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Mémoire

**Determinants of Financial Literacy and Financial
Planning in Canada**

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In this paper, we investigate how financially literate Canadians are and how their financial knowledge reflects in their habits and behavior. With the use of a survey on 3005 Canadians living in the provinces of Quebec and Ontario, between the ages of 35 and 55, we learn about their financial situation and plan for retirement. Our research is divided in three sections. In the first and next section, we try to identify which factors make an individual significantly more likely to be a planner. We find the determinants that are significant in predicting that an individual will be a planner to be the employment status, education level, annual income, gender (at the 10% significance level) and financial literacy. We make a parallel with the paper of Boisclair *et al.* (2014) which analyses the financial literacy and retirement planning capabilities of Canadians. Our findings are coherent with theirs. We suggest that the age and region of respondents might have been added to the list of statistically significant predictors if our sample was more heterogeneous. In the second section, which is twofold, we try to identify the determinants which lead to higher savings and do the same thing for previous year investment contributions. We find that the variables which have a significant impact on wealth accumulation are overall financial literacy, income, province, age, education, employment status and having a financial plan for retirement. However, only income, employment status, education and financial planning are important determinants of contribution amounts. Although education and age do appear to be correlated with contribution, the relationship is not as straightforward and significant. In the third and last section, we look for determinants of financial literacy. Contrary to the majority of other studies conducted on financial literacy, we find a very high sample score ranging from 74% to 89% indicating that Canadians are well literate, and specifically in the areas of risk diversification, inflation and interest rate compounding. Respondents scored lower when we went into more details about TFSA and RRSP properties. Overall, 60% of our sample answers the three simple questions on financial literacy correctly, which is considerably better than the reported scores of many other countries. We analyzed the relationship between financial planning and demographic factors to find which variables can help predict that an individual is more likely to be financially literate. We find that the best predictors of financial literacy are income, age, education, gender and province.

I. INTRODUCTION

The purpose of this study is to analyse the level of financial literacy of Canadians on one hand and the determinants of financial planning and level of savings on the other hand. Statistic Canada reported at the end of 2018 that Canadians have reached a peak indebtedness level as measured by the debt service ratio (DSR) around 175%, which is the level of debt payment relative to disposable income¹. Given the consequences of carrying a high debt level and the current household indebtedness, it is important to evaluate the level and determinants of financial literacy to understand whether Canadians are making well-informed decisions. Everyone is faced with financial decisions in their life: credit card debt, mortgage payments, retirement plan, saving and investment accounts, financing to buy a car, etc. Financial decisions have to be made even by young students when taking on a student loan. In a world in which internet facilitates purchases and feeds people with the desire for consumption, it is important to teach discipline

¹ <http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3780123>

and money management. Financial literature seeking to evaluate the level of financial literacy, in many different countries and regions, find that people, in general, have low financial knowledge. This study is interesting and relevant given the literature does not include many in depth researches done on Canadians. In addition, this study is the first to analyze financial literacy and factors which influence planning for retirement by controlling for individuals' risk aversion and time preference. We will get back to this later, in section III when we describe our model.

We found one study conducted by Boisclair, Lusardi and Michaud (2014) which targets Canadians and confirms that, on average, just like in the other regions where these studies are conducted, respondents show a low level of financial literacy. More specifically, they find that only 42% of respondents are able to answer three simple questions relating to interest, inflation and risk diversification. Those three questions were designed by Lusardi and Mitchell, 2011 (see Appendix A) with the intent to create a standard that revolves around four principles: Simplicity, Relevance, Brevity and Capacity to differentiate [the type of financial knowledge]. In our study, we will use the capacity to answer these three questions as a variable to identify whether a respondent is financially literate or not. We will explain this variable when discussing methodology. While Boisclair *et al.* (2014) target Canadians of all ages with focus on retirement planning, our purpose is also to evaluate the level and determinants of financial literacy in addition to saving capabilities, which should help individuals avoid financial distress and achieve retirement objectives. They also analyse the relationship between financial literacy and retirement planning but they don't focus on financial literacy itself and its determinants. Our research aims to analyse those relationships and also evaluate knowledge in different fields such as tax, savings and investing (we will analyze how well respondents did on more specific questions not developed by Lusardi and Mitchell). This is why our results are separated in three sections. The first section resembles that of Boisclair, Lusardi and Michaud (2014) and studies the relationship between financial planning and its determinants with our survey data. The second section tests the same variables as the previous one to determine which ones are correlated to savings and contribution amounts. In the last section, we examine the variables listed as significant predictors of financial literacy in many studies. The results of our research should help determine which areas our government and learning establishments can improve in. For example, in our study, education clearly has an impact on financial planning, on the level of savings and contributions (although the relationship is not as strong for the level of contribution) and on financial literacy. This shows that financial education can not only help make optimal decisions but also adopt better behavior. Analyzing those relationships and responses to the survey can help determine how we can improve our education system by looking at where respondents lack knowledge. Financial distress has harmful consequences and it can deteriorate the quality of life. It should and can be avoided with better education. One example, Dew *et al.* (2012) shed light on the negative impact of financial disagreement on marital relations. They conclude that financial disagreements are predictors for divorce and that money is the most impactful argument subject. If finances are not well managed, problems arise and may create a snowball effect leading to personal bankruptcy and elderly poverty.

Governments are paying more attention to financial literacy. The government of Canada established, in 2009, an organism called the Task Force on Financial Literacy which is comprised of 13 members. Their objective is to submit proposals to the Minister of Finance that could help improve financial literacy in

Canada². But what is financial literacy? The Government of Canada defines financial literacy as “having the knowledge, skills and confidence to make responsible financial decisions; knowledge refers to an understanding of personal and broader financial matters; skills refer to the ability to apply that financial knowledge in everyday life; confidence means having the self-assurance to make important decisions; responsible financial decisions refers to the ability of individuals to use the knowledge, skills and confidence they have gained to make choices appropriate to their own circumstances”³. The Government also put in place an organism to educate and help consumers with financial matters. The Financial Consumer Agency of Canada (FCAC) was established in 2001 to educate consumers of financial services, to protect them and to survey Canadians in order to assess the level of financial literacy⁴. Additionally to the surveys undertaken by the FCAC, there are surveys conducted by Statistics Canada to measure spending, savings habits and wealth. With a similar intent to help consumers of financial services, the Securities and Exchange Commission (SEC) in the United States established, in section 911 of the Dodd-Frank Act, an advisory committee whose objective is to advise and consult with the Commission on regulation of securities products and all related matters, on initiatives to protect investors, on initiatives for legislation changes and more. The *Dodd-Frank Wall Street Reform and Consumer Protection Act* itself was published in 2010 as a reform to promote financial stability of the United States and protect American taxpayers⁵.

II. REVIEW OF LITERATURE

As previously mentioned, the FCAC conducts surveys on Canadians. We found the Canadian Financial Capability Survey (CFCS) conducted in 2014 whose intention is to collect information on the degree of financial decision-making knowledge amongst Canadians⁶. Its findings show that most men and women consider their perception of financial knowledge to be “fairly knowledgeable” when given the four options: very knowledgeable, knowledgeable, fairly knowledgeable and not very knowledgeable⁷. In other words, if we rank the average self-confidence level of men and women on four (with four being the most confident), we get two. The CFCS found that aboriginal population members and age group ranging from 35 to 44 years to be those who struggle the most to pay their bills. They suggest that one third of Canadian adults are not financially ready for retirement even with their employer pension plan. Also, 3 in 10 were “not at all confident” or “not very confident”, when given these options along with “fairly confident” and “very confident”, that their household income will be enough to keep up with their standard of living at retirement⁸. To underline the importance of education, the survey finds that those with the highest education level are most likely to be preparing and saving for their retirement (78% of university graduates) and are also more likely to have answered yes to having a budget compared to those with the

² http://publications.gc.ca/collections/collection_2011/fin/F2-198-2011-eng.pdf

³ <https://www.canada.ca/en/financial-consumer-agency/programs/financial-literacy/financial-literacy-history.html>

⁴ idem

⁵ <https://www.govinfo.gov/content/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf>

⁶ <https://www.canada.ca/content/dam/canada/financial-consumer-agency/migration/eng/resources/researchsurveys/documents/managing-money-key-findings.pdf>

⁷ <http://www.statcan.gc.ca/daily-quotidien/141106/dq141106b-eng.pdf>

⁸ idem

lowest education level (49% vs 41%). There is also a positive correlation between the education level and the use of RESPs as a means to save for children's education. RESP accounts are beneficial to parents who wish to save for their children's education in part because the government subsidizes up to a certain investment amount and allows the grants, contributions and all additional investment earnings to grow tax-free until withdrawn. Hence, knowing these type of accounts exist and utilizing the tax saving tools that the Government puts at our disposal are beneficial. All registered accounts that allow tax-deferred growth or any type of tax benefit offer an efficient way to save for retirement or future needs and should be taken advantage of. With the rise in life expectancy as reported by Statistics Canada (in 2017, the numbers were 79 years old and 83 years old for male and female, respectively), retirement planning becomes increasingly important to avoid outliving savings.

Retirement planning

Financial knowledge is key considering that individuals not only invest and save their personal wealth but also their retirement money through their pension plan. Basic knowledge about interest rates, diversification benefits, inflation and taxes would help achieve better planning and quality of life. For example, a study found that financially unsophisticated households avoid the stock market (Van Rooij, Lusardi and Alessie, 2011; Kimball and Shumway, 2006; Hogarth, Beverly and Hilgert, 2003) and make poor choices regarding mortgages (Moore, 2003; Campbell, 2006). Lusardi (2008) mentions that lack of literacy can affect saving ability and the probability for a comfortable retirement. They find that many workers do not think about retirement, even the older ones who are only five to ten years away from retirement. In fact, almost half of older workers do not know which type of pensions they have and about the rules governing their benefits. Beshears *et al.* (2007) explain that savings plan participation in most American companies is not automatic and requires voluntary enrollment by the employee (standard enrollment vs automatic enrollment). They observe that when an employee is automatically enrolled, participation rate jumps to about 95% of employees, a difference of 35% in participation rate relative to standard enrollment. Employees have an incentive to contribute the amount that their employer is willing to match and participation to the retirement savings plan can substantially alter wealth accumulation.

Insolvency and elderly poverty

As previously mentioned, the reason we find financial literacy to be so important is because financial problems accumulate with time and often create a snowball effect. This is why the interest is to evaluate financial literacy among working age candidates. Decisions made in the earlier years have the greatest impact. Subjects such as savings and spending habits, timely credit card payments, tax free or deferred savings accounts and investment vehicles are important and yet not discussed enough. Financial products are becoming more commonly used and more complex which are other reasons to promote financial education. From 1998 to 2001, the percentage of undergraduate students holding at least one credit card grew from 59% to 83% (Nellie Mae, 2002, a wholly owned not-profit subsidiary of Sallie Mae). Sallie Mae, a publicly traded student loan company in the United States, found that only 31% of college students correctly answered three simple questions on how credit works. They claim that those who were most

confident about their money management skills were least likely to answer correctly the three questions. In addition, students with more credit experience were not more likely to answer the question correctly⁹. Sallie Mae's research also finds that almost one third of students put tuition fees on their credit card and as much as 92% of them use their credit card to pay for school materials (textbooks, school supplies and other education expenses) when there are less expensive credit access available to them. Debts can accumulate quickly, especially in an environment in which the access to credit is easy. Livshits (2015) report that the number of personal bankruptcies has increased significantly in the 2000s. Their key finding suggests that credit market innovations lead to increased borrowing, defaults and credit card debt. The logic behind is that innovations decrease transaction costs of lending and bankruptcy costs and can also increase information asymmetry, leading to less secured lending and potentially more defaults. Hence, the complexity of our financial system and financial products along with technological innovations increase the risk of financial distress. Financial illiteracy may have severe consequences such as personal bankruptcy and yet, many studies report that it is a widespread phenomenon. In a study conducted by Bianco *et al.* (2012) in which they surveyed 574 full-time New England undergraduate students on personal finance, they get an average score of 46%. They find male students with higher grades, pursuing business majors and with higher family income to achieve higher scores. Chen *et al.* (1998) found that college students, especially non-business major students, do not have the necessary knowledge on savings and borrowing, general financial, insurance and investments after surveying 924 students in 14 college campuses. Another study conducted on 5 500 millennials between 23 and 35 years old by *Price Water Coopers and George Washington University* found that only 24% of them demonstrated basic financial knowledge and 14% admitted taking a hardship withdrawal in the past year¹⁰.

Problems managing debt payments are a risk for bankruptcy filing. Some progress has been made to rectify those high bankruptcy filing numbers with the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) reform in 2005, in the United States. The purpose of that reform was to reduce the number of filings and make it more difficult for debtors to file for Chapter 7 bankruptcy which allows assets to be liquidated and debt to be completely erased. The Act dictated that filers must pass a test to determine if they are eligible for Chapter 7 bankruptcy. Or else, they would have to file for Chapter 13 bankruptcy and negotiate a repayment plan with creditors so that repayments would be made before debt is discharged (Chapter 13 differs from Chapter 11 by imposing restrictions on eligibility through income and debt limit). Livshits (2015) claims that the high numbers in bankruptcy filings which reached the one million in the 90s, seems to have dampened down with reforms. Gross *et al.* (2018) reach the same conclusion by claiming that there were 1 million less bankruptcy filings in the two years following the BAPCPA reform than there would have been without it. They explain the peak in bankruptcy filing before 2005 as a strategy for indebted people to rush and get rid of their debt before the new legislation. In Canada, a similar reform was proposed to the Canadian Bankruptcy and Insolvency Act (BIA), in 2009. The reform includes amendments to increase the maximum debt allowed to file for a proposal (Chapter 13 equivalent for Canadians) and increase the costs of bankruptcy filing for high-income defaulters. A

⁹http://news.salliemae.com/sites/salliemae.newshq.businesswire.com/files/doc_library/file/SallieMae_MajoringinMoney_2016.pdf

¹⁰<https://www.pwc.com/us/en/about-us/corporate-responsibility/assets/pwc-millennials-and-financial-literacy.pdf>

study conducted by Allen and Basiri (2016) finds that the level of proposals increases by 13% relative to bankruptcies (Chapter 7 equivalent for Canadians) which was the objective since proposals have lower administrative costs for debtors and higher recovery rates for financial institutions. Price (2007) argues that filers are not poor people but rather middle-class American families who abuse the bankruptcy system. We can make a parallel with Gross *et al* (2018) who mention that the peak around 2005 and the drop post-reform could be attributed to families trying to get rid of their debt before the amendment was made. They mention a criticism of BAPCPA being that it does not address lending practices. Knowing that the reforms only made it harder for borrowers to file for bankruptcy, it is not clear whether those reforms were intended to dictate what type of bankruptcy and settlement option should be chosen by filers rather than to really help prevent bankruptcy. Going back to our purpose, rectifications and amendments need to be made to the source of the problems that lead to bankruptcy filing in the first place: they should improve and promote borrowers' financial health. We had also mentioned elderly poverty as another consequence of poor financial management. Pottow (2011) found an increase in the proportion of elderly Americans filing for bankruptcy due primarily to credit card debts although medical care costs contribute to financial distress. Thorne *et al.* (2008) found that the rate of bankruptcy filings among people aged 65 or more has more than doubled since 1991 while the level of bankruptcy filing among Americans 34 and younger has decreased. Hence, this might suggest that the accumulation of financial stress and bad habits catches up to the elderly.

We listed some interesting statistics and the many ways in which lack of financial education can impact quality of life and reduce accumulation of wealth. We reviewed the numerous consequences and implications of insufficient financial knowledge. This leads us to the next section in which we discuss the relationship between financial education and financial behavior.

Education

Because financial decisions start at a young age, knowledge level among the youth would reveal a lot on the completeness and adequacy of Canada's educational system. People with minimal investment knowledge rely on a financial advisors to manage their wealth for them. The portion of households owning equity directly is now among the highest in the world: the capitalisation of the world stock markets increased by 1,800% and the volume of share trading went from \$1.22 trillion to \$111.2 trillion from 1983 to 2007 (Grout *et al.* 2009) so Canadians should be familiar with investment concepts. If people around the world are indeed, as reported in all the cited articles, financially illiterate, the general increase in market participation may suggest that people are relying on financial advice. However, it is still important to understand the basic investment concepts in order to have an understanding of what the investment advisor is accomplishing and whether external finances services are indeed adding value. For example, in our sample, 174 respondents admitted having been contacted by a financial advisor in the past two months to talk about RRSP loans and 25% took out such a loan. It also appears that those who have a financial advisor have a slightly higher proportion of stocks. With a higher level of financial education, one can make more informed decisions and assess if a transaction is justified or simply the result of a conflict of interest. Guiso *et al.* (2015) find that investors with higher financial literacy are better at detecting

potential conflict of interests with their financial advisors and are better market timers. To get to the first conclusion, they explain that following the crisis and the collapse of Lehman Brothers, many Italian banks were facing a liquidity crisis. Banks needed liquidity and were pushing investors to liquidate other holdings to purchase the bank's bonds. From end of 2007 to end of 2008, investments in the bank's bonds increased by more than 100%. To evaluate the conflict of interest, they look at the increase of bank bonds in households' portfolios, as per the advisor's recommendation: it was a risky investment with poor diversification benefits because investors have their checking accounts with the bank as well. They got the second conclusion by analyzing the time at which investors got out of the market during the financial crisis of September 2008.

