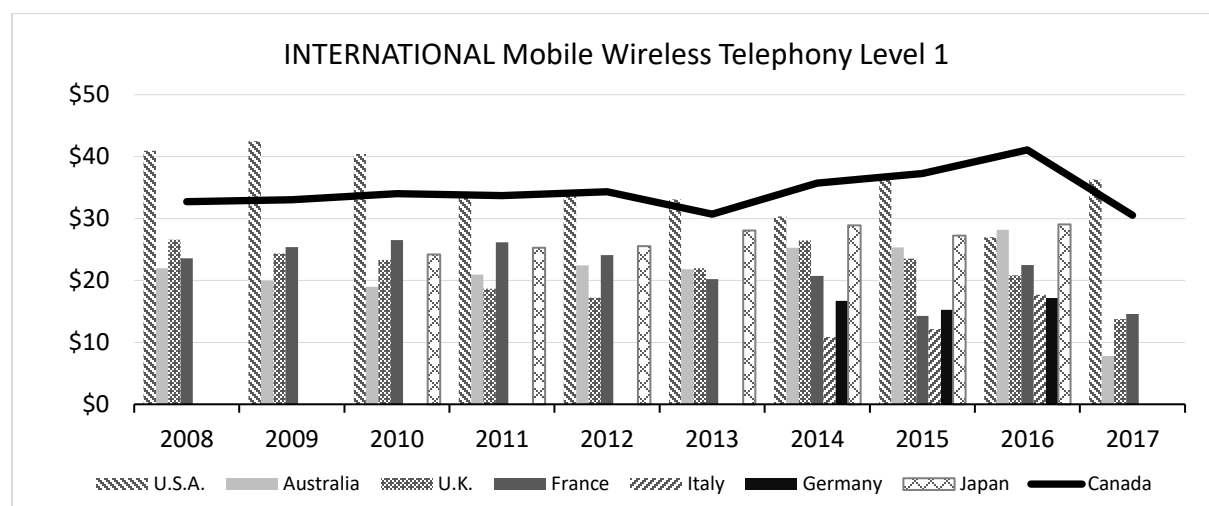


Table D.2. 1: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

Level 1: 150 Minutes

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$32.73	\$40.92	\$21.96	\$26.57	\$23.55	n/a	n/a	n/a
2009	\$33.03	\$42.51	\$19.98	\$24.33	\$25.37	n/a	n/a	n/a
2010	\$34.03	\$40.43	\$18.96	\$23.31	\$26.54	n/a	n/a	\$24.20
2011	\$33.73	\$33.38	\$20.95	\$18.64	\$26.13	n/a	n/a	\$25.29
2012	\$34.32	\$33.78	\$22.44	\$17.21	\$24.09	n/a	n/a	\$25.53
2013	\$30.71	\$33.08	\$21.82	\$21.97	\$20.24	n/a	n/a	\$28.09
2014	\$35.70	\$30.34	\$25.28	\$26.46	\$20.75	\$10.85	\$16.68	\$28.88
2015	\$37.29	\$37.04	\$25.35	\$23.50	\$14.26	\$12.15	\$15.23	\$27.23
2016	\$41.08	\$27.00	\$28.19	\$20.84	\$22.49	\$17.70	\$17.15	\$29.06
2017	\$30.53	\$36.31	\$7.82	\$13.75	\$14.59	n/a	n/a	n/a
CAGR	-0.8%	-1.3%	-10.8%	-7.1%	-5.2%	27.7%	1.4%	3.1%

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

Figure D.2. 2: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

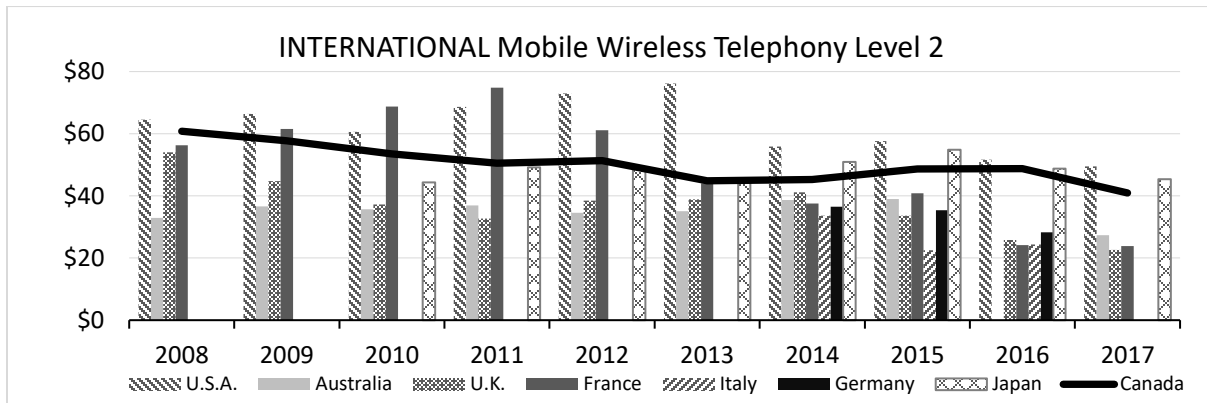


Table D.2. 2: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

Level 2: 450 Minutes and 300 SMS

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$60.81	\$64.54	\$32.90	\$53.98	\$56.30	n/a	n/a	n/a
2009	\$57.78	\$66.38	\$36.67	\$44.73	\$61.51	n/a	n/a	n/a
2010	\$53.49	\$60.60	\$35.65	\$37.27	\$68.70	n/a	n/a	\$44.34
2011	\$50.51	\$68.69	\$36.97	\$32.75	\$74.86	n/a	n/a	\$49.14
2012	\$51.31	\$72.94	\$34.56	\$38.43	\$61.13	n/a	n/a	\$49.28
2013	\$44.86	\$76.14	\$35.04	\$38.85	\$44.08	n/a	n/a	\$44.36
2014	\$45.26	\$55.91	\$38.69	\$41.17	\$37.55	\$33.61	\$36.48	\$50.98
2015	\$48.68	\$57.59	\$38.98	\$33.62	\$40.87	\$22.48	\$35.35	\$54.81
2016	\$48.77	\$51.64	n/a	\$25.79	\$24.17	\$24.41	\$28.28	\$48.78
2017	\$40.95	\$49.48	\$27.36	\$22.58	\$23.88	n/a	n/a	\$45.38
CAGR	-4.3%	-2.9%	-2.0%	-9.2%	-9.1%	-14.8%	-11.9%	0.3%

CAGR: Compound Annual Growth Rate from 2008 to 2017.
n/a: not available.

