The Impact of Growing Mobile Telephony Penetration in Canada: Lots More Gross Domestic Product

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Executive Summary

Canada lags behind most other developed countries, including the United States, in mobile telephony penetration, measured in subscriptions per 100 population. In addition, the price of mobile telephone service is higher for most segments of the mobile telephone market.

This report discusses the potential economic benefits that Canada would have enjoyed with higher mobile telephone penetration, expressed in terms of Canada's Gross Domestic Product (GDP) over the past five years. The assessment is based on the conclusions from a 2005 study by Waverman et al.[1], and commissioned by Vodafone and the Leverhulme Trust. They found that the Canadian GDP would have increased by 1% as a result of a doubling of mobile telephone penetration.

Using this approach, the Canadian economy would have benefited by just over an estimated $56 billion, or 5.1% in increased Gross Domestic Product (GDP) by 2006, if the benefits of increased mobile penetration had started in 2002. Even more modest estimates of the effects of increases in mobile telephone penetration leading to GDP increases of ½% or ¼% result in estimated GDP increases of $27.7B and $13.8B respectively.

[1] Waverman, L., Meschi, M., and Fuss, M. (2005). The impact of telecoms on economic growth in developing countries (pp. 10-23). In Africa: The impact of mobile phones. The Vodafone Policy Paper Series, Number 2.

In line with the Waverman et al analysis, a GSM Association Press Release of February 14 2007[2] stated that the benefit would not be 1% but rather 1.2% for developing countries. Under this scenario, GDP would have increased by $67.5B in 2006.

Even if one questions the exact value of these estimates, the analyses suggest that the country would have been better off with a higher mobile telephone penetration over the past number of years.

