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## Bitcoin Awareness and Usage in Canada

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P2P Financial Systems

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**Abstract**

There has been a tremendous discussion of Bitcoin, digital currencies, and fintech. However, there is limited empirical evidence of its adoption and usage. We propose a methodology to collect a nationally representative sample via the Bitcoin Omnibus Survey (BTCOS) to track the ubiquity and usage of Bitcoin in Canada. We find that about 64 percent of Canadians have heard of Bitcoin, but only 4 percent own it. We find that awareness of Bitcoin was strongly associated with men and those with college or university education; additionally, Bitcoin awareness was also more concentrated among unemployed individuals. On the other hand Bitcoin ownership was associated with younger age groups and a high school education. Furthermore, we construct a test of Bitcoin characteristics to gauge the level of perceived versus actual knowledge held by respondents. We find that knowledge is positively correlated with Bitcoin adoption. Based on the survey response and data, we offer suggestions to improve future digital currency surveys, in particular to achieve precise estimates from the hard-to-reach population of digital currency users using social network analysis.

*JEL Codes*: E4.

*Keywords*: E-money, Blockchain, Rare events logit.

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# 1 Introduction

Awareness and discussion of digital currencies such as Bitcoin is ubiquitous in the media. However, the usage of digital currencies as a payment method has not kept pace. In this note, we explore the determinants between the awareness and ownership of Bitcoin. Focusing on Bitcoin, the most popular digital currency, we found that 64 percent of Canadians are aware of Bitcoin but about three percent actually own Bitcoin. These findings are in line with the Technology Strategies International (2016) Canadian Payments Forecast which finds that 64 percent of Canadians have heard of Bitcoin and that 3.9 percent actually use Bitcoin.

Understanding these developments is important for the Bank of Canada, the sole issuer of banknotes, so that it may undertake its role in an efficient manner, see Arango et al. (2012) and Fung et al. (2015). The Bank of Canada has conducted research on Canadian payments using survey data such as the 2009 and 2013 Method-Of-Payments survey, see Arango and Welte (2012) and Henry et al. (2015). These surveys provide rich micro data on the usage of cash, debit, and credit cards. Using this data, the Bank of Canada conducts research and analysis in order to be cognizant of new developments of payment innovations so as to conduct planning in the short and long run of its currency function. Due to the novelty of Bitcoin and other digital currencies they were not included in these surveys. However, at this juncture there is more demand from a policy side to understand drivers behind adoption and use of digital currencies, and the potential implications for cash. This note contains analysis from a pilot study that is a first step in understanding digital currency usage in Canada.

This pilot study is known as the Bitcoin Omnibus Survey, or BTCOS for short; explanation of why we focused on Bitcoin, and further elaboration of the survey design can be found in Section 2. There are several reasons why it is prudent to conduct a pilot study, and which motivated our efforts here. Firstly, evidence from both Schuh and Shy (2016) and Technology Strategies International (2016) suggests that Bitcoin users are a *hard-to-reach* population. That is, using traditional survey methods it can be hard to obtain a sufficiently large sample of Bitcoin users that is useful for data analysis. In this respect, it is sensible to initially limit the number of respondents and the scope of the survey. If we were to implement a full-scale survey covering topics about digital currency in an in-depth way, we may end up with large amounts of data that are unusable. Additionally, it is practical to confirm for ourselves that in a Canadian context, Bitcoin users are indeed a hard-to-reach population.

Secondly, pilot studies are a cost-effective and timely way to gather data that can be used for preliminary analysis. The online methodology means that we can go directly to the field to test out hypotheses about questions such as: reasons for Bitcoin ownership, demographic characteristics related to Bitcoin use, levels of Bitcoin ownership, etc. Since a pilot study is limited and flexible, we are able to address pertinent questions as they arise. Furthermore,

the online methodology allows us to collect the data for lower cost compared to paper-based or mixed-mode methods.

Finally, the pilot study will be crucial for informing a potential full-scale survey on digital currencies; by full-scale we mean with a much larger sample of digital currency users, and with a larger set of questions. One potential solution for accessing hard-to-reach populations is to use innovative sampling schemes such as *respondent-driven sampling*, see Heckathorn (1997). However, such methods require careful preparation and execution to achieve the desired statistical properties. Analysis from the pilot study would be integral to implementing respondent-driven sampling. Furthermore, the range of responses from the pilot can be used in developing or refining questions for the full-scale survey. Thus, the BTCOS pilot study is an important first step towards a more in-depth understanding of digital currencies in Canada.

This note provides a thorough discussion of the BTCOS, beginning with elements of survey design and an explanation of why we focus on Bitcoin in section 2. Section 3 provides a set of descriptive figures for the awareness and ownership of Bitcoin while section 4 provides a conditional analysis of the awareness and ownership of Bitcoin. We provide lessons learned and suggestions on how to proceed in section 5.

# 2 The Bitcoin Omnibus Survey

As part of the Bank of Canada's research agenda on e-money, the focus of this study is on adoption and use of Bitcoin specifically, as opposed to digital currencies more broadly, see Fung and Halaburda (2014). More information is available at the following website: http://www.bankofcanada.ca/research/e-money/.

## 2.1 Why do we focus on Bitcoin?

There are two reasons for why we solely focus on Bitcoin. Firstly, from available North American data on digital currency, awareness and usage of Bitcoin are orders of magnitude higher than the next most popular digital currencies. Currently, there are about 740 digital currencies available.[1] However, Bitcoin is two orders of magnitude larger than its nearest competitor (Ethereum). Further, other central bank studies such as Badev and Chen (2014), Bolt and van Oordt (2016), and Tasca et al. (2016) have focused on Bitcoin usage by analyzing the history via the blockchain or distributed ledger to provide a topography of users. However, the characteristics of the Bitcoin users are not known since there is only a hash-tag to identify a transaction but no personal characteristics of the users are available. The

[1]Source: https://coinmarketcap.com/ accessed on 20 November 2016. Gandal and Halaburda (2014) provide an extensive discussion of cryptocurrency competition.

Federal Reserve Bank of Boston has conducted a detailed payments survey that includes bitcoin. Schuh and Shy (2016) find that 40 percent of respondents had heard of Bitcoin, with only 1.1 percent aware of other virtual currencies. From these studies, we deduce a key assumption that familiarity with other forms of digital currency is likely to imply familiarity with Bitcoin, and hence it is convenient to focus on Bitcoin.

Secondly, an important lesson from Schuh and Shy (2016) is that ordinary Canadian consumers - as opposed to expert researchers studying the topic! - can easily become confused by the actual term *digital currency*, mistaking it for other payment technologies such as PayPal, or even sovereign currencies such as the Euro. Indeed, almost 10 percent of respondents who said they were aware of digital currency made such a mis-characterization in Schuh and Shy (2016). In addition, as our survey design was limited to a small set of questions (see below), we did not wish to impose additional burden on the respondent by introducing a definition of digital currency, in order that they could reasonably answer questions about the topic.