Figure D.2. 3: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

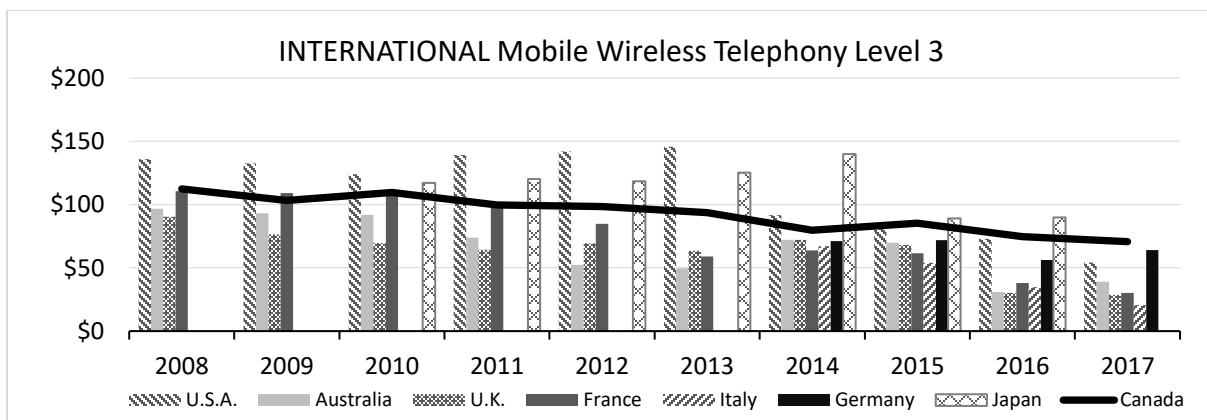


Table D.2. 3: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

Level 3: 1,200 Minutes, 300 SMS and 1 GB Data

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$112.34	\$135.72	\$96.75	\$90.23	\$110.46	n/a	n/a	n/a
2009	\$103.24	\$132.58	\$93.13	\$76.36	\$109.08	n/a	n/a	n/a
2010	\$109.59	\$124.01	\$91.93	\$69.49	\$109.37	n/a	n/a	\$117.19
2011	\$99.69	\$139.03	\$73.87	\$64.27	\$100.75	n/a	n/a	\$120.21
2012	\$98.37	\$141.80	\$52.35	\$69.30	\$84.77	n/a	n/a	\$118.51
2013	\$93.59	\$145.79	\$49.54	\$63.52	\$58.90	n/a	n/a	\$125.24
2014	\$79.69	\$91.52	\$72.10	\$72.14	\$63.68	\$67.06	\$71.15	\$139.90
2015	\$85.22	\$85.65	\$69.97	\$68.03	\$61.50	\$53.94	\$71.91	\$88.96
2016	\$74.67	\$73.00	\$30.91	\$30.13	\$38.08	\$34.79	\$56.20	\$89.72
2017	\$70.70	\$54.17	\$39.08	\$28.65	\$30.24	\$20.51	\$64.03	n/a
CAGR	-5.0%	-9.7%	-9.6%	-12.0%	-13.4%	-32.6%	-3.5%	n/a

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

Figure D.2. 4: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

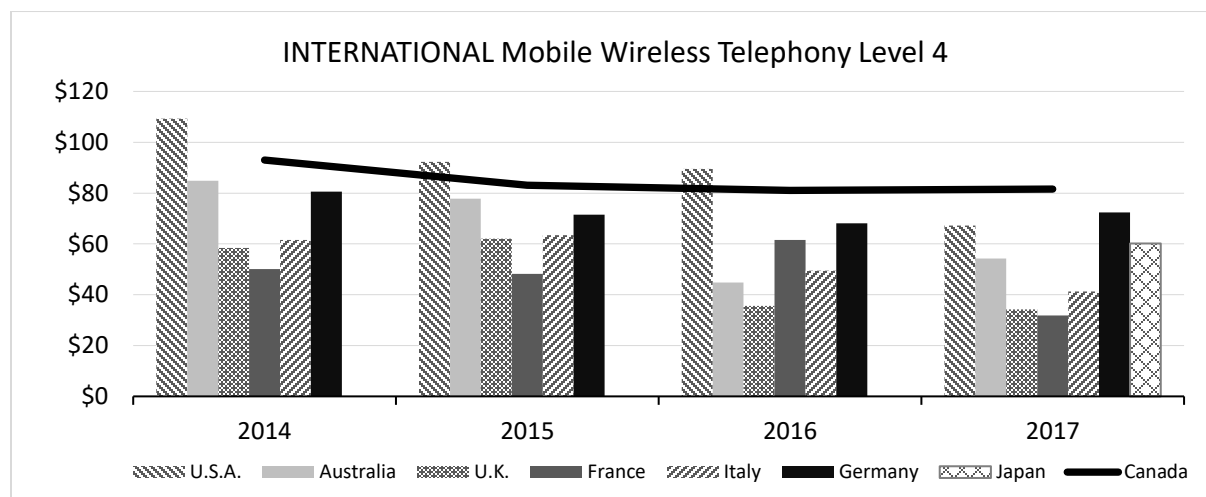


Table D.2. 4: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

Level 4: Unlimited Minutes, SMS and 2 GB Data

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2014	\$92.99	\$109.28	\$84.85	\$58.37	\$50.14	\$61.52	\$80.63	n/a
2015	\$83.08	\$92.23	\$77.80	\$62.03	\$48.24	\$63.47	\$71.56	n/a
2016	\$81.05	\$89.50	\$44.78	\$35.55	\$61.60	\$49.42	\$68.12	n/a
2017	\$81.61	\$67.20	\$54.29	\$34.26	\$31.86	\$41.22	\$72.41	\$60.11
CAGR	-4.3%	-15.0%	-13.8%	-16.3%	-14.0%	-12.5%	-3.5%	n/a

CAGR: Compound Annual Growth Rate from 2014 to 2017.

n/a: not available.

