



# THE SCHOOL OF PUBLIC POLICY

## MASTER OF PUBLIC POLICY CAPSTONE PROJECT

The Lack of Competition among the Mobile Services Operators in Canada: What Policies might Promote Competition in the Canadian Mobile wireless Market?

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## **Abstract**

This paper is an answer for a long-time issue in Canada- the significantly expensive cell phone plans mobile users pay in Canada compared to other countries.

Its core objectives are to express the need for competition in the Canadian market, and suggests possible policy steps that would address this issue.

The paper finds that the Canadian mobile wireless market is associated with only few competitors and strict regulations, which in turn discourage any form of competition. Consequently, as shown in the paper, Canada's mobile phone prices are among the highest within the developed world, and that in countries where the level of competition is higher- prices tend to be more affordable. Moreover, the paper finds that in Canadian provinces where there are more competitors- prices tend to be lower.

It shows that although the Canadian market is characterized by high quality of service, those services are not always attainable by many Canadians due to the high fees they need to pay for those services.

Finally, the paper states that there is a need to combine several different policies in order to stimulate competition in the Canadian market.

**Key Words:** Mobile, Competition, Telecommunications, Wireless,

## **Introduction**

More than ever, Canadians are relying on wireless services for their everyday needs, and as a result making access to high quality and affordable wireless services is absolutely essential.

The Canadian mobile wireless market, however, is highly concentrated, with three main companies that dominate it- Bell, Rogers and TELUS ('the Big 3'). This situation of few companies that account for a huge portion of the market is associated with high cell phone plan fees, which, as this paper shows, are among the highest in the developed world. Although the Canadian mobile wireless market is attributed with high level of quality of services, which means high download and upload speeds, many Canadians do not fully enjoy these high-quality services due to several factors, which will be expanded in this paper. Lastly, Canadians do not enjoy a lot of choices in the Canadian mobile wireless market, which means that their power as buyers is very limited- a situation which provides 'The Big 3' an advantage over their consumers. These attributes of the Canadian market are due to the lack of competition in this market.

Therefore, this paper will examine what policies might promote more competition in the Canadian mobile wireless market, thus forcing the incumbents to not only reduce their high fees, but also to offer better services and more options for the consumers.

The first part of this paper will present an international comparison between the Canadian mobile wireless market and the markets of Australia and the United States, in order to illustrate how bad the situation of the lack of competition in the Canadian market is in comparison to other developed countries.

The second part of this paper will show a national comparison among Canada's provinces, in order to illustrate one crucial point, which is that in provinces where there are strong regional competitor that compete with 'the Big 3'- prices tend to be lower than in provinces in which the market is more constricted.

Finally, the last part will examine 2 possible policies that might promote competition in the Canadian mobile wireless market. The first is mandating access of Mobile Virtual Network Operators (MVNOs) This policy relies on regulation that would allow different firm to enter the market at lower costs. The second policy is encouraging facilities-based competition, and it relies on market forces to further spur competition by allowing the establishment of more networks.

In order to understand the opportunities and challenges that each policy has, a series of case studies will be examined, as well as the pros and cons of each of the policies. Some of the material that will be in use include reports by the Canadian Radio-television and Telecommunications Commission (CRTC), the United States' Federal Communications Commission (FCC) as well as the Organization for Economic Co-operation and Development (OECD). A large focus will be dedicated to the importance of Radio

Spectrum<sup>1</sup>, which is the space through which the radio signal created as a result of using mobile services pass. As I will show, many mobile users in one area can create some challenges for carriers to provide appropriate services.

## **Economic Review**

### *The benefits of competition*

This paper strives to show the need in increasing the level of competition in the Canadian mobile wireless market, as it is assumed that a high level of competition benefits consumers, mainly in three key different areas, which will be explored throughout this paper: cell phone plan prices<sup>2</sup>, quality of service<sup>3</sup> and consumer choice<sup>4</sup>. The benefits of competition have long been examined by various studies. For example, the OECD's 1995 report concluded that the introduction of competition brings substantial benefits to both consumers and carriers in many developed countries. The benefits for users include price reductions, improved quality of services and greater choice for the consumers, providing more freedom for users to manage their own telecommunications requirements. Mobile service providers benefit from increasing competition by enjoying the expansion of the

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<sup>1</sup> The importance of spectrum is significant for the understanding of this paper, and thus an explanation about it is needed to be made here. When a mobile wireless carrier wants to provide its services across the country, it needs to acquire particular space through which its users could send/receive radio signals in order to use their cell phones. This space is called spectrum, and it is a limited resource, hence creating a need to manage it by the government.

<sup>2</sup> Cell phone plan prices can be determined in various ways. For the purpose of this paper, prices will be determined by the monthly fees that consumers pay for the cell phone plan they have purchased. The more features the plan offers, the higher its price shall be.

<sup>3</sup> The quality of service of the mobile services consumers experience can be measured mainly through download and upload speeds, which enable the consumers an efficient use of their mobile phones. In addition, the level of quality of service is also determined (for the purpose of this paper) through the availability of those services to the consumers.

<sup>4</sup> The level of the consumer choice, that is the options available for the consumer which enable them to make effective decisions based on the data they have, can be determined by different factors such as the market share of the different mobile carriers (which has an effect on the options consumers have), and to what extent the consumers are able to switch between those carriers. Consumer choice not only guarantees the consumers will have more buying power, but also forces companies to improve their services. One main factor that affects consumer choice is switching costs, which are the payments consumers need to pay when shifting their consumption from seller A to seller B. In the mobile services area, switching costs include the cost of leaving a long-term service contract early and the cost of unlocking a locked SIM card. High switching costs deter competition, as consumers are less eager to consume different supplier's services and prefer to stay with their current supplier, even if the latter's fees are higher. Consequently, suppliers are struggling to attract new customers, thus losing profit after a significant investment made in order to enter the market. Similarly, low switching costs associated with greater competition among the suppliers, thus enabling consumers more choice. This ability of the consumers, to switch between suppliers, encourages those suppliers to compete on price and quality in order to retain and attract as many consumers as they can. As a result, low switching costs allow smaller carriers to attract customers from the larger ones, thus increasing the competition in the market. In some jurisdictions, consumers are allowed to keep their phone number when switching to another cell phone provider. This is called number porting, and it makes switching easier for consumers.

mobile wireless market created as a result of the growing efficiency competition encourages. Furthermore, according to this report, competition opens up new employment opportunities in and beyond the telecommunications sector. Many jobs are being created in order to meet the growing demand for new features and services (OECD 1995, 65-73).

The benefits of competition in the mobile wireless market have also been demonstrated by C. M. Rossotto, M. Kerf, and J. Rohlfs (2000), who argue that the growing competition in many developing countries has stimulated the adaption of mobile technology. For example, in Romania, the number of subscriptions had increased 12 times from 16,000 to 225,000 within a year (p. 69).

In terms of price, they found that in several competitive markets, the average price of a call from a GSM handset is 40-50 per cent lower than in markets with a single provider (P. 69). For instance, in Germany prices were reduced by as much as 70 per cent after 4 years of since the introduction of competition in the market (Rossotto et al 2000,p. 70).

In addition, they also claim that competition can spur the introduction of a wider range of mobile services. This is because the response of the incumbents to the entry of new competitors brings them to present new features (Rossotto et al 2000, p. 70).

The authors also suggest that competition can benefit the incumbents as well. In both developed and underdeveloped countries the introduction of competition in the mobile wireless market has forced incumbents to improve their services, thus helping them to expand their market share (Rossotto et al 2000, p. 71).

Furthermore, the introduction of competition did not erode investments in the market nor the incumbents' revenues, but rather helped the incumbents to gain larger revenues as a result of the growing adoption of mobile technology by users. For example, in Spain, where the incumbent operator has increased its revenues by 31 per cent and 72 per cent, respectively, in the year before and during the year in which competition was introduced. In the same period the rate of growth of profits increased (Rossotto et al 2000,p. 72).

With regard to the Canadian mobile wireless market, a study conducted by the Competition Bureau found that the incumbent carriers have lowered their prices in reaction to growing competition, thus indicating the positive effect that competition has on consumers (Competition Bureau 2017).

Despite claims against introducing competition, which include eradication of the market's revenue, the data collected by the CRTC indicates that in the years 2014-2018 there was an increase in the national ARPU<sup>5</sup>, from \$61.03 to \$69.61 per month, an average increase of 3.3 per cent per year (CRTC 2019, 234). This is possibly due to the increasing effectiveness of both the incumbents and the new entrants, as a result of the growing competition from the new entrants.

It can be concluded that the number of operators in a market has a significant effect on the level of competition in that market. For example, a study conducted by Pareto

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<sup>5</sup> Average Revenue Per Wireless User (ARPU)- measures the revenues mobile providers receive for each subscriber per month.



Securities found that a situation in which there are three operators rather than four in a market can eradicate competition, which may be associated with higher tariffs and less choice for consumers. The study shows that prices in three carrier markets (i.e. Germany) are on average 77 per cent higher than in four carrier markets (Pareto Securities 2018, p. 3).

### *The need for regulation*

Given the significant barriers to entry, particularly acquiring spectrum, smaller markets tend to be dominated by only a few competing companies due to economies of scale<sup>6</sup>, which enables big firms to markup prices above marginal costs by selling products at lower unit cost than smaller firms. With one or only a few firms operating in the industry, governments may then intervene in the market forces such as through regulation to lower prices to be closer to marginal costs of production (resulting a better allocation of resources or economic efficiency).<sup>7</sup>

Panzer and Willing also suggest that economies of scope<sup>8</sup> whereby a firm operates in several related markets can create barriers to entry barriers. By sharing joint product costs or a common factor of production (eg. innovation costs), an established firm can offer a product in one market at a lower cost than a single-product firm (Teece 1980, 2). For example, in the Canadian telecommunications market the 'Big 3' are able to provide different types of wireless services. They provide not only mobile services, but also TV and landline services, in addition to internet for households. The smaller carriers, such as Freedom Mobile, rely mainly on their mobile services as their mainstream revenue. Economies of scope may arise because some fixed item of capital equipment is indivisible amongst the alternative products (Teece 1980, 4). For example, in the mobile wireless market there is a need to invest a huge amount of capital- as will be mentioned later- in building infrastructure and acquiring advanced equipment. By diversifying their revenue streams, the 'Big 3' are able to reduce these costs.

Consequently, with limited competition, consumers may have limited choices. Specifically, in the Canadian mobile wireless market, which is dominated by three strong companies, the market failure of oligopoly plays a significant role in limiting choices and the prices charged to mobile users. The lack of spectrum, which is necessary in order to

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<sup>6</sup> Economies of Scale is the he ability of a firm to gain efficiency through an increased production of its product(s). By producing a greater amount of output, the firm is able to reduce its costs per unit, thus increasing its advantage over its competitors (Heakal 2019).

<sup>7</sup> Market Failure: Mankiw, McKenzie & Kneebone define market failure as "a situation is which a market left on its own fails to allocate resources efficiently (Mankiw et al 2017, 11). They argue that one possible cause of market failure is market power, which allows one person or firm to heavily influence market prices.

<sup>8</sup> Economies of scope: The ability of a firm to gain efficiency by diversifying the scope of products it offers, thus selling a variety of different products which enable the firm to gain market share in the various markets. As a result, the firm is able to reduce its costs per unit it produces (Joel D. Goldhar; Mariann Jelinek 1983).

provide wireless services, accompanied with strict foreign ownership regulation, creates a situation in which the 'Big 3' have a significant market power. The extent to which the oligopoly has an impact on consumers depends. As Weimer and Vining note in their book, "Policy Analysis: concepts and practice" (2011), the elasticity of demand- that is, how responsive consumers are to price changes- determines whether or not the creation of monopoly has significant impact on consumers, and whether it is necessary to tackle it. Thus, if there are other products (e.g. wireline telephones) that are available to consumers, with similar characteristics (like area coverage), a cell phone plan will unlikely to have inelastic demand, and the monopoly providing that good (cell phone services provider) will have little impact on the market.