## 2.2 Survey design

The BTCOS was conducted as an online omnibus survey by Ipsos-Reid. The omnibus format is an ongoing survey that is updated weekly with various topics, and is purposely kept short so as to consistently obtain high response rates. The online methodology allows respondents to complete the survey on their computer or smart phone, and provides maximum flexibility in recruiting respondents of certain demographic profiles. Two waves of the survey were implemented with sample sizes of $1,000$ and $1,001$ respectively[2], for a total of $N = 2,001$ Canadians aged 18 or older. The combined sample was subsequently post-stratified with respect to region, age, and gender to be representative of the Canadian population as of the 2011 census. Table 6 provides some demographic statistics to see if the sample differs in any other demographic areas; the results suggest that our sample has greater weight on those not in labour force and with smaller household incomes compared to the Canadian population.

Questions in the BTCOS focused on broad measures concerning awareness and ownership of Bitcoin. Questions on wave 1 of the survey were as follows (for the full survey and logic see Figure 1). The first question was asked to gauge awareness: "Have you heard of Bitcoin?" Secondly, respondents were asked if they currently had or owned Bitcoin. Bitcoin owners were asked to provide their main reason for owning Bitcoin and the amount of Bitcoin they owned. Respondents who had heard of Bitcoin but did not own any were asked to provide their main reason for not owning Bitcoin as well as if they had owned Bitcoin in the past. Finally, all respondents were asked to provide their preferred payment method for making online purchases. Wave 2 of the survey was almost identical to Wave 1, but with an

[2]Wave 1 was implemented from November 9 to 13, 2016. Wave 2 was implemented from December 14 to 18, 2016.

additional set of five true or false questions used to assess the extent of Bitcoin knowledge among owners and non-owners. The full set of true or false questions can be found in Figure 2, and they are analyzed in Section 3.3.

A third wave was collected which only asked if respondents were current or past users of Bitcoin and if they would be interested in joining a larger survey in the future (see Figure 3). The purpose of this wave was to obtain a larger pool of current and past Bitcoin users to be used as seeds in a future survey using Respondent Driven Sampling (see Section 5.2). Of the 2,430 respondents in the sample, 77 were Bitcoin owners and 80 were past users. No questions from the previous waves were asked. As such, this data is only used for demographic breakdowns in Section 3.2.

# 3 Descriptive Statistics

The two initial questions on the BTCOS were "Have you heard of Bitcoin?" and "Do you currently have or own any Bitcoin?" We thus define two populations: those aware of Bitcoin and those who own Bitcoin. In this section, we present demographic breakdowns of these two groups. Next, we investigate the reasons for choosing to own or not to own Bitcoin, the amount of Bitcoin held by owners, and the methods of payment preferred for online purchases. Finally, we assess knowledge of the properties of Bitcoin by developing a knowledge score from true or false questions.

## 3.1 Awareness

Overall, 64 percent of Canadians aged 18 or older stated they had heard of Bitcoin. Figure 4 breaks down Bitcoin awareness by age group and gender. For both men and women, the group most likely to have heard of Bitcoin were those aged 25 to 34 (79 percent of men and 62 percent of women), but differences between age groups were not significant. Men were more likely to be aware of Bitcoin across all age groups; overall, 75 percent of men and 54 percent of women stated they had heard of Bitcoin.

For the most part, Bitcoin awareness was increasing in both education and household income (Figure 5). For example, 72 percent of individuals with incomes of $100,000 or more were aware of Bitcoin, compared to 54 percent of those with incomes below $30,000. Those with university educations were more likely (76 percent) than those than those with college (59 percent) or high school (51 percent) educations to have heard of Bitcoin. This relationship held for all income categories, but was not always significant. There were no significant differences between the college and high school groups.

Figure 6 breaks down awareness by labour force status and gender.[3] Overall, unemployed individuals were more likely than those in other employment situations to have heard of Bitcoin (73 percent) followed by employed persons at 68 percent, retirees at 62 percent, and those not in the labour force at 52 percent. Differences between the top three were not significant, but awareness among those not in labour force was significantly smaller than the other three groups. Trends in Bitcoin awareness across labour force status was similar for both men and women, but was higher for men in all categories.

Figure 7 illustrates the geographical distribution of Bitcoin awareness. British Columbia proved to be the province most aware of Bitcoin, with 78 percent. Quebec was the least likely to be aware, with less than half stating they had heard of Bitcoin. The remaining regions were in between, and fairly similar at about 63 to 68 percent. As with labour force status, trends in Bitcoin awareness were similar for both men and women, but with men more likely to have heard of Bitcoin in all cases. This gender difference was particularly pronounced in Quebec, where 63 percent of men were aware of Bitcoin compared to just 35 percent of women.

## 3.2 Ownership

The number of individuals using Bitcoin remains small in Canada; 3.9 percent of respondents were identified as current users of Bitcoin while a further 4.2 percent identified as past users. Figure 8 illustrates that most Bitcoin users were in the younger age groups; specifically, 9.1 percent of those aged 25 to 34 age group owned Bitcoin, followed by 8.9 percent of those aged 18 to 24 and 4.6 percent of those aged 35 to 44. Similar to awareness, there was a gender gap in ownership; 5.6 percent of men owned Bitcoin compared to 2.3 percent of women. This gender difference was also seen in the younger age groups; for example, in the 25 to 34 age group, 14 percent of men stated they owned Bitcoin compared to just 4.7 percent of women. Residents from B.C. and Quebec were more likely than those from other regions to own Bitcoin, at 5.0 percent and 4.6 percent, respectively (9). This latter result is surprising given that Quebec residents were the least likely to have heard of it (3.1). However, this was only significant when compared to the Atlantic region, which was the least likely to own Bitcoin (2.5 percent).

[3]We group labour force status into four categories: employed, unemployed, not in labour force, and retired. Employed includes full-time, part-time, self employed, and military. Unemployed includes those who were not employed but looking for a job. Not in labour force includes those who were not employed and not looking for a job, long-term sick or disabled, full-time parents or homemakers, and students or pupils.

### 3.3 Assessing Bitcoin knowledge

Wave 2 of the BTCOS added a set of five true or false questions (Figure 2), each assessing knowledge of a particular aspect of Bitcoin. It would be expected, if the questions really do test Bitcoin knowledge, that Bitcoin users perform better than non-users. As can be seen in Table 3, this is indeed the case for questions 2, 3, and 5. However, users surprisingly did worse on the other two questions. This difference is particularly pronounced for question 4, where 83 percent of non-users gave the correct answer compared to just 40 percent of users.