Governments are paying more attention to ensure that the education system is complete and provides enough tools to give youth the necessary basic knowledge. There are reasons to believe that students leave the educational establishments without the proper knowledge to address real life financial issues. Lusardi *et al.* (2010) found that only 27% of their sample understand basic financial concepts relating to inflation, risk diversification and interest rate calculations. More specifically, women, Afro-Americans, Hispanics and those with a lower education level are found to be more illiterate. Bartholomae *et al.* (2007) found that having followed a personal finance course increased savings rate in high school and college students and that college level courses result in increased investment knowledge. Bianco and Bosco (2011) analysed the curricula of 100 AACSB institutions – the organization that grants accreditation to institutions for bachelors, masters, doctoral degrees in business administration and accounting – and concluded that business faculties should grant more importance to personal finance courses since the examined business students are as illiterate as the non-business students group. Literature sheds light on the fact that educational establishments should incorporate more finance courses. There is strong evidence that it makes a difference in decision-making and behavior. Bernheim *et al.* (2001) evaluated the adult financial decision-making of households according to their high school curricula. They hypothesize that financial education increases savings. They used a cross-sectional household survey to compare household behavior in states which adopted legislation mandating 'consumer' related education between 1957 and 1985 (of the 29 states which did impose this legislation, 14 specifically mandated topics relating to finance behavior and knowledge) to those states which did not adopt this legislation. They conclude that exposure to the new legislation mandate increases the level of financial education and ultimately increases the rates at which individuals save and accumulate savings in their adult lives. Another meta-analysis conducted by Kaiser *et al.* (2017) of 126 studies uncover the same conclusion, also based on the premise that individuals don't save enough and efficiently: financial education leads to better financial education but also better financial literacy depending on intensity of the education and the moment. They extract six principles from the results of their meta-analysis: (i) financial education has a strong positive effect of financial literacy and in turn, effects on financial literacy impact positively financial behavior (ii) "financial education has a positive, measurable impact on financial behavior" (iii) "effects of financial education depend on the target group" meaning that education to lower-than-mean income participants has less impact on one hand. On the second hand, it is more difficult to impact financial behavior as country incomes and mean years of schooling increase (which they blame on diminishing marginal returns of additional financial education) (iv) "success of financial education depends on the type of financial behavior targeted" suggesting that borrowing behavior are harder to influence relative to saving behavior

by conventional financial education (v) the success of financial education intervention is affected by its intensity and its (vi) timing. If individuals relate to what they are learning, financial education has a greater impact¹¹.

In some cases, students themselves wish to learn more about finance. This evidence is consistent across many countries. We found a study from Germany performed on 1540 students who get an average score of 64.2% on a questionnaire comprised of 13 financial literacy questions. The two questions which were missed the most were the ones on the relationship between interest rates and bonds and the long term performance of stocks relative to bonds and savings accounts (Erner *et al.* 2016). Statistics in that article show that 75% of adolescents between 15 and 17 years old would like more economic and financial subject exposure in school (SCHUFA 2013, a Germany based private credit bureau with the purpose to protect its client from credit risks). These low scores on financial literacy questions are also observed in India (see Agarwalla, Barua, Jacob and Varma, 2015; Jayaraman and Jambunathan, 2018), Mexico, Lebanon, Uruguay, Turkey, Colombia (see Karakurum-Ozdemir, Kokkizil and Uysal, 2018) and many more countries around the world (see Lusardi *et al.* 2011 for an overview study on different countries). To get an overview on financial literacy at the international level, the Organisation for Economic Co-operation and Development (OECD), whose mission is to promote economic and social well-being of individuals across the globe, published a study on financial literacy gathering information from thirty different countries. They study financial knowledge and financial behavior levels across countries and find an overall average score of 13.2 out of 21, which combines knowledge and behaviour, consistent with poor financial literacy observations¹².

The determinants of financial literacy

Most articles on financial literacy examine literacy on three grounds: the level of financial literacy, the determinants of higher financial knowledge and how the results may be of use to policymakers and to the educational system. We previously enumerated many factors that other papers have deemed to influence the level of financial literacy. For example, we mentioned that Bianco *et al.* (2012) find male students with higher grades, pursuing business majors and with higher family income to achieve higher scores. Lusardi *et al.* (2010) found that women, Afro-Americans, Hispanics and those with a lower education level are likely to be more illiterate. On the other hand, Jappelli and Padula (2013) predict, with their model, that wealth and financial literacy are strongly correlated. They perceive financial literacy as an investment which explains that wealthier people and those who save most have more incentive to get financial education. Lusardi and Mitchell (2014) find that the relationship between age and the level of financial knowledge is hump-shaped meaning that the younger and older subset of the population will display a lower level of financial literacy. They find this relationship to be robust across many different countries. They also confirm with their findings that woman and those with less education (specifically those without college education) are more likely to be financially illiterate. Taylor (2011) also gets to the same conclusion

¹¹ See biography

¹² <https://www.oecd.org/daf/fin/financial-education/OECD-INFE-International-Survey-of-Adult-Financial-Literacy-Competencies.pdf>

that financial capability (making appropriate financial decisions, knowing how to manage a credit card and debt, correctly selecting products and services that are suitable) increases with age and reaches a peak at age 75 for men and at an older age for women. Nonetheless, consistent with Lusardi *et al.* (2010), they find that between the ages of 20 and 70, men are more financially capable than women. They also conclude that those working in the financial sector are much more literate. The most important factor which can considerably decrease financial capability is unemployment. Clearly some factors such as gender, age, employment, education, field of work or education, wealth or income and ethnicity or race, are repeated from study to study and consistently found to be impactful.

Although we shed light on the many studies which report low financial literacy levels, some articles do find a good response level to some of the basic financial literacy questions. For example, that same article (Lusardi and Mitchell, 2014) studied the responses of Americans, aged fifty years and up, to the same three basic financial literacy questions we used. Their results suggest that 75.2% and 67.1% answered the inflation and interest rate compounding questions correctly, respectively. It is really the rate of respondents who answered all three questions correctly that is quite low, at 34.3%. In Lusardi and Mitchell's 2010 article, which targets young adults, they find that 79.3% answer the interest rate question correctly. The other two questions got scores below 60% however, and only 27% of respondents answered all three questions correctly. In their 2008 article in which they surveyed 785 women, they get a score of 70.6% and 61.9% on the inflation and interest rate question, respectively. Only 29% answered all three questions correctly. Van Rooij *et al.* (2011) surveyed their Dutch population sample and asked five basic financial literacy questions. The lowest score they get is 71.8% for the question linked to nominal versus real value of money after inflation is taken into account. The highest score of 90.8% goes to the question on interest rate compounding. They suggest that although they have knowledge of basic concepts, many cannot go beyond those basic questions (ex: difference between bond and stocks, relationship between interest rates and bond prices). We reviewed the characteristics most likely to indicate financial illiteracy. Comparing across different studies, it appears that education and income levels, employment status, gender, age are recurrent determinants of financial literacy. The last section on financial literacy will confirm that all those variables except for employment are found to be significant in our model. In addition, because we used the research of Boisclair *et al.* (2014), which was also conducted on Canadians, as a reference, we added a variable that accounts for region and find it to be significant as well. In the following sections, after we describe our sample and methodology, we will outline our findings.

III. SAMPLE AND METHODOLOGY

Our sample consists of 3005 Canadians, most specifically Ontarians and Quebecers, between the ages of 35 and 55 who were administered a questionnaire through an online panel survey organization known as AskingCanadians. AskingCanadians created an online research community consisting of Canadians who opt to join the community to participate in a few surveys and get rewarded for every survey they

complete¹³. Our questionnaire was administered in the spring of 2018 because it follows a period in which Canadians contribute the most to their savings accounts¹⁴. Thereby, the information collected on each respondent's balance sheet should be fresh in their memory. The questionnaire, which was available in both, English and French, consists of questions and sub questions about participants' demographics, financial situation, assets and liabilities, employment, retirement and investment decisions. Participants were also put through different incentivized scenarios to evaluate their investment preferences and choices. We will analyze the financial literacy questions and investment preferences. In this study, we are looking to evaluate people's knowledge and financial decision making capabilities. We report and compare our findings with those of Boisclair *et al.* (2014) who used a survey sponsored by the Canadian Securities Administrators (CSA). The survey was administered through internet in May 2012, which was the first year that the survey included the three financial literacy questions we use. Their sample is comprised of 6,790 Canadian adults across the ten Canadian provinces, after eliminating Canadians living in the Territories from their sample. It is important to note that their sample is more heterogeneous with respect to age and region of respondents.

There are three main sections to our analysis. In the first section, we are interested in assessing the factors which encourage individuals to have a TFSA, RRSP or an Employer Pension Plan (EPP). We qualify an individual as being a "planner" if they have any of those three plans. The first section tries to identify which factors make an individual significantly more likely to be a planner and resembles the analysis made by Boisclair *et al.* (2014) on retirement planning. We hypothesize that factors such as financial literacy, employment status, income bracket, education level, age, gender, region, time preference and risk aversion would affect whether an individual is a planner or not. The second part of our analysis is twofold. First, we are interested in evaluating which factors explain that one has higher savings accumulated. Second, we want to evaluate which factors lead to higher investment contributions using the previous fiscal year contribution. Savings are defined as the sum of the amounts accumulated in RRSP, TFSA or Non-registered accounts (NRA) and contributions are TFSA or RRSP total investments made in the previous calendar year (2017 since the questionnaire was administered in 2018). Although it would have been ideal to add contributions made in EPP, that information was not readily available in our survey. We use multivariate regressions to establish the relationship between our variables and determine which ones are most significant in determining that an individual has higher accumulated wealth and higher contributions in the previous year. In the third and last part of our analysis, we are interested in evaluating the level of financial literacy of participants in the survey. Respondents were asked basic questions regarding interest rate, inflation and risk along with more in depth questions regarding the tax implication of investment accounts. Here again, we use multivariate regression analysis to determine which factors are more likely to yield a higher level of financial literacy. Before we get into the details of our models and start disclosing our findings, we display a few descriptive statistics on our sample.

¹³ Participants have the options to be rewarded with AC Points, Hudson's Bay Rewards Points, Aeroplan Miles, Petro-Points, VIA Rail Points or by entering into contests and draws.

¹⁴ This so called period is known as 'RRSP Season'. It consists of the first 60 days of the year and allow Canadians to contribute to their RRSP with the option to have that contribution deducted from their previous year's income or the current year's income.

III. 1 Descriptive Statistics

Our sample is almost equally split between Ontarians and Quebecers and almost as well equally split between male and female. Our sample is comprised with individuals of working age and is most comparable with studies examining financial capabilities of the working age population, although we may compare with other studies and report sample differences when needed. It is comprised of individuals between 35 and 55 years old with different education and income levels. We created the age categories in a way not to make them too granular but also not too large and aggregated. As shown in the table below (Table 1), we almost have a quarter of our sample in each of the four age categories. The majority of our sample has a Cegep degree, some university or a Bachelor’s degree and only a few did not pursue additional education after high school. The vast majority of our sample was employed in the year 2017 and a few respondents were self-employed or unemployed. Self-employment and unemployment represent only 9.3% and 7.7% of our sample, respectively (luckily our sample is big enough to avoid sample size limitation). In terms of annual income, the most populated category is the one with salaries ranging from 40 000\$ to 60 000\$. Most respondents earn between 20 000\$ and 80 000\$ with those three categories representing 58.2% of our sample. Not shown in the table but interesting fact, as much as 72% own their primary residence. Surprisingly, almost half (45%) of our sample has a remaining mortgage of less than 25% of their residence’s current market value while as much as 71% owe less than half of their home’s market value. Last thing from the table below is that as much as 44% of respondents don’t have a financial advisor, which is a lot if literacy lacks in certain aspects of finance.

Table 1

	Count	Percent
Respondent's Province of Residence		
Ontario	1,507	50.1%
Quebec	1,498	49.9%
Respondent's Gender		
Female	1,443	48.0%
Male	1,562	52.0%
Respondent's Age		
35 to 40	854	28.4%
41 to 45	658	21.9%
46 to 50	681	22.7%
51 to 55	812	27.0%
Respondent's Education Levels		
High School or less	393	13.1%
Certificate	208	6.9%
CEGEP or some University	965	32.1%
Undergraduate	886	29.5%
Graduate or more	553	18.4%

Respondent's Employment Status		
Employed	2,476	82.9%
Self-employed	279	9.3%
Did not work	231	7.7%
Respondent's Individual Income		
0 to 20k	342	11.8%
20k to 40k	458	15.8%
40k to 60k	677	23.4%
60k to 80k	551	19.0%
80k to 100k	368	12.7%
over 100k	503	17.4%
Advisor		
Yes	1,273	43.8%
No	1,636	56.2%

Respondents were asked which of the following assets they have: Registered Retirement Savings Plan (RRSP), Tax-Free Savings Account (TFSA), Registered Education Savings Plan (RESP), Non-Registered Account, Universal life insurance (which includes a savings portion) and other assets (car, secondary residence, Registered Disability Savings Plan (RDSP). They were also asked if they participate in a pension plan offered by their employer (DBPP, DCPP, Group TFSA, Group RRSP, etc.). Table 2 below shows that 71% of our sample has a RRSP while more than half own a TFSA or a NRA. Around 49% of our respondents have both a TFSA and a RRSP. We define a person to be a 'planner' if they own a savings account such as a TFSA, a RRSP or an employer initiated pension plan (they don't if they opt out or the employer does not offer any kind of retirement plan). Owning an RESP does not qualify a respondent as being a planner because having an RESP is contingent on having children. Hence, these types of account are only accessible to parents who are planning for their children's education. Whether respondents have a NRA or not is irrelevant to qualify them as planners because no one would open a NRA, which is fully taxable, before investing primarily in a TFSA or RRSP. When individuals start saving, they do so in tax sheltered accounts first.

Table 2

	Count	Percent
Respondent has a RRSP		
No	861	28.7%
Yes	2,144	71.3%
Respondent has a TFSA		
No	1,283	42.7%
Yes	1,722	57.3%
Respondent has a RESP		
No	2,239	74.5%

Yes	766	25.5%
Respondent has a NRA		
No	1,294	43.1%
Yes	1,711	56.9%
Respondent has an Employer Pension plan		
No	1,216	42.5%
Yes	1,644	57.5%
Respondent is a planner		
No	369	12.5%
Yes	2,580	87.5%

We find that only 6.3% of our sample has none of the assets listed above. What is worrisome is that over one third of those few individuals are 50 years of age or older. Employed respondents were also asked about the retirement plan they have with their employer: 32% have a defined benefit pension plan, 18% have a defined contribution plan, 22% have a group RRSP account, and 25% say their employer does not offer a plan. To have more detail on saving habits, we asked respondents about the amounts accumulated in their savings accounts. As one would expect, the wealth accumulated in each account type gets higher with the age level. Overall, the average wealth accumulated in RRSP, TFSA and NRA is 117,800\$, 28,600\$ and 72,400\$, respectively. It appears as though the TFSA limit (which was 5,500\$ in 2017 and 2018 or 57,500\$ in total if carried forward each year¹⁵) is not yet attained by the majority. To get a better understanding of saving habits and tax efficiency, respondents were also asked about the amounts contributed into their different savings accounts in the previous year. The questionnaire was administered in spring specifically because it follows the so called 'RRSP season' which corresponds to the first 60 days of the year. Those first 60 days of the year are the most important for Canadians in terms of contributions to their RRSP. That being said, the contribution amounts should be accurate and known by respondents. Respondents were asked if they contributed the 5,500\$ maximum amount allowed in their TFSA in 2017 and as much as 61% of respondents admitted they did not. The majority contributed an amount lesser than 3,000\$ in their TFSA and the average contribution amount across our sample is 4,270\$. As for the RRSP contributions for that same year, respondents were asked about the amount contributed along with the amount they were allowed to contribute in the year 2017¹⁶. Once again, a little over half contributed an amount below 3,000\$ and only about one in ten contributed an amount equivalent to their contribution right. If we exclude those few individuals who had no contribution right, we find an average ratio of RRSP contribution on contribution right of 43.8%. This means that the average respondent contributed less than half of what was allowed. In this attempt to identify factors which make individuals more likely to own a RRSP, a TFSA or an EPP, it is interesting to observe how our sample is distributed

¹⁵ The limit of 57 500\$ applies to individuals who have never contributed to a TFSA and who were eligible since its inception in 2009, which is the case of all our respondents because they were at least 18 years old in 2009.

