

The Perils of Living Paycheque to Paycheque: The relationship between income volatility and financial insecurity

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Foreword by CPA Canada

For many years, Chartered Professional Accountants of Canada (CPA Canada) has been at the forefront of confronting the challenge of promoting financial wellness and the behaviours that enable it. We leverage our capacity as trusted financial experts and advisors – both through our thought leadership, such as with this report, and our award-winning financial literacy programming to help Canadian families and newcomers to the country understand the importance of financial literacy.

The work we do has demonstrated that financial wellness is affected by factors beyond literacy. Many Canadians who struggle to make ends meet, for example, may simply not have an opportunity to use the tools we might provide through financial literacy programming. In addition, there is a very real challenge in identifying all of the factors that may impose barriers on individuals trying to leverage lessons learned from literacy programs.

This problem is not one that will resolve itself. In fact, the way our labour market is changing, the advent of new technologies and automation will escalate the challenges some Canadians will face when trying to achieve a secure financial future. A growing body of research is giving rise to concerns about a shift towards more short-term, task-oriented employment. This type of employment may not have the same stability that previous generations enjoyed, potentially adding another barrier to financial wellness that is affecting a growing number of Canadians.

This second report in CPA Canada's series on financial capability, explores the intersection between financial wellness and the changing nature of work for the first time in a Canadian context. We do so with the hope that our public discourse recognizes that financial wellness is at the heart of many of public policy issues, from poverty and low-income to the increasing economic disenfranchisement of certain pockets of society. This is a critical time for Canada to be having this conversation. Let us make sure we are having the right one.

Executive Summary

Poverty, defined in terms of income usually over a one-year period, has real and lasting negative socio-economic effects. The definition, however, is very narrow. It does not include households who may not be poor in terms of their annual income but who have good months and bad months for their income. What happens when a household isn't certain they'll be able to make ends meet month-to-month because their income swings up and down? That uncertainty or volatility, within the year, might also lead to a host of financial, practical and psychological problems for a household, particularly if they have limited ways to smooth out their income through savings or affordable credit. For now, most financial products and advice, most income support programs and most expenses, are not set up to help households where incomes swing up and down from month to month.

Several studies have documented some increase in year-over-year fluctuations in personal incomes (before taxes and transfers) in Canada, particularly among younger workers, women and lone parents (Morissette and Ostrovsky, 2005, 2007; Beach, Finnie and Gray, 2010; García-Medina and Wen, 2014). In Canada, however, we know almost nothing about the extent or effects of month-to-month changes in income. One survey conducted by Ipsos Canada for TD Bank Group suggested that 37% of adult Canadians reported some volatility in their income in the previous year (TD Bank Group, 2017). This means that more than one-third of Canadians may be dealing with the financial and psychological challenges that come with volatile incomes.

In this study, we make use of a unique dataset that collected self-reported month-to-month volatility in household income, measures of capability, financial knowledge and psychological variables. CPA Canada conceived and designed a survey that builds on work by the Financial Consumer Agency of Canada and Statistics Canada's Canadian Financial Capability Survey. But this study is the first of its kind in Canada to look at the relationship between income instability and broader measures of financial well-being. It is also only the second study to report on month-to-month income volatility among Canadian households.

We find that:

- One in three adult Canadians reported at least some volatility in their monthly incomes, with six per cent reporting that the source and amount were both uncertain.

- Income volatility is present across a wide swath of the survey respondents, regardless of gender, family status, region of the country, education level and even income sources. Self-reported volatility is higher among women, younger workers, respondents in modest income households and those receiving provincial social assistance benefits. But differences in the rates of volatility are only statistically significant for those with modest incomes.
- Income volatility is correlated with lower financial knowledge, lower financial capability, and stronger beliefs that financial outcomes are up to fate and outside of personal control. Even when we control for factors like household income level, we find that self-reported volatility in monthly income predicts negative outcomes like having trouble making ends meet, difficulty planning ahead financially, and an overall sense of not being in control of one's finances.

It is important to note that these results are from one survey and more research is needed. But based on our preliminary results, we suggest that financial service providers, financial education, and financial information providers may not be doing enough to tailor products, services and advice to the share of Canadians with highly volatile incomes. This finding, to some extent, echoes that of our earlier report on gender differences in financial literacy and financial capability. Our results also suggest that public income transfers are being delivered in ways that seem to exacerbate month-to-month income volatility, increasing the financial challenges that households face. In other words, the very design of some pieces of our social welfare system may be making it harder for Canadians to gain financial stability and feel in control of their futures. As policymakers rethink the social safety net for a 21st century economy, we think the issue of income volatility needs much more attention.



KEY RESULT 1

1/3 of respondents reported some income volatility



KEY RESULT 2

Respondents with a volatile income reported lower financial capability scores and scored worse on a financial knowledge quiz.



KEY RESULT 3

Respondents with a volatile income believed less in ability/effort and believed more in chance/fate as determining financial outcomes.

1. Introduction

In 2015, Chartered Professional Accountants of Canada (CPA Canada) conducted a survey of adult Canadians' financial habits, attitudes and knowledge. In addition to questions about personal finances, the survey also collected demographic information and one measure of self-reported income volatility.