The reason for this apparent contradiction may lie in how each question is interpreted by respondents. In the case of question 4, the intention was to determine if individuals knew whether Bitcoin was backed by a government or not. However, the current phrasing may be interpreted as '"Is Bitcoin in general similar to government-backed currencies?"' rather than the intended '"Is Bitcoin backed by a government?"' It seems reasonable that a non-user would be more likely to think of Bitcoin as being different from standard currencies and thus would be more likely to answer the question 'correctly.' A similar argument could be made for question 1 and the interpretation of a 'third party.'

The initial goal was to develop a knowledge score based on answers to the five questions. Given the potential vagueness of question 4 and how badly Bitcoin users scored on it, we based the final score on only the other four questions. Each correct answer was given a score of +1 while each incorrect answer was given a score of -1. If the respondent did not know, they got a score of 0. The overall knowledge score was simply the sum of these values, resulting in an index taking values from -4 to 4.

About 27 percent of non-users simply answered 'don't know' to all five questions. On the other hand, all Bitcoin users in the sample answered at least one of the questions. Thus, it seems that simply attempting the questions was an indicator of Bitcoin knowledge if we assume Bitcoin users are generally more knowledgeable. In order to make appropriate comparisons between users and non-users we will exclude those who did not give any answers for the remainder of the section.

Figure 12 shows the distribution of scores for users and non-users. As expected, Bitcoin users were more likely to get high positive scores. About 15 percent of users had the maximum score of 4 and 30 percent had a score of 2[4]. On the other hand these figures were 0 percent and 8 percent for non-users. Additionally, users were more likely to get positive scores (56 percent compared to 32 percent) and less likely to get negative scores (23 percent compared to 32 percent).

[4]A score of 3 was uncommon because the only way one could obtain this score would be to answer three correctly and leave the fourth unanswered.

## 3.4 Reasons for choosing to own or not own Bitcoin

Bitcoin users were asked to provide their main reason for owning Bitoin (Table 1), while non-users (who were aware of Bitcoin) were asked to provide their main reason for not owning it (Table 2). Investigating these two questions can potentially shed light on why adoption rates for Bitcoin remain low. For users, the most common primary reason given for owning Bitcoin was interest in new technology (29 percent). Other common reasons involved using Bitcoin for international payments, buying goods and services at physical stores, and investment (12 percent each). Reasons associated with inherent properties of Bitcoin were actually less common; 10 percent cited using secure blockchain technology to prevent fraud as a main reason and 8 percent cited being able to make payments anonymously.

Individuals who were aware of Bitcoin but did not own any were asked to provide their main reason for not owning Bitcoin. About 60 percent said that their current payment methods met their needs or that they did not understand or know enough about the technology. This provides a possible explanation for low adoption rates: consumers are largely content with their current state or unaware of the alternative's advantages or disadvantages relative to their current state. Other common primary reasons provided for not using Bitcoin were that it is not widely accepted (7 percent) and not easy to acquire or use (7 percent).

There was a notable proportion of both users and non-users who expressed a level of distrust for the institutions involved with the alternative method of payment. On one hand, 6 percent of Bitcoin users stated they do not trust either the banks, the government, or the Canadian dollar; also, as discussed above, 18 percent mentioned wanting to avoid fraud or make payments anonymously. On the other hand, a combined 21 percent of non-users stated they did not trust a private currency that is not backed by a central government, were concerned about cyber theft, or were concerned about a lack of oversight from a regulatory body.

## 3.5 Bitcoin holdings

Bitcoin users were asked to provide how much Bitcoin they owned (Figure 10). The most common response (37 percent) was that they owned less than 0.1 Bitcoin, which is valued at less than \$100 CDN (note that 1 Bitcoin $\approx$ \$1,000 CDN)[5]. A further 23 percent held between 0.1 and 1 Bitcoin (equivalent to between \$100 and \$1,000 CDN), while 27 percent held between 1.1 to 10 Bitcoins (equivalent to \$1,000 and \$10,000 CDN). Holdings larger than this were rare; just 6 percent of users held more than 10 Bitcoins (greater than \$10,000 CDN).

[5]Bitcoin-Canadian Dollar is \$1,017.36 conversion rate as per Bitcoin Price Index, last updated at Dec 7, 2016 at 19:41 GMT on http://www.coindesk.com/price.

### 3.6 Methods of payment for online purchases

All respondents were asked what their preferred choice for making online purchases was (Figure 11). Credit cards were by far the most commonly preferred method of payment, at 52 percent, while PayPal was second with 29 percent reported. Other methods of payment were rarely reported as the preferred method; indeed, not making online purchases at all was more likely (11 percent). Bitcoin was the least likely to be preferred, at just 1 percent.

## 4 Conditional Analysis

This section presents a conditional analysis of Bitcoin awareness and ownership using logistic regression. The analysis considers a range of demographic variables (age, gender, education, income, labour force status, and region) as well as the knowledge score defined in Section 3.3. The results of these logistic regressions in terms of odds ratios are contained in Table 4. For example, consider the 45 to 54 age group in model 1 (awareness); the conclusion drawn would be that the odds of being aware of Bitcoin are 0.6 times lower than that of the comparison age group (18 to 24) and that this is significant at 5 percent.

### 4.1 Awareness

Bitcoin awareness was smaller among the older age groups compared to the 15 to 24 age group. However, the only significant differences were found in the 45 to 54 age group. Specifically, compared to the youngest age group this group had 0.6 times the odds of having heard of Bitcoin; compared to the 25 to 34 age group, they had 0.7 times the odds. Gender was also a strong predictor of Bitcoin awareness; the odds of being aware of Bitcoin were 0.4 times less for women compared to men.

Similar to the findings in Section 3.1, Bitcoin awareness increased with education. College education was associated with an odds of awareness 1.4 times that of the high school educated population. For those with a university education, this figure was 2.5. Household income, on the other hand, was not a statistically significant predictor of Bitcoin awareness.

As for labour force status, results were again similar to Section 3.1; in particular, the odds of having heard of Bitcoin were about 2.5 times higher for the unemployed population compared to those not in the labour force while comparisons to the employed and retired populations were not significant at 5 percent. This was followed by retirees (1.6 times the odds) and employed individuals (1.4 times the odds). Additionally, Quebec was again found to be the region least aware of Bitcoin while B.C. was the most likely. The remaining regions were in between and not significantly different from each other.