¹⁶ For the year 2017, the contribution limit was 18% of the previous year's income up to a maximum of 26,010\$ minus pension adjustments. Contribution rights differ from one individual to the other but the information is available on their Notice of Assessment. More information on RRSP limit calculations are available on Canada Revenue Agency's website: <https://www.canada.ca/en/services/finance/pensions.html>

within our variables of interest, given the different independent variables. Table 3 shows that across both Quebec and Ontario, RRSPs are the most common account type. It is surprising that there is a higher proportion of TFSA owners in the lowest age group relative to the highest one. The proportion of account ownership increases with education and income, as would be expected. This observation is also true for employment and presence of a financial advisor.

Table 3

	RRSP		TFSA		EPP	
	No	Yes	No	Yes	No	Yes
Province of Residence						
Ontario n = 1,507	28.8%	71.2%	38.8%	61.2%	43.5%	56.5%
Quebec n = 1,498	28.5%	71.5%	46.7%	53.3%	41.5%	58.5%
Gender						
Female n = 1,443	31.5%	68.5%	43.1%	56.9%	45.9%	54.1%
Male n = 1,562	26.1%	73.9%	42.3%	57.7%	39.4%	60.6%
Age						
35 to 40 n = 854	33.8 %	66.2 %	39.3 %	60.7 %	39.0 %	61.0 %
41 to 45 n = 658	27.7 %	72.3 %	41.5 %	58.5 %	41.6 %	58.4 %
46 to 50 n = 681	26.9 %	73.1 %	43.6 %	56.4 %	42.2 %	57.8 %
51 to 55 n = 812	25.5 %	74.5 %	46.4 %	53.6 %	47.1 %	52.9 %
Education Levels						
High School or less n = 393	49.4%	50.6%	60.1%	39.9%	61.6%	38.4%
Certificate n = 208	43.3%	56.7%	60.1%	39.9%	50.8%	49.2%
CEGEP or some University n = 965	30.3%	69.7%	47.6%	52.4%	40.8%	59.2%
Undergraduate n = 886	20.1%	79.9%	33.5%	66.5%	36.5%	63.5%
Graduate or more n = 553	19.3%	80.7%	30.0%	70.0%	39.2%	60.8%
Employment Status						
Employed n = 2,476	24.8 %	75.2 %	40.2 %	59.8 %	29.5 %	70.5 %
Self-employed n = 279	32.6 %	67.4 %	44.8 %	55.2 %	100.0 %	0.0 %
Did not work n = 231	60.6 %	39.4 %	66.2 %	33.8 %	100.0 %	0.0 %
Individual Income						
0 to 20k n = 342	57.6 %	42.4 %	62.0 %	38.0 %	91.8 %	8.2 %
20k to 40k n = 458	46.5 %	53.5 %	51.1 %	48.9 %	66.9 %	33.1 %
40k to 60k n = 677	26.6 %	73.4 %	44.8 %	55.2 %	38.0 %	62.0 %
60k to 80k n = 551	20.3 %	79.7 %	38.3 %	61.7 %	26.5 %	73.5 %
80k to 100k n = 368	16.6 %	83.4 %	33.4 %	66.6 %	22.8 %	77.2 %

over 100k n = 503	9.1 %	90.9 %	27.0 %	73.0 %	24.1 %	75.9 %
Advisor						
No n = 1,636	4.2%	59.8%	5.4%	49.6%	47.3%	52.7%
Yes n = 1,273	11.6%	88.4%	31.4%	68.6%	36.4%	63.6%

We mentioned earlier that this study is the first to account for variables such as risk aversion (σ) and impatience (β). Those variables were provided to us by Martin Boyer, Philippe d’Astous and Pierre-Carl Michaud (2019) and based on the approach of Andersen *et al.* (2008). Andersen *et al.* (2008) developed a framework to model risk aversion and time preferences of individuals using Holt and Laury’s (2002) Multiple Price List of Lotteries (MPL). They use monetary compensation by giving each subject the chance to receive a payment associated with their lottery choices. We will explain how these variables are estimated for each individual respondent.

In our survey, respondents were shown a first MPL for risk aversion followed by a second one for time preferences, each with 10 lotteries and two payout options to pick from, A and B (see Appendix B). As seen in the table below, each lottery has a probability p_J of outcome $w_{J,1}$ and $1 - p_J$ of outcome $w_{J,2}$ given $J = A, B$. In our survey, each participant has a 5% chance (1 in 20) of being selected for a payout and each lottery has a 10% chance (1 in 10) of being picked out. They are therefore more incentivized to play the lottery as if the payout would be realizable. In a first step to estimating risk aversion σ for each individual given their characteristics, Boyer *et al.* (2019) used the constant relative risk aversion (CRRA) utility function to estimate bounds on σ , which are shown in the last two column of the table below, that are compatible with a switch from lottery A to lottery B. These columns were not shown to respondents when making their choices of lottery.

Table 4

	p_A	$w_{A,1}$	$1-p_A$	$w_{A,2}$	Ew_A	p_B	$w_{B,1}$	$1-p_B$	$w_{B,2}$	Ew_B	σ_{\min}	σ_{\max}
1	0.1	20.0	0.9	16.0	16.4	0.1	39.0	0.9	1.0	4.8	$-\infty$	-1.672
2	0.2	20.0	0.8	16.0	16.8	0.2	39.0	0.8	1.0	8.6	-1.672	-0.916
3	0.3	20.0	0.7	16.0	17.2	0.3	39.0	0.7	1.0	12.4	-0.916	-0.462
4	0.4	20.0	0.6	16.0	17.6	0.4	39.0	0.6	1.0	16.2	-0.462	-0.122
5	0.5	20.0	0.5	16.0	18.0	0.5	39.0	0.5	1.0	20.0	-0.122	0.164
6	0.6	20.0	0.4	16.0	18.4	0.6	39.0	0.4	1.0	23.8	0.164	0.426
7	0.7	20.0	0.3	16.0	18.8	0.7	39.0	0.3	1.0	27.6	0.426	0.689
8	0.8	20.0	0.2	16.0	19.2	0.8	39.0	0.2	1.0	31.4	0.689	0.981
9	0.9	20.0	0.1	16.0	19.6	0.9	39.0	0.1	1.0	35.2	0.981	1.376
10	1.0	20.0	0.0	16.0	20.0	1.0	39.0	0.0	1.0	39.0	1.376	∞

Source: Boyer, d’Astous and Michaud (2019) p.41

To illustrate how these bounds are calculated and given the CRRA utility function:

$$u(L) = \begin{cases} \frac{1}{1-\theta}L^{1-\theta} & \text{if } \theta > 0, \theta \neq 1 \\ \ln L & \text{if } \theta = 1 \end{cases}$$

Where $u(L)$ measures the level of utility of a given lottery L and θ represents the level of relative risk aversion. With this function, $\theta = 0$ represents a risk-neutral individual (linear utility function), $\theta > 0$ represents a risk-averse individual (concave utility function) and $\theta < 0$ represents risk lovers (convex utility function). In our case, participants are given the option between lotteries A and B so given these two lotteries, utility can be written in the following way:

$$(1) \quad U = u(A) + u(B)$$

The first derivative of the utility function gives us the marginal utility for one incremental consumption of a good: in our case, each lottery. We can derive the marginal rate of substitution of switching from one lottery to the other:

$$\frac{u'(A)}{u'(B)} = \frac{A^{-\theta}}{B^{-\theta}} = \left(\frac{B}{A}\right)^{\theta}$$

Which can be rewritten such as:

$$\frac{A}{B} = \left(\frac{u'(B)}{u'(A)}\right)^{1/\theta}$$

The exponential term $\sigma = 1/\theta$ is therefore the elasticity of substitution that we can infer using the expected value of each lottery. It tells us about the preference in substituting one lottery for the other when the relative expected lottery value changes. Using the normal cumulative distribution function that includes each respondent's characteristics along with the minimum and maximum bound on σ for each lottery, Boyer *et al* (2019) were able to estimate the risk aversion on an individual level (see Appendix B).

A second MPL was shown to respondents in order to estimate their time preference as a discount factor β . Each MPL allows the calculation of a bounded estimate of each parameter σ and β . With those bounded estimates as an input to the maximum likelihood model using each respondent's observed characteristics, those parameters can be estimated on an individual level. In option A, respondents receive 12\$ in one month whereas in option B, they can receive a high payout in thirteen months. In this case again, participants have a 5% chance of being picked to receive a monetary compensation and each of the 10 lotteries has an equal likelihood of being selected for payment. To derive a discount factor for each individual, the estimate for risk aversion σ is used as an input. Andersen et al. (2008) explain their model in greater detail, however we can illustrate the reasoning behind. Here again, with the utility function giving the individual two options:

$$(2) \quad U(c + M_t) + \frac{1}{(1+\delta)^T}U(c) = U(c) + \frac{1}{(1+\delta)^T}U(c + M_{t+\tau})$$

They define c as being background consumption, M_t as being a payout given at time t , δ is the discount rate and τ is the extra delay for the later payout $M_{t+\tau}$. On the left-hand side is the sum of the discounted utilities of receiving a payout M_t and consumption c at time t with no later payout at time $t + \tau$. On the

right-hand side is the addition of the discounted utilities of receiving only regular consumption c at time t and extra payout $M_{t+\tau}$ at time $t + \tau$. This equation needs solving for the discount rate δ that makes the utility of receiving amount M_t at time t equivalent to receiving amount $M_{t+\tau}$ at time $t + \tau$, given consumption level c . If the individuals were risk-neutral, equation 2 can be written in the following way:

$$M_t = \frac{1}{(1 + \delta)^T} M_{t+\tau}$$

When accounting for risk profile however, it is clear from equation 2 that the more concave the utility function is (i.e. the more risk averse the individual is), the lower the discount rate. This shows that the risk profile of the individual is an evident input to be able to determine time preference. We thus include those individual level estimates of time preference and risk aversion in our model.

The table 5 below is useful to better visualize the mean and median of time preference and risk aversion, across respondents' different demographic variables. We also reported the values of the appropriate mean comparison tests (t-test or analysis of variance for multiple category variables). For example, it appears that women are more patient and risk averse than men. These suggestions are significant at a 5% confidence level (two-sided p -values of 0.0139 and 0.0336, respectively). Mean and median are conflicting for the province variable, but region does not seem to affect time preference and risk aversion (i.e. the relationship is not clear). A mean comparison analysis suggests that province is not significant in determining time preference or risk aversion (p -values of 0.627 and 0.2346, respectively). Surprisingly, those in the youngest age category seem to value present consumption more than their older peers (age is significant at the 10% level with a p -value of 0.090) and are more risk averse relative to those who are above 46 years old, although risk aversion seems to follow a hump-shaped distribution. We find risk aversion difference not to be significantly different than 0 across different age category. Also hump-shaped is the distribution of median risk aversion relative to income: respondents falling in the lower and upper end of the income distribution seem less risk averse. Average shows an almost perfect relationship that risk aversion decreases with income, although it shows not to be significant. This is incoherent with Arrow (1984) who claims that absolute risk aversion should decrease as wealth increases. This is why quadratic and exponential utility functions are sometimes viewed as misleading because the former implies an increasing absolute risk aversion and the latter implies constant absolute risk aversion. The CRRA function however, is convex so risk aversion falls as wealth increases. Guiso *et al.* (2008) confirm with their findings that CRRA utility is more suited and they reject CARA utility function because they find risk aversion to decrease with endowment. From the table below, it is unclear whether there is a relationship between income and time preference and the relationship does not appear to be significant. Being unemployed seems to increase risk aversion and patience although only risk aversion is significant. This makes sense given that an unemployed individual can take on less risk than someone earning an income and having more stability. Guiso *et al.* (2008) also mentions that individuals facing more income uncertainty or income constraints are more risk averse, coherent with our finding. We also find individuals with a higher level of education to be more risk loving (significant at 5% level). Guiso *et al.* (2008) also conclude that risk averse individuals are typically younger, less educated, more likely to be a female and to be married. They also find a very low proportion of risk averse individuals to be self-employed, which is coherent with the idea that those individuals take on more risks. Education, however, does not

significantly impact time preference. Finally, marital status does not significantly impact risk aversion or even time preference. In the following section, we examine which variables significantly make it more likely to be a planner.

Table 5

	Time Preference		Risk Aversion	
	Average	Median	Average	Median
Province of Residence				
Ontario	0.968	0.973	0.3756	0.296
Quebec	0.9719	0.9685	0.4168	0.2963
	t=-0.486; p=0.627		t=-1.189; p=0.235	
Gender				
Female	0.9801	0.9879	0.4342	0.556
Male	0.9606	0.9662	0.3606	0.2956
	t=2.460; p=0.014		t=2.126; p=0.034	
Age				
35 to 40	0.9588	0.9663	0.4047	0.2967
41 to 45	0.9768	0.9731	0.4482	0.5555
46 to 50	0.9627	0.9685	0.3829	0.2958
51 to 55	0.9829	0.9878	0.3526	0.2957
	F=2.17; p =0.090		F=1.28; p =0.278	
Education Levels				
High School or less	0.9803	0.9879	0.4776	0.5563
Certificate	0.9773	1.0507	0.4424	0.5564
CEGEP or some University	0.9732	0.9803	0.402	0.5557
Undergraduate	0.9692	0.9685	0.413	0.2958
Graduate or more	0.9571	0.9685	0.2947	0.2955
	F=0.83; p =0.507		F=2.53; p =0.038	
Employment Status				
Employed	0.9693	0.9686	0.398	0.2962
Self-employed	0.9586	0.9686	0.2915	0.2955
Did not work	0.9961	1.0522	0.5139	0.5559
	F=2.04; p =0.130		F=3.45; p =0.032	
Individual Income				
0 to 20k	0.9824	1.0235	0.4256	0.2966
20k to 40k	0.967	0.9685	0.4788	0.5557
40k to 60k	0.9589	0.9663	0.407	0.5558
60k to 80k	0.9708	0.9731	0.4098	0.5556
80k to 100k	0.9664	0.9663	0.3689	0.2958
over 100k	0.9798	0.973	0.324	0.2954

	F=1.47; p =0.195		F=0.83; p =0.525	
Marital Status				
Not single	0.9703	0.9686	0.3963	0.2962
Single	0.9693	0.9686	0.3949	0.2962
	t=0.127; p=0.899		t=0.040; p=0.968	

Reported under mean are the unpaired t-test, F-test and p values

III. 2 Multivariate Statistics

As previously mentioned, our study is divided in three sections, each one trying to answer a different question. In the first and next section, we try to identify which factors make an individual significantly more likely to be a planner. In the second section, we try to identify the determinants which lead to higher savings and contributions. In the third and last section, we look for determinants of financial literacy.

III. 2. A) Financial planning

In this section, we examine which variables significantly make it more likely to be a planner by using the research of Boisclair *et al.* (2014) as a guideline. For the following regression model, in which the dependent variable is binary, we use the logistic regression (LR), which is most popular in situations where the dependant variable is binary. Appendix C contains details regarding the multivariate analysis and how data in the following table is interpreted. We present the regression outcome using 3 different models. As mentioned previously, respondents were asked three basic questions on interest rate compounding, inflation and the effect of diversification on risk. These questions are commonly used in many other studies and will help us create a binary variable in order to qualify a respondent as being financially literate. We wanted to evaluate whether financial literacy has an impact on being a planner and integrated the variable in three different ways:

1. In the 1st model we included each financial literacy question individually (i.e. three binary variables)
2. In the 2nd model, we replaced the financial literacy questions by one binary variable equal to 1 if the respondent answers all questions correctly.
3. In the 3rd model, we replaced the financial literacy questions by the number of correct answers.