Figure D.2. 5: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

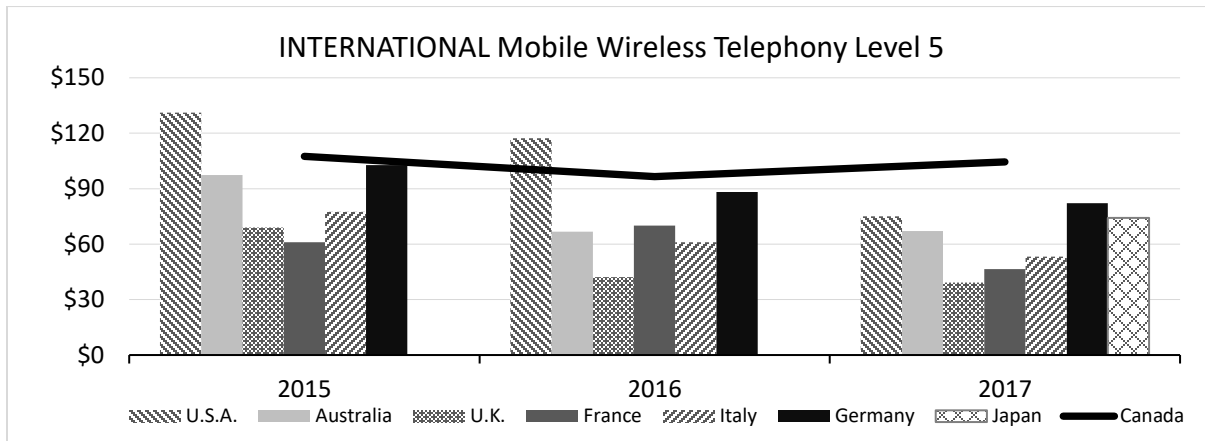


Table D.2. 5: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

Level 5: Unlimited Minutes, SMS and 5 GB Data

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2015	\$107.50	\$131.12	\$97.43	\$68.93	\$60.96	\$77.44	\$102.74	n/a
2016	\$96.55	\$117.33	\$66.67	\$42.22	\$70.12	\$61.02	\$88.23	n/a
2017	\$104.49	\$75.06	\$67.04	\$39.20	\$46.45	\$53.22	\$82.21	\$74.12
CAGR	-1.4%	-24.3%	-17.0%	-24.6%	-12.7%	-17.1%	-10.5%	n/a

CAGR: Compound Annual Growth Rate from 2015 to 2017.
n/a: not available.

Figure D.2. 6: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

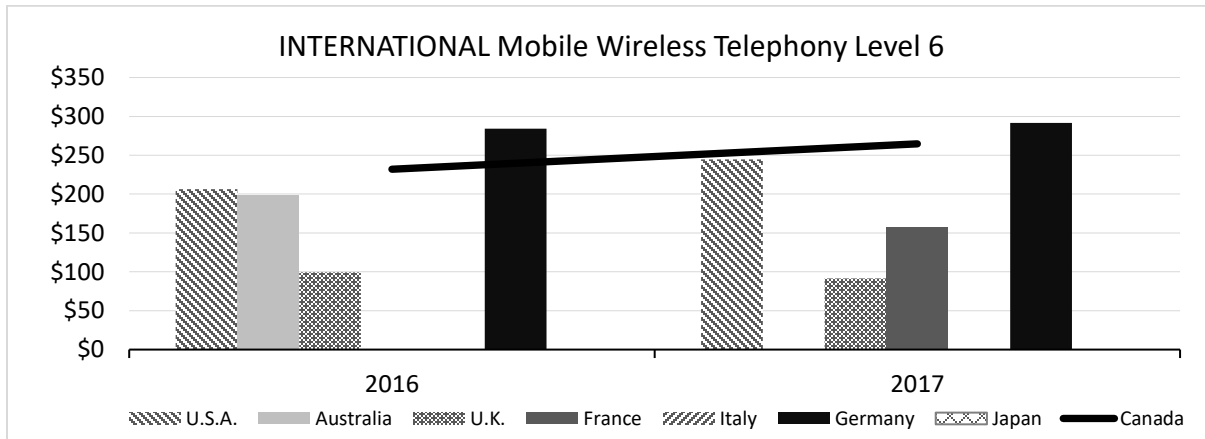


Table D.2. 6: International Wireless Telephony Service Prices (PPP-Adjusted CA\$)

Level 6: Unlimited Minutes, SMS and 10 GB Data with 3 Lines

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2016	\$231.99	\$206.19	\$198.50	\$99.31	n/a	n/a	\$284.12	n/a
2017	\$264.65	\$244.64	n/a	\$91.42	\$157.80	n/a	\$291.53	n/a
CAGR	14.1%	18.6%	n/a	-8.0%	0.0%	n/a	2.6%	n/a

CAGR: Compound Annual Growth Rate from 2016 to 2017.
n/a: not available.