## 4.2 Ownership

The rate of ownership or usage Bitcoin is a rare occurrence. Because of this, if the number of Bitcoin owners is small within a particular group, the standard logit model may estimate an extreme parameter estimates for the group. In the extreme case - 0 Bitcoin users within a group - the corresponding parameter estimate would be undefined and so the group would be dropped. To adjust for this, model 2 uses Firth's method, which penalizes such values to provide more reasonable estimates and avoid dropping categories(see Firth (1993)). The method maximizes the same likelihood as logistic regression, but adds a penalty term. Let $\ell^{\text{f}}$ be the firth penalized log-likelihood, $\ell$ be the original log-likelihood, and $I$ be the Fisher information matrix; then the resulting objective function is:

$$\ell^{\text{f}}(\beta) = \quad \ell(\beta) + \log(\det(I(\beta))^{1/2}) \tag{1}$$

Model 2 provides results for this regression (note that the regression is performed only among the population who have heard of Bitcoin [6]). As expected, the older age groups (45 and older) were the least likely to own Bitcoin, while the younger age groups (15 to 34) were the most likely. The 25 to 34 age group was the most likely to own Bitcoin and this was significant compared to all age groups except the 15 to 24 group. For example, the odds of owning Bitcoin were 8.6 times higher for those aged 25 to 34 compared to the 65+ age group. Based on models 1 and 2, it seems that while all age groups are fairly similar in their awareness of Bitcoin, actual ownership is very concentrated towards the younger groups. Contrary to the findings in Section 3.2, the gender gap in Bitcoin ownership was not significant.

While higher education was associated with Bitcoin awareness, it seems the opposite is true for ownership; the odds of owning Bitcoin for those with college or university educations were both about 0.4 times smaller compared to this with a high school education or below. For income and labour force status, trends were similar to the awareness model (e.g. unemployed persons were more likely than other labour force statuses to own Bitcoin) but were no longer significant. Results by region were similar to Section 3.2; Quebec, despite having the lowest awareness, had the highest ownership (1.3 to 1.5 times the odds compared to the other regions). The remaining regions were similar to each other, with no statistically significant differences.

Model 2 also added a set of indicator variables for negative, zero, and positive Bitcoin knowledge scores (see Section 3.3). As expected, those with positive scores had the highest

[6]Since you can't own Bitcoin if you haven't heard of it, including unaware respondents in the regression would mean that the parameters are measuring both the effect on ownership and the effect on awareness. By restricting the population to aware participants, we isolate the effects on ownership

Bitcoin adoption (4.4 times the odds of those with with zero scores) however this was not significant when compared to those with negative scores. Thus, the previous observation is reiterated here: simply attempting the questions was associated with Bitcoin ownership.

# 5 Discussion and Recommendations

## 5.1 Summary

In order to obtain baseline measurements on the use of digital currency in Canada, the Currency department commissioned Ipsos-Reid to conduct the Bitcoin Omnibus Survey. From a sample of 2001 Canadians, it was found that almost 64 percent stated they had heard of Bitcoin. However, adoption of Bitcoin remains low at just 3 percent overall (five percent among those aware of Bitcoin). Conditional analysis shows that the awareness of Bitcoin was strongly associated with men and those with college or university educations. Additionally, Bitcoin awareness was more concentrated among those retired or in the labour force, as well as in B.C. Bitcoin ownership, on the other hand, was associated with younger age groups and high school educations. Additionally, while Quebec had the lowest awareness, it had the highest adoption rates. Finally, we developed a knowledge score for Bitcoin and found that many, even among users, were unaware of its properties.

## 5.2 Recommendations for subsequent analyses

Standard stratified random sampling methodology may not be effective as there is a *hard-to-reach* population of Bitcoin users. A sample size of 2001 can be considered quite large in the realm of survey statistics, and so to obtain a subset of only 62 Bitcoin users is somewhat disappointing from a statistical perspective. Schuh and Shy (2016) discuss the inherent difficulties of enumerating this hard-to-reach population.

To address this issue, we propose using a methodology called respondent driven sampling (RDS) where respondents are asked to recruit people they know to the survey. To motivate participation, respondents are given an incentive for their response to the survey as well as an additional incentive for each person they successfully recruit (see Heckathorn (1997)). RDS is similar to snowball sampling (a type of convenience sample), but aims to produce biased and efficient estimates by taking into account that individuals with more connections are more likely to be sampled and that different groups have different recruitment patterns. Liebau and Schonlau (2012) provides a Stata command for performing this analysis.

Since RDS relies on the recruitment of peers, it would be useful to know how many people a respondent typically knows who have Bitcoin. Thus, it could be useful to perform third wave of the BTCOS with an additional question asking about network size. It is plausible

that many Bitcoin users only know other users through online forums with varying degrees of anonymity. Thus, further questions on the nature of their relationships with other Bitcoin users could be a good indicator of how successful RDS would be. Wave 3 of the survey would have the additional purpose of adding to our pool of seeds - that is, the initial respondents who we can recruit to start off the RDS. Finally, a third wave of the BTCOS would allow us to explore other variables that may be useful for understanding behaviour with respect to Bitcoin such as: field of employment (or previous employment if unemployed); consumer level of risk aversion; source of awareness about Bitcoin, e.g. friends/family/news/etc.

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Figure 1: Schematic of Survey (Wave 1)

1. Have you heard of Bitcoin?
Yes No
[IF YES TO Q1, ASK Q2, ELSE SKIP TO Q5]
2. Do you currently have or own any Bitcoin?
Yes No
[IF YES TO Q2, ASK Q3a and Q3b, ELSE SKIP TO Q4a]
3a. Please tell us your main reason for owning Bitcoin.
(Select one)
[RANDOMIZE LIST]
I am interested in new technologies
It is an investment
I use it to buy goods and services on the internet in Canada/elsewhere
I use it to buy goods and services in physical stores in Canada/elsewhere
It allows me to make payments anonymously
I use it to make remittances or other international payments
It uses secure blockchain technology to prevent loss and fraud
I do not trust banks
I do not trust the government or the Canadian dollar
[ANCHOR] Other (specify)

3b. How many Bitcoin do you own?
(Select one)
None, Less than 0.1, 0.1 to 1, 1.1-10, More than 10, Unsure/would rather not say

[IF NO TO Q2, ASK Q4a and Q4b, ELSE SKIP TO Q5]
4a. Have you owned or used Bitcoin in the past, but subsequently stopped using it?
Yes, No

4b. Please tell us your main reason for not owning any Bitcoin.
[RANDOMIZE LIST]
I do not understand/know enough about the technology
It is not widely accepted as a method of payment
My current payment methods meet all my needs
The value of Bitcoin varies too much
It is not easy to acquire/use
I do not trust a private currency that is not backed by the central government
I am concerned about cyber theft
I am concerned about lack of oversight from regulatory bodies
I use alternative digital currencies instead (e.g. Dogecoin, Litecoin, Ripple,etc)
[ANCHOR] Other (specify)

[ASK ALL]
5. What is your preferred method of payment for making purchases online?
(Select one)
[RANDOMIZE LIST]
Credit card, PayPal, Interac online, Interac e-transfer, Bitcoin
[ANCHOR 2ND LAST] Other
[ANCHOR LAST] I do not make purchases online

Figure 2: Bitcoin Knowledge Questions (Wave 2)

To the best of your knowledge, which of the following are features of Bitcoin? Please select any that apply.