The table below shows our logistic regression results. Financial literacy seems to have an impact on whether the respondent will be a planner or not. Looking at the first model, only the question on diversification and risk seems significant but our second model tells us that one who answered all three questions correctly has significantly more chances of being a planner. The odds of being a planner increase by 74% for individuals who answered all questions correctly. Our third model also confirms that financial literacy is positively correlated to financial planning. We find that having the correct answer to one extra financial literacy question increases the odds of having a savings plan by 29%. Our results suggest that income is significant in determining whether an individual is a planner. As expected, a higher income makes it more likely to have an investment account. As seen in table 6, for example, the odds of being a

planner increase by 917% ($(100 \times (e^{2.32} - 1))$) for someone earning over 100 000\$ a year relative to the lowest earner (below 20 000\$). The estimated coefficient increases as the income bracket increases so the relationship between income and planning is highly positive. Another variable that is significant in predicting whether one will turn out to be a planner or not is the education level: the odds of being a planner for a respondent with a Bachelor's degree are 158% greater than those of the reference group. Also, those with more than a Bachelor's degree are three times more likely to be a planner relative to those with high school or less. Although there does not seem to be a significant difference between earning a high school degree and a certificate, the coefficient increases and becomes more significant as education level increases. Also, we find females more likely to plan for retirement although the relationship is not as strong as for the other variables. The last variable in our model to be significant in predicting financial planning is employment status. The unemployed respondent is about 76% less likely to have a retirement savings plan compared to an employed respondent. Region, age, time preference and risk aversion do not predict whether an individual is likely to have an investment account. We will get to the two former shortly but as for the two latter, it is somehow interesting to elaborate on our findings. These findings contradict studies performed on savings and consumption which examine the relationship between saving and uncertainty with regards to the future. For example, Carroll (1992) studies the so called "buffer-stock" model of saving which dictates that consumers hold assets to insure or protect their consumption against the uncertain income fluctuations. He explains that buffer-stock saving depends on patience and prudence. If income in the future were certain, one would borrow against future consumption or spend down their assets. However, prudence restricts such a behavior. When uncertainty increases regarding future employment, target buffer-stock increases. He stretches on the existence of a target wealth stock. If wealth is below the target wealth stock, prudence overrides impatience and vice versa. Also, Bommier *et al.* (2019) confirm that risk-averse individuals will tend to save more when facing income uncertainty. Even when we try a different specification of our model (if we define our dependant variable using NRA), we do not find time preference nor risk aversion to become significant in predicting the probability of planning financially. Time preference and risk aversion should also impact the level of savings and this is what the next section will try to uncover. In summary, we find the determinants that are significant in predicting that an individual is a planner to be the employment status, education level, annual income, financial literacy and gender (at a 10% significance level).

If we contrast our results with those of Boisclair, Lusardi and Michaud (2014), we find some differences in the determinants that are significant in predicting a planner versus a non-planner. They find a strong relationship for gender supporting that women are more likely to plan for retirement. We also find women to be more likely to plan for retirement, but the relationship is not as strong in our sample (only at the 10% significance level versus 1% in their study). They find region and age to be significant. However, this is because their sample is more heterogeneous than ours. For example, they find a significant difference in retirement planning between respondents from Quebec and Atlantic. However, they find no significant difference between Quebecers and Ontarians and our sample is comprised only of people from these two provinces so in that regards, our findings are consistent with theirs. The same situation applies to the age variable. They find that older individual are more likely to hold retirement savings. However their sample is comprised of individuals aged between 25 to 64 years old whereas our sample is restrained to individuals between the ages of 35 and 55. Based on their findings, the age gap in our sample should be

much wider for the age variable to be statistically significant. Therefore, if our sample was more diversified in terms of age and region, we might have found these two variables to be significant. Again to contrast with their study, they mention that the marital status variable would have been added to their regression if it was available. This variable is available in our database. However, it is not statistically significant and it does not appear to increase the goodness of fit of our regression model. As a result, we chose to exclude it.

Table 6

Individual is a planner	1st Model	2nd Model	3rd Model
Intercept	-0.307 (0.53)	0.105 (0.50)	-0.288 (0.52)
Interest Literacy (ref. Incorrect or DK)			
Correct	0.376 ⁺ (0.23)		
Inflation Literacy (ref. Incorrect or DK)			
Correct	-0.199 (0.19)		
Risk Literacy (ref. Incorrect or DK)			
Correct	0.616 ^{***} (0.17)		
Overall correct (ref. No)			
Yes		0.553 ^{***} (0.15)	
# Correct Literacy Questions			
			0.258 ^{**} (0.082)
Respondent's Individual Income (ref. 0 to 20k)			
20k to 40k	0.447 [*] (0.21)	0.482 [*] (0.22)	0.463 [*] (0.22)
40k to 60k	1.563 ^{***} (0.25)	1.562 ^{***} (0.26)	1.555 ^{***} (0.26)
60k to 80k	2.159 ^{***} (0.31)	2.169 ^{***} (0.32)	2.164 ^{***} (0.32)
80k to 100k	2.306 ^{***} (0.40)	2.304 ^{***} (0.40)	2.309 ^{***} (0.40)
over 100k	2.320 ^{***} (0.36)	2.329 ^{***} (0.36)	2.331 ^{***} (0.36)

Province (ref. Ontario)			
Quebec	0.217 (0.15)	0.229 (0.15)	0.245 (0.15)
Gender (ref. Female)			
Male	-0.270 ⁺ (0.15)	-0.283 ⁺ (0.15)	-0.267 ⁺ (0.15)
Age (ref. 35 to 40)			
41 to 45	-0.00115 (0.21)	0.0105 (0.21)	0.00940 (0.21)
46 to 50	0.207 (0.21)	0.180 (0.21)	0.195 (0.21)
51 to 55	0.00414 (0.20)	-0.0322 (0.20)	-0.0204 (0.20)
Education (ref. High school or less)			
Certificate	-0.219 (0.27)	-0.198 (0.26)	-0.205 (0.26)
CEGEP or some University	0.496 [*] (0.20)	0.501 [*] (0.20)	0.498 [*] (0.20)
Undergraduate	0.955 ^{***} (0.23)	0.919 ^{***} (0.23)	0.941 ^{***} (0.23)
Graduate or more	1.123 ^{***} (0.29)	1.070 ^{***} (0.28)	1.094 ^{***} (0.29)
Work status (ref. Employed)			
Self-employed	-0.672 ^{**} (0.23)	-0.695 ^{**} (0.23)	-0.679 ^{**} (0.23)
Did not work	-1.426 ^{***} (0.24)	-1.408 ^{***} (0.24)	-1.411 ^{***} (0.24)
Time preference			
	0.317 (0.44)	0.226 (0.44)	0.297 (0.44)
Risk aversion			
	0.00317 (0.10)	0.00463 (0.10)	-0.00369 (0.10)
Observations	2467	2467	2467
Pseudo R^2	0.26	0.257	0.254
AIC	1336	1337.2	1341.4
BIC	1463.9	1453.4	1457.6

Mc Fadden Adj. R^2	0.224	0.226	0.225
Cox-Snell R^2	0.168	0.166	0.165
AUC	0.851	0.849	0.849
†Accuracy	89.66	89.5	89.46
†Sensitivity	98.03	97.85	97.85
†Specificity	24.29	24.29	23.93

Robust Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We repeated the regression but instead of using “planner” as the dependant variable, we used each account type separately. The tables in Appendix C show the same analysis for RRSP, TFSA and EPP individually. It is interesting to evaluate the determinants for each planning engine individually. For example, we find that the determinants which are significant in determining that an individual has a RRSP are the same as the ones that an individual is a planner with one additional factor: age. The older the individual, the more likely it is they have a RRSP. For TFSA, age shows a negative correlation but is less significant while province is strongly significant, at the 1% confidence level. The odds of a Quebecer having a TFSA are 21% smaller relative to an Ontarian. Gender is also significant but only at the 5% significance level; the odds of a male having a TFSA are smaller relative to the opposite sex. If we look at table 3 however, there does not seem to be an important difference in gender. Finally, for EPP, the employment variable was eliminated due to collinearity and the most important factor is income. Age and education are significant (at the 1% significance level) but unlike the other regressions, significance level decreases for ‘undergraduates’ (still present at the 5% level) and disappears for ‘graduates and more’. Risk aversion appears significant at the 10% confidence level with positive correlation, showing that more risk averse individuals are more likely to have an employer pension plan.

Financial advisor

In this section, we simply want to outline a few statistics on the use of a financial advisor. The use of a financial advisor would be highly significant in our analysis but due to simultaneity and conflict of interest, it is best that we omit this variable. By simultaneity, we mean that it is hard to determine whether an individual decides to save more because they have a financial advisor or that they decide to seek the guidance of a financial advisor because they save more. In addition to that bi-directionality between planning for retirement and having an advisor, there is the conflict of interest since advisors are paid a certain commission on asset under management. Their remuneration gives them the incentive to encourage their clients to save more. As Boisclair *et al.* (2014) reported in their research, this simultaneity problem also applies to financial literacy and planning for retirement. However, unfortunately there is no variable in our questionnaire that could be a good instrument for financial literacy to correct for potential endogeneity (that variable would have to be uncorrelated for our dependant variable). A good instrumental variable would have been available if the survey included a question on the level of financial education received up to this day (in school, through work training, etc).

Going back to the advisor variable, it is still interesting to analyse whether Canadians have a financial advisor and why not. To our surprise, 56% of respondents don't have a financial advisor. The most recurrent reason given by more than a third of respondents is that they don't have enough money to need a financial advisor. Another reason given by 20% of them is that having a financial advisor is too expensive. The most surprising part is that one third assume they have enough financial knowledge to need an advisor. It is interesting to evaluate whether these 512 respondents who don't have a financial advisor because they estimate their financial knowledge to be good enough actually did well in the financial literacy questions: 94% answered the financial literacy question on interest rates correctly, 86% answered the risk and inflation questions correctly and 75% answered correctly all three questions. Their performance is above average in those basic financial literacy questions. Respondents were also asked more detailed and technical question (see Appendix A for details). We find an average performance score of 76% for the question regarding tax deductibility of TFSA and RRSP contributions, 82% for the question on withdrawal from a TFSA or RRSP, 61% for the question regarding taxation of distributions in a TFSA or RRSP, 27% for the question about penalty for early withdrawal and 42% for the question about contribution room after withdrawal. Clearly, when questions become too technical, the performance drops significantly. In the following section, we look at savings and contributions as the dependant variable of interest.

III. 2. B) Savings and contribution

In the second part of our analysis, we are interested in determining which factors have an impact on the amount of savings and previous year contributions. Our model here is an extension of the research of Boisclair *et al.* (2014). In this section, we keep our previous model but rather than looking at the probability of being a planner, we look at the level of planning with total savings accumulated. Savings are defined as amounts accumulated in RRSP, TFSA and Non-Registered accounts (NRA). Total contributions are defined as investments made in RRSP or TFSA accounts. The survey did not inquire about contributions in a NRA which explains the exclusion of that observation. In addition, although respondents were asked about their employer pension plan contributions, some respondents gave their contribution as a percentage of work income and others gave their pre-authorized contribution amount and frequency, which complicates things. For simplicity and accuracy, we used the contributions to RRSP and TFSA accounts as the total contribution. After removing the outliers and using the logarithm of total savings, our model was well suited (see Appendix D for details).

Accumulated Savings

Before we report the findings of our analysis, we included a detailed table with average savings accumulated (along with other descriptive data) given different demographic variables. Clearly, average savings increases with age, employment status, education level and income. It is quite unusual that the average savings amount is higher for those earning a very low income relative to those earning between 20 000\$ and 40 000\$ but it appears as though some extreme values are skewing the mean upward. It would have been interesting to have after tax income to get a closer picture to disposable income. Although our questionnaire enquires about monthly spending, many values are extreme and so a more direct question on discretionary income would have also been useful. Another surprising finding is that

self-employed individuals save more on average relative to employed individuals. Unemployed individuals have a decent amount of wealth accumulated and this could be due to the fact that this category might include individuals who were simply between two jobs when taking the survey. They remain, however, the category with the least amount of average savings. The average and median savings accumulated are much higher for Ontarians relative to Quebecers. This is also true for males relative to females. Finally, having a financial advisor seems to influence the amount of savings accumulated but as previously mentioned, there is a direct conflict of interest around that variable because more savings would mean higher trailer fees to the advisor. In order to make our research more reliable, it is best that the advisor variable be left out of the regression. Our multivariate analysis will determine which factors have a significant impact on savings.

Table 7

Savings	# Obs.	Average	Median	Min	Max
Province of Residence					
Ontario	1,307	\$166,404.80	\$58,000	\$0	\$4,075,000
Quebec	1,323	\$110,664.40	\$32,000	\$0	\$5,570,000
Gender					
Female	1,235	\$112,785.20	\$35,000	\$0	\$4,075,000
Male	1,395	\$161,011.00	\$52,000	\$0	\$5,570,000
Age					
35 to 40	743	\$79,303.40	\$25,000	\$0	\$2,530,000
41 to 45	579	\$113,834.30	\$40,000	\$0	\$2,000,000
46 to 50	590	\$145,737.20	\$56,550	\$0	\$2,160,000
51 to 55	718	\$213,207.00	\$70,350	\$0	\$5,570,000
Education Levels					
High School or less	331	\$50,399.50	\$5,000	\$0	\$825,000
Certificate	171	\$46,493.30	\$7,000	\$0	\$590,000
CEGEP or some University	844	\$101,814.90	\$35,000	\$0	\$2,060,000
Undergraduate	791	\$177,179.60	\$70,000	\$0	\$2,160,000
Graduate or more	493	\$229,587.40	\$88,000	\$0	\$5,570,000
Employment Status					
Employed	2,164	\$140,504.40	\$50,000	\$0	\$3,520,000
Self-employed	241	\$173,420.10	\$55,000	\$0	\$4,075,000
Did not work	210	\$82,466.80	\$225	\$0	\$5,570,000
Individual Income					
0 to 20k	305	\$57,814.40	\$1,550	\$0	\$820,000
20k to 40k	390	\$47,010.60	\$8,050	\$0	\$1,000,000

40k to 60k	591	\$77,036.40	\$31,400	\$0	\$1,437,000
60k to 80k	487	\$110,587.40	\$58,000	\$0	\$925,000
80k to 100k	341	\$179,901.30	\$90,000	\$0	\$2,060,000
over 100k	466	\$358,277.00	\$180,000	\$0	\$5,570,000
Advisor					
No	1,468	\$101,083.60	\$20,500	\$0	\$2,560,000
Yes	1,096	\$193,794.30	\$89,400	\$0	\$5,570,000

It is important to note that we considered the possibility of a sample bias given that those who are not planners cannot technically save or contribute to their accounts. In our survey, respondents who claimed they don't have a certain type of account were omitted in the following question inquiring about the amount of savings they have in that account, so the data is unobserved. Sample selection is really a form of sample truncation where information is missing because it is unobserved (Baum, 2006; Kennedy, 2006; Woolridge 2010)¹⁷. In our case, the sample selection bias is due to the fact that we do not know the total savings for those who are not planner. The histograms in Appendix D and E show what the distribution of observations looks like and if there is an apparent truncation/censoring. As seen in Appendix D and E, our dependant variable is left-censored and in such situation, OLS regression fails to provide consistent parameters estimates. We used two well-known methods that suit better our variable distribution:

- Type I Tobit Model.
- Type II Tobit model, which is commonly known as Heckman Two Stage Model.

We here again use the three different specifications to define financial literacy:

1. In the 1st model we included each financial literacy question individually (i.e. three binary variables)
2. In the 2nd model, we replaced the financial literacy questions by one binary variable equal to 1 if the respondent answers all questions correctly.
3. In the 3rd model, we replaced the financial literacy questions by the number of correct answers.

In table 8 below, we present the results of the Tobit model and the Heckman model. However, we will report the results of the Tobit model given that the value of ρ in the Heckman model is not significant (see Appendix D for details). Overall financial literacy level seems to have an impact on savings. A respondent qualified as financially literate (2nd model) will save on average 340% ($100 \times (e^{1.481} - 1)$) more than a respondent who is not. The marginal effect on total savings of answering one additional financial literacy correctly is also positive: it increases savings by 310%, all else equal. The table below, using the first model for financial literacy, illustrates that income has a very significant impact on the level of savings, which is to be expected. An individual in the highest income bracket has much higher accumulated savings relative to the lowest bracket earner. The estimate coefficient significantly increases as income bracket increases and the relationship is exponential so the impact on savings increases quickly.

¹⁷https://media.terry.uga.edu/socrates/publications/2018/05/Heckman_Sample_Selection_2016_1.pdf

We found a study performed by Gilles Bérubé and Denise Côté (2000) on the Bank of Canada website which tries to identify the determinants of personal savings¹⁸. Although their analysis is performed on a macroeconomic level, our purpose is to emphasize on the importance of the income variable on savings. Amongst the most important determinants of personal savings rate, they identify the ratio of household net worth to personal disposable income. Income is an input to obtaining that ratio. Another significant variable is the region or province. The table below shows that Quebecers save on average 36% less than Ontarians and leads to the following question: What are Ontarians schools teaching or doing differently to encourage a higher savings rate? Although table 7 showed males save higher than females on average, gender revealed not to be a significant determinant of savings. As would be expected, older individuals have, all else equal, more savings and the wealth accumulated increases as age bracket increases. Individuals over 50 years old have about 118% more in savings than younger individuals between 35 and 40 years old have accumulated. Being highly educated increases the likelihood of having greater savings. This tells us that universities are potentially better at teaching the importance of good financial behavior and savings relative to Cegeps and high schools. Having a Bachelor's degree or more is likely to yield to higher accumulated wealth relative to those with a high school degree or less. We previously mentioned that unemployed respondents have relatively decent savings accumulated, on average, if we compare with employed individuals. However, it appears that being employed has a strong positive impact on accumulated wealth. Unemployed individuals, *ceteris paribus*, save on average 86% less than employed individuals, which is consistent with Carroll (1992) that we previously cited. In his study, he mentions that unemployment is the trigger of the most drastic fluctuation in households' income. He considers unemployment expectations in his model and explains that when consumers think that the risk of unemployment will increase, the uncertainty about future income rises which leads the target buffer-stock to increase as well. With a higher target buffer-stock, households increase their saving to meet the revised target.