For professionals who provide financial advice, training, coaching and more, income volatility could be a key factor in providing programs and services that best meet their clients' needs. Furthermore, employers who determine working arrangements for workers – which can be an important source of volatility (Murdoch & Schneider, 2017) – should be aware of the potential effects of income volatility on the well-being of workers. Finally, policy-makers who design and implement tax and transfer systems that are meant to redistribute and help stabilize household incomes on a year-to-year basis, should also pay attention to month-to-month income fluctuations and whether policy is responding appropriately.

In this report, we make use of the new CPA Canada data to take a fresh look at how income volatility – in addition to income itself – is associated with: financial capability, financial knowledge, a sense of personal control over finances, and a range of indicators of potential financial difficulties. We ask:

- 1) Does income volatility play a role in shaping our financial habits, attitudes and knowledge above and beyond the amount of income and our other demographic traits (like age, education, or gender)?
- 2) Does income volatility play a role in how much control a person feels over their own finances?

2. Previous research on income volatility

Before discussing the current study, we briefly review the literature on income volatility, including descriptive studies on the prevalence of income volatility and studies linking financial decisions and habits to income volatility.

2.1 Research on the prevalence of income volatility in Canada

Income volatility has, until recently, been studied only in terms of fluctuations in annual incomes, sometimes examining patterns in year-over-year changes during a study period and sometimes examining changes in income at the

start and end of a period of a few years. Studies have used both survey as well as administrative data (such as tax records), sometimes arriving at different conclusions.¹

In Canada, several studies have examined income dynamics of households, tracking fluctuations in movement in or out of low income (Finnie & Sweetman, 2003) or even intergenerational changes in family income (Corak, 2017). But research specific to income volatility within households has been somewhat limited.

Two papers by Morissette and Ostrovsky (2005; 2007) looked at income instability among Canadian families during the 1980s to early 2000s. Using tax return data, they find that overall instability in annual income is much higher among families in the bottom third, and that single mothers are particularly at risk of income instability. They do not, however, find an overall increase in the instability of annual employment earnings in Canada during the 20 years of their study period. Depending on the age of major income earner and the composition of the family, between 15 per cent and 39 per cent of households display some instability in their incomes. Younger workers show greater levels of instability. Finally, the researchers find that government benefits play a significant role in stabilizing incomes from one year to the next. They find that provincial social assistance benefits significantly reduced annual income instability among lone mothers but that, on balance, federal Employment Insurance had the more powerful stabilizing effect on household incomes.

Similarly, García-Medina and Wen (2018) look at the difference in variability between pre-tax and after tax and transfer incomes to look at the degree to which taxes and individual transfers are offsetting instability in personal incomes. They conclude that, beginning in the late 1990s, Canada's tax and transfer systems have done much less than in previous years to offset fluctuations in market incomes. They note that families where the main earner has lower education and families who receive social assistance experienced greater net instability in their incomes, as tax and transfer systems became less progressive.

Three papers by Beach, Finnie and Gray also look at instability in annual personal and household incomes in Canada. Like Morissette and Ostrovsky, they use tax records to examine fluctuations in annual incomes in Canada. Looking at two periods in the 1980s and 1990s, they find annual earned incomes have become more unstable over time, though not continuously so (Beach, Finnie, & Gray, 2003). Men show greater long-run earnings instability than women and, consistent with other research, instability tends to decline

1 For an excellent overview of methods and the historical U.S. literature, see Moffit & Zhang (2018).

with age. The concentration of long-run instability among men is replicated again in a second paper (Beach, Finnie, & Gray, 2005). Their most recent paper (Beach, Finnie, & Gray, 2010) instead concludes that it is women who face the greatest instability in their incomes, driven largely by the rise in non-standard employment in sectors (like the service sectors) where women are over-represented. This last paper updates results to 2006 and finds that it is the short-term, rather than long-term, variability that is impacting Canadian women.

In sum, the Canadian research on annual incomes suggests that:

- overall instability has risen since the late 1990s
- men may face greater long-term instability
- women face greater short-term instability
- younger workers, single mothers, and lower income households are at greater risk of income instability
- while public benefits (like EI and welfare) do reduce instability, Canada's overall tax and transfer system is doing less today than in previous decades to offset fluctuations in market incomes

But what about instability of monthly incomes? Just one study in Canada has so far documented swings in the monthly incomes of Canadians. In a report released in late 2017, TD Bank Group found that 12 per cent of respondents reported fluctuations of 25 per cent or more in their income from one month to the next. Researchers constructed a composite measure of income volatility, combining answers to at least three questions about the stability, consistency and level of variability in monthly income in the last year. Using that composite measure, they report that 66 per cent of respondents reported some degree of volatility in their monthly income, including 18 per cent who report high or very high levels of volatility. The same study found that self-employed, part-time, unemployed and seasonal workers were more likely to report within-year income volatility. Income volatility was also more frequently reported by Millennials and by lower income Canadians.

Within-year volatility in incomes has received far more research and attention in the United States.