Figure D.3. 1: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

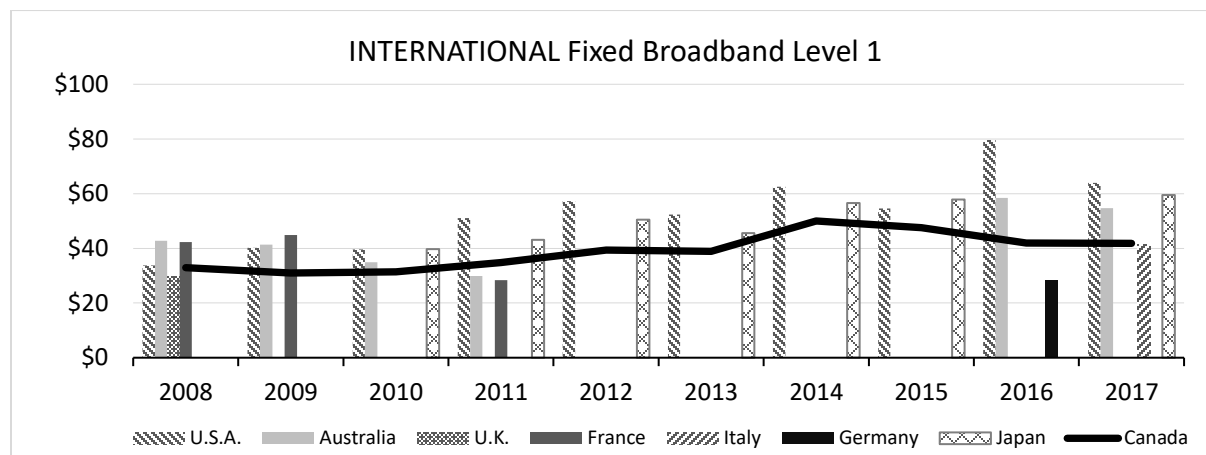


Table D.3. 1: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

Level 1: 3 to 9 Mbps

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$32.88	\$33.77	\$42.79	\$29.93	\$42.23	n/a	n/a	n/a
2009	\$30.98	\$40.19	\$41.31	n/a	\$44.87	n/a	n/a	n/a
2010	\$31.44	\$39.61	\$34.91	n/a	n/a	n/a	n/a	\$39.73
2011	\$34.85	\$51.06	\$29.84	n/a	\$28.33	n/a	n/a	\$43.13
2012	\$39.37	\$57.24	n/a	n/a	n/a	n/a	n/a	\$50.48
2013	\$38.91	\$52.38	n/a	n/a	n/a	n/a	n/a	\$45.55
2014	\$50.00	\$62.53	n/a	n/a	n/a	n/a	n/a	\$56.55
2015	\$47.51	\$54.54	n/a	n/a	n/a	n/a	n/a	\$57.83
2016	\$41.94	\$79.64	\$58.38	n/a	n/a	n/a	\$28.28	n/a
2017	\$41.83	\$63.92	\$54.72	n/a	n/a	\$41.18	n/a	\$59.49
CAGR	2.7%	7.3%	4.0%	n/a	-12.5%	n/a	n/a	7.8%

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

Figure D.3. 2: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

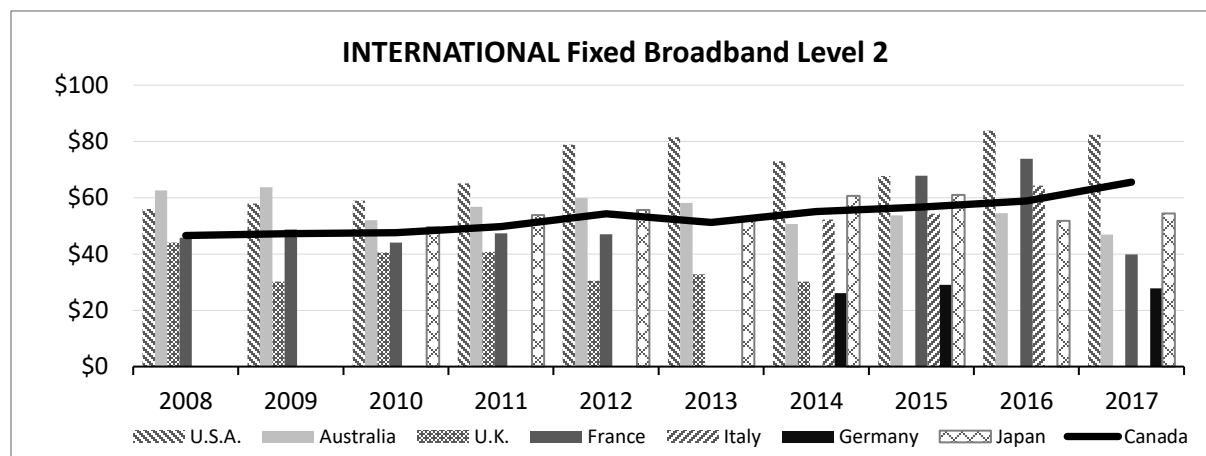


Table D.3. 2: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

Level 2: 10 to 15 Mbps

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$46.58	\$55.97	\$62.56	\$44.05	\$45.82	n/a	n/a	n/a
2009	\$47.26	\$57.92	\$63.76	\$30.22	\$48.69	n/a	n/a	n/a
2010	\$47.60	\$58.97	\$52.01	\$40.57	\$44.03	n/a	n/a	\$49.55
2011	\$49.79	\$65.14	\$56.74	\$40.72	\$47.41	n/a	n/a	\$53.79
2012	\$54.31	\$78.84	\$59.81	\$30.50	\$46.97	n/a	n/a	\$55.70
2013	\$51.20	\$81.42	\$58.15	\$32.85	n/a	n/a	n/a	\$52.53
2014	\$55.10	\$72.91	\$50.67	\$30.22	n/a	\$52.26	\$26.09	\$60.65
2015	\$56.66	\$67.66	\$53.75	n/a	\$67.78	\$54.31	\$29.08	\$61.03
2016	\$58.88	\$83.85	\$54.49	n/a	\$73.83	\$64.29	n/a	\$51.75
2017	\$65.54	\$82.43	\$46.90	n/a	\$39.81	n/a	\$27.77	\$54.39
CAGR	3.9%	4.4%	-1.7%	-6.1%	6.1%	10.9%	2.1%	0.7%

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

Figure D.3. 3: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

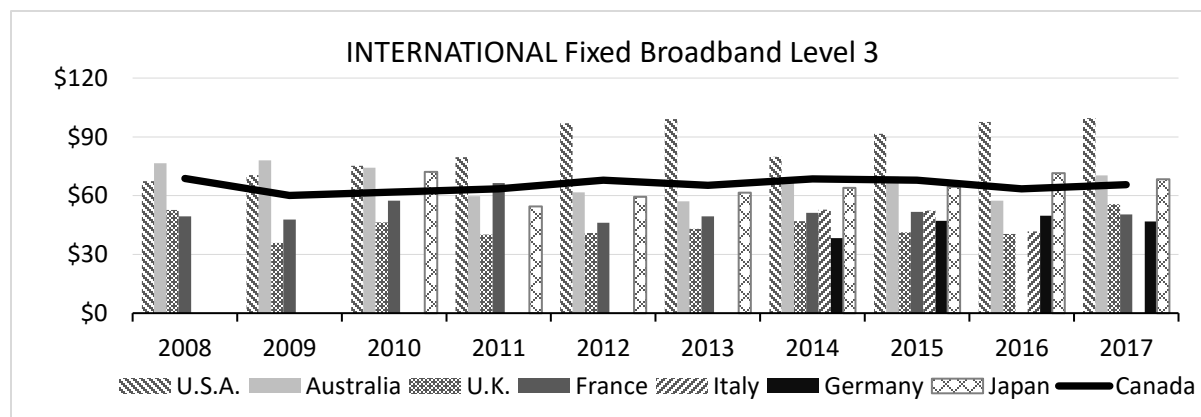


Table D.3. 3: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

Level 3: 16 to 40 Mbps

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$68.74	\$67.40	\$76.47	\$52.72	\$49.41	n/a	n/a	n/a
2009	\$60.08	\$70.41	\$77.98	\$35.93	\$47.73	n/a	n/a	n/a
2010	\$61.88	\$75.26	\$74.32	\$46.24	\$57.45	n/a	n/a	\$72.15
2011	\$63.44	\$79.60	\$59.72	\$40.09	\$66.37	n/a	n/a	\$54.52
2012	\$67.94	\$97.00	\$61.69	\$40.88	\$46.07	n/a	n/a	\$59.37
2013	\$65.18	\$99.10	\$57.10	\$43.01	\$49.34	n/a	n/a	\$61.52
2014	\$68.60	\$79.76	\$67.44	\$46.89	\$51.15	\$52.92	\$38.30	\$63.88
2015	\$67.81	\$91.55	\$69.64	\$41.25	\$51.68	\$52.28	\$47.08	\$64.50
2016	\$63.48	\$97.53	\$57.41	\$40.43	n/a	\$41.77	\$49.75	\$71.52
2017	\$65.59	\$99.64	\$70.35	\$55.67	\$50.43	n/a	\$46.80	\$68.32
CAGR	-0.5%	4.7%	-0.9%	0.6%	0.2%	-11.2%	14.0%	-0.1%