Getting to the interesting observations, risk aversion and time preference, we notice that risk aversion does not affect the level of savings, contradicting previous studies (Carroll, 1992; Bommier *et al.*, 2019; Deaton 1991) which claim that risk aversion encourages households to maintain a contingency fund (buffer-stock) but impatience drags that buffer down. There is empirical evidence that risk aversion and time preference impact wealth accumulation. We would have expected more patient and more risk averse individuals to have higher savings and vice versa: a higher discount factor (a more patient individual) and a lower risk aversion factor should lead to greater accumulated wealth. We made an interesting finding. We tried different models in which the total savings is the amount accumulated in each account type individually. We first ran the regression using total savings in the RRSP since this account is specifically for retirement and so patient individuals should have significantly more in that account relative to the impatient ones. We find time preference to be, here also, significant at the 5% level with a positive coefficient. However, when we ran the models in which the dependent variable is the accumulated savings in the TFSA or the NRA, the time preference variable is not significant. The time preference variable thus appears to be important for the account which provides a tax deduction as an incentive to plan for retirement although it is not in our final model. The last variable we did not address is whether the

¹⁸ <https://www.bankofcanada.ca/wp-content/uploads/2010/01/wp00-3.pdf>

respondent has a financial plan. A study conducted by Ameriks *et al.* (2002) emphasizes on the fact that increased wealth and savings arise from the "propensity to plan" which is way more important than the discount factor. The propensity to plan encourages individuals to have a financial plan and to set budgets. They track their spending more carefully and are more likely to accumulate more wealth. In our survey, respondents were asked if they have a plan for retirement. We included that variable in our model and it is very significant. We find those individuals who do have a financial plan for retirement to have accumulated, all else equal and on average, 288% more savings than individuals who don't. This tells us that policy makers should perhaps, as a measure to make our educational system better, focus on teaching about budgeting and the importance of having a plan for retirement.

To summarize our findings with the final model shown in Table 8, we determine that the variables which have a significant impact on wealth accumulation are overall financial literacy, income, province, age, education, employment status and having a financial plan for retirement. The following section analyses the determinants of investment contributions.

Table 8

log(Total Savings + 1)	Literacy Indicators		Overall 3 corrects		# correct Literacy questions	
	Heckman	Tobit	Heckman	Final	Heckman	Tobit
Intercept	7.501 ^{***} (0.38)	1.920 [*] (0.86)	8.050 ^{***} (0.35)	3.764 ^{***} (0.80)	7.478 ^{***} (0.37)	1.983 [*] (0.84)
Interest Literacy (ref. Incorrect or DK)						
Correct	0.342 ⁺ (0.18)	1.310 ^{**} (0.43)				
Inflation Literacy (ref. Incorrect or DK)						
Correct	0.165 (0.12)	0.734 ^{**} (0.27)				
Risk Literacy (ref. Incorrect or DK)						
Correct	0.573 ^{***} (0.11)	1.443 ^{***} (0.26)				
Overall correct (ref. No)						
Yes			0.576 ^{**} (0.087)	1.481 ^{***} (0.21)		
# Correct Literacy Questions					0.366 ^{***} (0.056)	1.141 ^{***} (0.14)

Individual Income (ref. 0 to 20k)

20k to 40k	0.00848 (0.24)	0.702 (0.50)	0.0346 (0.24)	0.792 (0.51)	0.0137 (0.24)	0.718 (0.50)
40k to 60k	0.750 ^{***} (0.22)	2.214 ^{***} (0.47)	0.760 ^{***} (0.22)	2.302 ^{***} (0.48)	0.743 ^{***} (0.22)	2.213 ^{***} (0.47)
60k to 80k	0.941 ^{***} (0.22)	2.716 ^{***} (0.47)	0.977 ^{***} (0.22)	2.903 ^{***} (0.47)	0.939 ^{***} (0.22)	2.726 ^{***} (0.47)
80k to 100k	1.407 ^{***} (0.23)	3.241 ^{***} (0.48)	1.421 ^{***} (0.23)	3.370 ^{***} (0.48)	1.402 ^{***} (0.23)	3.247 ^{***} (0.48)
over 100k	1.800 ^{***} (0.22)	3.559 ^{***} (0.48)	1.825 ^{***} (0.22)	3.716 ^{***} (0.48)	1.801 ^{***} (0.22)	3.571 ^{***} (0.48)

Province (ref. Ontario)

Quebec	-0.230 ^{**} (0.075)	-0.449 [*] (0.18)	-0.226 ^{**} (0.074)	-0.429 [*] (0.18)	-0.218 ^{**} (0.074)	-0.435 [*] (0.18)
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Gender (ref. Female)

Male	-0.0115 (0.078)	-0.0727 (0.18)	-0.0170 (0.079)	-0.0516 (0.18)	-0.00180 (0.078)	-0.0603 (0.18)
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Age (ref. 35 to 40)

41 to 45	0.185 ⁺ (0.11)	0.418 ⁺ (0.24)	0.202 ⁺ (0.11)	0.457 ⁺ (0.24)	0.193 ⁺ (0.11)	0.426 ⁺ (0.24)
46 to 50	0.535 ^{***} (0.11)	0.520 [*] (0.24)	0.531 ^{***} (0.11)	0.515 [*] (0.24)	0.527 ^{***} (0.11)	0.499 [*] (0.24)
51 to 55	0.895 ^{***} (0.10)	0.779 ^{**} (0.24)	0.897 ^{***} (0.10)	0.801 ^{**} (0.24)	0.890 ^{***} (0.10)	0.757 ^{**} (0.24)

Education (ref. High school or less)

Certificate	0.0546 (0.24)	-0.534 (0.56)	0.0756 (0.25)	-0.463 (0.57)	0.0702 (0.24)	-0.506 (0.56)
CEGEP or some University	0.373 [*] (0.17)	1.006 ^{**} (0.38)	0.366 [*] (0.17)	1.066 ^{**} (0.38)	0.379 [*] (0.17)	1.014 ^{**} (0.38)
Undergraduate	0.633 ^{***} (0.17)	1.821 ^{***} (0.37)	0.612 ^{***} (0.17)	1.891 ^{***} (0.37)	0.637 ^{***} (0.17)	1.822 ^{***} (0.37)
Graduate or more	0.763 ^{***} (0.17)	1.777 ^{***} (0.40)	0.744 ^{***} (0.17)	1.846 ^{***} (0.40)	0.764 ^{***} (0.17)	1.773 ^{***} (0.40)

Work status (ref. Employed)

Self-employed	0.304 [*]	0.374	0.306 [*]	0.411	0.296 ⁺	0.361
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	(0.15)	(0.32)	(0.15)	(0.32)	(0.15)	(0.32)
Did not work	0.0912 (0.28)	-1.994 ^{***} (0.58)	0.132 (0.27)	-1.931 ^{***} (0.58)	0.0885 (0.27)	-1.995 ^{***} (0.58)
Time preference	0.437 ⁺ (0.22)	0.245 (0.53)	0.408 ⁺ (0.22)	0.154 (0.53)	0.420 ⁺ (0.22)	0.219 (0.53)
Risk aversion	-0.00423 (0.054)	0.0265 (0.13)	-0.00318 (0.054)	0.0265 (0.14)	-0.00558 (0.054)	0.0228 (0.14)
Respondent has a financial plan (ref. No)						
Yes	0.612 ^{***} (0.074)	1.357 ^{***} (0.17)	0.606 ^{***} (0.075)	1.357 ^{***} (0.17)	0.625 ^{***} (0.074)	1.378 ^{***} (0.17)
Observations	2177	2177	2177	2177	2177	2177
Censored observations	293	293	293	293	293	293
R ²	0.301	0.289	0.293	0.281	0.300	0.287
rho	-0.072		-0.085		-0.076	
lambda	-0.117		-0.137		-0.123	
sigma	1.618	3.956	1.619	3.982	1.621	3.960

Robust standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Prior year contribution

Just as we did to better illustrate savings accumulated by variable category, we included a detailed table with average and median contributions. Table 9 shows that mean and median contributions are greater in Ontario relative to Quebec. Males and older respondents also contribute more to their RRSP and TFSA, but the increase relative to the reference category is extremely small. It is surprising that the difference in average contribution between the youngest and oldest respondents is not more than 700\$. Although allowed TFSA contributions are the same for everyone in a given year, regardless of age, the RRSP contribution is dependent on income so it could vary with age. Education might be a good determinant of the level of contributions since it is positively correlated with our dependant variable. By looking at the average metric, the higher the education level, the higher the contribution; this is almost true for median contribution. The contribution more than triples for someone with the highest level of education compared to someone who, at most, completed high school. There are a few self-employed individuals with very high contribution amounts, driving up the average relative to employed individuals. The average contribution does not vary much for employed and self-employed individuals (which was not the case for total savings) but it is significantly less for those who were unemployed. As would be expected, contributions increase significantly with the level of income and the difference is quite important if we

compare the extremities. Our last observation, one that is expected, is that respondents who use the services of a financial advisor contribute more than those who don't.

Table 9

Contributions	# Obs.	Average	Median	Min	Max
Province of Residence					
Ontario	1,360	\$6,794.70	\$3,000	\$0	\$175,000
Quebec	1,362	\$5,149.50	\$2,000	\$0	\$75,000
Gender					
Female	1,294	\$5,619.90	\$1,780	\$0	\$175,000
Male	1,428	\$6,290.10	\$3,000	\$0	\$83,000
Age					
35 to 40	766	\$5,702.60	\$2,000	\$0	\$175,000
41 to 45	588	\$5,862.20	\$2,700	\$0	\$101,000
46 to 50	613	\$5,974.40	\$2,300	\$0	\$80,000
51 to 55	755	\$6,327.10	\$2,600	\$0	\$83,000
Education Levels					
High School or less	355	\$2,537.80	\$0	\$0	\$62,000
Certificate	178	\$3,511.60	\$325	\$0	\$64,000
CEGEP or some University	865	\$4,840.30	\$1,800	\$0	\$101,000
Undergraduate	814	\$7,527.20	\$4,000	\$0	\$80,000
Graduate or more	510	\$8,655.80	\$5,000	\$0	\$175,000
Employment Status					
Employed	2,231	\$6,420.50	\$3,000	\$0	\$175,000
Self-employed	256	\$6,124.50	\$1,730	\$0	\$52,000
Did not work	219	\$1,539.70	\$0	\$0	\$64,000
Individual Income					
0 to 20k	321	\$1,652.70	\$0	\$0	\$32,000
20k to 40k	414	\$2,653.60	\$400	\$0	\$64,000
40k to 60k	606	\$4,469.00	\$2,000	\$0	\$57,000
60k to 80k	501	\$5,630.30	\$3,200	\$0	\$50,000
80k to 100k	348	\$8,319.30	\$5,060	\$0	\$175,000
over 100k	471	\$12,935.50	\$9,500	\$0	\$83,000
Advisor					
No	1,511	\$4,606.10	\$1,000	\$0	\$80,000
Yes	1,146	\$8,042.50	\$5,000	\$0	\$175,000

For the analysis of total contributions, we used the same three model specifications for financial literacy as those used for accumulated savings. Just as was the case for total savings, we have many respondents who did not contribute anything to their RRSP or TFSA in the year 2017 and therefore, many zero values. As seen in Appendix E, our dependant variable is left-censored here again, we used the same models as the previous section:

- Type I Tobit Model.
- Type II Tobit model, which is commonly known as Heckman Two Stage Model.

To assess whether Heckman Model fits well, we look at the estimated values of ρ , the error correlation between the first and second stage regressions of the model. As explained in Appendix E, we present our findings using the Tobit model in Table 10 below. We find that the most important and significant factors in determining the amount of contributions are income, employment status, education and financial planning. These variables are significant at the very least at the 1% confidence level. We learn nothing new except that some variables which we would expect to be significant turn out not to be. For example, it is interesting to note that financial literacy has a greater impact on savings than on contributions. The estimated coefficient for having answered all three questions correctly or for answering one incremental question correctly is almost double for savings relative to contributions. Table 9 showed a large gap in contribution amounts between respondents in the regions of Quebec and Ontario. Ontarians seem to contribute more to their accounts but it turns out that region is not significant in determining contribution amount. It was significant in determining accumulated wealth: on average, Ontarians have more savings than Quebecers, all else equal. Table 9 also showed that average contribution increases with age but the relationship was not perfect when looking at the median: the two metrics were not necessarily changing in the same direction. The relationship between age and contribution is not significant based on our regression estimations, although it is very significant and positive to predict total savings. Our model also tells us that gender is not significant in predicting contribution about, nor was it significant to predict total savings, although Table 7 and Table 9 seemed to show that males save and contribute more.

Looking at the first Tobit model from table 10, with the individual financial literacy indicators, the level of income increases contribution amounts exponentially. The estimated coefficient increases for each increase in income bracket. For example, respondents earning between 60 000\$ and 80 000\$ contribute, on average, 3,500% ($100 \times (e^{3.597} - 1)$) more than those in the lowest income bracket. Those earning between 80 000\$ and 100 000\$ and those earning over 100 000\$ contribute on average 5,600% and 12,450%, respectively, more than respondents in the lowest income bracket. Clearly, income is a major determinant of the level of contribution. So is education level. Table 9 shows that mean and median contribution increases with education level. The relationship is very significant, although the coefficient decreases from 'undergraduate' to 'graduate or more', as is the case for income. All else equal, someone falling into the highest education category should contribute 410% more, on average, relative to someone who graduated from high school at most. We previously mentioned that RRSP contributions depend on the previous year's income versus TFSA eligibility which depends on age. That being said, one needs to be employed in order to have contribution room in their RRSP the following tax year which is not the case

for TFSA contributions. This explains why we find that unemployment reduces contribution amounts by 98% ($100 \times (e^{-4.081} - 1)$). To make a parallel with Ameriks *et al.* (2002), we here again find the binary variable for financial planning to be significant. While some variables like income and employment status are more obviously known to impact contributions, having a set financial plan also helps individuals be more organized and disciplined with their finances. All else equal, having a financial plan increases contributions by 380% and it is very significant in predicting both, savings and contributions. As was the case for total savings, we would have expected time preference and risk aversion to be significant. More patient and more risk averse individuals (nervous about future uncertainty) should contribute more than impatient and risk loving peers, and vice versa. We ran the model using contributions in RRSP and TFSA individually, as dependent variables. Our conclusion does not change. Time preference does not change in the Tobit model (it only did in the Heckman model with RRSP contribution as a dependent variable). It could be because patience is not meaningful when looking at a contribution in one given year. It would have been interesting to conduct the same analysis with panel data to study contribution of respondents over time but this goes beyond the scope of our research and available data.

To sum up this section, we find, using the Tobit model, that the most significant variables to predict contributions are income, employment status, education and financial planning. In the following section, we evaluate the level of financial literacy and its determinants.