Introduction

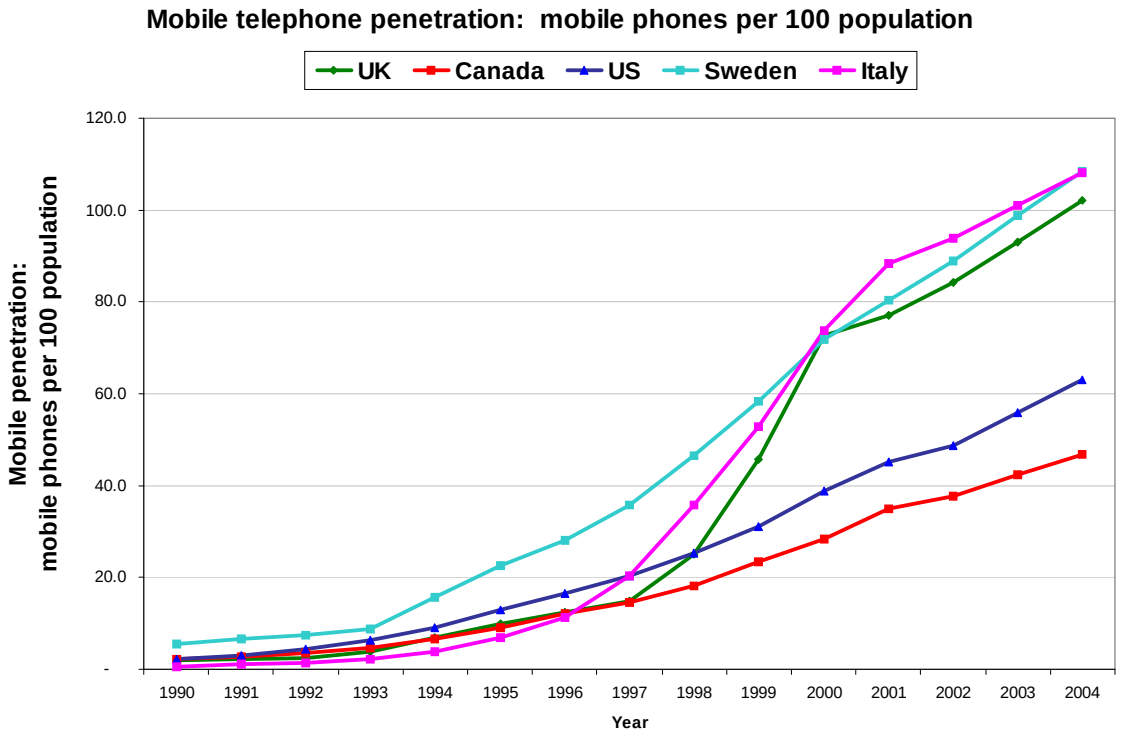
Canadian Mobile Penetration

Canada lags behind most other developed countries in mobile telephone penetration, as well as in the rates of growth of mobile telephony. Figure 1[3] shows that overall telephone penetration, measured as number of mobile telephones per 100 population, lags well behind that of other developed countries, including Sweden, the United Kingdom and Italy. By the year 2000, Sweden, Italy and the UK had all reached mobile telephone penetration higher than Canada's current penetration rate of 58 per 100 population[4]. The US had already met and surpassed the current Canadian mobile penetration rate by 2004, three years ago. Canada's lag in telephone penetration is also reflected in a study by McKinsey and Company who found that, controlling for real GDP per capita, Canada lags well behind all other developed countries[5].

The (Canadian) Telecommunication Policy Review Panel report, published in 2006 also arrived at a similar conclusion regarding mobile telephone penetration, even when limiting their comparison of Canada to the United States. As they state:

> … *an examination of the growth of wireless in the United States and Canada reveals a persistent and growing gap between the rates of the two countries. In addition to having lower mobile wireless penetration than the U.S., Canada has much lower usage of wireless services (page 1-19 and 1-20)*[6].

[2] GSM Press Release. 14th February 2007 (taken from the Internet May 2007) http://www.gsmworld.com/news/press_2007/press07_25.shtml
[3] International Telecommunications Union (ITU), Yearbook of Statistics (Geneva), www.itu.int [code 36]
[4] Canadian estimate of 58% is derived from the Canadian Wireless Telecommunications Association website (June 6 2007) http://www.cwta.ca/CWTASite/english/index.html
[5] McKinsey and Company. Wireless Unbound. The Surprising Economic Value and Untapped Potential of the Mobile Phone. December 2006 (taken from the Internet June 2007) Page 12 Exhibit 5
[6] Telecommunications Policy Review Panel Final Report 2006.



Mobile telephony prices

It is no simple task to compare mobile telephony prices within Canada, let alone prices between countries. Give the plethora of calling options and alternatives, it is almost as if mobile telephone suppliers wish to remove price as a comparator between suppliers; however I suspect the answer to this comment would be that the various "calling plans" are designed to satisfy the needs of various customer segments. Be that as it may, a comparison of price-per-minute rates would tell only part of the story; it's the other charges, one of which is the mysterious "system access", that serves to complicate matters.

One study by Grant and Restivo (2007)[7] which compared prices between Canada, the U.S. and Europe, did so by segmenting customers into four categories of users, namely, survival, pre-paid, average and heavy, and compared the prices of different packages of services suitable for each of these market segments. They concluded that Canadian prices were all higher than U.S. prices except for the survival segment, where U.S. prices were higher, but where they offered more for the prices charged.

> *To determine the best prices for cell phone users in each city, we applied cell phone user profiles – survival, pre-paid, average and heavy – to reflect different user consumption patterns. Each service basket reflects a different selection of*

[7] Grant, I.G.B. and Restivo, Kevin. Lament for a Wireless Nation. A Cross-National Survey of Wireless Service Prices: Canada, the United States and Europe. Montreal, Seaboard Group, March 2007

service elements and reflects different types of users – from a low-usage no-feature customer to one who uses her phone a great deal and uses multiple features. The profiles are meant to reflect different consumption patterns.

Canadian heavy users now pay 56% more than they would if the same user had bought a U.S. plan; 14% more than the same user in Europe. … Average Canadian users … pay 33% more than the same type of user in the United States. … For the survival user, Canada is a better place to buy a cell phone plan: it's about 27% less expensive to buy minutes than that same user would pay in she were in the United States. However, we note that Canadian survival users pay 42% more than they would in Stockholm. … While U.S. service providers sell survival service for a premium when compared to the European or Canadian service providers, most basic plans offered in the U.S. that we selected exceeded the requirements of the survival user profile. The plans offered in the U.S. often included 200 or more minutes (we looked for 70) and offered ancillary services that we weren't looking for – unlimited U.S. long distance calls and sometimes to they included Canada as well!

…Overall, Canadian average users pay an average of US$18.73 a month more than Americans for the same number of minutes and features. At a monthly average cost of US$92.87, Toronto is the most expensive Canadian city for average cell phone users. The least expensive Canadian city included in the survey was Winnipeg, where cell phone service costs an average of US$70.03. (Grant and Restivo, 2007, pages 9,10[8])

In short, Grant and Restivo concluded that mobile telephony prices are generally higher in Canada than in the U.S. This, combined with the finding that mobile penetration is lower in Canada than in the U.S. suggests a relationship between the two, though there are naturally a host of other factors that also contribute.