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

Figure D.3. 4: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

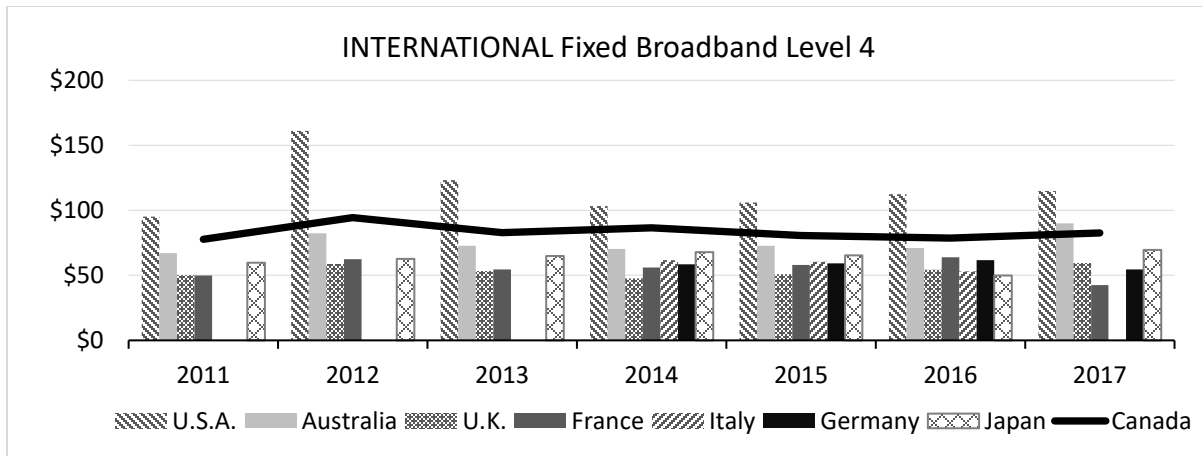


Table D.3. 4: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

Level 4: 41 to 100 Mbps

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2011	\$77.71	\$95.07	\$67.19	\$50.07	\$49.79	n/a	n/a	\$59.76
2012	\$94.39	\$160.97	\$82.25	\$58.66	\$62.36	n/a	n/a	\$62.65
2013	\$82.88	\$123.27	\$72.69	\$53.31	\$54.58	n/a	n/a	\$64.89
2014	\$86.46	\$103.17	\$70.33	\$47.76	\$55.98	\$61.79	\$58.52	\$67.73
2015	\$80.63	\$105.90	\$72.66	\$50.75	\$57.95	\$60.45	\$59.32	\$65.32
2016	\$78.77	\$112.30	\$71.03	\$54.20	\$63.80	\$53.02	\$61.78	\$49.78
2017	\$82.54	\$114.81	\$89.98	\$59.38	\$42.47	n/a	\$54.45	\$69.58
CAGR	1.0%	3.2%	1.1%	2.9%	-2.6%	-7.4%	2.7%	-3.6%

CAGR: Compound Annual Growth Rate from 2008 to 2017.
n/a: not available.

Figure D.3. 5: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

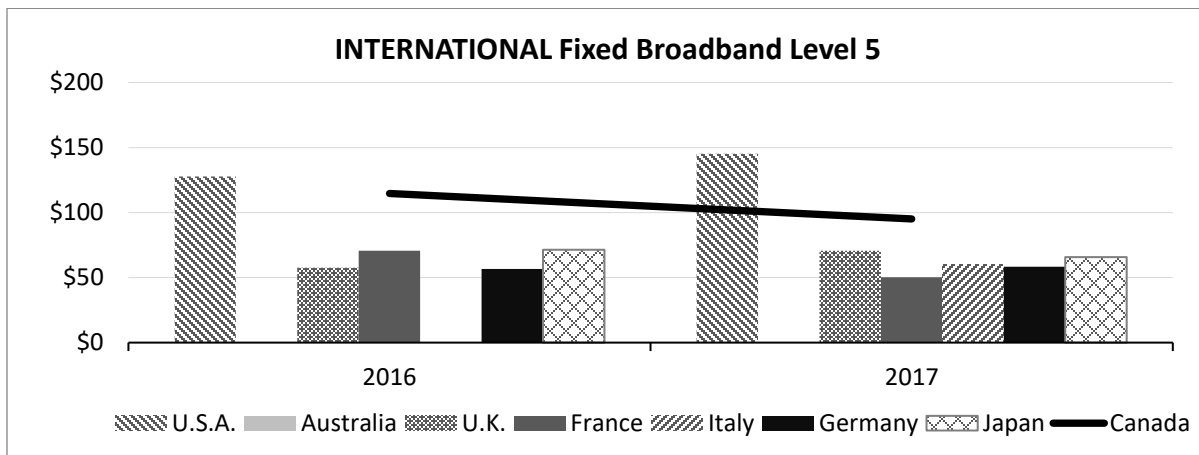


Table D.3. 5: International Fixed Broadband Internet Service Prices (PPP-Adjusted CA\$)

Level 5: Over 100 Mbps

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2016	\$114.65	\$127.69	n/a	\$57.56	\$70.54	n/a	\$56.57	\$71.36
2017	\$95.10	\$145.15	n/a	\$70.67	\$50.19	\$60.39	\$58.33	\$65.64
CAGR	-17.1%	13.7%	-	22.8%	-28.9%	-	3.1%	-8.0%

CAGR: Compound Annual Growth Rate from 2016 to 2017.

n/a: not available.