In the mobile wireless market, however, this is rarely the case. As a result in the tremendous jump in mobile wireless services consumption, consumers are greatly dependent and rely on these services provided only by mobile cell phone. The monopoly firm might be forced to adjust its price due to a threat of competition, which requires that entry into the industry be relatively easy. One specific model that explains the incumbents' prices in excess of marginal cost is called the Cournot Model, which applies where (a) the firms produce homogeneous goods, (b) they compete simultaneously on output and (c) they expect their rivals not to change their output in response to any change that they make.

### **World Comparison: Canada, Australia and United States**

To study the competitiveness of the Canadian wireless mobile market, it will be compared to the Australian and American markets, which have similar challenges. For example, the population in Australia is as sparse as Canada's over a large geographical area. The much more populated United States is geographically large as Canada and therefore, faces similar challenges in providing acceptable services for customers. This is why cellphone companies may find it challenging to establish mobile networks in these countries.

For the following comparison, three factors, which have significant impacts on the wireless market, will be considered: price, quality of service and consumer choice.

### **Methodology**

The cell phone plan prices comparison will be investigated through 3 different studies that use different approaches and methodologies, thus providing us an accurate picture of the situation in the Canadian market in comparison to other markets.

The main study that I will use in this paper was conducted by Wall Communications Inc. (Wall study). The study examined telecommunications services in several different categories. For the purpose of this paper, I will refer only to the category of mobile wireless services. Individual service baskets were defined according to increasing levels

of service usage and feature availability under each category. The study was conducted in 2018, but there is a newer study conducted in 2019. However, the 2019 study does not give us a full coverage of the Australian market prices. Nevertheless, from examining the data that are available, a similar conclusion can be concluded.

The 2018 Wall study distinguishes the category of mobile wireless services into five different levels (baskets): level 1 (150 voice minutes), level 2 (450 voice minutes and 300 SMS<sup>9</sup>), level 3 (1,200 voice minutes, 300 texts and 1 GB of data usage per month), level 4 (unlimited nationwide talk and text along with 2 GB of data), level 5 (unlimited nationwide talk and text along with 5 GB of data) and level 6 (Shared plan with 3 phones lines and unlimited nationwide talk and text along with 10 to 49 GB of data).

The second study was conducted by the OECD (OECD study), and it compares pricing across 35 countries in three baskets of use: a "low user" basket (including 100 calls and 500MB data per month), a "medium user" basket (including 300 calls and 1GB data per month), and a "high user" basket (including 900 calls and 2GB data per month). The most recent results are from May 2017.

The third study that compares wireless prices internationally was conducted by the United States FCC (FCC study), which is the main telecommunications regulator in the United States, and it includes data from 2017. The FCC study distinguishes among four levels of baskets:

1. Data less than 2GB.
2. Data between 2 GB and less than 5 GB.
3. Data between 5 GB and 10 GB.
3. Data more than 10 GB.

The FCC study is more complex than the OECD or Wall studies. Instead of simply reporting the prices of representative plans within a given basket, the FCC study reports the results of two separate analyses: a price index and a hedonic price index comparison. The former calculates a (weighted) average price for a fixed collection of plans. The latter aims for a more "apples-to-apples" comparison through the use of econometric methods to remove the potential effects of country-level differences in cost, demographics and quality measures (e.g., download speeds).

In order to conduct the quality of service comparison, I will look at reports conducted by Opensignal, which analyze consumer experience across different countries. The latest data are from early 2020, and it shows several different factors regarding the level of quality of service in each country. For the purpose of this paper, I will be focusing only on two of them: upload and download speeds. Another factor that contributes to the

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<sup>9</sup> SMS- Short Message Service, a system that enables mobile phone users to send and receive messages.

understanding of the availability of quality services is the penetration rate<sup>10</sup>, which for the purpose of this paper will be taken from the OECD latest data.

With regard to consumer choice, I will use reports by the main regulators of each country. The features which will be investigated will be the market share of the carriers in each market (which indicates the level of concentration), switching costs and churn rate<sup>11</sup>, as the two latter features were mentioned earlier as having a significant influence on whether consumers are able to enjoy high level of choice.

## **Australia**

### **Price**

According to the Wall study, the average price for level 4 services basket in 2017 was \$54.29 and in 2018 it was \$24.70 (all prices in the Wall study in Canadian dollars – Wall Inc. 2018, A3.1). Another reduction occurred also in 2019: \$22.35 (Wall Inc. 2019, A3.1). As will be seen later, in Canada and other developed countries the prices for this kind of plan are much higher.

The OECD study has found that prices in Australia are significantly lower than the OECD average for all three levels of baskets (OECD 2017, 4.2, 4.4, 4.6). Nonetheless, it is worth noting that the Australian plan calculated in each of the baskets is the same. This is because the OECD methodology makes comparisons based on “the lowest cost offer calculated for each operator and basket”. In other words, the Australian plan, which includes 3GB of data, is the lowest cost option that meets the criteria for all three levels available in the Australian market.

The FCC study also compares Australia to other countries (all prices in the FCC study are in US dollars). According to this study, the mean monthly plan fees in Australia were as the following: for the 1<sup>st</sup> basket \$19.44, for the 2<sup>nd</sup> basket \$25.01, for the 3<sup>rd</sup> basket \$31.19 and for the 4<sup>th</sup> basket \$46.35 (FCC 2018, table 5). These prices were lower than in the United States or Canada as shown below.

### **Quality of service**

According to Opensignal report from April 2020, the average download speed was at the range between 36 Mbps and 47.3 for the three largest carriers, and with an average download speed of 45.6 Mbps. It seems that Australians enjoy relatively competitive speed compared to other countries (Opensignal 2020). For upload speed experience,

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<sup>10</sup> Mobile Penetration Rate- number of subscribers per 100 inhabitants. A low penetration rate indicates the many people do not enjoy access to appropriate mobile services.

<sup>11</sup> Churn rate- the percentage of connections that are disconnected from mobile wireless service provider during a given time period. High churn rate may indicate that the consumers have a great ability of switching mobile providers, due to various reasons such as dissatisfaction with the services they receive. However, a low churn rate does not necessarily mean the consumers lack the ability to switch providers, as it might indicate the consumers' growing satisfaction.

Australia's 3 largest carriers scored a score of between 9.9 Mbps and 8.6 Mbps.

According to the OECD, as of December 2019 the overall mobile broadband penetration is also very high with 129.1 subscribers per 100 people (OECD 2019, 1.2). It means that mobile wireless services of Australia are in the reach of many people, and it also indicates that more people in Australia enjoy the quality of the mobile services in comparison to the OECD average, which is 114.5 subscriptions per 100 people.

### **Consumer Choice**

In recent years, there has been a significant change with regard to market share in Australia, according to Roy Morgan report from 2019, the market share of the incumbent carriers has dropped to 71 per cent of the consumers who have pre-paid mobile phones (Itwire 2019). The buyers' power in Australia is considered high due to negligible switching costs, which allow consumers to switch their provider swiftly. However, there has been some reduction in the percentage of consumers saying that they had switched mobile providers (churn rate). According to data from Roy Morgan Research, 10 per cent of Australian consumers said they had switched mobile phone service provider in the previous 12 months (2016), compared to 12 per cent in 2013 (ACCC 2018, 120). The data show that of those who switched mobile phone service provider in the last 12 months in 2016, the most common reasons for choosing their current service provider were related to price, data inclusions and network coverage.

That said, lower percentage of consumers switching mobile carriers does not necessarily indicate a negative development. On the contrary, it could mean that consumers are more satisfied with their mobile carriers due to an increased level of services.

With regard to roaming, the ACCC found that the state of competition in the market for mobile roaming services appears to depend on the geographical area in which mobile services are offered. For example, in areas currently covered by two or more carriers, which account for almost most of Australia, competition is generally effective. This is because VHA has a current commercial roaming agreement with Optus which allows its customers to roam onto a significant part of Optus' network (ACCC 2017, 21).

The degree of consumer choice in Australia is not fully understood. A further examination is needed in order to determine whether Australians enjoy a wide range of choice.

### **United States**

#### **Price**

The Wall study shows that prices (in Canadian dollars) for low level baskets were slightly higher than Canada's. For levels 1-2, the prices were \$28.50 and \$44.29 respectively. However, there has been a reduction in recent years of about 23.05 per cent for level 1 and 23.09 per cent for level 2. For levels 3-5, which include larger plans, prices were lower than other countries, with \$62.48 for level 3 basket, \$61.26 for level 4

and \$97.88 for level 5. Level 6 basket was \$206.57,, but, as will be seen later, prices in Canada are higher (Wall Inc. 2018, A3.1)

According to the FCC study on U.S. wireless services, prices (in U.S. dollars) were as the follows: for the 1<sup>st</sup> basket \$55.53 for the 2<sup>nd</sup> basket \$72.99, for the 3<sup>rd</sup> basket \$102.36 and for the 4<sup>th</sup> basket \$93.48 (FCC 2018, table 5).

According to the OECD study, American prices (in U.S. dollars) were as the following: \$46.21 for low user basket (OECD 2017, table 4.2), and \$51.71 for both the medium and high user baskets (tables 4.4 and 4.6).

### **Quality of Service**

According to Opensignal report from January 2020, users of the 4 largest carriers' services experienced a range of between 23.9 Mbps and 27.4 Mbps (Opensignal 2020). With regard to upload speed, the speed for the 2 largest carriers were in the range of 7.9 Mbps and 8.6 Mbps. Two other carriers had relatively lower upload speeds, with 2.7 Mbps and 6 Mbps (2020). According to the OECD, the mobile penetration rate is one of the highest in the world, with 148.9 subscribers per 100 people (OECD 2019, table 1.2).

### **Choice**

Switching costs are generally incurred only in terms of changing a phone number, so the power of many buyers is high (Marketline 2019, 18-19). In 2017, the CTIA (2017) reported that there was an annual churn rate of 15.9 per cent, and a monthly rate of 1.3 per cent, a reduction in comparison to previous years, as cited by the FCC report (2018, 10). This is a higher rate than what was observed in Australia the year before, and as in Australia's case, a declining churn rate may suggest for consumers' growing satisfaction.

There are four major facilities-based operators in the United States that offer nationwide wireless services. In addition, U.S. Cellular, currently the fifth largest facilities-based service provider in the United States, provides services to 22 states (FCC 2018, 4). These non-nationwide service providers increase choice for consumers and help to promote deployment in rural areas.

As of 2017, Verizon Wireless's market share was 35.5 per cent, compared to 32.4 per cent for AT&T, 17 per cent for T-Mobile, and 12.8 per cent for Sprint. In addition, 2.3 per cent of revenue market share was held by smaller operators such as MVNOs (FCC 2018, 6), with the four largest carries hold together approximately 80 per cent of the total wireless spectrum (page 29).

The FCC characterizes the market as competitive as nearly 92 per cent of the Americans have a choice at least four 4G providers (FCC 2018, figure A-29).

As a result of the growing competition, the providers strive to introduce new features in order to attract much costumers as they can. According to Marketline industry profile, all the national carriers has recently introduced unlimited data plans, combined with features

that increase the options available to consumers. These non-nationwide service providers increase choice for consumers and help to promote deployment in rural areas.