The relatively higher price of mobile telephony in Canada is also reflected in the following statement by the Telecommunications Policy Review Panel in their 2006 final report:

…the prices of Canadian wireless services are relatively high. Canada ranks tenth among OECD countries based on the prices to low-usage customers, seventh on prices to medium-usage customers and 13th on prices to high-usage customers.[9]

Having established that the penetration of mobile telephony is lower in Canada than in a number of comparator countries, especially the U.S., the issue at hand is to assess the cost to Canadians of a lower penetration and higher price of mobile telephony.. In other

[8] Grant, I.G.B. and Restivo, Kevin. Lament for a Wireless Nation. A Cross-National Survey of Wireless Service Prices: Canada, the United States and Europe Montreal, March 2007

[9] Telecommunications Policy Review Panel Final Report 2006, Page 11-20.

words, what, if anything, has Canada lost by having lower mobile penetration for a number of years, and what would Canada have gained with higher mobile penetration.

The benefits of higher mobile penetration

A study by Waverman et al. (2005) entitled: "*The impact of telecoms on economic growth in developing countries*"[10] attempted to answer this question: What is the economic impact of growth in mobile telephony in developing countries? The study was based on mobile and other telephony data for the period 1996 to 2003 and included data from the International Telecommunications Union (ITU) and the World Bank's development indicators.

The authors included data from both developed and less developed countries, and concluded that:

> *We find that mobile telephony has a positive and significant impact on economic growth, and this impact may be twice as large in developing countries compared to developed countries. This result concurs with intuition. Developed economies by and large had fully articulated fixed-line networks in 1996.* ***Even so, the addition of mobile networks had significant value-added in the developed world: the value-added of mobility and the inclusion of disenfranchised consumers through pay-as-you-go plans unavailable for fixed lines****. (Page 2, emphasis added.)*

Elsewhere in the report, Waverman et al. say;

> *All else equal, in the "low income" sample, a country with an average of 10 more mobile phones for every 100 people would have enjoyed a per capita GDP growth higher by 0.59 percent.* (Page 21)

In addition to their conclusions regarding developing countries, where increases in mobile telephony provide a considerable boost to a country's economy, the study also stated that:

> *For high-income countries, mobile telephones also provide a significant growth dividend during the same time period. Sweden, for example, had an average mobile penetration rate of 64 per 100 inhabitants during the 1996 to 2003 period, the highest penetration of mobiles observed. In that same period, Canada had a 26 per 100 average mobile penetration rate. All else equal, we estimate that* ***Canada would have enjoyed an average GDP per capita growth rate nearly 1 percent higher than it actually was, had the mobile penetration rate in Canada been more-than-doubled****."* (Page 2, emphasis added)

[10] Waverman, L., Meschi, M., and Fuss, M. (2005). The impact of telecoms on economic growth in developing countries (pp. 10-23). In Africa: The impact of mobile phones. The Vodafone Policy Paper Series, Number 2. The study was funded by the Leverholme Trust and Vodaphone

Taking the above statements together suggests that Waverman et al's analysis of the impact of increases in mobile telephone penetration should have produced a 1% growth in Canadian GDP in the period 1996 to 2003. Alternatively, GDP in Canada should have risen by approximately half of 0.59% for every increase of 10 in 100 of mobile telephone penetration.

In line with the Waverman et al analysis, a GSM Association Press Release of February 14 2007[11] makes a similar point of the benefit of increased mobile penetration for developing countries, namely that

> *… an increase of 10 percentage points in mobile penetration will lift that country's annual economic growth rate by 1.2 percentage points.*

A more microeconomic model of the benefits of increased mobile penetration by Robert Jensen[12] points to similar conclusions, albeit at the individual level. In his case Indian fisherman in Kerala, armed with mobile phones to assess the market for their fish catch of the day, and route their boats filled with fish to best market on a particular day, could thereby increase their profits and reduce customer prices, a two-sided win-win benefit.

Two questions present themselves as a result of reviewing these studies, namely:
1. If one follows Waverman et al's methodology, what are the specific numbers that arise from this analysis, and
2. How would things change in Canada / how would things be done differently that could produce benefits of this magnitude?

The next section deals with various scenarios which quantify the impacts on the Canadian economy suggested by the Waverman et al. analysis.