The U.S. Financial Diaries Project documented substantial volatility in the household incomes of the 235 participating lower and modest income American households (Hannagan & Morduch, 2015; Morduch & Schneider, 2017). Researchers defined volatility as a swing of at least 25 per cent above or below a household's average monthly income. In a 2015 paper, Hannagan and Morduch report that the average household experienced at least 2.5 months in a year where such swings fell below 25 per cent of average monthly income

and 2.6 months in a year where the swings exceeded 25 per cent of average monthly income. While the volatility was most pronounced among the very lowest income families in the sample, even households with an income at 300 per cent of the U.S. poverty line continued to show significant volatility.

The Diaries project data is from a rich but very small sample. Using a random sample of 100,000 clients, researchers at JP Morgan Chase examined all account transactions – both deposits and debits – to understand volatility in monthly income and expenditures over a 27-month period (Farrell & Greig, 2015). They used a much lower benchmark of volatility: just a five per cent or greater swing over the previous period. The researchers found that the overwhelming majority of clients experience income volatility in both their annual income and monthly incomes, but that monthly income volatility is significantly more common (84 per cent) than annual income swings (70 per cent). Income (and spending) volatility was present across all income levels. In follow-up studies with additional samples from their client data, JP Morgan Chase report that 55 per cent of adults experience more than one month where income fluctuates by more than 30 per cent, and that volatility is more prevalent among young adults, those in the bottom income quintile and those living in the western United States (Farrell & Greig, 2016). They also report that most of the volatility is due to swings in earned income, but not to employment changes. This could be a result of positive events such as an annual bonus or commission income, or negative events such as cuts to shift work or seasonal downturns. Furthermore, 40 per cent of client accounts examined also showed some kind of large extraordinary expense – such as a medical expense or car repair – in any given month (Farrell & Greig, 2017). Looking at the financial assets of the same account-holders, the researchers concluded that most did not have enough liquid savings to smooth consumption or manage extraordinary expenses, raising the prospect that combined income and spending volatility might increase risks of debt and financial strain (Farrell & Greig, 2015).

The size of the JP Morgan Chase sample is very impressive, but we don't know if clients of that financial institution are systematically different from other consumers. However, data from representative samples of Americans also finds substantial volatility in monthly income. Using data from the Survey of Income and Program Participation,² Maag and her colleagues (2017) find that half of all working age adults (aged 25 to 50 years) have at least one month per year in which their household income swings by 25 per cent or more above their average and that for 39 per cent (overall) the swing is negative – dropping

2 The SIPP is a representative panel survey that, among other topics, collects detailed monthly data on income, from all sources.

below their average income. The same study also confirms that volatility is greater among lower income Americans (64 per cent) and that 56 per cent (overall) experience a negative swing in household income. Volatility in monthly income was also more pronounced among lower income households with 40 per cent experiencing volatility six months or more in the year. Using the same data source, Bania and Leete (2009) found that within-year volatility had increased significantly in the U.S. between 1992 and 2003, particularly for those in low-income and those living in deep poverty. Like the Canadian research, Bania and Leete argue that public transfer systems are now less effective in helping households to smooth their market incomes.

Finally, the annual Survey of Household Economics and Decision-making (SHED) is conducted by the Board of the U.S. Federal Reserve. In 2016, the Board began reporting on self-reported volatility in household income from the SHED.³ One in five respondents stated they experienced occasional swings in monthly income in 2015, and 22 per cent did so in 2016 (Board of Governors, 2016; 2017). Another 12 per cent reported frequent income volatility in 2015, 10 per cent did so in 2016. Income volatility was more likely to be reported by Americans with lower education and by black or Hispanic Americans.

Taken together, the available research suggests that monthly income volatility is nearly universal when it is defined as even a small shift above or below usual monthly income levels. This volatility appears across all income levels and may represent either gains or losses to income. When income volatility is defined more stringently (as a swing of 25 per cent or 30 per cent relative to average monthly income), then the incidence is somewhat lower, but still substantial, affecting up to half of working-age adults in the U.S. and 18 per cent in Canada. The research finds a consistent relationship between income level and income volatility, with lower income households more prone to swings and, particularly, downward swings in monthly income. The leading source of income volatility appears to be the labour market, though not necessarily job changes or job loss, and research suggests that public tax and transfer systems have become less adept at helping households to smooth these fluctuations in income.

2.2 Research on the effects of income volatility

In addition to the prevalence of income volatility, some studies have also looked for an association between volatility and a range of financial and non-financial outcomes.

³ Administrative and survey data may yield different results in measuring income volatility. For example, Dahl, DeLeire and Schwabish (2011) find that survey data tends to result in higher estimates of increases in annual income volatility compared to administrative sources that cover the same period.