In addition, it seems that the U.S market is associated with low roaming fees, with no charges at all for users who have unlimited plans, and monthly fees of between \$2 and \$10 for customers who do not have unlimited plans (Wall Inc. 2018, table 10).

## **Canada**

### **Price**

Canadian mobile service prices are uniformly amongst the highest in developed nations, and sometimes remarkably higher than those found in comparable countries. As of 2018, an unlimited plan with 2GB costs \$75, which brings Canada to be the second most expensive country amongst the G7 countries, according to the Wall study. Although there has been a reduction of about 5.1 per cent between 2014 and 2018 for the level 4 basket, this reduction is very small in comparison to other countries (Wall Inc. 2018, attachment 3, table A3.1), including the U.S, (13.5 per cent) and Australia (-26.5 per cent).

Further, the OECD's study also found that prices in Canada are significantly higher in comparison to the other OECD members. For example, in the high user basket, the price in Canada was 85 per cent higher than the (simple) average of all 35 countries in that basket- \$58.31USD versus \$31.46 USD (OECD 2017, table 4.6).

According to the FCC study, prices (U.S. dollars) in Canada were as the following: for the 1<sup>st</sup> basket \$74.69, for the 2<sup>nd</sup> basket \$85.24, for the 3<sup>rd</sup> basket \$111.53 and for the 4<sup>th</sup> basket \$166.91 (FCC 2018, table 5).

To conclude, Canada's mobile services are poorly competitive in terms of price in comparison to other developed countries.

### **Quality of Service**

According to OpenSignal report, the Canadian mobile wireless market is associated with a relatively competitive download speed of about 55.4 Mbps average, only second to the Korean market which has the highest speed experience. With regard to upload speed experience, Canadian users enjoy high speed of between 11.7 Mbps and 12.8 Mbps from the largest national carriers- 'the Big 3' (Opensignal 2020).

Nevertheless, while modern high-speed mobile services may be available across most of Canada, they remain out of reach for individuals and households who earn low incomes. To illustrate, in 2019 Canada was ranked 32<sup>nd</sup> of 37 OECD member countries for overall mobile broadband penetration, with only 82.3 subscriptions per 100 people, much lower than the OECD average (OECD 2019, table 1.2)

Mobile data usage (GB per month) in Canada is comparatively low as a result of high prices for mobile services. Canadian mobile broadband subscribers use 2.9 GB per month on average, less than the OECD average of 5.80 GB per month, and far behind Australia

(OECD 2019, table 1.13). Canada's mobile networks may feature high speeds, but this is of little use if prices are so high as to discourage usage

### **Choice**

In Canada, 'the Big 3' and the other providers try to extend their service coverage across the country by establishing roaming arrangements, which enable subscribers to have access to service outside their mobile service provider's home network. That said, although the Canadian wireless market is associated with a vast option of roaming, in comparison to other countries, the U.S market has a significantly higher presence of roaming.

In 2018, the percentage of voice minutes and data traffic (excluding SMS and MMS traffic), derived from roaming in Canada was 26 per cent for data and 29 per cent for voice, in the United States it was 55 per cent for data and 56 per cent for voice and internationally it was 19 per cent for data and 16 per cent for voice (CRTC 2019, 336, figure 10.30). In Canada, roaming revenues represent approximately 4 per cent of total retail mobile revenues, and they are largely generated from subscribers who use mobile services in the United States (CRTC 2019, 302). Indeed, the Wall study found that the Canadian market has higher roaming fees in comparison to the U.S, with a general fee of \$7 per day charged by the national carriers and about \$5-\$6 from the regional carriers (Wall Inc. 2018, table 8).

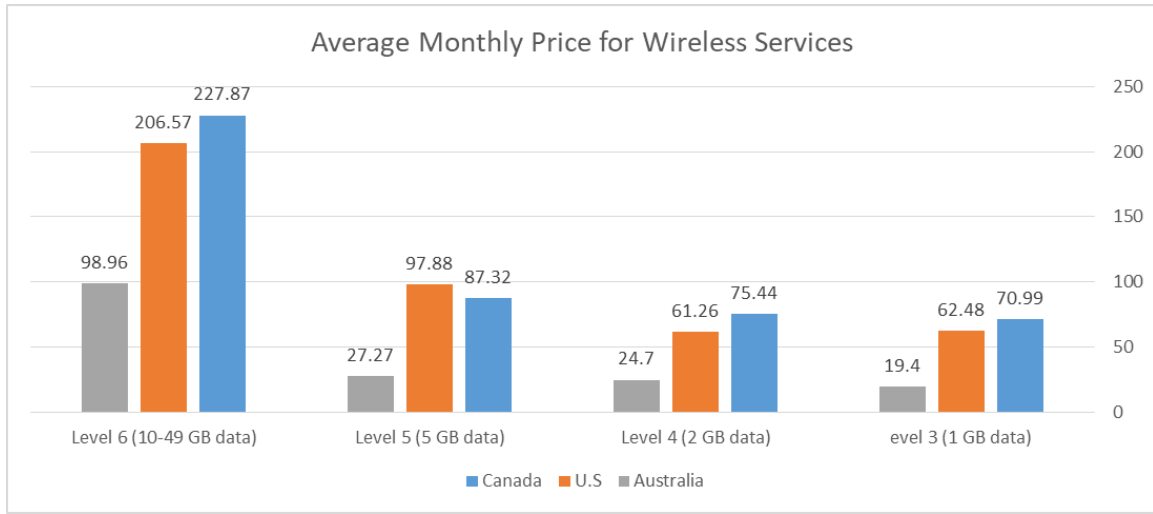
The regulatory framework described above has maintained a lack of competition in the wireless market, which is controlled by three major carriers (AKA 'the big 3'): Bell (33.3 per cent), Telus (27.8 per cent) and Rogers (29.6 per cent). Together, 'the big 3' provide mobile services to over 90 per cent of the total mobile users in Canada (CRTC 2019, 304, table 10.2). It is also worth noting that, as will be shown later, the "Big 3" hold together about 90 per cent of the spectrum, which has an effect on the competitiveness in the market (Joseph 2018).

In fact, in 2018 only 55 per cent of Canadians had access to mobile coverage from more than 3 networks (CRTC 2019, 326, infographic 10.10). However, prices and market shares of providers vary across provinces. In Saskatchewan and Quebec, the share of the national carriers tends to be eroded by regional providers such as SaskTel and Videotron (CRTC 2019, 308, figure 10.5). In general, Canadian consumers have a choice between two to five providers.

With regard to churn rate, there is a similar picture to the U.S and Australia markets, with a very similar average monthly churn rate of 1.44 per cent as of 2018 (CRTC 2019, 317, figure 10.16), which can indicate both lack of choice or growing satisfaction. However, the churn rate in United States is slightly higher (FCC 2018).

Figure 1: Differences in prices between Canada, United States and Australia





**Source: Wall Inc. 2018**

## Conclusion

The comparison shows that the Canadian mobile wireless market suffers from a lack of effective competition relative to other developed countries, such as the U.S and Australia. The lack of competitiveness reflects substantially higher cell phone plans prices in comparison to other countries. Further, the same picture of prices which are considered higher in international comparison can be concluded from various different studies, conducted by different organizations and which use different methodology.

The Wall study ranked Canada between the 2<sup>nd</sup> (for levels 1, 3 and 4 baskets) and 1<sup>st</sup> (for levels 2 and 5 baskets) with the highest prices among the G-7 countries and Australia. The OECD study compared wireless prices across 35 countries, and ranked Canada in the 3<sup>rd</sup> place for high and medium user baskets and 4<sup>th</sup> for a low user basket.

The FCC also ranked Canada as one of the most expensive countries in terms of wireless prices. This study ranks 29 countries from first (most cheap plans) to last (most expensive plans). Canada is ranked 28<sup>th</sup> out of 29 for single plans, whereas for a shared plan it is ranked 23<sup>rd</sup>. Australia was ranked, according to the FCC study, 5<sup>th</sup> for single plans, and 13<sup>th</sup> for shared plans. U.S. was ranked 25<sup>th</sup> for single plans, and 18<sup>th</sup> for shared plans, still lower than Canada.

Although the Canadian market is associated with speed data and quality of service, many Canadians cannot afford those services as a result of high fees charged by the carriers. Consequently, Canadians that live in rural areas or those who earn low income, are being neglected by the major carriers, which enjoy from a significantly large market share, whereas in other developed countries, such Australia and U.S., diverse mobile markets allow these portions of population to enjoy high quality mobile services, that otherwise would be ignored by the incumbents. When it comes to consumer choice, the Canadian market seems to suffer from a competitive disadvantage in comparison to the neighbor from the south- the U.S.

As was seen from the explanation about the legal framework of the Canadian wireless market, the regulatory regime plays a significant role in maintaining the lack of competition on the Canadian market. In a section below, I further examine the regulatory regime in Canada, and its impacts on the Canadian mobile wireless market.

### **A National Comparison**

This part presents a national comparison between the different Canadian provinces and Territories. The comparison considers the same factors discussed in the international comparison: price, quality of service and choice. It will strive to show that in regions where there are strong regional wireless providers, competition is stronger and prices are lower. Furthermore, I will show that there are differences in terms in other factors such as speed between urban and rural areas.

In order to conduct this comparison, I will use data from the CRTC, which makes a comprehensive report on the Canadian telecommunications industry every year. The report uses the same method as the Wall study uses. The price structure of mobile services is based on usage. To assess the prices for these services in urban centers and rural communities, four service baskets were used, and both flanker and primary service brands were considered. The Level 1 service basket comprises introductory or low-usage types of plans that offer 150 minutes of voice service per month, with no SMS or Internet data.

As shown in the international comparison, most of the Canadian cell phone users do enjoy high quality of service, which is attributed to factors such as high download and upload speeds. However, as I am going to show in this part, many Canadians cannot enjoy this level of quality. This is because the carriers' networks do not tend to cover all the rural and First Nations communities, which are usually located far from urban centers.

The top three companies held the majority revenue share in each province/territory, except in Saskatchewan where the other providers captured 60.3 per cent of the sector, a decrease from 61.8 per cent in 2017 (CRTC 2019, 237). The province of Quebec, as discussed earlier, also has a high presence of strong regional provider, which accounts to 17 per cent of the province's subscriber market share. In the following part, I will show that in these two provinces- Quebec and Saskatchewan- prices are relatively lower.

In order to compare the quality of service among the different provinces, I will present data from 4 large cities in Canada (Calgary, Toronto, Quebec City and Winnipeg), in which different combination of carries exists.