1. Bitcoin allows for direct transactions between two parties, without a third party involved.
2. The total supply of Bitcoin is fixed.
3. All Bitcoin transactions are recorded on a distributed ledger that is publicly accessible.
4. Bitcoin is similar to other national currencies, such as the euro or peso, that are backed by the government.
5. Bitcoin transactions take place instantaneously.

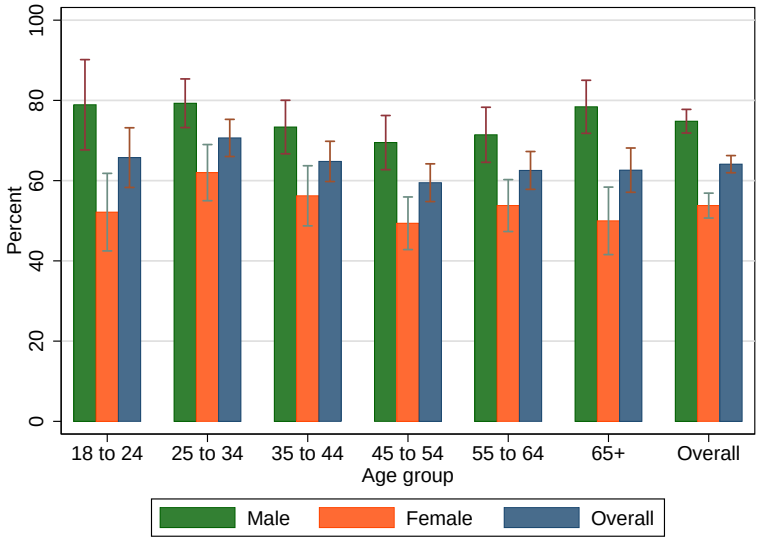
Note: This question was asked of wave 2 participants who said they had heard of Bitcoin. The items which are true features of Bitcoin are 1, 2, and 3. The items which are false are 4 and 5. The order of the features was randomized for each respondent.

Figure 3: Recruitment questions (Wave 3)

1. Do you have or own any Bitcoin?
    - Yes, I currently have or own Bitcoin.
    - No, but I have had or owned Bitcoin in the past.
    - No, I have never owned Bitcoin.
2. We have a potential study coming up in the near future about Bitcoin usage. Those who participate will receive $20 as a token of our appreciation. May we contact you with an invitation to that survey?
    - Yes
    - No

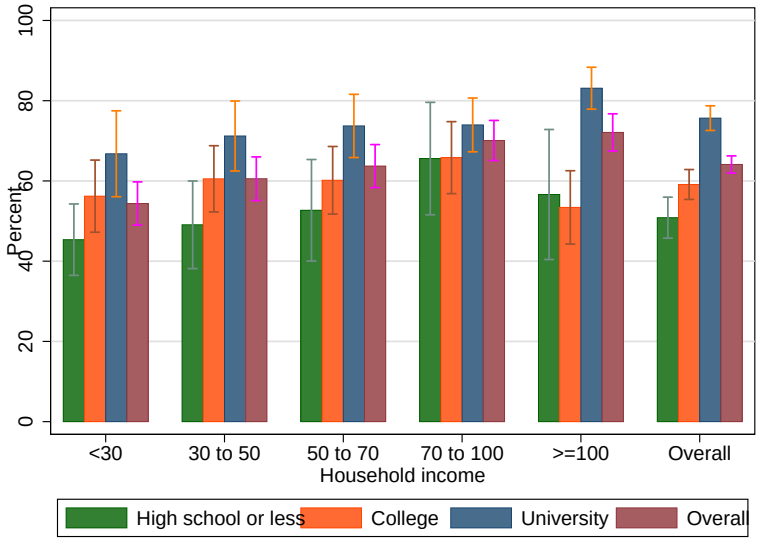
Note: Question 2 was only asked if respondents were current or past Bitcoin users.

Figure 4: **Awareness of Bitcoin by Age and Gender**



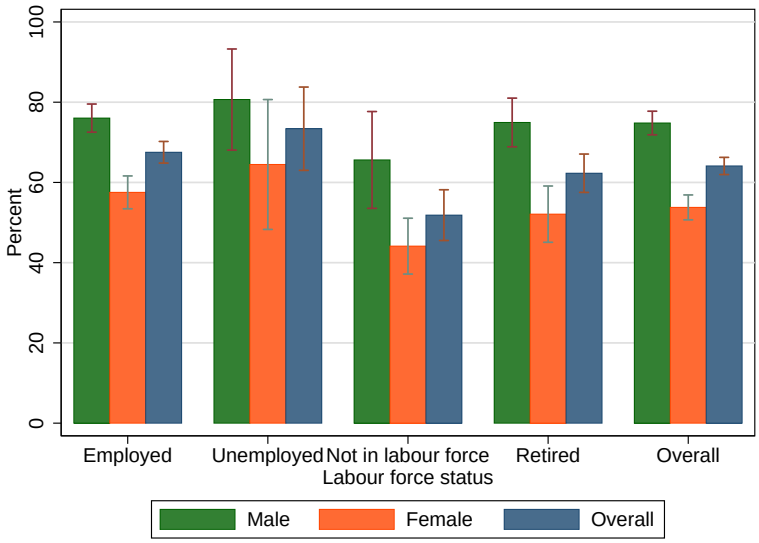

Note: This graph provides the percentage of individuals who answered "Yes" to the question "Have you heard of Bitcoin?" Results are broken down by age group and gender and are post-stratified by region, age, and gender. The sample consists of 2,001 Canadians aged 18 or older.