- American researchers have described the effects of financial precarity on the financial decisions and behaviours of lower income households. When households face uncertainty in their income and do not have savings to self-insure against exogenous shocks, they are conditioned to prefer short-term planning horizons and may even make financial decisions that appear to be contrary to their self-interest (Barr, 2012; Mullainathan & Shafir, 2013).
- This broad observation is supported by the highly detailed Financial Diaries study, which finds that income volatility can negatively affect financial decision-making by limiting choices and, in some cases, exacerbating financial exclusion from mainstream banking and consumer credit (Murdoch & Schneider, 2017). Studies of the fringe financial services industry in the U.S. and Canada suggest that many consumers prefer to pay higher transaction costs with fringe banking providers in exchange for faster transactions to cope with immediate financial pressures (Buckland, 2012; Servon, 2017).
- Compared to those with stable incomes, those experiencing income volatility are also less likely to report saving (Fisher, 2010; TD Bank Group, 2017; Pew Charitable Trusts, 2017), more likely to have shorter savings horizons and more likely to have lower motivation to save for retirement (Fisher, 2010). However, income uncertainty may not predict actual declines in household saving once demographic variables are accounted for.
- Income volatility may increase the risk of mortgage delinquency (Diaz-Serrano, 2005). An analysis of eight mortgage markets in the European Union suggests that income volatility predicted whether someone would default on a mortgage – even when statistically controlling for overall income. In fact, income volatility was one of only two predictors (along with size of savings) that consistently predicted defaults in all eight mortgage markets.
- Income volatility may be associated with missing bill payments (Farrell & Greg, 2016; 2017; TD Bank Group, 2017).
- Volatility seems to be associated with lower self-reported financial well-being and greater financial strain (TD Bank Group, 2017; Pew Charitable Trusts, 2017).
- Volatility seems to increase reliance on food stamps, but only if the shock is fairly persistent and only for lower income families. Results also suggest that, absent food stamps, lower income families may reduce their spending on food by as much as a third (Blundell & Pistaferri, 2003).

- Greater income volatility in household income has been linked to less charitable giving even after controlling for overall household income (Hughes & Luksetich, 2008).
- Within-year income volatility has been linked to lower engagement in school and poorer school performance, even after controlling for income level as well as several child and family characteristics (Genetian, Wolf, Hill, & Morris, 2015).
- Downward income volatility increases the risk of depression, although absolute volatility actually seems to reduce the risk of depression (Prause, Dooley &, Huh, 2009).
- Income volatility can affect people's relationships: transitory (but not permanent) income shocks have been linked to higher divorce rates (Nunley & Seals, 2010). An analysis of 30 years' worth of data from U.S. households participating in the National Longitudinal Survey of Youth suggests that transitory household income shocks increased in the year leading up to a divorce. This effect was most pronounced for those with middle socio-economic status.
- The effects of income volatility on spending appear to be mixed. While some research finds correlation between self-reported volatility in income and in spending (Farrell & Greig, 2016), other research suggests that households are not always able or willing to adjust their consumption when incomes fall (or rise). For example, the Financial Diaries study finds that low-income households reduce spending when incomes fall but by a smaller ratio than households with modest or middle incomes (Morduch & Schneider, 2017). When consumption is already constrained to essentials, there may not be much room to adjust when incomes fall. Similarly, patterns in the JP Morgan account data suggest that individuals may have different revealed preferences – with some consumers behaving optimistically, expecting future income to rise again to offset current consumption, while others behave pessimistically, keeping consumption changes below income swings, and only a minority (28 per cent) actively managing to track income patterns in their consumption.

This last finding, of diversity in patterns of economic behavior of consumers, suggests that individual differences may be important. Does income volatility interact with – or even shape – individual differences such as a sense of control over personal finances?

2.3 Research on economic beliefs as a function of income volatility

Individual differences that can influence financial management not only include socio-economic aspects about the individual (age, gender) and their financial situation (income, income volatility) but also psychological differences in what they believe about how the world works. One relevant belief that may be tied to financial management is the perceived locus of control over economic outcomes, or the degree to which someone believes that financial success is due to internal, controllable factors (e.g., ability, effort) versus external, uncontrollable factors (e.g. fate, chance).

Locus of control is the degree to which people believe that they have control over the outcome of events in their lives, as opposed to external forces beyond their control (Rotter, 1954). Believing that one's own actions matter and that one has some control over outcomes is an essential component of self control and underlies health decisions, and job and academic performance (Lefcourt, 2014).

With regard to one's personal financial situation, people might have more specific beliefs about whether their own economic situation can be controlled or not. Economic locus of control distinguishes whether someone believes their situation is due to internal, controllable factors such as ability and effort, or they might believe their situation is due to external, uncontrollable factors such as fate or luck (Furnham, 1986).

Belief in internal factors has been linked to more positive financial outcomes:

- Internal economic locus of control is linked to greater satisfaction with one's own financial standing in a study of 2,510 U.S. households (Sumarwan & Hira, 1993).
- Internal economic locus of control is linked to more purposeful shopping habits in Canadian students (Busseri, Lefcourt, & Kerton, 1998).
- Internal economic locus of control is linked to more rational financial choices (such as less discounting of future gains and losses) in a sample of British students (Plunkett & Buehner, 2007).
- A study of close to 10,000 Australian households showed that households where at least one person in the household had an internal locus of control saved more of their income, both in absolute terms and as percentage of earnings (Cobb-Clark, Kassenböehmer, & Sinning, 2013).

Beliefs about being able to control financial outcomes have been consistently linked with income and household net worth: higher income individuals and those with higher net worth are more likely believe their economic situation is due to their ability and effort and less likely to believe they are due to chance or fate than low income individuals (Cobb-Clark et al., 2013; Furnham, 1986; Sumarwan & Hira, 1993).