### **Differences between urban areas and rural communities**

The report made by the CRTC found that the average differences between the lowest and highest prices were lower in rural communities than in urban centers for most of the

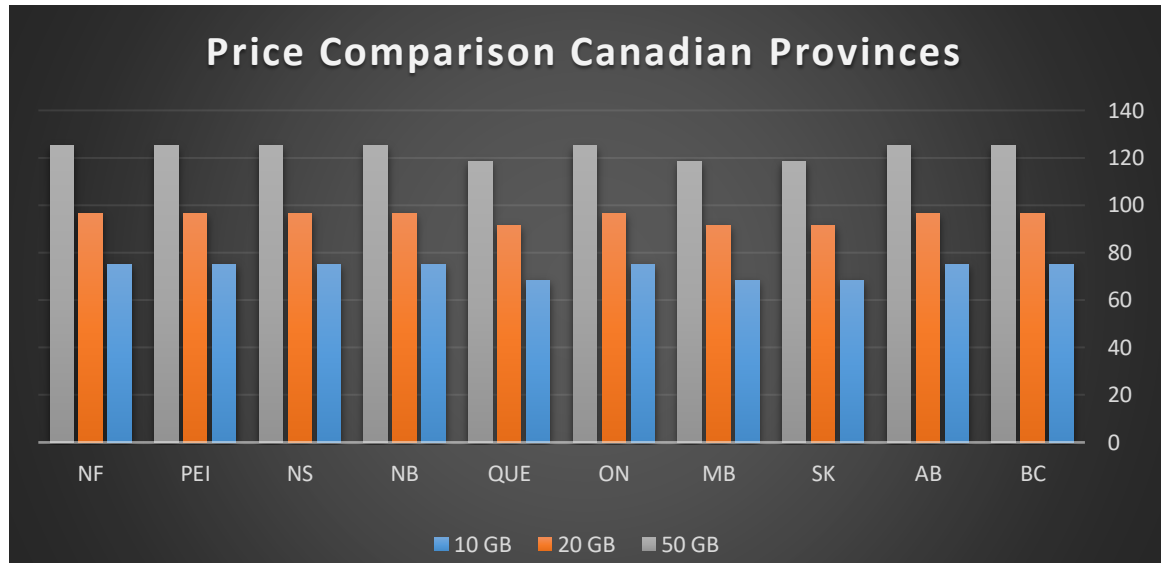
service baskets (CRTC 2019, 88), which may indicate that the level of competition and consumer choice are lower in rural communities, due to the absence of mobile services providers associated with rural areas, which results in few large mobile providers that have significant market power.

The prices for mobile wireless services in rural communities, across all service baskets, with few exceptions, were generally equal to or higher than those in urban centers. Although households in rural communities tend to spend less on mobile wireless services, it seems that they have experienced higher jump in prices. Between the years 2013-2017, the average monthly household spending on mobile wireless services in urban centers grew by 25.8 per cent, whereas in rural communities it grew by nearly 50 per cent (CRTC2019, 35, figures 1.5 and 1.6). This jump in spending among rural communities, in comparison to urban centers, may reflect the higher prices offered in rural communities as a result of fewer service providers in those areas. In addition, in rural communities and First Nations reserve areas, there seems to be less coverage by the mobile carriers. While in urban centers the coverage is about 99 per cent, in the rural and First Nations areas the coverage is 95.9 per cent and 72.8 per cent respectively (CRTC 2019, 44).

### **Price**

The Wall study also shows that the regional carriers offer mobile wireless prices that are significantly lower than those of the incumbents – 34 per cent, 45 per cent, 31 per cent, 28 per cent and 12 per cent lower for service basket Levels 1 to 5, respectively (Wall Inc. 2019, table 3). Consequently, in provinces where there are strong regional carriers that pose competition to the national carriers, prices tend to be lower. For example, in Quebec an average level 3 basket (unlimited 2 GB plan) costs \$53.92, whereas the average price for this kind of plan across Canada is \$74.42 (Wall Inc. 2019, attachment 2, table A2.1, Level 3). Figure 2 shows that in provinces where there are strong regional competitors- prices are lower.

Figure 2: Differences in Prices across Provinces



Source: Wall Inc. 2019

### Quality of Service

Over 99 per cent of Canadians have access to LTE networks, but this availability varies by location. Canadians living in urban centres have greater access to these networks than those living in rural communities or small-populated territories. According to Opensignal report from February 2020, which compares users experience between Canada’s 10 largest cities, in regions where there is a 4<sup>th</sup> large carrier (Freedom Mobile in Calgary or Toronto and Videotron in Quebec City), there are wide speed variables<sup>12</sup>(Opensignal 2020). For the convenience of the reader, I choose to show data from 4 major cities: Toronto, Calgary, Winnipeg and Quebec City. The data are summarized in figure 3.

The data show that in all cases, the incumbents had better performance than the regional competitors. However, in regions where there is not a 4<sup>th</sup> carrier, such as Manitoba, the incumbents’ performance was worse than in provinces where they faced competition (Opensignal 2020). Therefore, it can be concluded that it is possible to have more competition, meaning more carriers in the same region, and having higher quality of service from the incumbents. Similarly, it seems that less competition does not necessarily mean higher quality of service. However, the data shows that the regional carriers in Canada do not pose strong competition against the incumbents, as in almost all cases the speed experience of their users was lower.

**Table 1: Regional Comparison of Upload and Download Speeds across Provinces in Canada**

<sup>12</sup> Wide speed variables means that there is a wide variety of speed levels attributed to one specific area.

	Toronto	Calgary	Quebec City	Winnipeg
Telus	16.1, 92.5	19.6, 112.5	13.4, 88.5	15, 97.1
Bell	15.5, 86.8	17.3, 93.7	14.6, 98.3	12.8, 67.4
Rogers	14.7, 58.4	15, 60.5	14.7, 57.5	11.2, 56.5
Freedom Mobile	9.8, 25.8	11.3, 30.6		
Videotron			14, 36.2	

Source: Opensignal 2020

**Download Speed**

**Upload speed**

### Choice

According to the Canadian Media Concentration Research Project (CMCRP), the concentration in the Canadian mobile wireless market has slowly declined over the last decade following the entry of “new entrant” regional mobile carriers Freedom Mobile in BC, AB, and ON; Videotron in QC; and Eastlink in the Maritime and Atlantic provinces and parts of Northwestern Ontario. In Quebec, in which there is a 4<sup>th</sup> strong carrier, concentration was at 2610?? in 2017 (CMCRP 2019, 13), much lower than the national concentration level.

It is also important to note, as discussed earlier, that the CRTC report found that urban centers with four or more mobile carriers generally had the largest difference between the lowest and highest prices reported, as well as the lowest reported prices in three of the four service baskets. This indicates that consumers in areas where there are more than 3 providers enjoy higher degree of choice.

### Conclusion

In Manitoba, Saskatchewan, and Quebec, the national carriers have adjusted their pricing in response to the strong presence of a regional carrier, and as a result prices charged by national carriers are generally lower in these provinces than they are elsewhere in Canada. The reason for this is that the national carriers have had to compete against incumbent telecommunication companies, Sasktel and MTS, which have kept prices low in order to maintain market share, resulting in a more competitive marketplace than is found in other parts of the country. This is consistent with the Competition Bureau’s observation in its disposition of the 2017 BCE-MTS merger, where it found that “where Bell, TELUS and Rogers do not face competition from a strong regional competitor, prices are substantially lower.”

These differences among the provinces come into force through differences in spending on mobile wireless services. For example, household in Quebec tend to spend less than provinces in which the level of competition is lower, like in Alberta. Additionally, the Bureau noted that its “investigation also found that, generally, Canadians in areas with a strong regional competitor use substantially more data than Canadians in areas without a strong regional competitor”. This suggests that in markets with less competition, high

prices have been restricting Canadians use of wireless services resulting in pent up demand for additional data.

### **The Canadian Market and Regulations**

As concluded from both the international and national comparison, the Canadian mobile wireless market, and especially the provinces in which the level of competition is lower, is associated with higher prices, inequality in terms of quality of service and limited consumer choice. Hence, in order to investigate what policies might promote competition in this market, an examination of the main regulators of the telecommunications market is needed, as those regulators have a significant impact on the level of competition in the market.

### **Key Regulatory Actors in the Wireless Market**

	<b><u>CRTC</u></b>	<b><u>ISED</u></b> <sup>13</sup>
<b><u>Responsibilities</u></b>	<ul style="list-style-type: none"> <li>● Regulating carriers by enforcing the Telecommunications Act, and reporting to Industry Canada.</li> </ul>	<ul style="list-style-type: none"> <li>● To ensure a safe and efficient use of wireless spectrum.</li> </ul>
<b><u>Authorities</u></b>	<ul style="list-style-type: none"> <li>● Approving agreements between carriers.</li> <li>● Enquiring and make determinations with respect to permitted or prohibited telecommunication activities.</li> </ul>	<ul style="list-style-type: none"> <li>● Allocating and managing spectrum licenses and permits to bidders who wish to enter the Canadian telecom market.</li> </ul>
<b><u>Policy Tools</u></b>	<ul style="list-style-type: none"> <li>● The CRTC may impose conditions on carriers offering telecommunications services, or alternatively to</li> </ul>	<ul style="list-style-type: none"> <li>● Allocation of spectrum through licensing mechanisms. This is done mainly</li> </ul>

<sup>13</sup> Innovation, Science and Economic Development in Canada- a department of the Government of Canada.

	exempt carriers from certain conditions.	through auctions.
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As can be noticed, the CRTC is the main regulator of that industry, and as such it has the power to introduce new policy steps that could spur competition in the market. For example, it has the power to exempt certain potential entrants from the Canadian ownership requirement of the Telecommunications Act, thus changing the composition of the market. Thus, it has the ability to mandate entrance of MVNOs, which might have impact on level of prices and competition. Nonetheless, one should remember that the CRTC is only a public agency, and as such it does not have the last word, and the final decision is in the hands of the federal government of Canada.

The ISED, on the other hand, decides “who gets what”, by allocating spectrum licenses to those who most value it. As part of the federal government, its authorities may have more effect on the variety of the Canadian mobile wireless market. Where the demand for spectrum is not expected to exceed the supply, Industry Canada generally uses a first-come, first-served licensing process to award spectrum licenses. In instances where the demand for spectrum is expected to exceed supply, a competitive licensing process, such as an auction, is generally used.

**Factors that cause a lack of competition**

Many factors can influence the level of competition in the mobile wireless market. These include access to spectrum, economies of scale (and minimum efficient scale due to capital requirements) and regulatory restrictions. Therefore, in order to tackle the lack of competition in the Canadian mobile wireless market, a further examination of these factors is needed, which will have to be addressed under any policy reform.

**1) Access to Spectrum**

One of the most significant barriers to providing competitive wireless services is access to spectrum. To be clear, spectrum is the space in which wireless technologies telecommunications go through and deliver wireless services to users. As many other commodities, spectrum is a natural limited resource, which means that spectrum is fixed in quantity as a common resource. If it becomes too crowded due to overuse, wireless data cannot be delivered effectively. Therefore, attempts to allocate spectrum in an efficient way are needed, and this is done- in Canada and many other countries- through auctions, which are held by the ISED on behalf of the Canadian federal government.

The ISED sells wireless providers the rights to transmit signals over specific bands of the spectrum, in the hope that those who most value this right to use the spectrum will obtain a large amount of it. Spectrum bands vary in breadth and in their propagation characteristics, and these variations have implications for how spectrum is deployed. Although the goodwill of the regulators, which aim to act in light of the aforementioned Telecommunications Act’s objectives to increase competition, past experience suggests

that new wireless providers usually are not able to obtain a significant portion of the allocated spectrum. I will show later on, this is seen as a barrier to competition.

As Joseph mentioned in his study, ISED 2010 inventory data showed that Canada's largest carriers held about 81 per cent of all commercial mobile spectrum licenses (Joseph 2018). Only four organizations were able to procure licenses in more than two auctions: Bell and Rogers won licenses in five auctions each, and Telus and Mipps, Inc. took home licenses in three. These data suggest that few companies have the means to win licenses at multiple auctions, and that large incumbents are favoured as auction winners. Moreover, data collection on the 41 unique auction winners revealed that nine companies have been merged or acquired by other companies since their auction wins. These factors deter telecom companies from investing in spectrum. For instance, annual investments in spectrum fell from \$5.26 billion in 2014 to only \$0.12 billion in 2018 (CRTC 2019, 232).

In terms of license distribution among Canada's big wireless providers, in the 2500 MHz frequency, 76.74 per cent of licenses were won by top providers. Furthermore, the concentration increased six years later, when 92.78 per cent of the 700MHz licenses auctioned were acquired by one of Canada's top service providers. In the 700MHz and 2500 MHz frequency ranges, few licenses have changed hands since auctions were held: four in the 700 MHz range, and 18 in the 2500 MHz range (Joseph, 2018).