Figure D.4. 1: International Mobile Wireless Internet Service Basket Prices (PPP-Adjusted CA\$)

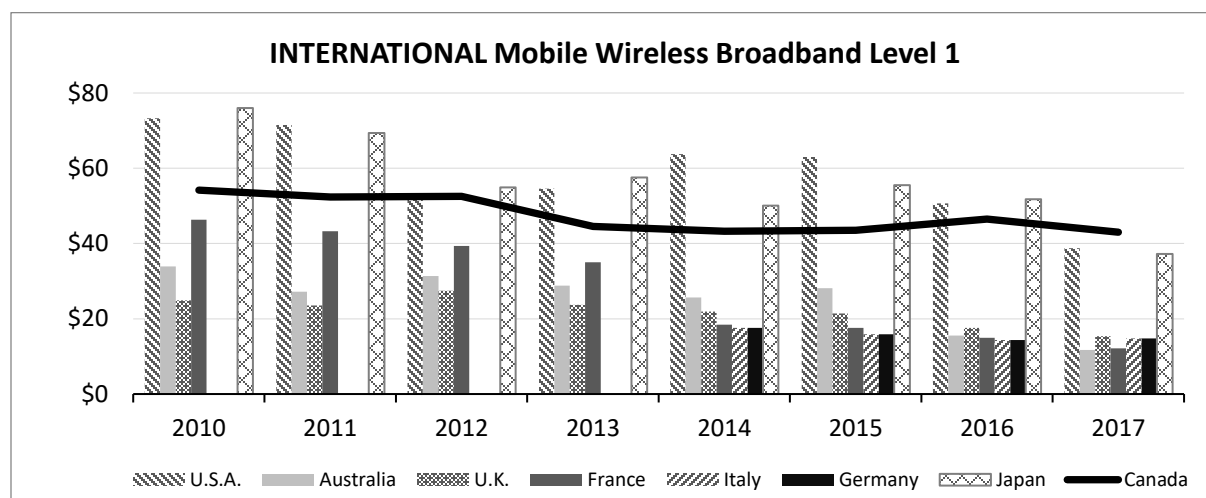


Table D.4. 1: International Mobile Wireless Internet Service Basket Prices (PPP-Adjusted CA\$)

Level 1: 2 GB to less than 5 GB

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2010	\$54.19	\$73.26	\$33.89	\$24.86	\$46.29	n/a	n/a	\$76.00
2011	\$52.41	\$71.50	\$27.18	\$23.51	\$43.30	n/a	n/a	\$69.38
2012	\$52.55	\$52.29	\$31.38	\$27.42	\$39.36	n/a	n/a	\$54.89
2013	\$44.55	\$54.61	\$28.80	\$23.71	\$34.98	n/a	n/a	\$57.54
2014	\$43.30	\$63.74	\$25.67	\$21.90	\$18.47	\$17.56	\$34.37	\$50.05
2015	\$43.55	\$63.02	\$28.15	\$21.44	\$17.60	\$15.87	\$25.96	\$55.49
2016	\$46.47	\$50.68	\$15.57	\$17.61	\$14.98	\$14.35	\$23.56	\$51.81
2017	\$43.01	\$38.73	\$11.73	\$15.33	\$12.11	\$14.81	\$20.40	\$37.22
CAGR	-3.2%	-8.7%	-14.1%	-6.7%	-17.4%	-5.5%	-16.0%	-9.7%

CAGR: Compound Annual Growth Rate from 2010 to 2017.

n/a: not available.

Figure D.4. 2: International Mobile Wireless Internet Service Basket Prices (PPP-Adjusted CA\$)

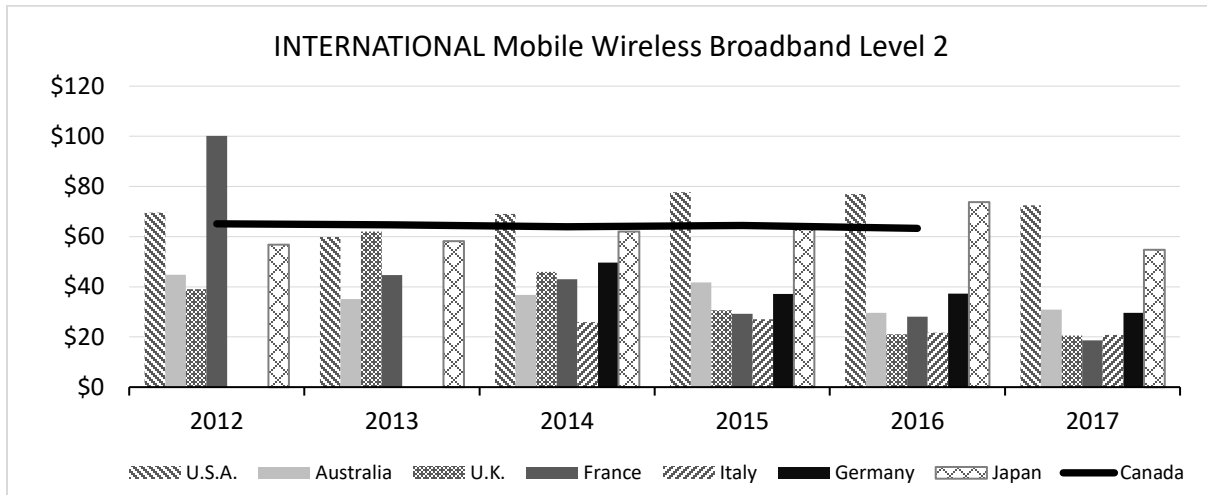


Table D.4. 2: International Mobile Wireless Internet Service Basket Prices (PPP-Adjusted CA\$)

Level 2: 5 GB to less than 10 GB

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2012	\$65.11	\$69.51	\$44.85	\$39.11	\$100.15	n/a	n/a	\$56.77
2013	\$64.67	\$59.82	\$35.13	\$62.01	\$44.65	n/a	n/a	\$58.24
2014	\$63.90	\$69.05	\$36.80	\$45.93	\$43.04	\$25.86	\$49.70	\$62.04
2015	\$64.48	\$77.72	\$41.69	\$30.60	\$29.18	\$27.05	\$37.17	\$63.82
2016	\$63.30	\$76.93	\$29.67	\$21.07	\$28.11	\$21.71	\$37.31	\$73.74
2017	\$60.79	\$72.44	\$30.84	\$20.54	\$18.59	\$20.87	\$29.67	\$54.81
CAGR	-1.4%	0.8%	-7.2%	-18.1%	-28.6%	-6.9%	-15.8%	-7.3%

CAGR: Compound Annual Growth Rate from 2012 to 2017.

n/a: not available.