Figure 5: **Awareness of Bitcoin by Education and Income**



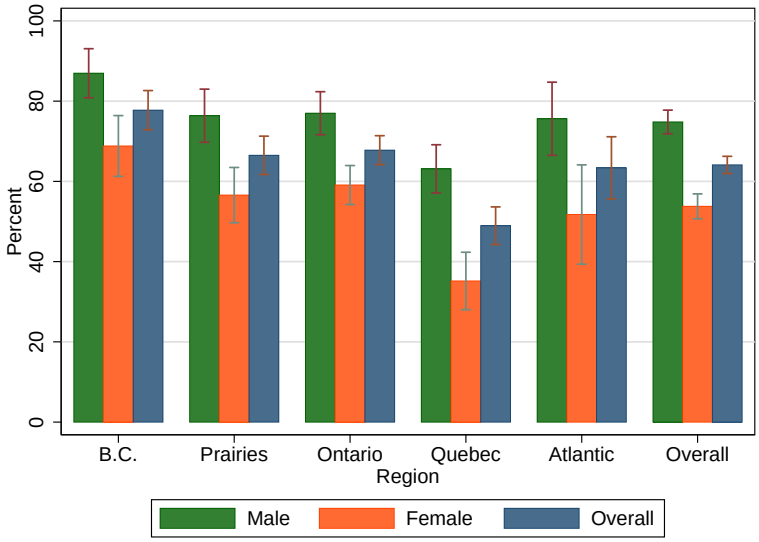

Note: This graph provides the percentage of individuals who answered "Yes" to the question "Have you heard of Bitcoin?" Results are broken down by household income and education and are post-stratified by region, age, and gender. Multiple imputation was used for 225 missing values for income. The sample consists of 2,001 Canadians aged 18 or older. College includes CEGEP and trades. Note that individuals only needed "some" education to be included in a category; they do not necessarily have a diploma/degree.

Figure 6: **Awareness of Bitcoin by Labour Force Status and Gender**



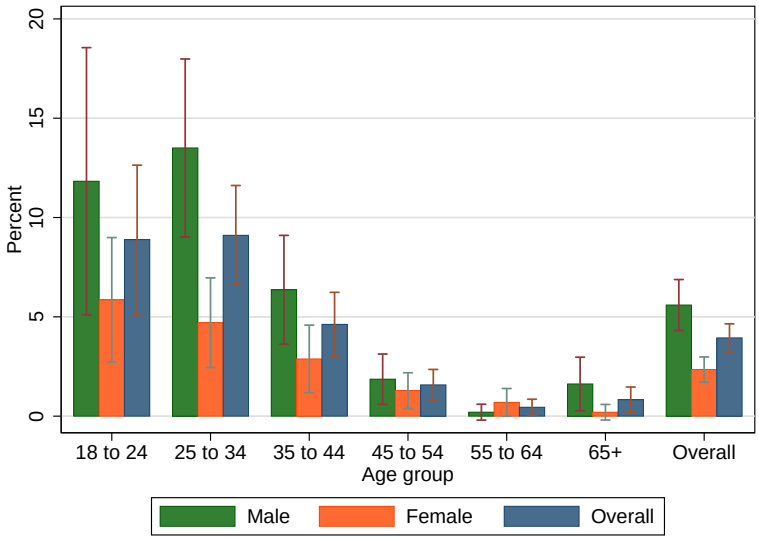

Note: This graph provides the percentage of individuals who answered "Yes" to the question "Have you heard of Bitcoin?" Results are broken down by labour force status and gender and are post-stratified with respect to region, age, and gender. Multiple imputation was used for 9 missing values for labour force status. The sample consists of 2,001 Canadians aged 18 or older. Employed includes full-time, part-time, self-employed, and military. Unemployed includes those looking for work. Not in labour force includes those not looking for work, long-term sick or disabled, full-time parents/homemakers, and students/pupils.

Figure 7: **Awareness of Bitcoin by Province and Gender**



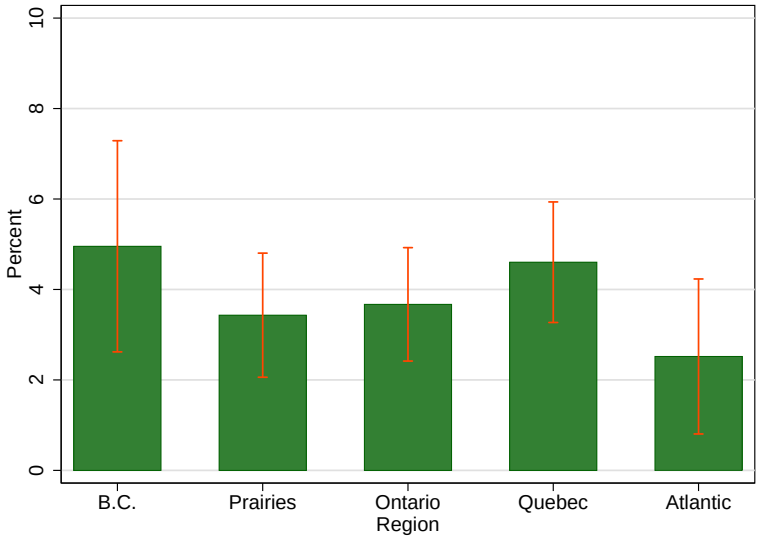

Note: This graph provides the percentage of individuals who answered "Yes" to the question "Have you heard of Bitcoin?" Results are broken down by region and gender and are post-stratified with respect to region, age, gender, and education. The sample consists of 2,001 Canadians aged 18 or older.

Figure 8: **Ownership of Bitcoin**



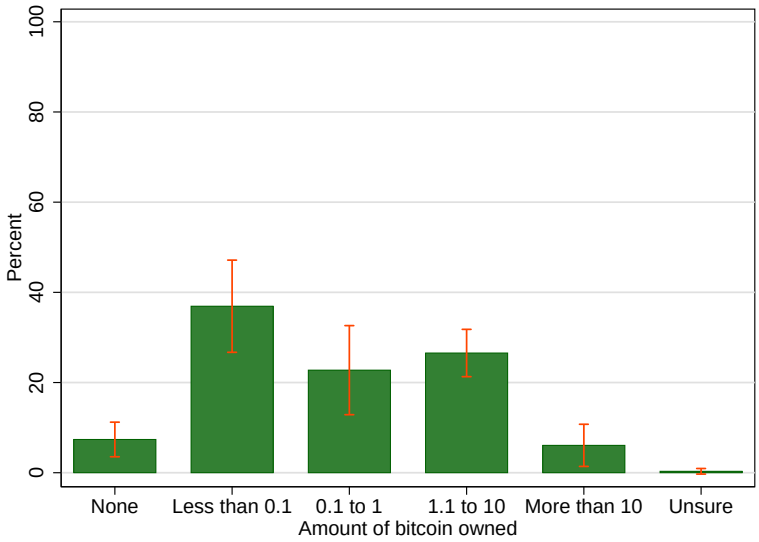

Note: This graph provides the percentage of individuals who answered "Yes" to the question "Do you currently have or own any Bitcoin?" Results are broken down by age group and gender and are post-stratified with respect to region, age, and gender. The sample consists of 4,431 Canadians aged 18 or older. Those who stated they have not heard of Bitcoin were assumed to not own any Bitcoin.