The benefits to Canada's Economy of increased mobile penetration

Methodology and Scenarios

A number of book-end scenarios were created to better understand the implications of Waverman et al's statement that a doubling of mobile penetration would have improved the Canadian GDP per capita by 1%. The statement was assumed to apply to the Canadian economy beyond the period for which the analysis had originally been done. In addition, for the purposes of this analysis it was assumed that the improvements in GDP would have occurred annually and that the benefits would have been felt cumulatively.

Information was obtained from Statistics Canada on Annual GDP, as well as on population projections for the period 2002 to 2006. From these GDP per capita was

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[11] GSM Press Release. 14th February 2007 (taken from the Internet May 2007) http://www.gsmworld.com/news/press_2007/press07_25.shtml

[12] Jensen's work is reported in: The Economist Economics focus. To do with the price of fish The Economist May 10th 2007

calculated. The projected improvements in GDP per capita were then applied to these numbers, after which the results were multiplied by the population projections to estimate the impact on overall GDP.

The following scenarios were run, based on the methodology described above:

Scenario A: The Canadian GDP per capita grows by an additional 1% per year for the period.

The next two scenarios were done as book-end estimates of the impact if in fact the overall impact projected by Waverman et al. was less than the 1% projected. They are included on the assumption that at least some of the benefits claimed by Waverman et al. would have accrued to the Canadian GDP as mobile penetration has risen, but that the benefits would have been even greater had penetration been somewhat higher.

Scenario B: The Canadian GDP per capita grows by an additional ½% per year for the period (instead of 1%).

Scenario C: The Canadian GDP per capita grows by an additional ¼% per year for the period (instead of 1%).

A fourth scenario was also done to reflect the kind of impact that might have been felt if the numbers in the GSM press release were to apply in Canada, namely 1.2%, rather than the lower Waverman et al. number of 1%.

Scenario D: The Canadian GDP per capita grows by an additional 1.2% percent per year for the period (instead of 1%).

Table 1 shows the results for each of the four scenarios for each of the years, while the tables in the appendix show more detailed calculations for each of the scenarios, as well as the baseline calculations.

Table 1: The impact on Canadian GDP of increases in mobile penetration $M (following Waverman et al.)

	2002	2003	2004	2005	2006
Scenario A: The Canadian GDP per capita grows by an additional 1% per year for the period.	9,859	20,239	31,482	43,420	56,111
Scenario B: The Canadian GDP per capita grows by an additional ½% per year for the period (instead of 1%).	4,929	10,095	15,664	21,551	27,781
Scenario C: The Canadian GDP per capita grows by an additional ¼% percent per year for the period (instead of 1%).	2,465	5,041	7,813	10,736	13,823
Scenario D: The Canadian GDP per capita grows by an additional 1.2% percent per year for the period (instead of 1%).	11,830	24,311	37,853	52,258	67,598

As shown in Table 1 and the tables in the Appendix:

- With a 1% increase in GDP as a result of increased mobile penetration, Canadian GDP would have increased 2006 GDP by $56B, 5.1%
- With a ½% increase in GDP as a result of increased mobile penetration, Canadian GDP would have increased 2006 GDP by $27.7B, 2.5%
- A ¼% increase in GDP as a result of increased mobile penetration, Canadian GDP would have increased 2006 GDP by $13.8B, 1.26%
- A 1.2% increase in GDP as a result of increased mobile penetration, Canadian GDP would have increased 2006 GDP by $67.5B, 6.14%

It is interesting to note, as an aside that the estimated $13.8B 2006 addition to GDP in Scenario C, the ¼% scenario, is of the same order of magnitude as what the CWTA projects as it's members' combined annual revenues of $11B[13].

Discussion of scenarios

As mentioned above, Scenarios B and C where increased mobile penetration improved GDP by ½% and ¼%, were created as book-end estimates of the impact on GDP of increased mobile telephone penetration on the assumption that some of the benefits of increased mobile penetration would already have been felt in the economy as mobile penetration rates have risen.

[13] The Canadian Wireless Telecommunications Association (CWTA) http://www.cwta.ca/CWTASite/english/index.html (retrieved from the Internet June 2007)

Nevertheless, following the Waverman et al. approach, the calculations show that the benefits to the Canadian economy would be substantial if mobile penetration would have increased well beyond the current low level fits to Canadian GDP.

Mechanisms of benefit resulting from increased wireless penetration

If one accepts that there will be increases in Canadian GDP resulting from increases in Canadian mobile penetration, the mechanisms by which this will be achieved, and the markets where the benefits would be felt need to be explored; this is beyond the scope of this report, though some summary observations are in order.