Figure D.4. 3: International Mobile Wireless Internet Service Basket Prices (PPP-Adjusted CA\$)

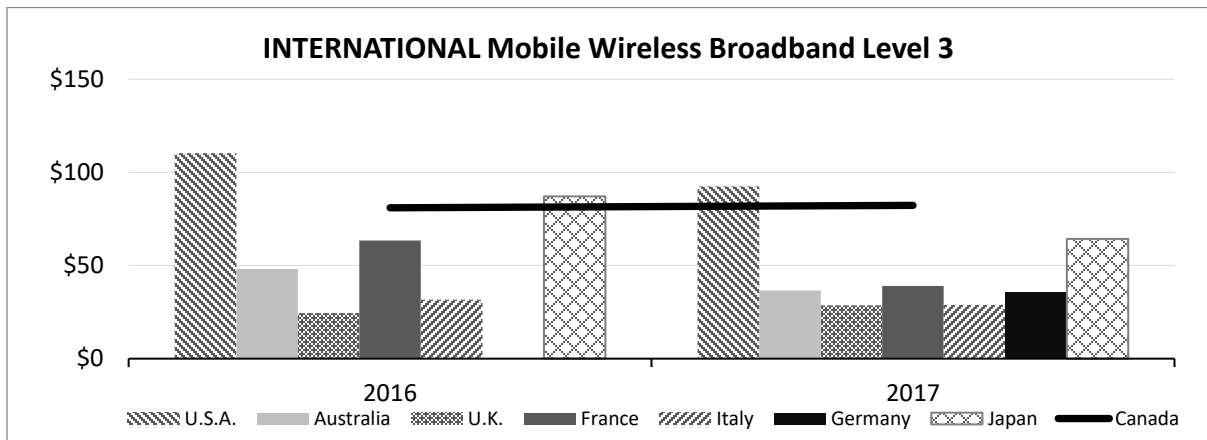


Table D.4. 3: International Mobile Wireless Internet Service Basket Prices (PPP-Adjusted CA\$)

Level 3: 10 GB and more

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2016	\$80.98	\$110.38	\$48.17	\$24.47	\$63.45	\$31.58	n/a	\$87.09
2017	\$82.28	\$92.46	\$36.62	\$28.48	\$39.09	\$28.80	\$35.98	\$64.28
CAGR	1.6%	-16.2%	-24.0%	16.4%	-38.4%	-8.8%	-	-26.2%

CAGR: Compound Annual Growth Rate from 2016 to 2017.

n/a: not available.

Figure D.5. 1: International Bundled Services Prices (PPP-Adjusted CA\$)

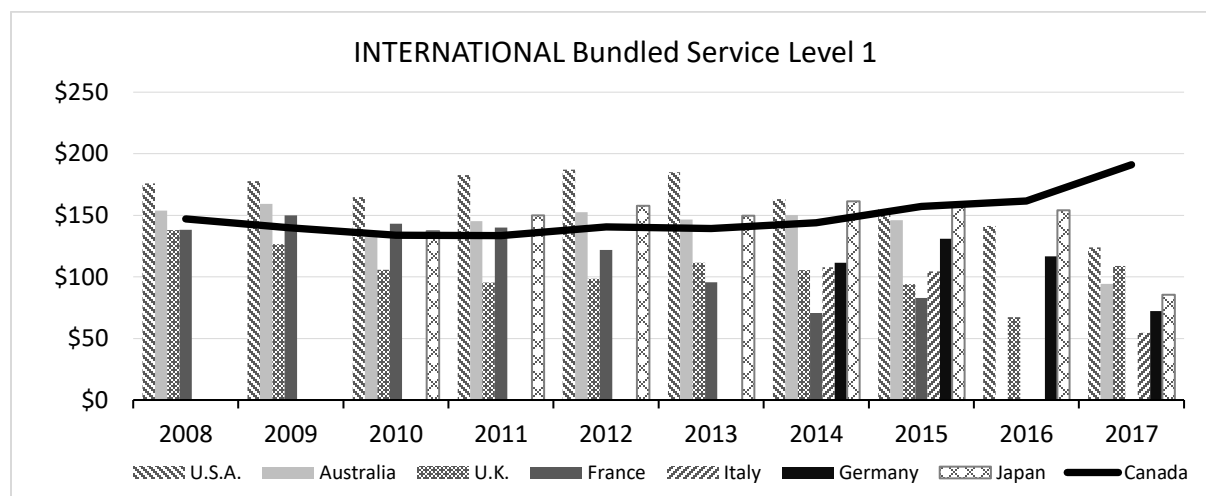


Table D.5. 1: International Bundled Service Basket Prices (PPP-Adjusted CA\$)

Level 1: Wireline, Wireless & Fixed Broadband

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$146.96	\$175.99	\$153.82	\$137.87	\$138.18	n/a	n/a	n/a
2009	\$139.86	\$177.74	\$159.31	\$126.45	\$149.89	n/a	n/a	n/a
2010	\$133.83	\$164.61	\$132.28	\$105.80	\$143.16	n/a	n/a	\$137.08
2011	\$133.50	\$182.65	\$145.28	\$95.36	\$140.15	n/a	n/a	\$149.91
2012	\$140.47	\$187.07	\$152.47	\$98.57	\$121.94	n/a	n/a	\$157.73
2013	\$139.15	\$185.00	\$146.45	\$111.39	\$95.62	n/a	n/a	\$149.63
2014	\$143.95	\$163.11	\$150.32	\$105.40	\$70.56	\$107.94	\$111.52	\$161.38
2015	\$157.20	\$154.78	\$145.98	\$94.07	\$82.75	\$104.39	\$131.06	\$156.57
2016	\$161.63	\$141.40	n/a	\$67.19	n/a	n/a	\$116.68	\$154.11
2017	\$191.08	\$123.87	\$88.34	\$96.77	n/a	\$54.43	\$72.18	\$85.36
CAGR	3.0%	-3.8%	-6.0%	-3.9%	-7.1%	-20.4%	-13.5%	-6.5%

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

Figure D.5. 2: International Bundled Services Prices (PPP-Adjusted CA\$)