In order to allow more new bidders to obtain a larger amount of license, the ISED has been trying to implement pro-competitive measures such as setting- aside some portion of the auctioned spectrum, so more of spectrum will be available for smaller and regional competitors. The scarcity of spectrum plays a major role in diminishing a situation of competition within the Canadian wireless market. This is because the incumbents, which usually associate with a significant capital power and resources in comparison to smaller new potential entrants, have greater ability to win more spectrum and thus to maintain their strong presence in the market.

## **2) Investing in wireless infrastructure**

The mobile telecommunications services sector, which comprises cellular operator firms, is capital-intensive (Bettis and Hitt, 1995). In addition to the cost of obtaining spectrum, mobile wireless providers also need to invest a lot of capital in order to have access to adequate wireless infrastructure facilities in the form of towers, antennas and cell sites (FCC 2018). New accommodating new mobile wireless technologies also requires the carriers to deploy additional cell sites. Investing in appropriate infrastructure is crucial for the success of expanding in the wireless market, but it requires capital and resources, which small providers usually lack.

Additionally, the adoption of 5G technology will likely strengthen this barrier significantly in the near future. The CRTC itself has acknowledged that *“one of the first steps toward the introduction of 5G technology is the construction of the cellular network*



*infrastructure that the technology requires. Going forward, carriers will continue to need to acquire and develop high-power cell sites where they can install radio equipment on ground-based masts, towers, rooftops, and other existing structures” (Telecom Notice of Consultation CRTC 2019-57).*

The Competition Bureau also recognizes the advantage of the incumbents (‘the Big 3’) over new potential entrants in terms of advanced infrastructure: *“The national wireless carriers and incumbent regional carriers have taken decades to construct their existing infrastructures, and thereby possess a considerable advantage over a new company attempting to establish or grow their presence in the wireless industry. Further, the large sunk capital investments already committed by the Big 3 make them very difficult to displac”* (Telecom Notice of Consultation CRTC 2019-57 — Further Comments of the Competition Bureau).

### **3) Telecommunications Act Restrictions on Ownership**

The Canadian ownership rule requires a corporation’s board of directors to be at least 80 percent Canadian and have at least 80 percent of the voting shares belong to Canadians (Telecommunications Act 1993. Part 2, Eligibility). It was included in the Telecommunications Act as an attempt to create a national telecommunications industry through Canadian investments by Canadian-controlled companies, in light of the rapid global growth of telecommunications in the 1990s.

However, this ownership requirement has discouraged foreign investors from entering or investing in the Canadian telecommunications market, thus eroding opportunities for competition. As a result, policies that aimed at promoting competition in the telecommunications industry did not achieve their objectives. For instance, the 2008 spectrum auction that aimed at allowing new entrants to enter the market was not sufficiently effective in sustaining strong competition. This results from the ownership restriction limiting potential entrants from participating in the 2008 spectrum auction, thus blocking potential strong carriers from competing ‘the Big 3’.

Limiting the number of bidders has an important impact on the creation of a competitive market. Foreign investors usually have greater access to capital funding than local investors, which could be used for acquiring more licenses at a higher cost per user. Otherwise, they will choose to invest their resources in other markets outside of Canada, thus diminishing the country’s competitiveness.

Regulators such as the CRTC have avoided taking drastic actions that could improve competition in the market. Before the Act was amended in 2012 many potential entrants had been blocked from entering the market. The 2012 amendment to the Canadian operational requirements in the Telecommunications Act allowed companies to operate in Canada with significant foreign investment as long as “it has annual revenues from the provision of telecommunications services in Canada that represent less than 10 per cent of the total annual revenues, as determined by the Commission, from the provision of telecommunications services in Canada” (House of Commons of Canada, 2012, s.595; Telecommunications Act, 2012). Even with the 2012 amendment, the existing ownership

provision still prevents large multinational wireless corporations like Vodaphone and AT&T from instantly disrupting the market or claiming a significant stake in the Canadian wireless industry.

## **Conclusion**

As I showed above, several barriers to entering the mobile wireless market exist. They also seem to complement each other. The strict regulatory framework, which generally favours Canadian investors, not only discourages foreign investors from investing in the market, but also discourages them from even trying to enter the market. To be more specific, investors are not eager to invest a huge amount of capital, which is needed in order to obtain enough licenses of spectrum and to establish appropriate infrastructure, as a result of the regulatory barriers foreign investors need to face with. In conclusion, not only these barriers block the entry of new providers, but they also prevent the expansion of those providers, thus allowing the incumbents to secure their market share.

## **Policies to stimulate competition**

As discussed above, the Canadian wireless market suffers from a lack of competition, which is associated with higher prices and fewer choices. This reflects significant market power that the three incumbents possess in the wireless market. The fact the mobile wireless industry is capital intensive, combined with regulation that clearly discriminates between local and foreign investors, also adds to the diminishment of competition. Therefore, when looking at possible policies that might encourage competition in the mobile wireless market, it is important to examine whether the policy addresses the barriers to entry as described above. To be more specific, the suggested policies should ease, on the one hand, the entry process of new entrants into the market, but at the same time assure the expansion of those new entrants by encouraging investment. Although the difficulties with comparing different wireless markets internationally, as every market is linked to different conditions, it might be helpful to look at different country experiences, which have had to deal with similar challenges to those the faced in the Canadian market.

### **1. Mandating Access of MVNOs**

One possible policy to consider is to allow for the access of MVNOs, which are mobile virtual network operators, that lease spectrum from MNOs (Mobile Network Operators who are the carriers). The OECD defines MVNOs as “*mobile network operators without a spectrum license*” (OECD 2014, 71), whereas the FCC defines MVNOs as “[MVNOs] *do not own any network facilities, but instead purchase mobile wireless services wholesale from facilities-based service providers and resell these services to customers*” (FCC 2018, 5).

Although the definition of an MVNO definitely may vary due to the different extent to which MVNOs are dependent on the facilities of the MNO, the main characteristic of

MVNOs is that they do not own spectrum license, and thus they use the MNOs' facilities in order to provide mobile wireless services to their customers. MVNOs can distinguish their plans from MNOs by bundling their service with other products, offering different pricing plans for consumers or building a good reputation through a better customer service. In recent years, there has been a growth in the presence of MVNOs throughout the world, with the global MVNOs sector grew by 10.9 per cent between 2014 and 2018, to reach a volume of 271.3 million subscriptions (MarketLine 2019).

### **Ways to mandate MVNOs**

Two different approaches are used to impose MVNOs policy: a merger remedy or regulatory intervention.

The merger remedy requires MVNOs access to be mandated as a condition of merger. The regulation aims to prevent activities that erode competition in the market, such as mergers of carriers, which increase prices and reduce consumers' choice. With this form of regulation, the mandated access is imposed on the acquiring firm, which is typically the stronger party of the merger agreement. The past experience with this kind of regulatory regime is mixed, as will be examined in instances below.

In contrast to merger-remedy policy, regulatory intervention increases competition in the market by providing consumers with more choices at affordable prices. Mandating access of MVNOs is done through obligations on spectrum licensing, regulatory backstops and wholesale rate regulation. This form of regulation is less common than the merger remedy and is usually used only when negotiations between MNO and MVNO fail.

To sum up, the former intends to prevent lessen of competition by demanding the acquiring firm to mandate MVNOs, thus "punishing" it for getting a larger market share. The latter aims to increase competition in the market through regulation by expanding the competitors number in the market, thus allowing consumers a wider range of choices.

### **Advantages and Disadvantages Mandating MVNOs**

#### **Advantages**

##### *a. Segmentation*

MVNOs usually target specific segments of the population that are being neglected by the big carriers, thus addressing specific communities' needs. For example, they may offer services to seniors or residents of rural areas, who usually are not served by the major MNOs. This allows more equality, and also a price reduction for weak segments of the population, such as low-income subscribers. MVNOs also tend to provide services to low-income subscribers through lower prices (discount), and immigrant communities (ethnic). In its comments to the telecom notice of the CRTC, the Competition Bureau referred to a recent study of nearly 1,500 MVNOs around the world prepared for the New

Zealand Commerce Commission (NZCC study), which has found that the most common segments targeted by MVNOs include: discount (22 per cent), retail (17 per cent) and ethnic (12 per cent) (Competition Bureau 2019, 190, 15).

Specific instances and their consequences will be discussed in the part below, but here the following is illustrated. In the U.S. mobile wireless market TracFone Wireless offers pre-paid service, a successful model that has helped the firm gain more than 10 million customers. Jitterbug has entered the market with a focus on seniors, and consequently *“this proliferation of services has allowed mobile access to spread quickly and to niches as well as the mass market”* (Ehrlich, E., Eisenach, J., and Leighton, W. 2010, 9). Another very popular niche are students. For instance, Lycamobile- an MVNO from the U.K- offers affordable student plans to various customers across the world. One way to look at this is by comparing this business model to Fintech technology companies, who usually provide chase flow services to small businesses and organizations, which do not often receive financial aid from banks due to the absence of profitability for the banks.

MNOs are able to benefit from this model segmentation by selling unused capacity<sup>14</sup> to customers that are more difficult to capture under existing marketing and pricing plans, thus able to extend their market to unexplored niches. As concluded from Abernathy and Clark (1985), serving new segments may encourage innovation, and thus the emergence of new technologies.

The benefit to the MVNO is that they do not have to invest in large mobile networks. However, their margins tend to be slim and their operating models need to be efficient in order to generate sufficient operating cash flows.

#### b. Lower Price

As mentioned above, one of the main barriers to competition is the high cost of investing in establishing the wireless network. These costs include purchasing spectrum and investing in appropriate equipment and infrastructure. The high cost of investment results in higher prices for consumers. However, MVNOs avoid these costs, as will be discussed below. As a result, they need to invest less resource and capital, thus allowing themselves to operate in lower costs.

As discussed earlier, spectrum is a scarce resource. As such, it can be sometimes very costly to purchase portions of it, in addition to the cost of managing it. To illustrate, according to a study by GSMA, from 2008-2016, during the time when auctions for 4G technology became common, the average final price of spectrum sold at auction increased by 3.5 fold (GSMA 2017, 3). Moreover, the GSMA study also found a link between high spectrum costs and high prices for consumers of cell phone plans, thus deterring consumers' satisfaction. Consequently, high spectrum prices have serious consequences for consumers.

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<sup>14</sup> Capacity refers to amount of data a given portion of the spectrum can transmit in a given period of time.

MVNOs are able to overcome these correlations by just leasing some portion of that spectrum from the MNOs, thus avoiding the high costs of purchasing it. In addition to the costs of purchasing and managing spectrum, mobile network operators are required to invest in infrastructure and equipment that will allow them to provide their consumers with quality services. For example, the average cost of building the cell-tower alone is estimated to be between \$100,000 and \$350,000 USD (Foster 2015).

As mentioned earlier, these costs are expected to increase due to the deployment of the 5G technology and the growing number of subscribers around the world. Some types of MVNOs are able to avoid from this investment, since they do not own the network infrastructure. That being said, certain MVNOs are less dependent on the MNOs infrastructure, and thus they do invest in their own network.

Past experience has shown that MVNOs charge lower prices. For example, Pavel Prochazka of the University of Economics in Prague finds that market liberalization accompanied with technological development, which allowed the emergence of MVNOs, have contributed to price reduction for mobile wireless services in the European market. Pavel also shows that a correlation exists between price reductions for mobile services and the growing number of MVNOs.