However, no research has been done on the volatility or stability of income on beliefs about the locus of control of one's own financial situation.

On the one hand, it is possible that individuals with a highly volatile income are more likely to attribute their financial situation to effort and ability: a variable income might lend itself more to perceiving causal links between own effort and hard work than a fixed income. However, variable and uncertain incomes might also be perceived as being out of the personal control if, for example, the supervisor determines the hours one is called in for work and the raises one gets. This study is the first that allows a test of, not just how income, but how income volatility relates to individuals' beliefs about the determinants of their own financial situation.

3. Data sources and methods

The goal of this study is to better understand how income volatility is linked with self-reported financial behavior and attitudes towards finances, as well as objective knowledge. Because this is only the second survey to collect information on income volatility in Canada, we also provide a more detailed and descriptive analysis of the incidence of self-reported volatility.

Data was collected from an online panel of adult Canadians in 2015 by a third party under contract to CPA Canada. The questionnaire replicated many parts of the Statistics Canada Canadian Survey of Financial Capability. Questions covered financial behaviour, financial attitudes, a 14-item objective knowledge quiz, and psychological and socio-demographic traits. Anonymized data was shared with the authors for analysis. The data set covers 3,502 respondents, of whom 1,818 are female (52 per cent) and 1,684 are male (48 per cent). This distribution corresponds roughly to the gender distribution of the Canadian population (Urquijo & Milan, 2017).⁴

Age is measured as a continuous variable in years. The youngest respondent was 18 years of age and the eldest was 90 years of age. Average age of respondents was 53.5 years, which is slightly older than the Canadian

⁴ In a separate report, we provide a more detailed analysis of the role of gender, and personality traits related to gender, in observed financial capability.

population. Financial literacy seems to have a U-shaped pattern by age – it rises during working age, but then declines again in older age (OECD, 2013; 2017).

Education is measured in terms of the highest level of education completed with categories ranging from less than a high school diploma, through to a graduate or professional university degree. The most frequent level of education among respondents was some post-secondary (including college, trades, CEGEP or university), but do not hold a diploma or degree. However, 30 per cent of the sample reported an undergraduate or advanced university degree. In general, education is associated with higher financial literacy (OECD, 2013, 2017).

3.1 Measuring income and income volatility

Household income is measured as self-reported income, before taxes, for all members of the household, in 11 categories ranging from less than \$20,000 through to \$150,000 or more.⁵ Average household income for respondents was between \$50,000 and \$59,999, which is relatively close to average income for all Canadian household types.

An additional item recorded household income volatility. Specially, respondents were asked about the stability, over some period of time, of both the amount and source of income.

What best describes the nature of your household income?

1. Amounts of income are relatively stable and income source is dependable over a longer term.
2. Amounts of income are relatively stable; however, income source is not very dependable over a longer term.
3. Amounts of income change substantially from month to month but income source is dependable over a longer term.
4. Amounts of income change substantially from month to month and income source is not very dependable over a longer term.
5. Don't know.
6. Prefer not to say.

5 For the sake of simplicity, in our descriptive results at Table 1, we collapse income into 5 categories.

This approach is similar to that used by Farrell and Greig (2016, 2017). It does not set a benchmark for the degree (for example as a percentage variation from average monthly income). In contrast to studies reviewed above, this question also considers both instability in the amount and the source of income. We treat volatility as an ordinal variable with those reporting instability in both source and level of income as experiencing the greatest amount of volatility. For the analyses below, we coded respondents as experiencing no volatility ((1) above), volatility in either the amount or the source ((2) and (3) above), or experiencing volatility in both the amount and the source of income ((4) above).

3.2 Measuring financial knowledge (financial literacy)

Financial knowledge is measured in terms of correct answers to a quiz of 14 items included in the CPA Canada dataset. The questions broadly mirror those used by Statistics Canada's Canadian Financial Capability Survey (2008, 2014). The quiz covers topics such as interest rates, insurance, inflation and investments.

3.3 Measuring financial attitudes and behaviours (financial capability)

Financial capability is measured indirectly, using five different scales.

- Making ends meet: capability in using financial resources to cover ongoing expenses.
- Keeping track: capability in budgeting and monitoring personal finances.
- Planning ahead: capability in making financial plans for known life events (retirement) and unexpected future expenses.
- Choosing products: capability in exercising choice in financial products and services.
- Staying informed: capability in ongoing learning about personal finances.

This approach has previously been used in studies in the United Kingdom, Ireland, Norway and Canada, (Kempson, Collard & Moore, 2005; Atkinson et al, 2006; Statistics Canada, 2008; 2014; McKay, 2011; Russia Financial Literacy and Education Trust Fund, 2013). Results are calculated as scores on five scales using responses from 16 question items.⁶ In the case of the CPA Canada survey, one item is missing from each of the scales for "making ends meet" and "planning ahead." These are reported as truncated scales.

6 Further information on the scales and scoring is available in a report by Robson and Splinter (2015), titled "A new (and better) way to measure financial capability" and in a report by Robson (2012) titled "Piloting a financial literacy quiz in Canada." Many of the questionnaire items and scales were later replicated by the Financial Consumer Agency of Canada's online personal financial literacy quiz.