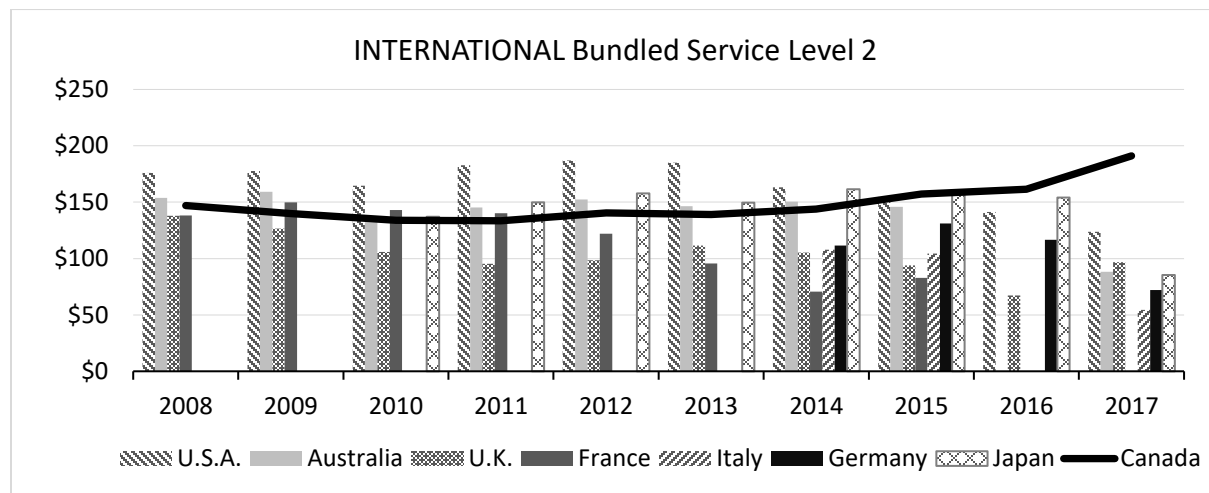


Table D.5. 2: International Bundled Service Basket Prices (PPP-Adjusted CA\$)

Level 2: Wireline, Fixed Broadband & TV

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$119.93	\$155.09	\$146.07	\$88.88	\$86.41	n/a	n/a	n/a
2009	\$122.43	\$163.81	\$150.86	\$91.21	\$91.78	n/a	n/a	n/a
2010	\$118.41	\$164.95	\$131.00	\$92.72	\$95.34	n/a	n/a	\$126.99
2011	\$122.87	\$173.88	\$139.49	\$82.21	\$73.72	n/a	n/a	\$137.73
2012	\$128.44	\$177.15	\$148.88	\$69.98	\$68.23	n/a	n/a	\$145.47
2013	\$134.19	\$167.92	\$145.27	\$80.55	\$69.17	n/a	n/a	\$137.23
2014	\$137.51	\$172.07	\$142.49	\$70.32	\$69.91	\$93.79	\$110.38	\$149.72
2015	\$139.78	\$168.62	\$136.44	\$77.54	\$54.35	\$91.64	\$118.08	\$136.93
2016	\$135.60	\$145.92	\$91.85	\$45.17	\$60.55	\$66.94	\$63.54	\$151.08
2017	\$120.99	\$138.41	\$71.99	\$66.71	\$51.42	\$52.91	\$65.63	\$93.74
CAGR	0.1%	-1.3%	-7.6%	-3.1%	-5.6%	-17.4%	-15.9%	-4.2%

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.

Figure D.5. 3: International Bundled Services Prices (PPP-Adjusted CA\$)

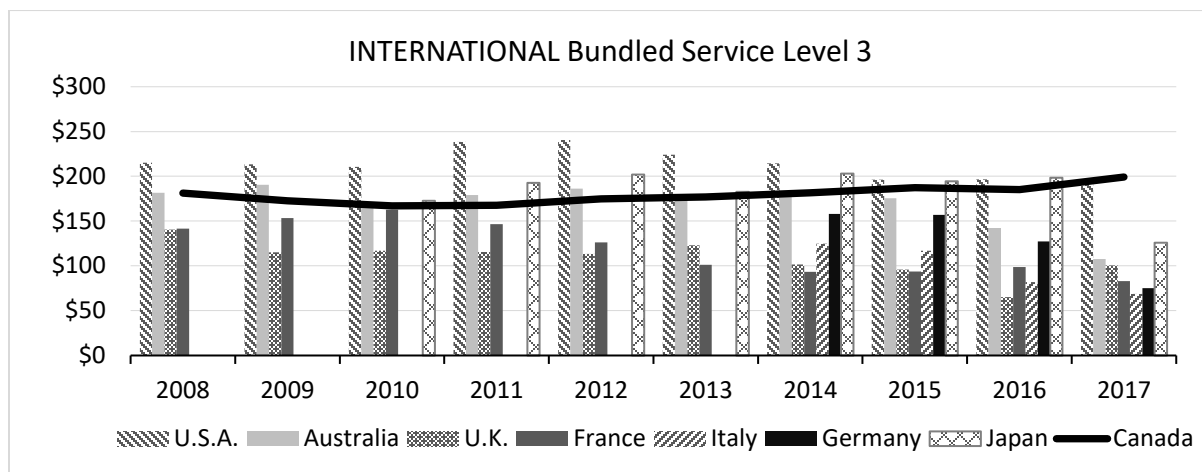


Table D.5. 3: International Bundled Service Basket Prices (PPP-Adjusted CA\$)

Level 3: Wireline, Wireless, Fixed Broadband & TV

Year	Canada	U.S.A.	Australia	U.K.	France	Italy	Germany	Japan
2008	\$181.31	\$215.13	\$181.60	\$140.62	\$141.43	n/a	n/a	n/a
2009	\$172.68	\$213.23	\$190.36	\$115.19	\$153.35	n/a	n/a	n/a
2010	\$167.01	\$210.52	\$164.62	\$117.04	\$162.78	n/a	n/a	\$172.52
2011	\$167.81	\$238.27	\$179.27	\$115.51	\$146.56	n/a	n/a	\$192.70
2012	\$174.71	\$240.65	\$186.13	\$113.31	\$126.39	n/a	n/a	\$202.02
2013	\$176.80	\$224.09	\$178.24	\$122.98	\$101.35	n/a	n/a	\$182.62
2014	\$181.70	\$214.39	\$182.43	\$101.52	\$93.21	\$124.94	\$157.98	\$202.99
2015	\$187.33	\$196.20	\$175.67	\$95.72	\$93.64	\$116.97	\$156.78	\$194.36
2016	\$185.06	\$196.70	\$142.45	\$65.27	\$98.63	\$81.91	\$127.15	\$198.54
2017	\$199.19	\$193.13	\$107.52	\$100.34	\$83.17	\$68.80	\$75.28	\$125.80
CAGR	1.1%	-1.2%	-5.7%	-3.7%	-5.7%	-18.0%	-21.9%	-4.4%

CAGR: Compound Annual Growth Rate from 2008 to 2017.

n/a: not available.