Table 10

log(Total Contributions + 1)	Literacy Indicators		Overall 3 corrects		# correct Literacy questions	
	Heckman	Tobit	Heckman	Tobit	Heckman	Tobit
Intercept	6.545 ^{***} (0.37)	-1.777 ⁺ (0.99)	6.969 ^{***} (0.30)	-0.189 (0.90)	6.581 ^{***} (0.33)	-1.272 (0.95)
Interest Literacy (ref. Incorrect or DK)						
Correct	0.300 (0.19)	1.576 ^{**} (0.50)				
Inflation Literacy (ref. Incorrect or DK)						
Correct	0.275 ^{**} (0.11)	-0.0589 (0.32)				
Risk Literacy (ref. Incorrect or DK)						
Correct	0.232 ^{**} (0.089)	1.054 ^{***} (0.31)				
Overall correct (ref. No)						
Yes			0.360 ^{***} (0.074)	0.828 ^{**} (0.25)		

# Correct Literacy Questions					0.261 ^{***} (0.059)	0.714 ^{***} (0.17)
Individual Income (ref. 0 to 20k)						
20k to 40k	0.234 (0.21)	1.369 [*] (0.59)	0.261 (0.22)	1.496 [*] (0.59)	0.236 (0.21)	1.445 [*] (0.59)
40k to 60k	0.568 ^{**} (0.21)	2.974 ^{***} (0.56)	0.587 ^{**} (0.21)	3.071 ^{***} (0.56)	0.568 ^{**} (0.21)	3.008 ^{***} (0.56)
60k to 80k	0.734 ^{***} (0.20)	3.597 ^{***} (0.56)	0.768 ^{***} (0.21)	3.768 ^{***} (0.56)	0.733 ^{***} (0.20)	3.654 ^{***} (0.56)
80k to 100k	0.952 ^{***} (0.21)	4.044 ^{***} (0.58)	0.982 ^{***} (0.22)	4.187 ^{***} (0.58)	0.952 ^{***} (0.21)	4.091 ^{***} (0.58)
over 100k	1.313 ^{***} (0.20)	4.750 ^{***} (0.57)	1.338 ^{***} (0.22)	4.905 ^{***} (0.57)	1.310 ^{***} (0.21)	4.808 ^{***} (0.57)
Province (ref. Ontario)						
Quebec	-0.0800 (0.058)	-0.0351 (0.22)	-0.0805 (0.058)	-0.00464 (0.22)	-0.0821 (0.057)	-0.0225 (0.22)
Gender (ref. Female)						
Male	-0.0505 (0.061)	-0.220 (0.22)	-0.0575 (0.061)	-0.203 (0.22)	-0.0516 (0.061)	-0.222 (0.22)
Age (ref. 35 to 40)						
41 to 45	-0.158 ⁺ (0.089)	-0.124 (0.30)	-0.152 ⁺ (0.090)	-0.0959 (0.30)	-0.160 ⁺ (0.089)	-0.116 (0.30)
46 to 50	-0.0009 (0.082)	-0.306 (0.31)	0.0064 (0.082)	-0.336 (0.31)	-0.001 (0.082)	-0.357 (0.31)
51 to 55	0.108 (0.079)	-0.147 (0.30)	0.122 (0.079)	-0.160 (0.30)	0.108 (0.079)	-0.200 (0.30)
Education (ref. High school or less)						
Certificate	-0.0041 (0.18)	0.0679 (0.64)	0.0042 (0.18)	0.148 (0.64)	-0.0046 (0.18)	0.100 (0.64)
CEGEP or some University	0.0834 (0.12)	0.862 ⁺ (0.45)	0.0867 (0.12)	0.926 [*] (0.45)	0.0805 (0.12)	0.853 ⁺ (0.45)
Undergraduate	0.115 (0.12)	1.986 ^{***} (0.44)	0.113 (0.12)	2.051 ^{***} (0.45)	0.110 (0.12)	1.958 ^{***} (0.44)

Graduate or more	0.196 (0.13)	1.629 ^{***} (0.48)	0.196 (0.13)	1.686 ^{***} (0.48)	0.192 (0.13)	1.592 ^{***} (0.48)
Work status (ref. Employed)						
Self-employed	0.212 ⁺ (0.13)	-0.460 (0.43)	0.221 ⁺ (0.13)	-0.456 (0.43)	0.214 ⁺ (0.13)	-0.484 (0.43)
Did not work	-0.0597 (0.24)	-4.081 ^{***} (0.67)	-0.0192 (0.24)	-4.018 ^{***} (0.68)	-0.0492 (0.24)	-4.061 ^{***} (0.67)
Time Preference						
	0.253 (0.18)	0.241 (0.64)	0.266 (0.18)	0.149 (0.65)	0.255 (0.18)	0.157 (0.65)
Risk aversion						
	-0.0577 (0.042)	-0.0447 (0.15)	-0.0615 (0.042)	-0.0689 (0.15)	-0.0579 (0.042)	-0.0605 (0.15)
Respondent has a financial plan (ref. No)						
Yes	0.377 ^{***} (0.062)	1.568 ^{***} (0.22)	0.364 ^{***} (0.062)	1.584 ^{***} (0.22)	0.373 ^{***} (0.061)	1.590 ^{***} (0.22)
Observations	2243	2243	2243	2243	2243	2243
Censored observations	685	685	685	685	685	685
R ²	0.239	0.231	0.234	0.226	0.236	0.229
rho	0.014		0.0022		0.0025	
lambda	0.016		0.0026		0.0029	
sigma	1.146	4.846	1,148	4.865	1.146	4.855

Robust standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

III. 2. C) Financial Literacy

While most articles find the level of financial knowledge to be poor, our findings are contradictory. To be more specific, 89% of respondents answered the interest rate compounding question correctly, 77% were right on the question regarding inflation and 75% were correct about the effect of diversification on risk. With almost 20% of respondents who admitted they did not know the answer, it seems like risk diversification is the least understood concept while the most understood subject is interest rate compounding. To contrast Boisclair, Lusardi and Michaud's (2014) 42% overall score drawn from the Canadian Securities Administrators' survey, 60% of our sample answered the three questions correctly. Important to remember is that their sample includes respondents from the Atlantic, Prairies, British Columbia (BC). However, respondents from the Prairies and BC perform better overall relative to Quebecers and even then, our overall sample score is better. They also report performance for respondents below 35 and above 65 years old, which we don't have in our sample. However, only

respondents below 35 years of age drag the average performance down with a score of 30% on the three questions. Our good score also contradicts Lusardi *et al.* (2010) who found that only 27% of the US youth population understand basic financial concepts relating to inflation, risk diversification and interest rate calculations. They used Wave 11 of the 1997 National Longitudinal Survey of Youth (NLSY97), a representative sample of the US youth population between the ages of 12 and 17. Wave 11 of the survey was administered in 2007-2008 and designed to examine the transition from school to work of those young individuals when they turned 23 to 28 years old. Even though their sample is younger, our results are striking given that our respondents outperform relative to those of many other countries like the U.S, Netherlands, Germany, Switzerland and Australia whose scores were respectively 30%, 45%, 53%, 50% and 43% (Lusardi *et al.* (2014)). Lusardi *et al.* (2014) show the comparative statistics of the financial literacy questions across twelve countries, with data ranging from the years 2007 to 2012. Table 11 below shows the percentage of respondents who answered correctly, incorrectly and those who did not know the answer to the three questions in Appendix A.

Table 11

	Count	Percent
Interest Rate Literacy		
DK	117	3.9%
Incorrect	199	6.7%
Correct	2,666	89.4%
Inflation Rate Literacy		
DK	226	7.5%
Incorrect	438	14.8%
Correct	2,315	77.7%
Risk Diversification Literacy		
DK	582	19.4%
Incorrect	163	5.7%
Correct	2,229	74.9%
ALL financial literacy questions are correct		
No	1,196	39.8%
Yes	1,809	60.2%
No. correct financial literacy questions		
0 question	126	4.2%
1 question	294	9.9%
2 questions	738	24.9%
3 questions	1,809	61.0%

In addition to these three standard financial literacy questions, respondents were asked additional questions about TFSAs and RRSPs. We find that respondents are knowledgeable about their basic properties. For example, 73% of respondents were well aware that only RRSP contributions are deductible

from taxable income and 76% of them knew that RRSP withdrawals are added to personal income and subject to income tax the year the withdrawal is made. Canadians scored lower when the questions got more specific and involved tax or transactions. Only 47% of the survey participants correctly answered that investment income in a TFSA or RRSP is not subject to income tax. The most missed question is one about penalty from early withdrawal. As much as 63% of respondents erroneously answered that there is a penalty associated with withdrawing money from an RRSP before retirement. This question might have been confusing because withholding taxes (which apply for RRSPs) may be considered a “penalty”. However, there is no penalty for withdrawal from TFSAs or RRSPs, which only 17% of respondents got right. The last questions concerns contribution room. The only type of account which grants back the contribution room following a withdrawal (the contribution room is granted back the year following the withdrawal) is a TFSA, and about 25% of respondents knew the answer. These numbers are quite shocking given that more than half and two third of our sample have a TFSA and RRSP, respectively, and that the majority don’t have a financial advisor to guide them through their tax or transactional inquiries. Table 12 gives a better idea of the ability to answer financial literacy questions given demographic factors. Looking at the last column, Quebecers perform slightly better than Ontarians, which contradicts Boisclair *et al.* (2014) who get a better overall score from Ontarians (44.7% versus 39.4%). We find a significant gap in performance between men and women: males perform much better. There seems to be a positive correlation between age and financial literacy but it is minimal from the results in the table below. Education, employment status and income all seem to be strongly correlated with financial literacy, consistent with Boisclair *et al.* (2014), but Table 13 will give us a clearer answer. The highest categories of education and income display an approximately 180% increase in performance relative to their lowest respective categories. As for employment status, being self-employed or employed within a company does not seem to affect the score, so long as there is employment. Being married or having a common-law partner and using the services of a financial advisor seem to yield a small increase in financial literacy performance. The following section illustrates the results of our regression analysis.

Table 12

	Interest		Inflation		Risk		Overall	
	DK	Correct	DK	Correct	DK	Correct	≥ 1 DK	3 Correct
Province of Residence								
Ontario	10.1%	89.9%	22.7%	77.3%	28.3%	71.7%	42.0%	58.0%
Quebec	11.1%	88.9%	21.9%	78.1%	21.8%	78.2%	36.0%	64.0%
Gender								
Female	12.8%	87.2%	27.2%	72.8%	31.8%	68.2%	47.9%	52.1%
Male	8.6%	91.4%	17.7%	82.3%	18.9%	81.1%	30.9%	69.1%
Age								
35 to 40	10.5%	89.5%	26.0%	74.0%	27.9%	72.1%	41.6%	58.4%
41 to 45	10.1%	89.9%	24.4%	75.6%	22.7%	77.3%	39.6%	60.4%
46 to 50	11.2%	88.8%	20.6%	79.4%	24.8%	75.2%	37.7%	62.3%

51 to 55	10.5%	89.5%	18.1%	81.9%	24.2%	75.8%	36.9%	63.1%
Education Levels								
High School or less	19.2%	80.8%	36.5%	63.5%	42.6%	57.4%	60.8%	39.2%
Certificate	14.1%	85.9%	35.1%	64.9%	34.3%	65.7%	52.5%	47.5%
CEGEP or some University	11.7%	88.3%	25.7%	74.3%	26.3%	73.7%	43.5%	56.5%
Undergraduate	6.6%	93.4%	14.5%	85.5%	17.7%	82.3%	27.6%	72.4%
Graduate or more	7.7%	92.3%	14.0%	86.0%	18.8%	81.2%	29.2%	70.8%
Employment Status								
Employed	9.8%	90.2%	21.7%	78.3%	23.9%	76.1%	37.9%	62.1%
Self-employed	11.1%	88.9%	20.1%	79.9%	24.2%	75.8%	35.7%	64.3%
Did not work	16.2%	83.8%	29.7%	70.3%	36.7%	63.3%	53.7%	46.3%
Individual Income								
0 to 20k	18.9%	81.1%	31.0%	69.0%	38.5%	61.5%	55.0%	45.0%
20k to 40k	12.7%	87.3%	31.0%	69.0%	33.8%	66.2%	52.1%	47.9%
40k to 60k	11.4%	88.6%	24.6%	75.4%	27.0%	73.0%	42.1%	57.9%
60k to 80k	8.1%	91.9%	17.8%	82.2%	19.6%	80.4%	33.5%	66.5%
80k to 100k	5.4%	94.6%	15.5%	84.5%	17.4%	82.6%	27.9%	72.1%
over 100k	5.4%	94.6%	11.8%	88.2%	13.2%	86.8%	23.0%	77.0%
Marital Status								
Not single	10.0%	90.0%	22.4%	77.6%	23.4%	76.6%	37.9%	62.1%
Single	11.6%	88.4%	22.1%	77.9%	27.9%	72.1%	41.1%	58.9%
Advisor								
No	10.7%	89.3%	22.6%	77.4%	27.3%	72.7%	42.0%	58.0%
Yes	8.4%	91.6%	20.0%	80.0%	19.7%	80.3%	32.7%	67.3%

By analyzing the relationship between financial literacy and demographic factors, we can compare our findings to those of our peers who find that certain determinants such as age, education level, sex, employment status can all impact the success rate. In this section, we use the binary variable equal to one if all three financial literacy questions were answered correctly as the dependant variable. In the full model we present the model with all variables whereas in the reduced form model, we present only the significant variables.

As seen in table 13, all variables are significant at least at the 5% confidence level except for work status which is only significant at the 10% confidence level, for self-employed individuals. As would be expected, financial literacy improves with age, income and education. Age becomes significant at the 1% level only when the gap increases (i.e. those between the age of 51 and 55 are more likely to be financially literate relative to those between 35 and 40 years old). We had mentioned a few studies (Lusardi and Mitchell,

2014; Taylor, 2011) which found literacy to be hump-shaped or to peak at a certain age before decreasing. It could be because our sample is only comprised of individuals between the ages of 35 and 55 while they study a sample comprised of people below the age of 36 and above 65, but in our model, the estimation coefficient doubles with each increase in age bracket. In their 2014 paper, Lusardi and Mitchell compare empirical evidence from different surveys and research in the United States and other countries (they report findings from the twelve other countries that have used those same three financial literacy questions). They show that in the United-States, Germany, the Netherlands and Switzerland, respondents above the age of 65 don't perform as well as respondents between 36 and 65 years old. If our sample was comprised of older respondents and that the hump-shaped distribution theory is true, perhaps the relationship would have turned negative at a certain threshold but Table 13 shows that being in the highest age category increases the odds of being financially literate by 38% relative to the reference category, all else equal. It makes sense that individuals acquire knowledge with time. It is interesting to note that the higher the income bracket of the individual, the greater the probability of answering all three literacy questions correctly, consistent with Jappelli and Padula (2013) who find that wealth is highly associated with financial literacy with their view that financial literacy is considered like an investment. From the previous table, less than half of respondents with an income below 20 000\$ got all three questions right whereas a little over 75% of the highest income bracket respondents did. The same observation applies to education. There is a 30% difference in average performance between respondents with a high school degree at most relative to those falling in the highest education category. In our model shown below, both variables are very significant. The odds of being financially literate increase by 159% for a respondent earning above 100 000\$ relative to the lowest earner. This finding is coherent with that of Lusardi and Mitchell (2011). As for education, the odds of being financially literate increase by 86% for a respondent who has completed Cegep or some university and they increase by 253% for a respondent who achieved a Bachelor's degree, relative to the reference group. This is coherent with Lusardi, Mitchell and Curto (2010) who also find education to be a significant determinant of financial literacy. Also coherent with other studies (Lusardi, Mitchell and Curto, 2010; Bianco and Bosco, 2012; Chen and Volpe, 2002), we find that males have better financial knowledge relative to females: we find that males are 89% more likely to be literate. In that same 2014 paper, Lusardi and Mitchell show that performance is higher for males in the United-States, Germany, the Netherlands and Switzerland. For those same countries, each increase in education achievement also increases performance.

What is somewhat surprising and contradictory relative to other studies is the work status variable. It does not appear that employment is an important determinant of financial literacy although Table 12 shows a gap of almost 20% in the percentage of unemployed and self-employed respondents who answered correctly all three questions. Even when trying different versions of the model, work status is persistently insignificant and this contradicts Lusardi and Mitchell (2011) and Taylor (2011). The latter actually finds unemployment to lead to the biggest reduction in financial capability, for both men and women. Furthermore from this contradiction in results, there are variables that we would have wished to include that have been reported to impact financial literacy. Literature finds differences in performance by race and ethnicity. More specifically, some studies find that African Americans and/or Hispanics are the lowest performers (Lusardi and Mitchell, 2007a, 2007b and 2011b; Lusardi, Mitchell and Curto 2010; Chen and Volpe 1998). We would have included those variables in our model but the survey did not inquire about

ethnicity or race. Another variable found to be significant in different articles is the field of employment or field of education. Taylor (2011) mentions that those employed in the financial sector are more financially literate. Bianco *et al.* (2012) as well as Chen *et al.* (1998) found that students pursuing business majors achieve higher scores. This is another variable that we would have wished to add but that was not available to us. Another contradiction we find is with the region variable. The previous table showed a slight outperformance by respondents from the Quebec region relative to those from Ontario. It turns out that this variable is significant and being from Quebec increases the odds by 53% of being financially literate. Interesting to note is that, although Quebecers perform better on financial literacy questions, they save less than Ontarians. In their survey, Boisclair *et al.* (2014) find that 44.7% of Ontarians get all three questions correct versus only 39.4% of Quebecers. They also breakdown their success rate by language and minority. While we don't have the minority data, the average performance of English speaking respondents is 59.1% versus 63.8% for French speaking respondents. If we breakdown per region, the average score of English and French speaking respondents from the region of Quebec are 64.7% and 63.8%, respectively. In Ontario, all respondents are English speaking and success rate sits at 58%. Region seems to have more impact than language itself and this is what we conclude since we tested language in our model and it appears not to be significant. The most important conclusion from Boisclair *et al.* (2014) regarding region is that when controlling for education, language and region differences disappear. However, in our case, adding an interaction dummy to control for different education level from one province to the other does not change the significance of our variable. After testing our model to account for language and marital status, determining they are not significant variables and do not make the model a better fit, we chose to exclude them. To sum up this section, we find that the best predictors of financial literacy are income, region, age (although slightly less significant), gender and education. More specifically, males, residents of Quebec, older individuals, highly educated individuals and high income earners are more likely to have better financial knowledge. The next and last section includes our concluding remarks.