Figure 9: **Ownership of Bitcoin by Province**



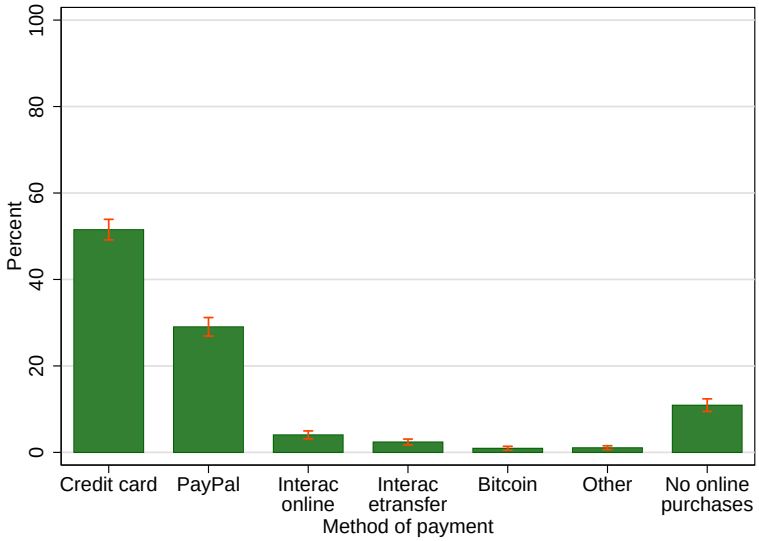

Note: This graph provides the percentage of individuals who answered "Yes" to the question "Do you currently have or own any Bitcoin?" Results are broken down by region and are post-stratified with respect to region, age, and gender. The sample consists of 4,431 Canadians aged 18 or older. Those who stated they have not heard of Bitcoin were assumed to not own any Bitcoin.

Figure 10: **Holdings of Bitcoin**



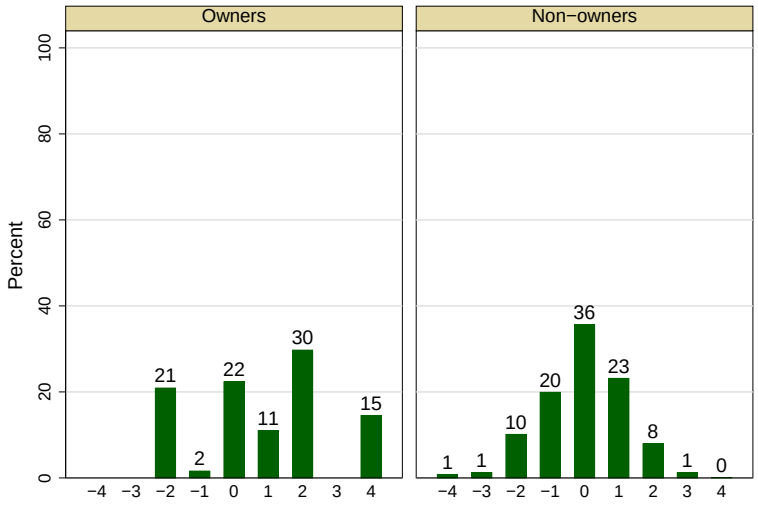

Note: This graph provides the distribution of responses to the question "How many Bitcoin do you own?" Results are post-stratified with respect to region, age, and gender. The sample consists of 62 Canadians aged 18 or older who said they have or own Bitcoin.

Figure 11: **Preferred Method of Online Payments**




Note: This graph provides the distribution of responses to the question "What is your preferred method of payment for making purchases online?" Results are weighted with respect to region, age, gender, and education. The sample consists of 2,001 Canadians aged 18 or older.

Figure 12: **Bitcoin Knowledge Score by Ownership**




Note: This graph presents the distribution of awareness scores as defined in Section 3.3. Results are post-stratified with respect to region, age, and gender (note that only one wave of the survey (half the sample) received these questions, and so results are re-weighted with this smaller sample). The sample consists of 36 Bitcoin owners and 457 non-owners aged 18 or older who said they had heard of Bitcoin and who attempted to answer at least one of the five Bitcoin knowledge questions.

Table 1: Main reason for ownership

| | No. | % |
|---|---|---|
| I am interested in new technologies | 18 | 29 |
| I use it to make remittances or other international payments | 8 | 12 |
| I use it to buy goods and services in physical stores in Canada/elsewhere | 7 | 12 |
| It is an investment | 7 | 12 |
| It uses secure blockchain technology to prevent loss and fraud | 6 | 10 |
| Other | 5 | 8 |
| It allows me to make payments anonymously | 4 | 6 |
| I use it to buy goods and services on the internet in Canada/elsewhere | 4 | 6 |
| I do not trust banks | 2 | 3 |
| I do not trust the government or the Canadian dollar | 2 | 3 |
| Total | 62 | 100 |

Note: This table provides the distribution of responses to the question "Please tell us your main reason for owning Bitcoin." Results are post-stratified with respect to region, age, and gender. The sample consists of 62 Canadians aged 18 or older who said they have or own Bitcoin.

Table 2: Main reason for non-ownership

| | No. | % |
|---|---|---|
| My current payment methods meet all my needs | 383 | 32 |
| I do not understand/know enough about the technology | 339 | 28 |
| I do not trust a private currency that is not backed by the central government | 151 | 12 |
| It is not widely accepted as a method of payment | 89 | 7 |
| It is not easy to acquire/use | 72 | 6 |
| I am concerned about cyber theft | 59 | 5 |
| I am concerned about lack of oversight from regulatory bodies | 50 | 4 |
| The value of Bitcoin varies too much | 44 | 4 |
| Other | 22 | 2 |
| I use alternative digital currencies instead (e.g. Dogecoin, Litecoin, Ripple, etc) | 5 | 0 |
| Total | 1,214 | 100 |

Note: This table provides the distribution of responses to the question Please tell us your main reason for not owning Bitcoin. Results are post-stratified with respect to region, age, and gender. The sample consists of 1,214 Canadians aged 18 or older who said they have heard of Bitcoin, but do not have or own any.

Table 3: Percentage who answered awareness questions correctly

| | Own Bitcoin | Do not own | Overall |
|---|---|---|---|
| Q1 | 75 | 91 | 90 |
| Q2 | 63 | 39 | 42 |
| Q3 | 73 | 46 | 50 |
| Q4 | 40 | 83 | 80 |
| Q5 | 31 | 6 | 8 |

Note: This table provides the proportion of individuals who correctly answered each of the five questions, excluding those who answered 'don't know' and broken down by Bitcoin ownership. Results are weighted with respect to region, age, gender, and education.