Further below, I will examine some specific case studies of mandating access of MVNOs, and whether it has effect on prices. MVNOs have the ability to compete with facilities-based carriers on the characteristics that concern those who are most vocal in calling for new regulations, i.e., they can pursue “nondiscriminatory” business models if they believe that is what consumers want.

## **Disadvantages**

### *a. Discouraging Investments in the Market*

One of the common concerns around mandating MVNOs access relates to the possible discouragement of investment made by MNO's in the mobile network infrastructure. MVNOs do not purchase spectrum and most of them do not establish their own infrastructure, but rather they use the MNOs' network.<sup>15</sup> Consequently, MVNOs do not take the same risks as MNOs take when the latter invest a significant amount of capital in building infrastructure and purchasing spectrum. MNOs thus may be less eager to invest capital, in the fear that it will serve its competitors. Less investments in the mobile wireless network could therefore have severe consequences for the consumers.

To illustrate this, the relationship between capital investment and its effect on the consumers is examined. R. Banker, C. Zhanwei, M. Nirup and R. Mudambi (2013) test the link between capital expenditure over a period and firm performance measures such as productivity and price recovery, by using quarterly data from 30 major firms in the

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<sup>15</sup> The MVNOs sign agreements with the MNOs at wholesale rates and then sell mobile services at retail rates. This is a lot cheaper than purchasing spectrum, establishing the facilities and distribute mobile services across the country. The MVNOs purchase only portions of the MNOs' spectrum, so it is a lot cheaper.

mobile wireless services from 1996 to 2005. The authors find that capital investment has a positive association with productivity for both the short and long durations, which means that low levels of investment reduce consumers' satisfaction. They also find that capital investment has a negative impact on price recovery, which refers to a firm's ability to charge high prices to its customers as well as its ability to pay low input prices to suppliers. As a result of that negative impact, higher levels of investment benefit the consumers by increasing their welfare.

The international experience with regard to the link between MVNOs' entrance and reduction in investment in the mobile wireless market is mixed. A study by Annukka Kiiski and Heikki Hämmäinen of the Helsinki University of Technology (2015) found that the arrival of new MVNOs in the Finnish mobile services market has slowed down the development of the industry but not spoil the business opportunity and investments in the field (, ). A study by Kim et al, (2011) which examined data from 21 OECD countries from 2000-2008, argues that mandated MVNO access was associated with lower investments by MNOs.). However, it is important to emphasize that lower investment does not necessarily mean a worse outcome for the consumers. Additionally, the study analyses only 6 instances, while MVNOs' presence across the world is significant.

The link between MVNOs access and lower levels of investment can be vague, as concluded by the Competition Bureau, who through its research *“did not find conclusive evidence from other jurisdictions of reduced investment incentives resulting from mandated MVNO access”* (Telecom Notice of Consultation CRTC 2019-57 — Further Comments of the Competition Bureau). The Bureau also mentions that it did not find any reduction in investments in markets where mandating MVNOs was associated with a reduction in prices. Further, the Bureau indicates that in several countries, where mandated MVNO access has proven to be effective in price reduction, there has not been any significant decrease in the investment levels (220).

Another evidence of the weak link between growing number of MVNO and levels of investment can be found in data presented by the FCC report, which show that wireless service providers made capital investments of \$28.5 billion in 2017, an increase of approximately 2.3 per cent from the \$27.9 billion invested in 2016. This occurred despite the growth in the number of MVNOs in the American market in the same period (FCC 2018, 20).

Overall, it is not clear if mandating MVNOs would discourage investment. It has been an issue raised by the incumbents though (Telus CEO says \$1 billion of spending and 5000 jobs at risk if CRTC pushes MVNOs – Canadian Press 2020).

#### b. *Lowering Quality of Service*

MVNOs may provide customers with a relatively lower level quality of services, which include factors such as slower download speed and upload time. For example, a report by

Tutela, an independent mobile quality measurement company based in Canada, found that download speeds on MVNO networks in the U.S. mobile market are, on average, 23 per cent worse than on the host operator (Tutela 2018).

A study by Zarinni et al (2014) compared the performance of MVNOs and MNOs for three key applications: web access (upload speed), video streaming and voice. The study finds that some MVNOs have performed a lower level of performance in comparison to MNOs ). In terms of customers' satisfaction, it is found that MVNOs may have better results than MNOs. For instance, according to the American Customer Satisfaction Index's (ACSI) report, costumers have better opinion of MVNOs than they have of MNOs. According to the report, consumer satisfaction comes down to factors such as flexibility, pricing, and value propositions. In addition, the report found that MVNOs main advantage is at ease of billing, which plays a main role in consumer satisfaction.

Further, David VanAmburg, managing director at ACSI, noted that network quality does not play a significant role in differentiating between MNOs and MVNOs that use the same networks (Chamberlain 2019).

### **International Experience**

In order to examine the real impacts of MVNOs on the mobile wireless market, I will look at instances in which MVNOs have allowed access. The examination will consist of experience in the following countries: United States, Australia and the EU (Spain and Germany). The reason these countries are chosen is that they have a significant presence of MVNOs as well as having a large land mass and population density similar to Canada. Each of these countries has implemented MVNOs access in a different way, and so it will be helpful to learn from their experience.

#### *United States*

The U.S. is the country with the highest number of MVNOs: 139 MVNOs as of 2019. Among the various MVNOs, the largest one has approximately 23 million subscribers (FCC 2017, 5). Consumer Cellular is a mobile virtual network operator, which operates through AT&T and T-Mobile, mobile networks. The company offers cellphones, no-contract cellphone plans and accessories with a focus on users aged 50-plus. The company also resells AT&T wholesale wireless services to other virtual operators. The company's reputation of focusing mostly on elderly consumers was enhanced by the creation of GrandPad, a touch-screen tablet designed specifically for older people, giving them the possibility to make video calls, view photos and consume news easier than before. As mentioned above, Jitterbug has also entered the market with a focus on seniors.

It seems that the policy of mandating the access of MVNOs has achieved its objectives. In 2017, the FCC approved a report that found that there is "effective competition" in the American wireless market for the first time since 2009 (Sherpadson 2017). Evidence also suggests that MVNOs and their host carriers (the MNOs) have been cooperative. For example, Obile virtual network operators (MVNOs) riding on Sprint's network already

have access to 5G in one city, with additional markets planned soon. Sprint historically has been a favored partner for MVNOs, and T-Mobile executives have promised that if the pair's proposed merger happens, MVNOs won't be left in the cold (Fletcher 2019).

### *Australia*

In Australia, MVNOs have a significant presence, with a combined market share of around 13.5% (ACCC 2018, 24). This market share has grown rapidly in a relatively short period of time, from 8.4% by the end of 2009 to 13.5% by the end of 2012 (Roy Morgan 2013). This increase in the presence of MVNOs can be explained by one of the main characteristics of MVNOs that was mentioned earlier: the ability to reach less-served segments of the population. In Australia, many MVNOs connect to non-mainstream customers that the large MNOs would not otherwise target themselves, such as younger or older customers, foreign visitors, and price-sensitive consumers. Moreover, MVNOs benefit the large MNOs as well, as the latter are able to outsource the customer service and marketing to the MVNO, and still derive profit indirectly from MVNO customers through wholesale access (Richardson and Shailer 2016). There is evidence that MVNOs in Australia are able to compete with the national carriers. For instance, in November 2015 it was reported that the rise of MVNOs' presence led to a drop in overall market share for one of the largest incumbents in the Australian market-Telstra (Takken 2016).

A good example of a MVNO that has brought diversity to the Australian market is TPG, considered by The ACCC as a strong competitor. TPG has been able to conduct aggressive pricing strategies, enabling it to gain some market share (Mallis 2018). For example, in April 2018 TPG refreshed its mobile phone plans to offer 65 per cent more data and a \$0 SIM fee (TPG 2019).

While there is no any specific pricing information in relation to wholesale MVNO services, respondents to a survey conducted by the ACCC in December 2017, stated that the price of the mobile services had either decreased or stayed at the same level. Moreover, no respondents experienced any increase in the price of mobile services provided by the MVNOs (ACCC 2018, 58). In addition, most of the MVNOs seem to provide a good coverage, with Telstra's wholesale MVNO service providing a coverage area of 98.8 per cent of the population, whereas Telstra's covers about 99.3 per cent of the population (ACCC 2018, 60).

Despite the common claim of mandating MVNOs would discourage investments in the market, according to the ACCC, all three national carriers announced their intention to accelerate their network investment in 2017 "*improve their coverage, capacity and performance*" (ACCC 2018, 35). The MNOs' announcement, combined with the current deployment of 5G that is already taking shape, illustrate that the implementation of an MVNOs solution need not necessarily discourage investments by the incumbents. Furthermore, the growing investments by the incumbents suggest that they are trying to stay competitive in light of the growing number of MVNOs.



## *Spain*

Spain's experience with MVNOs begins in 2005, when the CMT<sup>16</sup> found that the three national incumbents –Telefónica, Vodafone and Amena (the MNOs) – dominated the telecommunications market in Spain (CNMC<sup>17</sup> 2017, 2). Similar to Canada, the main barrier to market entry is access to radio spectrum. The CMT therefore required the three national carriers provide third parties (MVNOs) access when receiving a reasonable request and charge reasonable prices (2017, 2).

Following to this decision, the CNMC found that mandating access for MVNOs allowed the entrance in the retail market of a large number of MVNOs. Consequently, as of 2017, there are 33 MVNOs active in the Spanish market which have a joint share of 10.7 per cent, and a fourth MNO, Yoigo, which currently holds a share of 6.4 per cent. As a result, the CNMC observed that, between 2011 and 2016, retail prices significantly decreased (CNMC 2017, 3).

However, this decrease in prices led to a decline in revenue per minute of the wholesale voice call origination service by more than 75 per cent, which may indicate that mandating MVNOs access indeed makes the incumbents worse off (CNMC 2017, 4). That said, the growing number of MVNOs also led to the top three carriers in the Spanish market to launch their own flanker brands in order to target previously neglected segments, such as low-budget and youth markets (CNMC 2017). This shows that the entry of MVNOs does help to accelerate mobile usage and thus the availability of high level of mobile services to different types of consumers.

In 2017 mandated MVNO access was deregulated, as the CNMC found the market had achieved “effective competition”. Of course, if operators unreasonably remove access or sharply raise costs for the MVNOs, CNMC had the authority to intervene under Spanish competition law. While the majority of the early MVNOs in Spain was competing on discounted pricing, there was also MVNOs specializing in niche markets segments, such as emigrants providing cheaper international calls or Internet access.

Although the concerns regarding the lack of investment in the market due to mandated access given to MVNOs, data show that there has been an increase in the total investment in the sector, (3.8 per cent higher in 2018 than in 2017 (CNMC 2018, 4)). It seems that the costumers of the Spanish MVNOs enjoy the same advanced technology that MNOs offer to their customers. For example, in 2018 4G speed was available through the services offered by the MVNOs, as a result of access agreements signed with their host operators (CNMC 2018, 122). Other evidence for the growing investment in the Spanish market has been the rolling out of new LTE base station which supports advanced mobile services. In 2018, the MNOs rolled out a total of 47,669 LTE base stations, a 15.9 per cent increase compared to the previous year, with expanding to areas outside the major

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<sup>16</sup> Comisión del Mercado de las telecomunicaciones” (“CMT”). CMT was a sectorial regulator, later integrated into the current CNMC.

<sup>17</sup> CNMC- Comisión Nacional de los Mercados y de la Competencia, an independent authority that is responsible to assure a state of free competition in Spain.

cities (CNMC 2018, 24).