3.4 Measuring beliefs about financial outcomes

In addition to financial behaviours and attitudes, the survey designed by CPA Canada also assesses people's beliefs about economic control. In this scale developed by Furnham (1986), participants state their agreement with seven statements indicative of internal economic locus of control and with seven statements indicative of external economic locus of control. Agreement for each subscale is averaged across the seven statements. Both the internal locus of control scale and the external locus of control scale were internally reliable (Cronbach's alpha = .81 and .76, respectively), and comparable to the reliability of the scales in the originally published sample (Furnham, 1986).

Internal and external locus of control correlated moderately negatively, $r = -.29$, $p < .001$, suggesting that individuals who believe their economic outcomes are primarily determined by factors within their control tend to believe less in the importance of chance and fate, and vice versa.

Internal locus of control	External locus of control
<p>The belief that economic outcomes derive primarily from one's own actions and are within one's own control, such as effort and ability.</p> <p>Individuals who believe this would agree with the following statements:</p> <ul style="list-style-type: none"> • Saving and careful investing are key to becoming rich. • Whether or not I become wealthy depends mostly on my ability. • In the long run, people who take care of their finances stay wealthy. • If I become poor, it is usually my own fault. • I am usually able to protect my personal interests. • When I get what I want, it is usually because I worked hard for it. • My life is determined by my own actions. 	<p>The belief that economic outcomes derive primarily from factors beyond personal control, such as chance or fate.</p> <p>Individuals who believe this would agree with the following statements:</p> <ul style="list-style-type: none"> • There is little one can do to prevent poverty. • Becoming rich has nothing to do with luck. • Regarding money, there isn't much you can do for yourself when you are poor. • It's not always wise for me to save because many things turn out to be a matter of good fortune or bad fortune. • It is chiefly a matter of fate whether I become rich or poor. • Only those who inherit or win money can possibly become rich.

Similar to previous studies (Furnham, 1986), individuals with a higher income believed more in internal factors, such as effort and ability ($r = .16$), and less in external factors, such as chance and fate, as ($r = -.16$) explanations for their economic standing.

Older individuals were also more likely to believe in internal factors, such as effort and ability, and less in external factors, such as chance and fate, as explanations for their economic standing.

Men were more likely to agree with the statements denoting an internal economic locus of control than women ($t = 2.98$, $p = .001$), but genders did not differ in their agreement with external economic locus of control ($t = .71$, $p = .712$).

Education was not linked with either locus of control belief.

4. Results

4.1 How common is income volatility within a given year?

As noted earlier, we first offer descriptive information on the incidence of income volatility by socio-demographic characteristics. These are reported in Table 1, below. We report on the share of subgroups experiencing no volatility, volatility in either the amount or source of income, volatility in the amount and source of income, and those experiencing volatility in the amount with or without fluctuations in the source of income.

Overall, 12.3 per cent of respondents report 'substantial' volatility in the level of their monthly income, whether or not the source of income also varies. This is significantly lower than the indexed measure of incidence (66 per cent) reported in the TD Bank Group study (2017), but it is very similar to the incidence of self-reported instability and inconsistency of income reported by the same study at 13 per cent and 14 per cent respectively. Substantial volatility in both the source and the amount of monthly income is rare at just six per cent of respondents. One in four respondents report substantial volatility in either the source or amount of their monthly income.

We find that women are significantly ($p < 0.05$) more likely to report volatility than men, that some volatility declines with age, and that volatility is more prevalent among respondents with incomes between \$30,000 and \$50,000. These findings are all generally consistent with prior research.

We also find that volatility in the amount of income is more prevalent among respondents who are separated or divorced, among those living in British Columbia, among social assistance recipients, and among those with only a high school diploma. However, differences were not statistically significant. Interestingly, self-employment (by either the respondent or the spouse) is not associated with higher volatility in the amount of income.

Although the frequency of self-reported volatility may be significantly higher for some groups (and not for others), when we use these same characteristics to try to predict volatility (using ordered logistic regression to model odds of experiencing no, some or high volatility), only income emerges as significant in the model. More precisely, only income above \$30,000 but less than \$50,000 was significantly associated with increasing risk of volatility.

Table 1: Income volatility by socio-demographic characteristics

% reporting volatility (n = 3,050)					
	% of total sample	No volatility (source and amount are stable)	Some volatility (source or amount are volatile)	High volatility (source and amount are volatile)	Amount is volatile (with or without source)
Overall	100%	69.4	24.6	6.0	12.3
Gender					
Women	48.1	68.4	25.6	6.0	13.5
Men	51.9	70.6	23.5	5.9	11.2
Age group					
Youth (18-24)	2.9	66.0	29.8	4.3	9.6
Working age (25-64)	72.0	69.3	24.6	6.1	12.6
Senior (65+)	25.2	70.3	23.9	5.8	11.7
Marital status					
Single, never married	56.3	70.3	24.1	5.6	11.9
Married/common law	24.1	68.6	25.9	5.6	12.3
Divorced/separated	13.7	69.0	23.0	8.0	13.8
Widowed	5.5	66.5	27.5	6.0	10.8
Region					
BC	13.4	69.4	23.5	7.2	13.3
AB	9.8	70.7	23.5	5.9	13.1
SK & MB	6.6	64.7	29.4	5.9	10.8
ON	39.2	69.7	25.1	5.2	11.6
QC	24.1	70.0	23.5	6.5	13.0
Atlantic	6.9	68.9	24.8	6.3	11.7
Household income (grouped)					
Under \$30K	22.2	69.0	24.1	6.9	12.9
\$30K to under \$50K	22.7	66.1	26.6	7.4	15.1
\$50K to under \$70K	24.3	68.7	25.2	6.1	12.3
\$70K to under \$100K	18.0	72.0	22.9	5.1	11.0
\$100K and above	12.9	73.7	23.2	3.0	8.1