Table 13

Y=Financially Literate	Full Model	Reduced form Model
Intercept	-1.484 ^{***} (0.20)	-1.484 ^{***} (0.20)
Individual Income (ref. 0 to 20k)		
20k to 40k	0.0752 (0.17)	0.0753 (0.17)
40k to 60k	0.371 [*] (0.17)	0.371 [*] (0.17)
60k to 80k	0.617 ^{***} (0.17)	0.617 ^{***} (0.17)
80k to 100k	0.832 ^{***}	0.832 ^{***}

	(0.19)	(0.19)
over 100k	0.952 ^{***} (0.19)	0.952 ^{***} (0.19)
Province (ref. Ontario)		
Quebec	0.427 ^{***} (0.084)	0.427 ^{***} (0.084)
Gender (ref. Female)		
Male	0.638 ^{***} (0.084)	0.638 ^{***} (0.084)
Age (ref. 35 to 40)		
41 to 45	0.0842 (0.11)	0.0844 (0.11)
46 to 50	0.168 (0.12)	0.168 (0.12)
51 to 55	0.323 ^{**} (0.11)	0.323 ^{**} (0.11)
Education (ref. High school or less)		
Certificate	0.273 (0.19)	0.273 (0.19)
CEGEP or some University	0.619 ^{***} (0.13)	0.619 ^{***} (0.13)
Undergraduate	1.260 ^{***} (0.14)	1.260 ^{***} (0.14)
Graduate or more	1.140 ^{***} (0.16)	1.139 ^{***} (0.16)
Work status (ref. Employed)		
Self-employed	0.285+ (0.15)	0.285+ (0.15)
Did not work	0.104 (0.18)	0.104 (0.18)
Single (ref. Not single)		
	0.00390 (0.085)	
Observations	2859	2859
Pseudo R ²	0.089	0.089
AIC	3502.7	3500.7
BIC	3609.9	3602.0

Mc Fadden Adj R ²	0.0763	0.0774
Cox-Snell R ²	0.112	0.112
Area Under Curve ROC	0.699	0.699
†Accuracy	66.95	66.95
†Sensitivity	83.60	83.60
†Specificity	40.20	40.20

Robust standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IV. CONCLUSION

This study, on one hand, tries to identify the determinants of financial planning, accumulated savings and investment contributions of Canadians. On the second hand, we are interested in evaluating the level of financial literacy as well as the determinants likely to lead to better financial knowledge. We use the study conducted by Boisclair *et al.* (2014), which was also conducted on Canadians, as a guideline. We extended our research to evaluate factors most likely to lead to higher savings and contributions. This study is the first of its kind to be performed on Canadians and to account for variables such as time preference and risk aversion on an individual level. In the first part of our research, we find that the significant variables to predict that an individual is most likely to be a planner are employment status, education level, annual income, gender and financial literacy. Our findings are coherent with Boisclair *et al.* (2014) with only one contradiction: gender. They find women to be more likely to plan for retirement while we do not find a significant difference between men and women. They also find age and region to be a determinant factor but our sample is not as heterogeneous as theirs so in our case, age and region are not significant factors. In the second part of our research in which we examine the relationship between our independent variables from the first section and the level of accumulated savings and contributions, we find that more factors come into play when it comes to savings versus contributions. We found a study performed by Ameriks *et al.* (2002) which explains that increased wealth comes from having a “propensity to plan”, rather than a discount factor, which makes people more alert of their finances and leads to better monitoring. We support this conclusion by confirming that respondents who claimed to have a financial plan save and contribute more to their investment accounts. We find that the variables which have a significant impact on wealth accumulation are overall financial literacy, income, province, age, education, employment status and having a financial plan for retirement. For contributions, only income, employment status, education and financial planning are significant factors. Finding that education impacts significantly the probability of planning and that propensity to plan leads to greater wealth, this shows that governments trying to improve the financial wealth of their society should teach not only the importance of having a financial plan but also how to build one, how to budget, how to be organized and disciplined financially and the consequences that arise if one fails to do so. Also finding a difference in total savings from one province to the other leads to another intriguing question: how to provinces differ

in their financial education system? This goes beyond the scope of our research but analyzing the curriculums and educational programs of better performing countries or regions could give insights on how to improve because clearly, schools can make a difference. Although we find Canadians to perform extremely well and to be more financially literate relative to other countries, we still think that finance should be a mandatory subject in all educational establishments. Even if 60% of our sample answered the three financial literacy questions on risk, inflation and interest rates correctly (42% for Boisclair, Lusardi and Michaud, 2014), in depth understanding of financial concepts is important and we noticed that performance started to fall when questions got more technical and detailed. We also tried to identify the significant factors likely to impact the level of financial knowledge. We find that the best predictors of financial literacy are income, age, education, gender and education. By looking for these determinants that are significant predictors, we hope that any effort and attempt to improve society's financial literacy and behavior is well targeted.

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APPENDIX A

The following are the three simple questions relating to interest, inflation and risk diversification that were designed by Lusardi and Mitchell, 2011, and that we use to categorize an individual as being financially literate or not.

Q1 Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow during these 5 years?

- a. More than 102 \$
- b. Exactly 102 \$
- c. Less than 102 \$
- d. Don't know
- e. Refuse to answer

Q2 Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, with the money in this account, would you be able to buy...

- a. More than today
- b. Exactly the same as today
- c. Less than today
- d. Don't know
- e. Refuse to answer

Q3 Do you think the following statement is true or false? "Buying a single company's stock usually provides a safer return than a stock mutual fund."

- a. True
- b. False
- c. Don't know
- d. Refuse to answer

Our respondents were also asked more technical questions on financial literacy that we also analyze in our study. The questions are the following:

Q4 According to you, are the contributions made to an RRSP or to a TFSA deductible from taxable income?

- a. Yes, for the RRSP only
- b. Yes, for the TFSA only
- c. Yes, for the RRSP and the TFSA
- d. No, for the RRSP and the TFSA
- e. Don't know
- f. Refuse to answer

Q5 According to you, when money is withdrawn from an RRSP or a TFSA, is it subject to income tax in the year of the withdrawal? Assume the withdrawn amount **is not** used for the Home Buyers' Plan (HBP) or the Lifelong Learning Plan (LLP).

- a. Yes, for the RRSP only
- b. Yes, for the TFSA only

- c. Yes, for the RRSP and the TFSA
- d. No, for the RRSP and the TFSA
- e. Don't know
- f. Refuse to answer

Q6 Money invested in an RRSP or a TFSA can generate returns in the form of interest, dividends or capital gains. According to you, are these returns subject to income tax in the year during which they were generated?

- a. Yes, for the RRSP only
- b. Yes, for the TFSA only
- c. Yes, for the RRSP and the TFSA
- d. No, for the RRSP and the TFSA
- e. Don't know
- f. Refuse to answer

Q7 According to you, is there a penalty associated with withdrawing money from an RRSP or from a TFSA before retirement? Assume the withdrawn amount is **not** used for the Home Buyers' Plan (HBP) or the Lifelong Learning Plan (LLP).

- a. Yes, for the RRSP only
- b. Yes, for the TFSA only
- c. Yes, for the RRSP and the TFSA
- d. No, for the RRSP and the TFSA
- e. Don't know
- f. Refuse to answer

Q8 Let's assume you withdraw \$1,000 from an RRSP or a TFSA. According to you, will this withdrawn amount be added to your future contribution room?

- a. Yes, for the RRSP only
- b. Yes, for the TFSA only
- c. Yes, for the RRSP and the TFSA
- d. No, for the RRSP and the TFSA
- e. Don't know
- f. Refuse to answer

APPENDIX B

Risk aversion and time preference

Of the 3005 respondents, 392 were discarded because they never switched lottery. This behavior is not coherent since choice B in the last lottery offers a guaranteed gain that is higher than option A. There are also 784 observations with more than one switch. In that case, Boyer *et al.* (2019) kept the last switch. The final sample size is of 2613 respondents.

Risk Aversion Lottery Table

Choice		Lottery A				Lottery B				
Lottery A	Lottery B	Chances of winning	Amount to win	Chances of winning	Amount to win	Chances of winning	Amount to win	Chances of winning	Amount to win	
1	<input type="checkbox"/>	<input type="checkbox"/>	10%	\$20	90%	\$16	10%	\$39	90%	\$1
2	<input type="checkbox"/>	<input type="checkbox"/>	20%	\$20	80%	\$16	20%	\$39	80%	\$1
3	<input type="checkbox"/>	<input type="checkbox"/>	30%	\$20	70%	\$16	30%	\$39	70%	\$1
4	<input type="checkbox"/>	<input type="checkbox"/>	40%	\$20	60%	\$16	40%	\$39	60%	\$1
5	<input type="checkbox"/>	<input type="checkbox"/>	50%	\$20	50%	\$16	50%	\$39	50%	\$1
6	<input type="checkbox"/>	<input type="checkbox"/>	60%	\$20	40%	\$16	60%	\$39	40%	\$1
7	<input type="checkbox"/>	<input type="checkbox"/>	70%	\$20	30%	\$16	70%	\$39	30%	\$1
8	<input type="checkbox"/>	<input type="checkbox"/>	80%	\$20	20%	\$16	80%	\$39	20%	\$1
9	<input type="checkbox"/>	<input type="checkbox"/>	90%	\$20	10%	\$16	90%	\$39	10%	\$1
10	<input type="checkbox"/>	<input type="checkbox"/>	100%	\$20	0%	\$16	100%	\$39	0%	\$1

Of the 3005 respondents, the ones with a missing risk preference were dropped. In addition, there were 459 observations with more than one switch. Once again, the last switch from A to B was used.

Time Preference Lottery Table

Option A	Option B	Effective annual interest rate	Choice	
Amount you would receive in 1 month	Amount you would receive in 13 months		Option A	Option B
\$12.00	\$12.60	5%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$13.20	10%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$13.80	15%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$14.40	20%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$15.00	25%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$15.60	30%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$16.20	35%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$16.80	40%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$17.40	45%	<input type="checkbox"/>	<input type="checkbox"/>
\$12.00	\$18.00	50%	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX C

For the following regression models, in which the dependent variable is binary, we use the logistic regression (LR), which is most popular in situations where the dependant variable is binary. In this latter, the error ϵ is assumed to be distributed logistically leading to the binary logit with the following equation:

$$P(Y = 1|X_1 = x_1, X_2 = x_2, \dots, X_n = x_n) = \frac{e^{\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}}{1 + e^{\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}} = \frac{e^{\sum_{k=1}^n \beta_k x_k}}{1 + e^{\sum_{k=1}^n \beta_k x_k}}$$

The relation is not linear so in order to get a linear relationship we need to transform the equation above into log odds scale also known as *logit*. Thus equivalently we have:

$$\text{logit}(P(Y = 1|X_1 = x_1, X_2 = x_2, \dots, X_n = x_n)) = \log\left(\frac{P(Y = 1|X_1 = x_1, X_2 = x_2, \dots, X_n = x_n)}{1 - P(Y = 1|X_1 = x_1, X_2 = x_2, \dots, X_n = x_n)}\right) = \sum_{k=1}^n \beta_k x_k$$

While the log-odds are a linear combination of the independent variables, the odds are a non-linear combination of the independent variables. Therefore, in order to make the interpretation more meaningful, we can transform the log odds into the odds by taking the exponential of both sides of the LR equation. Then we can interpret a change in an exploratory factor X_k as the exponential value of β_k . Accordingly, we can interpret the exponential of the logit coefficient (i.e. e^{β_k}) as follows: For a unit change in X_k , the odds are expected to change by a factor of e^{β_k} , holding other variables constant.

For $e^{\beta_k} > 1$, we say that the odds are e^{β_k} times larger, if $e^{\beta_k} < 1$, we say that the odds are e^{β_k} times smaller. If $e^{\beta_k} = 1$ then X_k does not affect the odds.

Similarly, if we wish to show the probability, we can calculate it in the following way:

$$P(Y = 1|X_1 = x_1, X_2 = x_2, \dots, X_n = x_n) = \frac{e^{\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}}{1 + e^{\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}} = \frac{\text{odd}}{1 + \text{odd}} = \frac{e^{\beta_k}}{1 + e^{\beta_k}}$$

After building a LR model, we need to assess the fit with the assumption that we are, at least preliminarily, satisfied with our efforts at the model building stage. In other words, we assume that the model contains those variables that should be in the model based on literature and the expert recommendations and that variables have been entered in the correct functional form. Now we would like to know whether the probabilities produced by the model accurately reflect the true outcome experience in the data. This is referred to as its goodness of fit. There are many tests, for simplicity we presented only Hosmer-Lemeshow test.

H₀: Model fit data correctly *Versus* **H₁**: Model does not fit data correctly

If p-value ≥ 0.05 we do not reject null hypothesis (i.e. H₀), if else we reject null hypothesis.

Regression results for EPP:

Individual has an Employee Pension Plan	1 st Model	2 nd Model	3 rd Model
Intercept	-2.312 ^{***} (0.40)	-2.354 ^{***} (0.36)	-2.208 ^{***} (0.38)
Interest Literacy (ref. Incorrect or DK)			
Correct	0.110 (0.19)		
Inflation Literacy (ref. Incorrect or DK)			
Correct	-0.259+ (0.13)		
Risk Literacy (ref. Incorrect or DK)			
Correct	-0.0512 (0.13)		
Overall correct (ref. No)			
Yes		-0.0883 (0.11)	
# Correct Literacy Questions			
			-0.0954 (0.068)
Respondent's Individual Income (ref. 0 to 20k)			
20k to 40k	1.599 ^{***} (0.24)	1.603 ^{***} (0.24)	1.613 ^{***} (0.24)
40k to 60k	2.834 ^{***} (0.24)	2.826 ^{***} (0.24)	2.837 ^{***} (0.24)
60k to 80k	3.404 ^{***} (0.25)	3.394 ^{***} (0.25)	3.412 ^{***} (0.25)
80k to 100k	3.669 ^{***} (0.27)	3.658 ^{***} (0.27)	3.676 ^{***} (0.27)
over 100k	3.653 ^{***} (0.26)	3.643 ^{***} (0.26)	3.661 ^{***} (0.26)
Province (ref. Ontario)			
Quebec	0.216 [*] (0.098)	0.212 [*] (0.098)	0.217 [*] (0.098)

Gender (ref. Female)			
Male	-0.0904 (0.099)	-0.0988 (0.099)	-0.0924 (0.099)
Age (ref. 35 to 40)			
41 to 45	-0.220 (0.14)	-0.222 (0.14)	-0.219 (0.14)
46 to 50	-0.286* (0.14)	-0.298* (0.14)	-0.295* (0.14)
51 to 55	-0.400** (0.13)	-0.420** (0.13)	-0.411** (0.13)
Education (ref. High school or less)			
Certificate	0.244 (0.23)	0.241 (0.23)	0.251 (0.23)
CEGEP or some University	0.458** (0.16)	0.438** (0.16)	0.455** (0.16)
Undergraduate	0.412* (0.17)	0.381* (0.17)	0.403* (0.17)
Graduate or more	0.161 (0.18)	0.130 (0.18)	0.151 (0.18)
Time preference	-0.121 (0.27)	-0.126 (0.27)	-0.130 (0.27)
Risk aversion	0.122+ (0.064)	0.119+ (0.064)	0.120+ (0.064)
Observations	2412	2412	2412
Pseudo R^2	0.183	0.182	0.182
AIC	2711.9	2711.7	2710.3
BIC	2827.7	2815.8	2814.5
Mc Fadden Adj. R^2	0.166	0.167	0.168
Cox-Snell R^2	0.220	0.218	0.219
AUC	0.759	0.758	0.757
†Accuracy	73.13	73.22	73.09
†Sensitivity	89.12	89.12	88.98
†Specificity	50.40	50.60	50.50

Robust Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Regression results for RRSP:

Individual has a RRSP	1 st Model	2 nd Model	3 rd Model
Intercept	-1.316 ^{***} (0.38)	-0.840 [*] (0.35)	-1.361 ^{***} (0.37)
Interest Literacy (ref. Incorrect or DK)			
Correct	0.290 ⁺ (0.17)		
Inflation Literacy (ref. Incorrect or DK)			
Correct	0.122 (0.13)		
Risk Literacy (ref. Incorrect or DK)			
Correct	0.634 ^{***} (0.12)		
Overall correct (ref. No)			
Yes		0.599 ^{***} (0.10)	
# Correct Literacy Questions			0.359 ^{***} (0.062)
Respondent's Individual Income (ref. 0 to 20k)			
20k to 40k	0.142 (0.18)	0.166 (0.18)	0.137 (0.18)
40k to 60k	0.896 ^{***} (0.19)	0.898 ^{***} (0.19)	0.884 ^{***} (0.19)
60k to 80k	1.200 ^{***} (0.20)	1.227 ^{***} (0.20)	1.194 ^{***} (0.20)
80k to 100k	1.245 ^{***} (0.22)	1.256 ^{***} (0.22)	1.241 ^{***} (0.22)
over 100k	1.976 ^{***} (0.24)	1.995 ^{***} (0.24)	1.977 ^{***} (0.24)

Province (ref. Ontario)			
Quebec	0.164 (0.10)	0.174 (0.10)	0.181 (0.10)
Gender (ref. Female)			
Male	-0.185+ (0.10)	-0.178+ (0.10)	-0.172+ (0.10)
Age (ref. 35 to 40)			
41 to 45	0.269+ (0.14)	0.293* (0.14)	0.280* (0.14)
46 to 50	0.378** (0.14)	0.373** (0.14)	0.376** (0.14)
51 to 55	0.552*** (0.14)	0.550*** (0.14)	0.537*** (0.14)
Education (ref. High school or less)			
Certificate	-0.0978 (0.21)	-0.0655 (0.21)	-0.0924 (0.21)
CEGEP or some University	0.256+ (0.15)	0.285+ (0.15)	0.258+ (0.15)
Undergraduate	0.569*** (0.16)	0.584*** (0.16)	0.564*** (0.16)
Graduate or more	0.587** (0.19)	0.602** (0.18)	0.579** (0.19)
Work status (ref. Employed)			
Self-employed	0.0226 (0.18)	0.00797 (0.18)	0.00918 (0.18)
Did not work	-0.752*** (0.19)	-0.741*** (0.20)	-0.755*** (0.20)
Time preference	0.0888 (0.29)	0.0353 (0.29)	0.0854 (0.29)
Risk aversion	0.0233 (0.067)	0.0256 (0.067)	0.0202 (0.068)
Observations	2493	2493	2493
Pseudo R ²	0.139	0.136	0.136

<i>AIC</i>	2537.3	2542.1	2541.3
<i>BIC</i>	2665.4	2658.5	2657.7
Mc Fadden Adj. R^2	0.118	0.117	0.118
Cox-Snell R^2	0.149	0.146	0.146
AUC	0.745	0.744	0.743
†Accuracy	77.18	76.82	76.61
†Sensitivity	94.14	93.59	93.81
†Specificity	30.73	30.88	29.54

Robust Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Regression results for TFSA:

Individual has a TFSA	1 st Model	2 nd Model	3 rd Model
Intercept	-0.949 ^{**} (0.34)	-0.516+ (0.31)	-0.793 [*] (0.33)
Interest Literacy (ref. Incorrect or DK)			
Correct	0.490 ^{**} (0.16)		
Inflation Literacy (ref. Incorrect or DK)			
Correct	-0.155 (0.12)		
Risk Literacy (ref. Incorrect or DK)			
Correct	0.353 ^{**} (0.11)		
Overall correct (ref. No)			
Yes		0.277 ^{**} (0.093)	
# Correct Literacy Questions			0.187 ^{***} (0.057)
Respondent's Individual Income (ref. 0 to 20k)			
20k to 40k	0.293 (0.18)	0.328 (0.18)	0.314 (0.18)
40k to 60k	0.428 [*] (0.18)	0.440 [*] (0.18)	0.431 [*] (0.18)
60k to 80k	0.576 ^{**} (0.19)	0.610 ^{***} (0.18)	0.590 ^{**} (0.19)
80k to 100k	0.749 ^{***} (0.20)	0.773 ^{***} (0.20)	0.760 ^{***} (0.20)
over 100k	0.994 ^{***} (0.20)	1.024 ^{***} (0.20)	1.010 ^{***} (0.20)
Province (ref. Ontario)			

Quebec	-0.234 ^{**} (0.087)	-0.228 ^{**} (0.087)	-0.227 ^{**} (0.087)
Gender (ref. Female)			
Male	-0.217 [*] (0.090)	-0.214 [*] (0.090)	-0.214 [*] (0.090)
Age (ref. 35 to 40)			
41 to 45	-0.104 (0.12)	-0.0965 (0.12)	-0.103 (0.12)
46 to 50	-0.227 ⁺ (0.12)	-0.242 [*] (0.12)	-0.244 [*] (0.12)
51 to 55	-0.206 ⁺ (0.12)	-0.220 ⁺ (0.12)	-0.229 ⁺ (0.12)
Education (ref. High school or less)			
Certificate	-0.304 (0.21)	-0.271 (0.21)	-0.288 (0.21)
CEGEP or some University	0.0995 (0.14)	0.113 (0.14)	0.0956 (0.14)
Undergraduate	0.642 ^{***} (0.15)	0.645 ^{***} (0.15)	0.628 ^{***} (0.15)
Graduate or more	0.713 ^{***} (0.17)	0.711 ^{***} (0.17)	0.693 ^{***} (0.17)
Work status (ref. Employed)			
Self-employed	0.00288 (0.16)	-0.00503 (0.16)	-0.00606 (0.16)
Did not work	-0.592 ^{**} (0.19)	-0.581 ^{**} (0.19)	-0.590 ^{**} (0.19)
Time preference	0.280 (0.25)	0.235 (0.25)	0.257 (0.25)
Risk aversion	-0.0474 (0.057)	-0.0484 (0.057)	-0.0508 (0.057)
Observations	2493	2493	2493
Pseudo R ²	0.072	0.068	0.068

<i>AIC</i>	3182.6	3192.2	3190.3
<i>BIC</i>	3310.6	3308.7	3306.7
Mc Fadden Adj. R^2	0.0532	0.0515	0.0527
Cox-Snell R^2	0.0925	0.0875	0.0882
AUC	0.677	0.672	0.673
†Accuracy	64.62	63.78	64.30
†Sensitivity	81.48	80.25	80.66
†Specificity	40.68	40.39	41.07

Robust Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX D

For both saving and contribution amounts, respondents either gave a specific dollar amount or opted for a dollar bracket. We considered using the imputation technique for those respondents who opted for the amount bracket by replacing the missing dollar values by the median amount of the bracket they fall into. However, the percentage of missing dollar values was too small for the imputation technique to significantly impact our analysis. For the RRSP, TFSA and NRA savings accumulated, there were 168, 129 and 152 respondents, respectively, who opted for a total savings amount bracket rather than a specific dollar amount. For the RRSP and TFSA contribution, 105 and 125 respondents, respectively, opted for a contribution amount bracket rather than a specific dollar amount. These numbers are very small and would have not affected our findings so we chose to exclude them along with respondents who preferred not answering the question. The density of the distribution of total savings is shown in Figure 1 below. As we can see the total saving distribution is left skewed.

Figure 1

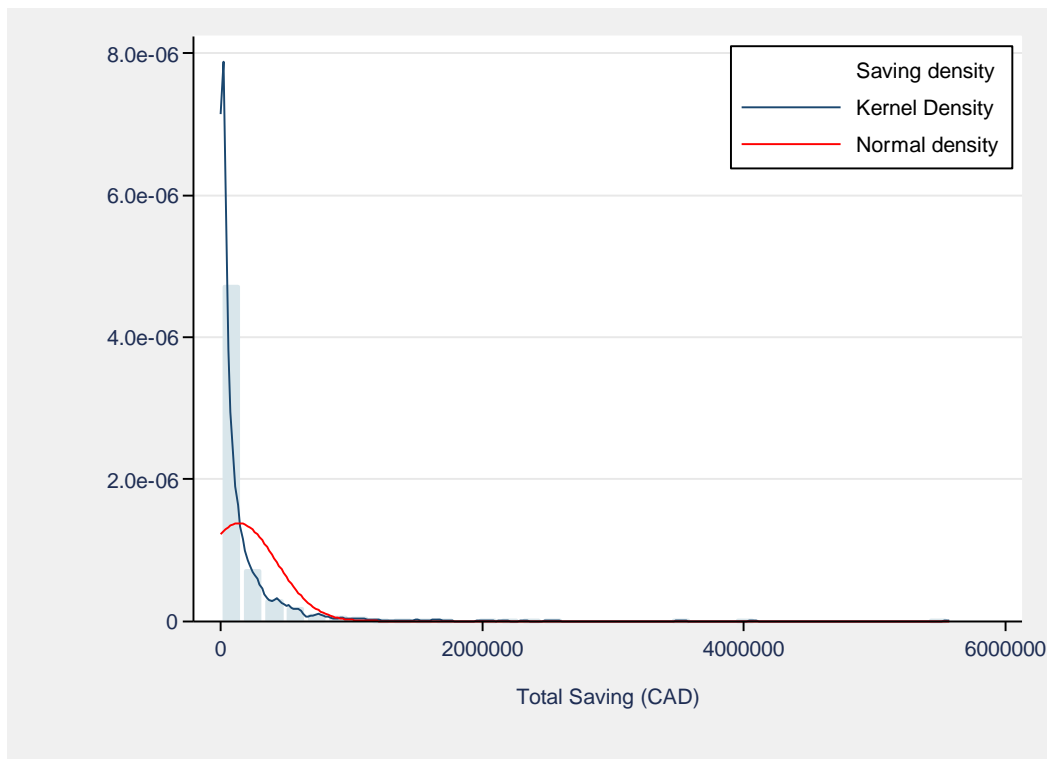


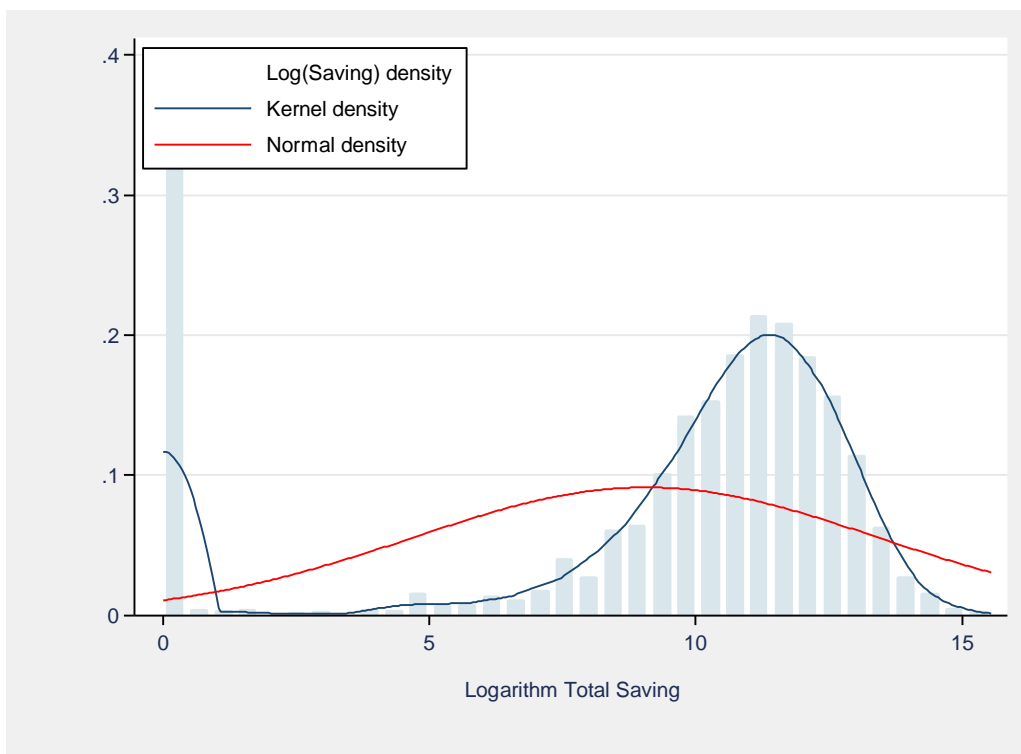
Figure 2 shows the logarithm of total savings. The majority of values are less than 200 000\$ with some extreme outliers. When taking the logarithm of total savings, we see the distribution is approximately normally distributed (Figure 2) with a lot of values at 0. Amongst our 2,630 observed savings amounts, there are 427 zeros (16.2%). In that case, we applied the most popular models when facing such a distribution, on the log-transformed outcome:

- Type I Tobit Model.

- Type II Tobit model, which is commonly known as Heckman Two Stage Model.

In our case, there is a corner at zero. The Type I Tobit model addresses and treats those zero values as such whereas the Type II (Heckman model) treats them as unobserved values. Therefore, Heckman model should be the best model if we have sample selection bias, given that savings for non-planners are unobserved. Once we apply the logarithm transformation to our dependant variable, we obtain an approximately normal distribution (Figure 2). Then we test the efficiency of Heckman models based on $\rho = correlation(e_1, e_2)$ where e_1 and e_2 are the errors of the 1st and 2nd stages, respectively. When there is no correlation between the error terms, OLS, or in our case Tobit model because savings and contributions are left-censored, is superior to Heckman's.

Figure 2



Since ρ in the Heckman model was not significant, we concluded that Type II Tobit model is not better than Type I. We presented our results using the Type I Tobit model, which supposes that y_i is a latent variable, linearly dependant on x_i and equal to y_i^* when its value is different than zero or zero otherwise.

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases}$$

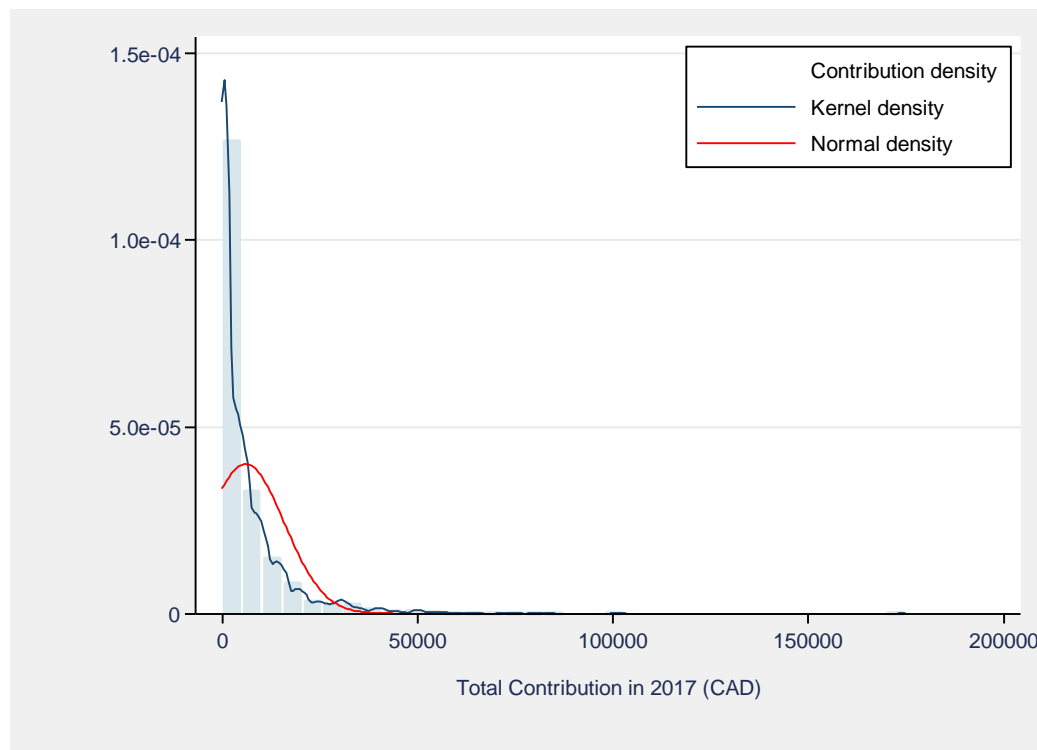
We did the same thing for contributions. Details are in the next section.

APPENDIX E

The density of the distribution of total contributions is shown in Figure 3 below. The distribution is left skewed and there are many respondents who did not make any contribution to their savings account. Amongst our 2,722 observed contributions, there are 893 zeros (32.8%). To remedy the problem of censored dependent variable (corner at 0), we used the same two models as in the previous section:

- Type I Tobit Model.
- Type II Tobit model, which is commonly known as Heckman Two Stage Model.

Figure 3



Once we apply the logarithm transformation to our dependant variable, we obtain an approximately normal distribution (Figure 4). As seen in table 10, the values of ρ are not significant and close to zero in the first ($\hat{\rho}=0.014$), second ($\hat{\rho}=0.0022$) and third model ($\hat{\rho}=0.0025$). Therefore, we do not reject the null hypothesis (i.e. $H_0: \rho = 0$) and determine that Heckman model does not fit data better (i.e. there is no sample selection problem). We present our findings using the estimated coefficient of the Tobit Model.

Figure 4