Mandated access for MVNOs has resulted in a decline in the number of employees in the sector (CNMC 2018, 20) although this could be driven by the adoption of new capital-intensive technologies. It is worth noting that although the early decline in prices, since 2017 there has been an increase in prices during 2018, with prices raised by 2.3 per cent, higher than seen in 2017, when they rose by only 1.3 per cent (CNMC 2018, 35). However, this increase is accompanied by significant improvements in the quality of the services.

### *Germany*

Germany has vast presence of MVNOs, given its friendly regulatory environment. According to MarketLine Industry, their market share of mobile subscribers is expected to significantly grow and reach 22.2% by 2022 (MarketLine 2020, 27). The access of MVNOs was mandated as part of a 'merger-remedy' regulation. Consequently, before it could acquire E-Plus, Telefónica was required to sell up to 30 per cent of its network capacity at a fixed price (European Commission 2014).

The evidence whether the access of MVNOs into the German market has promoted competition is mixed, however. On the one hand, Germans users enjoy more choice than in the past. For example, Vodafone- one of the largest carriers in Germany- has offered its services with generous discounts to new consumers aged 18 to 28. This resulted from competition with low-cost MVNOs that target price-sensitive consumers (Market Line 2020, 24). Additionally, shortly after mandating MVNOs access, MVNO Blau, which entered the German mobile market in September 2005, announced that it will launch its second price plan 'Blau World' at the end of April 2006. This price plan offered international calls to a number of destinations such as China, Estonia, Japan, Poland and Russia as low as 9 cents per minute. Low rates were also offered to the Ukraine (15 cents per minute), India (19 cents per Minute) and to Turkey (29 cents per minute). The aim of this price plan has been to ensure that users calling back home use the mobile phone rather than calling cards or special telephone booths. With this strategy, MVNO Blau was able to capture a specific segment of immigrants.

On the other hand, Pareto Securities shows that consumers did not benefit from the amplified competition and are paying high fees for small amount of 4G data compared to EU and OECD countries (Pareto Securities 2018). A report conducted by BEREC also shows that there has been an increase on prices for medium and high baskets of services following the merger (BEREC 2018).

Furthermore, it seems that there are some differences between MNOs and MVNOs quality of service. According to Opensignal's report that analyses users' 4G speed experience, there are differences in both download and upload speeds experienced by the users. For example, the report found that users connecting all MVNOs, on average, experienced 4G download speeds 23 per cent slower than users connecting on the host networks (the MNOs). Similarly, the data shows that MVNOs users experienced slower upload speeds by 20 per cent on average than users on the MNOs network (Opensignal 2020).

Overall, the policy of mandating MVNOs access does not seem to diminish investments in the market, although the German experience shows that the effectiveness of mandating MVNOs as part of a ‘merger-remedy’ might be limited. According to the main regulator in Germany, investments in fixed assets in the telecommunications market increased once again to €9.0bn in 2018, thereby surpassing the 2017 level by €0.5bn (Bundesnetzagentur 2018, 46.) In addition, there has been an increase in the number of users enjoying LTE coverage, indicating that the quality of services has maintained (Bundesnetzagentur 2018). According to Prochazka (year?) no clear link is established between the growing presence of MVNOs and the price reduction in the European market. The study states that the price reduction may be due to other factors, such as technological improvement, which resulting partly from the decreasing costs for long-distance calls, and regulatory measures.

### **MVNOs in Canada**

MVNOs in Canada are relatively few, as there appears to be no market-based appetite to provide MVNO access amongst MNOs.

In its 2015 Wireless Framework, the Commission confirmed the limited impact of MVNO arrangements when it observed the following: *“the national wireless carriers have exhibited limited interest in providing potential MVNOs with access that would enable the provision of retail mobile wireless voice, text, and data services on a national or regional basis. The Commission considers that the inability of these parties to negotiate access to necessary wholesale inputs demonstrates that there is no rivalrous behaviour between the national wireless carriers in the provision of GSM-based wholesale MVNO access at the national level”* (Telecom Regulatory Policy CRTC 2015-177).

The Commission also determined that it was necessary to regulate the domestic Global System for Mobile communications (GSM)-based wholesale roaming services that the “Big 3” provide to other wireless carriers. The Commission directed the national wireless carriers to provide wholesale roaming flexible condition, thus allowing mobile users to roam between the networks. This is due to its findings that (i) to refrain from such regulation would not be consistent with the policy objectives set out in section 7 of the *Telecommunications Act*, and (ii) wholesale roaming by the national wireless carriers is not subject to a sufficient level of competition to protect the interests of users. The Commission directed the national wireless carriers to file proposed wholesale roaming tariffs for approval. Given the potential to negatively impact facilities-based investment, however, the Commission determined that it would not be appropriate to mandate wholesale MVNO access.

The Internet Society Canada Chapter (ISCC) submitted that allowing MVNOs to operate in the Canadian market would enable these providers to target market niches, such as low-income households, that are currently neglected by the large national carriers (CRTC 2018, 27). However, wireless carriers and the Canadian Wireless Telecommunications Association (CWTA) opposed this notion, stating that mandating MVNOs access would not have a positive impact on the affordability of wireless services (CRTC 2018, 31).

Despite the strong resistance to MVNOs in Canada, the study by Wall found that in 2019 resellers (MVNOs) charged lower fees than the incumbents for Levels 2 (-32.17 per cent), 3 (-5.26 per cent) and 4 (-3.64 per cent). However, it needs to be noted that there is no available data for Level 5, and that MVNOs' fees were slightly higher than the incumbents' for Level 1 (+2.93 per cent). Additionally, there seems to be a regional variation among the provinces, with prices often higher than incumbent prices in Quebec, Manitoba and Saskatchewan- the provinces where there are strong regional operators (Wall Inc. 2019. Table 5). This means that MVNOs may pose a lower level of competition than regional carriers, as shown elsewhere in Chart 1.

### **What will effect on the success of MVNOs**

As discussed earlier, quality of service is a very important factor in determining whether a market is competitive and hence satisfying its consumers. Consumers are not keen to use mobile services when they experience low levels of quality, such as long delays and slow uploads (A. Aladwani, and P. Palvia, 2002). Customers' perceived quality is particularly important in the adoption of MVNO because MVNO has targeted providing quality of services.

Switching cost is also related to the customers' intention to adopt MVNO. For example, a study by Dong-Hee Shin of the Sungkyunkwan University in South Korea (2010) shows, similar to prior studies that switching costs play a vital role in consumers' decision whether to adopt mobile services provide by MVNOs in addition to factors such as quality of service and usability concerns. They conclude "*customers may be less inclined to switch when financial, social and psychological costs are involved* (Shin 2010, 621)." However, in contrast to previous research, Shin's study suggests that consumers may expect services provided by MVNO to be more customized to their specific needs and relatively accusable, thus indicating that MVNOs need to be much more efficient and innovative than MNOs (Shin 2010, 627). Most successful MVNOs are also those have the ability to find a perfect match between their core characteristics and the needs of specific groups that had not been previously fulfilled (Chorocheer, N., Lasio, L. 2013, 1122).

Another factor that affects the level of success of MVNOs is the willingness of MNOs to share capacity with third parties. For example, according to the NZCC study, the willingness of MNOs to share their capacity has been the most significant commercial driver for a successful MVNO policy (Competition Bureau, 2019). One way to increase the MNOs willingness is by building a close relationship with MNOs and aiming at forging a fair contract which would lead to a 'win-win' situation (McKinsey & Company Telecom 2014).

### **Factors to Consider before Mandating MVNOs entrance**

As concluded above, there are several trade-offs to consider before deciding whether mandating MVNOs is the right policy to deal with the lack of competition in the mobile wireless market. First, policymakers should determine whether MVNOs entrance would help to decrease mobile wireless services prices that consumers pay, thus benefitting the general public. Second, one should consider if MVNOs in the market could provide quality services to segments of the population that currently are being neglected by the

big cell phone companies. Third, policymakers should also investigate whether mandating MVNOs access will negatively impact on investments in the market. And finally, there is a need to look at the impact of MVNOs on the big cell phone companies themselves.

Therefore, before deciding to mandate MVNOs, it is worthwhile to consider the ability of MVNOs to: 1) reduce prices, 2) gain a share of the market while maintaining consumers' satisfaction, and 3) not discourage investment.

### **Facilities-based Competition**

While mandating MVNOs access is considered a regulatory solution to the lack of competition in the Canadian mobile wireless services market, a facilities-based (AKA an infrastructure-based) is considered a policy that relies on market forces. In a facilities-based competition (FBC), the carriers own their own infrastructure and network, which is purchased by the carriers as discussed above. Another way to think about the difference between FBC and MVNOs is that the former is a facility based-competition whereas the latter is a service- based competition.

To be considered a facilities-based service provider, a firm must provide services by using solely or predominantly its own facilities. A FBC policy might be chosen because of the limited ability of MVNOs policy to improve overall market performance due to the discouragement of investing in the construction of facilities.

The OECD started tracking broadband adoption rates in the late 1990s, and by 2001, recommended that the best way to encourage broadband access was by spurring infrastructure competition (OECD 2001). This focus on fostering competition as a means to increase innovation and investment in the broadband market continues (OECD 2008b), supported by evidence that facilities-based competition in particular has been effective in increasing broadband penetration in OECD countries. Facilities-based policy is believed to accelerate innovation and competition more than MVNOs policy, thus resulting in increased broadband penetration rates (OECD 2008b).

According to the FCC, facilities-based entry generates 'greater benefits' than MVNOs entry because the former signals a credible commitment to stay in the market:

*"Moreover, in some areas, we believe that the greatest benefits may be achieved through facilities-based competition, and that the ability of requesting carriers to use unbundled network elements, including various combinations of unbundled network elements, is a necessary precondition to the subsequent deployment of self-provisioned network facilities"* (FCC, Third Report and Order and Fourth further Notice of proposed Rulemaking, 1999. P. 5).

The international experience in wireless markets has shown that the competitive process generally achieves favorable outcomes. This finding is reflected in work by the OECD (a Mobile Network Operator is a facilities-based carrier):

*"...in countries where there are a larger number of MNOs, there is a higher likelihood of more competitive and innovative services being introduced and maintained"* (OECD, Directorate for Science, Technology and Innovation Committee on Digital Economy Policy, 2015. P. 5).

There is less cause for concern that vigorous competition stemming from facilities-based competition would lead to a reduction in investment, innovation, and quality. For instance, as the OECD has stated, the experience in other countries has been that:

*"...in markets introducing new players or maintaining at least four operators, investments in new network infrastructure increase and are pulled forward by existing operators, to defend against challengers"* (OECD, Directorate for Science, Technology and Innovation Committee on Digital Economy Policy, 2015. P. 9)."

According to a study commissioned by the Competition Bureau, Canadians see meaningful benefits when facilities-based wireless disruptors achieve a scale of at least a 5.5 per cent market share, and these benefits are substantially greater where a wireless disruptor reaches a 20 per cent market share (Competition Bureau, 2019, 234). The Competition Bureau concluded that as a result of coordinated behavior among Bell, TELUS and Rogers, mobile wireless prices in Canada are higher in regions where the "Big 3" do not face competition from a strong regional competitor.

A report prepared for Bell Canada by CRA International, found that there has been a strong correlation between the level of facilities-based competition and market outcomes that benefit consumers (CRA 2007). For example, the report found that broadband penetration is generally higher in countries with higher facilities-based competition, and that higher level of this kind of competition also leads to better broadband price/performance outcomes. Further, the CRA report also found that facilities-based competition leads to better market outcomes than wholesale regulation (AKA MVNOs). For instance, the report shows that the penetration rate is almost universally higher in countries that promote facilities-based competition than countries in which wholesale regulation is preferred. These results also indicate that broadband price/performance outcomes are generally better in countries with lower levels of wholesale regulation and higher levels of facilities-based competition.