It is likely that increased mobile penetration will only come with lower prices for mobile telephony. These lower prices could come from increased price competition between the existing mobile suppliers, or from new entrants.

If lower prices lead to increased mobile penetration, and possibly more mobile usage, then workers will have more opportunities to improve their productivity and efficiency. This benefit will like accrue to the more price sensitive segments of the population.

Conclusions

Even if one does not accept the specific values of the benefits of increased mobile penetration provided by these calculations, the Waverman et al. approach points to substantial benefits accruing to the Canadian national economy with increased mobile telephone penetration.

Unanswered are the reasons for the considerably lower penetration of mobile telephony in Canada.

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Appendix

Baseline Calculations					
	2002	2003	2004	2005	2006
GDP ($M) (Statistics Canada)	985,873	1,006,985	1,039,166	1,069,661	1,100,404
GDP year over year growth		2.14%	3.20%	2.93%	2.87%
Population estimates (M)	31.37	31.68	31.99	32.30	32.62
GDP / Capita ($)	31,425	31,790	32,485	33,117	33,730
GDP year over year growth / capita		1.16%	2.18%	1.95%	1.85%

Scenario A: The Canadian GDP per capita grows by an additional 1% per year for the period.					
	2002	2003	2004	2005	2006
GDP per capita excluding mobile impact	31,425	31,790	32,485	33,117	33,730
Cumulative improvement in GDP per capita caused by mobile impact ($M)	314	639	984	1,344	1,720
GDP per capita including mobile impacts	31,739	32,429	33,469	34,461	35,450
GDP ($M) (Statistics Canada)	985,873	1,006,985	1,039,166	1,069,661	1,100,404
Improvement in GDP caused by mobile impact ($M)	9,859	20,239	31,482	43,420	56,111
GDP including mobile impacts	995,732	1,027,224	1,070,648	1,113,081	1,156,515
% improvement in GDP produced by mobile increases	1.00%	2.01%	3.03%	4.06%	5.10%

Scenario B: The Canadian GDP per capita grows by an additional ½% per year for the period (instead of 1%).					
	2002	2003	2004	2005	2006
GDP per capita excluding mobile impact	31,425	31,790	32,485	33,117	33,730
Cumulative improvement in GDP per capita caused by mobile impact ($M)	157	319	490	667	852
GDP per capita including mobile impacts	31,582	32,109	32,974	33,784	34,582
GDP ($M) (Statistics Canada)	985,873	1,006,985	1,039,166	1,069,661	1,100,404
Improvement in GDP caused by mobile impact ($M)	4,929	10,095	15,664	21,551	27,781
GDP including mobile impacts	990,802	1,017,080	1,054,830	1,091,212	1,128,185
% improvement in GDP produced by mobile increases	0.50%	1.00%	1.51%	2.01%	2.52%

Scenario C: The Canadian GDP per capita grows by an additional ¼% per year for the period (instead of 1%).					
1.0025	2002	2003	2004	2005	2006
GDP per capita excluding mobile impact	31,425	31,790	32,485	33,117	33,730
Cumulative improvement in GDP per capita caused by mobile impact ($M)	79	159	244	332	424
GDP per capita including mobile impacts	31,503	31,949	32,729	33,449	34,154
GDP ($M) (Statistics Canada)	985,873	1,006,985	1,039,166	1,069,661	1,100,404
Improvement in GDP caused by mobile impact ($M)	2,465	5,041	7,813	10,736	13,823
GDP including mobile impacts	988,338	1,012,026	1,046,979	1,080,397	1,114,227
% improvement in GDP produced by mobile increases	0.25%	0.50%	0.75%	1.00%	1.26%

Scenario D: The Canadian GDP per capita grows by an additional 1.2% per year for the period (instead of 1%).					
	2002	2003	2004	2005	2006
GDP per capita excluding mobile impact	31,425	31,790	32,485	33,117	33,730
Cumulative improvement in GDP per capita caused by mobile impact ($M)	377	767	1,183	1,618	2,072
GDP per capita including mobile impacts	31,802	32,558	33,668	34,735	35,802
GDP ($M) (Statistics Canada)	985,873	1,006,985	1,039,166	1,069,661	1,100,404
Improvement in GDP caused by mobile impact ($M)	11,830	24,311	37,853	52,258	67,598
GDP including mobile impacts	997,703	1,031,296	1,077,019	1,121,919	1,168,002
% improvement in GDP produced by mobile increases	1.20%	2.41%	3.64%	4.89%	6.14%