% reporting volatility (n = 3,050)					
	% of total sample	No volatility (source and amount are stable)	Some volatility (source or amount are volatile)	High volatility (source and amount are volatile)	Amount is volatile (with or without source)
Self-employment					
Respondent is self-employed	7.5	72.1	21.0	7.0	12.2
Spouse is self-employed	3.4	76.0	20.2	3.9	7.7
Household income source (any)					
Employment income	47.2	69.8	24.7	5.6	12.1
Self-employment income	15.1	72.0	23.2	4.8	10.2
Private pension or retirement savings	23.1	69.6	23.6	6.8	13.4
Government benefits for seniors	40.3	68.1	25.2	6.7	13.2
Employment Insurance	8.8	66.7	25.3	8.1	13.2
Social assistance	12.5	67.5	24.4	8.1	15.1
Education					
Less than high school	4.7	73.2	21.8	4.9	11.3
High school diploma	21.8	67.4	25.3	7.3	14.0
Some college, trades or vocational training	14.9	68.4	26.2	5.4	12.2
College, trades or vocational program	27.7	70.8	23.3	5.9	12.2
University undergraduate	21.1	69.4	24.8	5.9	12.5
University graduate	9.8	70.8	24.3	4.5	8.9

4.2 Is volatility associated with lower financial knowledge?

Next, we look at the relationship between income volatility and financial knowledge. In Table 2 (below), we report the mean score on the test of financial knowledge and in Figure 1 (below), we show the distribution of knowledge test scores by the ordinal measure of income volatility.

We find that respondents who report stable within year incomes have scores on the knowledge test that are slightly above those that experience either some or a high volatility. The exact cause or mechanism for this difference is unclear.

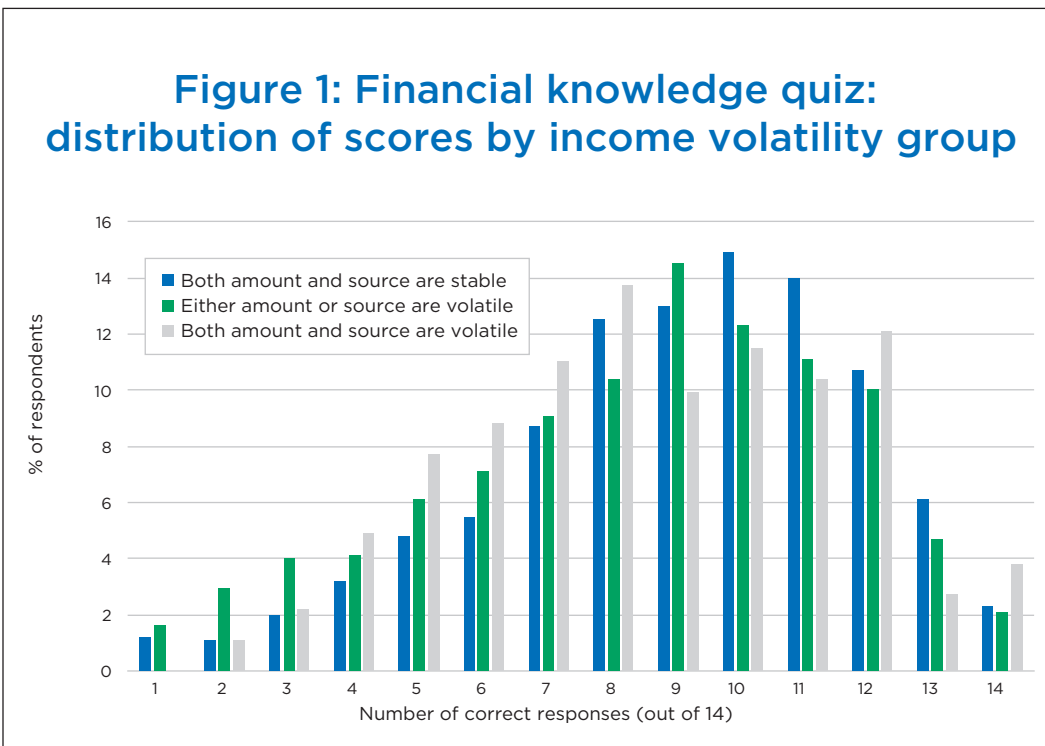
It may be, as suggested by Barr (2012) and by Mullainathan and Shafir (2013), that volatility creates cognitive demands that force consumers to pay attention to immediate needs, rather than increasing their knowledge of financial topics that may not be immediately relevant. However, Murdoch and Schneider (2017) found that participants experiencing monthly income volatility did not perform any worse (compared to average Americans) on a standardized test of financial knowledge.