## **International Experience**

### *Australia*

Following the entrance of a fourth carrier (MNO), Hutchison-3, to the Australian market in 2003, the ACCC found that the new entrant played an important role in driving prices down. However, it was found that Hutchison-3 had network capacity constraints, and would need to undertake substantial investments in network facilities in order to continue to compete aggressively for mobile broadband customers (OECD 2014, 26).

In April 2017, it was announced that TPG Telecom will build its own mobile network,

thus becoming the fourth MNO in Australia (Hatch, Patrick., and Battersby, Lucy. 2017) Consequently, there has been intense competition in terms of data plan offerings (MarketLine Industry 2019). For example, in mid-2018, Telstra launched “unlimited” data plans, with Vodafone following, while TPG increased its allowances by 65 per cent, thus allowing consumers more options and choice.

Neither did the increased facilities-based competition in Australia, following the entrance of TPG, erode the vast investment needed in the telecommunications market. On the contrary, according to the Marketline report, the leading carriers continued to invest in expanding their network coverage. For instance, Optus reportedly invested AU\$1.5bn in 2017 to expand its 4G network and introduce 4.5G, while Vodafone Hutchison spent AUD2bn for the same purpose. Telstra announced the deployment of 577 new 3G and 4G base stations to improve coverage, while TPG, the new player, spent AU\$1.9bn (US\$1.5bn) to complete its network coverage across Sydney, Melbourne, and Canberra by mid-2018. 5G is now in operation in Australia, as of 2019, and coverage will continue to expand.

The reports concludes that competition in the Australian telecommunications market will increase to the extent that new firms can enter the market if additional radio spectrum is made available for commercial wireless services, thus allowing more facilities-based competition. However, the most effective disruption comes from the leading MVNO in the market (Amaysim, MarketLine 2019).

#### *United States*

According to William Lehr of MIT, the entry of more carriers has accelerated the decline in prices consumers experienced in the United States. He notes that *“cellular prices fell 3 to 4 per cent per year from 1984-1995, but following entry of the new carriers, prices fell 17 per cent per year, and the new entrants offered prices that were “more than 50 percent lower than existing cellular rates (Lehr 2014, 15).*

Lehr estimates that without accelerating a policy of facilities-based competition in the U.S mobile wireless market, prices would be at least 10 per cent higher (Lehr, 2). He illustrates this, by showing the significant reduction of the average monthly bill for mobile services in the U.S, which fell from \$63.53 (Dec94) to \$48.73 (Dec12), or 1.5 per cent per year for the last two decades (Lehr, 5). Lehr also links between the growing facilities-based competition and the technological improvement that the mobile wireless market has experienced.

A consensus is reached among researches about the positive correlation between growing facilities-based competition and higher broadband penetration (Choi 2011). It indicates the contribution facilities-based competition has in regard to assuring more groups can enjoy high level of mobile services. Facilities-based competition also leads to subsequent investment by incumbents and that the greater investment by the incumbents invites additional facilities-based entry (Woroch 2000).

## *Korea*

In South Korea, there is an intense competition among the three main carriers: KT, Dacom Powercomm, and Hanaro Telecom, reflecting the Korean government's continuing efforts to promote competition in the mobile wireless market. For example, in 1997 the South Korean government licensed a new telecommunications service provider to compete directly with KT, which was government-owned during that time. Thus, in 1998 seven South Korean conglomerates provided funding to create Hanaro Telecom, which by 1999 began offering broadband services (Atkinson, Robert D., Correa, Daniel K., Hedlund, Julie A. 2008).

The government's encouragement of facilities-based competition, while exempting KT from regulation, provided the impetus for competition in areas that are important for determining the level of competition, such as competitive prices, appropriate infrastructure and high level of services. For example, one of the largest carriers in Korea, Hanaro, launched high-speed service in 2002, with 20 Mbps downstream speeds and 6 Mbps upstream, which was considered a revolutionary step at that time. Other incumbents, such as KT, followed with their own unique services in 2003 with 50 Mbps downstream and 4 Mbps upstream. These facilities-based competition policy also led to further mobile use, with more Koreans having online access (Atkinson et al 2008).

Facilities-based competition promoted rapid broadband diffusion within a short period of time. Between the late 1990s and 2002, the diffusion of mobile wireless services was at its peak due to the facilities-based policy imposed by the government during that period (Choi 2011). However, as Choi mentions, there a slow diffusion after 2002 with the shift from facilities-based policy to a MVNOs policy.

## **Canada: did FBC promote competition in the Canadian market?**

Over the years, the CRTC has consistently chosen policies with the view that *"facilities-based competition is the best means of ensuring that Canadians receive high-quality, affordable mobile wireless services provided over leading-edge wireless networks"* (Telecom Decision CRTC 2018-97, 67) . It further recognized that *"since 2015, there have been positive signs with respect to investment, since facilities-based competitors, both national and regional, have continued to invest in their networks. These investments have resulted in the latest wireless service technologies being made available to the vast majority of Canadians, with LTE technology available to 98.5 per cent of Canadians and LTE-A technology available to 83 per cent of Canadians"* (Telecom Notice of Consultation CRTC 2019-57, 28 February 2019, 36).

The growing presence of the regional carriers in some regions in Canada, such as Quebec and Saskatoon, provide clear evidence that the level of success of facilities-based policy, shows some sort of disruption of the status quo in Canada. In its testimony to the CRTC, Videotron claimed that its expansion in Quebec provides a clear example for the success of facilities-based policy, due to the significant decline in mobile services prices relative to the rest of Canada since it entered the market in Quebec (Quebecor, 25 February



2020). Indeed, as shown above, prices in Quebec tend to be lower than other provinces where strong facilities-based competition is weaker. In addition, Videotron's growing investment, \$2.5 billion between 2008 and 2020, on mobile spectrum and networks, indicates the positive link between growing competition in the form of facilities-based and investment in the market (Quebecor 2020).

The growing presence of regional carriers in Canada has fostered a situation of competition to some extent, which benefits the consumers. Hence, if further implemented, facilities-based competition might improve competition in the Canadian mobile wireless market.

## **Challenges**

Although facilities-based competition is thought to be desirable, it tends to be difficult to materialize because of significant upfront investments required for a new entrant to establish new infrastructure (A. Van Gorp, and C. Middleton (2010)). The entrant needs to immediately generate significant traffic volumes, attracting a large number of costumers concentrated around particular specific areas in order to be profitable or break even (K. Christodoulou and K. Vlahos 2001).

Another factor that poses challenges for fostering facilities-based competition is the lack of spectrum, as discussed above. Lehr (2014, p. 8) states that *“sustaining significant facilities-based competition in the mobile broadband market may prove more difficult in the future. The increased difficulty is due, in part, to the increased need for spectrum resources and the growing capital intensity associated with meeting the performance requirements of ever-faster and more capable mobile broadband services.”* He also notes that the need to build and sustain networks, through advanced infrastructure, requires substantial investments that may not be beneficial for many potential entrants. Advancement in innovation and technologies can create disruptions and regulatory uncertainty.

The OECD concluded with regard to Canada that *“there are, undoubtedly, challenges for any mobile carrier in covering such a large country with a small, often dispersed population outside major urban centers”* (OECD 2014, 26). Therefore, in order to address these challenges, a deliberate strategy is needed of which lowering barriers to entry or expansion as well as reducing consumer costs of switching carriers would all tend to stimulate competition among facilities-based carriers.

## **Policy Steps that might accelerate the success of both MVNOs & FBC**

Since both policy options, MVNOs and Facilities-based competition, have common challenges with implementation, it is necessary to consider various policy steps to achieve objectives:

## *An Efficient Allocation of Spectrum*

As noted above, available evidence suggests that spectrum holdings in Canada are concentrated among the national wireless carriers with Bell, Rogers and Telus holding 90 per cent of 700 MHz license (Joseph, 2018). Due to the requirements to manage spectrum as well as to ensure stable and continuous services, mobile markets are not typified by frequent market entry and exit.

However, currently, there are other options that could lower these entry barriers. These include implementing a policy of secondary markets of spectrum, which allows the spectrum lessee to trade their spectrum, enabling them to adapt to the changing traffic demand. For example, a spectrum lessee can sell some portion of its spectrum when the traffic demand is low and there is little benefit in having a large amount of spectrum. Then, the same lessee could use the money earned from the selling in order to purchase more spectrum when demand is high. By allocating spectrum through secondary markets, it is easier for mobile service providers to use it in a more efficient way by obtaining portions of the spectrum (Hong Xu, Jin Jin, and Baochun Li. 2010).

With regard to policy steps made by different countries, the international experience shows that in many jurisdictions there have been attempts to relinquish as much spectrum as possible. For example, the FCC in the United States has held approximately 100 auctions for spectrum licenses since 1994, through the implementation of “flexible use” of spectrum policies (such as secondary market). This can encourage more bidders to participate the spectrum auctions (National Academies of Sciences 2015).

It may be efficient to consider new policies that reduce concentrated spectrum holdings in Canada, thus allowing more carriers to hold a greater amount of spectrum. For example, Israel spurred competition in the telecommunications market among its mobile carriers by promising to refund bidder’s payments for spectrum after certain market share and population coverage thresholds were met, thus encouraging the carriers to be more efficient (Carney 2019).

### *Lower Switching Costs*

Lowering switching costs can be effective in spurring competition among Wireless carriers, as customers are able to switch among the various carriers, while carriers win more consumers when they decrease price and vice versa. That dynamic creates strong incentives to compete to sign up new customers and build a larger customer base. One possible policy through which switching costs could be reduced is by allowing users to keep their phone number while switching providers. Studies that have looked at the impact of imposing Mobile Number Portability (MNP) on mobile services, found it allows customers to keep their mobile number when they move to another provider. Thus, enabling MNP reduces customer switching costs and thereby increases the intensity of competition. For instance, an examination of the impact of MNP in Europe, where it

was introduced in 2002, and shows that it reduced prices by 7.9 per cent on average (Daegon Cho; Pedro Ferreira; and Rahul Telang. 2016).

The ways in which switching costs can be reduced are vary, and some of them have been implemented by the CRTC. Nonetheless, it seems that there is still room for further reduction in the Canadian market switching costs. Such a reduction can be achieved through measures such as SIM unlocking which allows customers to switch carriers more smoothly.

### *Roaming*

In 2011, the FCC ruled that data roaming must be provided “on commercially reasonable terms and conditions” (Reardon 2011), indicating the importance of mobile users’ ability to move freely across the different networks. In Canada, there are only two national networks, meaning that new entrants’ consumers must roam from their carrier’s network to other carrier’s consistently, thus facing with additional charges. Consequently, the ability of new entrants to compete the ‘big 3’ over costumers gets limited. An additional examination is needed with regard to the appropriate rate of roaming fees, but, no doubt, lower roaming rates will stimulate competition.

### **Conclusion**

Since both policies, facilities-based competition and MVNOs, have clear advantages and drawbacks, none of them will fully solve the challenges of the Canadian mobile market. Mandating MVNOs will diminish the high quality of the Canadian mobile services, while encouraging facilities-based competition will probably achieve limited results.

Allowing or encouraging network sharing, for example, may limit facilities based competition but if subject to certain conditions may expand services competition. For example, it may result in more offers in any particular location that enable users to have more choices than would otherwise exist on a geographical or national basis and the players operate in distinctly independent fashion (OECD 2014).

The viability and effectiveness of reseller and subsidiary competition depends on the vigor of competition for the wholesale network services that resellers rely on. National resellers need access to the networks of national facilities-based providers and having more than two facilities-based providers is important for ensuring competitive wholesale markets.

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