Table 4: Bitcoin Awareness and Ownership

| | (1) Awareness | | (2) Ownership | |
|---|---|---|---|---|
| | OR | CI | OR | CI |
| 25 to 34 | 0.9 | 0.6 - 1.4 | 1.6 | 0.7 - 3.6 |
| 35 to 44 | 0.8 | 0.5 - 1.2 | 0.7 | 0.2 - 1.7 |
| 45 to 54 | 0.6** | 0.4 - 0.9 | 0.2*** | 0.1 - 0.6 |
| 55 to 64 | 0.7 | 0.4 - 1.1 | 0.1** | 0.0 - 0.7 |
| 65+ | 0.7 | 0.4 - 1.2 | 0.2* | 0.0 - 1.3 |
| Female | 0.4*** | 0.3 - 0.5 | 0.7 | 0.4 - 1.3 |
| College | 1.4** | 1.0 - 1.8 | 0.4** | 0.2 - 0.8 |
| University | 2.5*** | 1.9 - 3.4 | 0.4** | 0.2 - 0.9 |
| $30,000 to $49,999 | 1.2 | 0.8 - 1.7 | 1.1 | 0.4 - 2.8 |
| $50,000 to $69,999 | 1.2 | 0.8 - 1.7 | 0.9 | 0.3 - 2.3 |
| $70,000 to $99,999 | 1.3 | 0.9 - 1.9 | 1.3 | 0.5 - 3.2 |
| $100,000 or more | 1.3 | 0.9 - 1.9 | 1.1 | 0.4 - 2.9 |
| Employed | 1.4** | 1.0 - 2.0 | 1.8 | 0.7 - 4.6 |
| Unemployed | 2.5*** | 1.4 - 4.6 | 2.4 | 0.7 - 8.3 |
| Retired | 1.6** | 1.0 - 2.5 | 1.1 | 0.1 - 9.2 |
| B.C. | 3.7*** | 2.6 - 5.3 | 0.3** | 0.1 - 0.8 |
| Prairies | 2.2*** | 1.6 - 3.0 | 0.3*** | 0.1 - 0.6 |
| Ontario | 2.3*** | 1.8 - 3.1 | 0.4*** | 0.2 - 0.8 |
| Atlantic | 2.1*** | 1.4 - 3.2 | 0.4* | 0.1 - 1.0 |
| Wave 1 | | | 1.3 | 0.6 - 2.8 |
| Knowledge score <0 | | | 2.2 | 0.8 - 5.9 |
| Knowledge score >0 | | | 4.4*** | 1.9 - 10.4 |
| Constant | 0.7 | 0.5 - 1.2 | 0.2*** | 0.0 - 0.7 |
| Observations | 2,001 | | 1,276 | |

*** p<0.01, ** p<0.05, * p<0.1

Note: The ownership logit model is estimated using the method by Firth (1993) which takes into account rare events to reduce bias. The baseline category is a respondent that is aged 15 to 24, male, has a high school education or below, has a household income below $30,000, is not in the labour force, and lives in Quebec. It is estimated among the population who said they had heard of Bitcoin. Also note that a dummy for wave 1 of the survey is included here in order to properly interpret the effects of the knowledge score, which was only asked among wave 2 participants.

Table 5: Sample Composition

| | Unweighted | Weighted | CIUS |
|---|---|---|---|
| **GENDER** | | | |
| Male | 47 | 49 | 49 |
| Female | 53 | 51 | 51 |
| **AGE** | | | |
| 18 to 24 | 8 | 12 | 15 |
| 25 to 34 | 18 | 17 | 17 |
| 35 to 44 | 17 | 17 | 16 |
| 45 to 54 | 21 | 20 | 19 |
| 55 to 64 | 20 | 16 | 16 |
| 65+ | 16 | 18 | 18 |
| **REGION** | | | |
| B.C. | 12 | 13 | 13 |
| Prairies | 20 | 17 | 17 |
| Ontario | 36 | 39 | 39 |
| Quebec | 23 | 24 | 23 |
| Atlantic | 9 | 7 | 7 |
| **LABOUR FORCE STATUS** | | | |
| Employed | 60 | 58 | 64 |
| Unemployed | 4 | 4 | 5 |
| Not in labour force | 37 | 38 | 31 |
| **HOUSEHOLD INCOME** | | | |
| Less than $25,000 | 15 | 17 | 13 |
| $25,000 to $45,000 | 18 | 18 | 18 |
| $45,000 to $65,000 | 21 | 21 | 18 |
| $65,000 or more | 45 | 44 | 51 |

Note: Weighted results are based on post-stratification by region, age, and gender. CIUS results are taken from Vincent (2015); they represent figures from the 2012 Canadian Internet Use Survey which were weighted with respect to the 2011 National Household Survey. This table can thus be used to determine how representative the sample is of the Canadian population (with respect to these demographics) as of 2011.

# A Technical Appendix

## A.1 Sample compositions

Table 6: Sample Composition

| | Wave 1 | | Wave 2 | | CIUS |
|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | |
| **GENDER** | | | | | |
| Male | 49 | 49 | 46 | 48 | 49 |
| Female | 52 | 51 | 54 | 52 | 51 |
| **AGE** | | | | | |
| 18 to 24 | 9 | 12 | 7 | 11 | 15 |
| 25 to 34 | 18 | 16 | 18 | 17 | 17 |
| 35 to 44 | 16 | 14 | 18 | 17 | 16 |
| 45 to 54 | 23 | 23 | 20 | 20 | 19 |
| 55 to 64 | 20 | 20 | 20 | 19 | 16 |
| 65+ | 15 | 15 | 17 | 16 | 18 |
| **REGION** | | | | | |
| B.C. | 12 | 13 | 12 | 13 | 13 |
| Prairies | 20 | 17 | 19 | 17 | 17 |
| Ontario | 35 | 38 | 38 | 38 | 39 |
| Quebec | 23 | 24 | 23 | 24 | 23 |
| Atlantic | 10 | 7 | 8 | 7 | 7 |
| **LABOUR FORCE STATUS** | | | | | |
| Employed | 60 | 56 | 59 | 55 | 64 |
| Unemployed | 4 | 4 | 4 | 4 | 5 |
| Not in labour force | 36 | 40 | 37 | 40 | 31 |
| **HOUSEHOLD INCOME** | | | | | |
| Less than $25,000 | 16 | 19 | 15 | 20 | 13 |
| $25,000 to $45,000 | 18 | 20 | 18 | 20 | 18 |
| $45,000 to $65,000 | 22 | 24 | 20 | 22 | 18 |
| $65,000 or more | 44 | 37 | 46 | 38 | 51 |

Note: Weighted results are based on post-stratification by region, age, gender, and education (done by Ipsos-reid). CIUS results are taken from Vincent (2015); they represent figures from the 2012 Canadian Internet Use Survey which were weighted with respect to the 2011 National Household Survey. This table can thus be used to determine how representative the sample is of the Canadian population (with respect to these demographics) as of 2011.