We suggest that one explanation may be the interaction with the level of income and the relevance of items on the financial knowledge test. If volatility is best predicted by lower household income, then the difference in test results may be indirectly driven by income level. Previous studies that use similar knowledge tests generally find a negative relationship between income level and knowledge test scores (Lusardi & Mitchell, 2014; OECD, 2017; Van Rooij, Lusardi, & Alessie, 2011, 2012). However, there may be bias in the test instruments themselves. For example, questions that ask about insurance of stock market investments may have little salience for a lower income household that has never had, and does not expect to have, these types of investments.

Table 2: Average financial knowledge scores, by income volatility group

All respondents	No volatility (source and amount are stable)	Some volatility (source or amount are volatile)	High volatility (source and amount are volatile)	Is this significant?
8.8 on 14	9.0 on 14	8.4 on 14	8.6 on 14	Yes. The least volatile group scores significantly higher on the Quiz on average than either of the other groups which do not differ from each other.

Figure 1: Financial knowledge quiz: distribution of scores by income volatility group

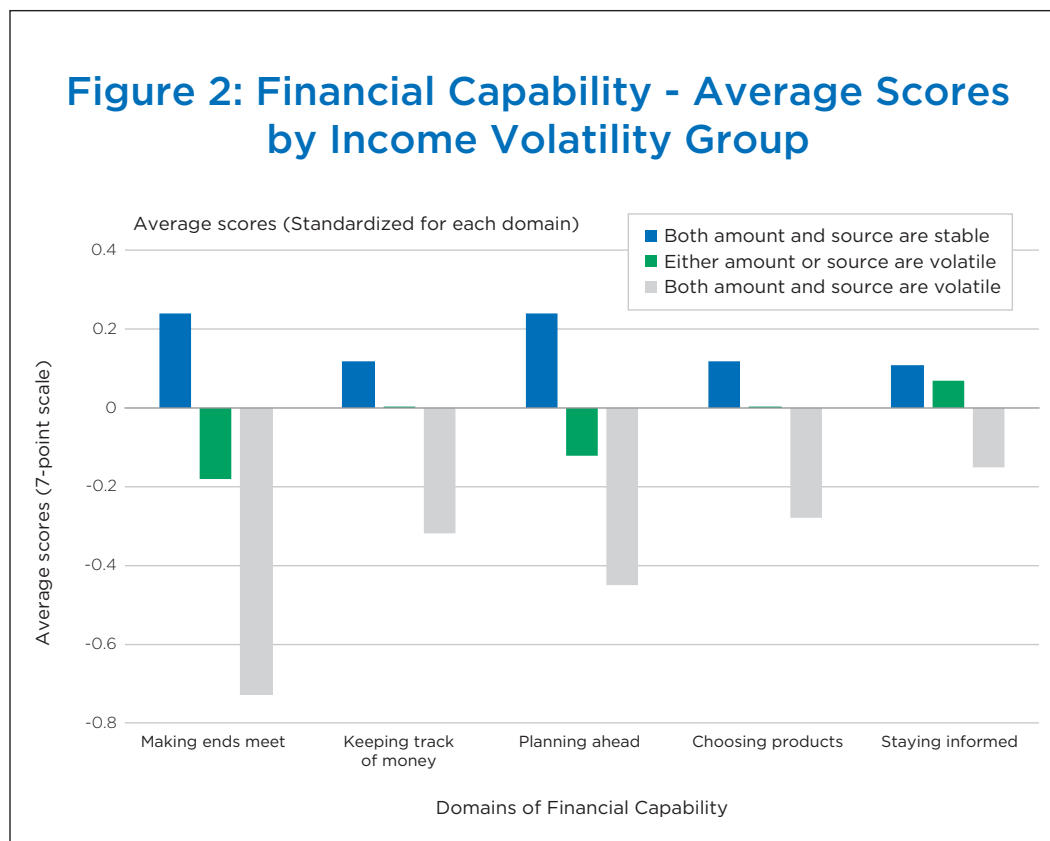


4.3 Is volatility associated with lower financial capability?

Next, we look at differences in average scores on the five financial capability scales. On all five scales, the group reporting highest volatility in their income in the survey sample performed significantly worse than those reporting the lowest volatility. The gap in scores is illustrated in Figure 2 (below).

We find that volatility is associated with lower financial capability scores, particularly in the domains of “making ends meet” and “planning ahead.” This is consistent with theory and prior research. The scale for “making ends meet” considers whether a household is able to cover ongoing expenses within their means, for example not falling behind on bills. The scale for “planning ahead” considers whether a household has taken steps to handle both short and long-term financial needs. As described above, previous research has shown that volatility is associated with missed bill payments, difficulty in matching expenses to income, and reduced saving.

The data also show a negative relationship between volatility and other areas of financial capability, namely “keeping track” of money, “choosing products” and “staying informed.” This could be consistent with the effects of scarce or uncertain resources, as described by Barr (2012) and by Mullainathan and Shafir (2013).

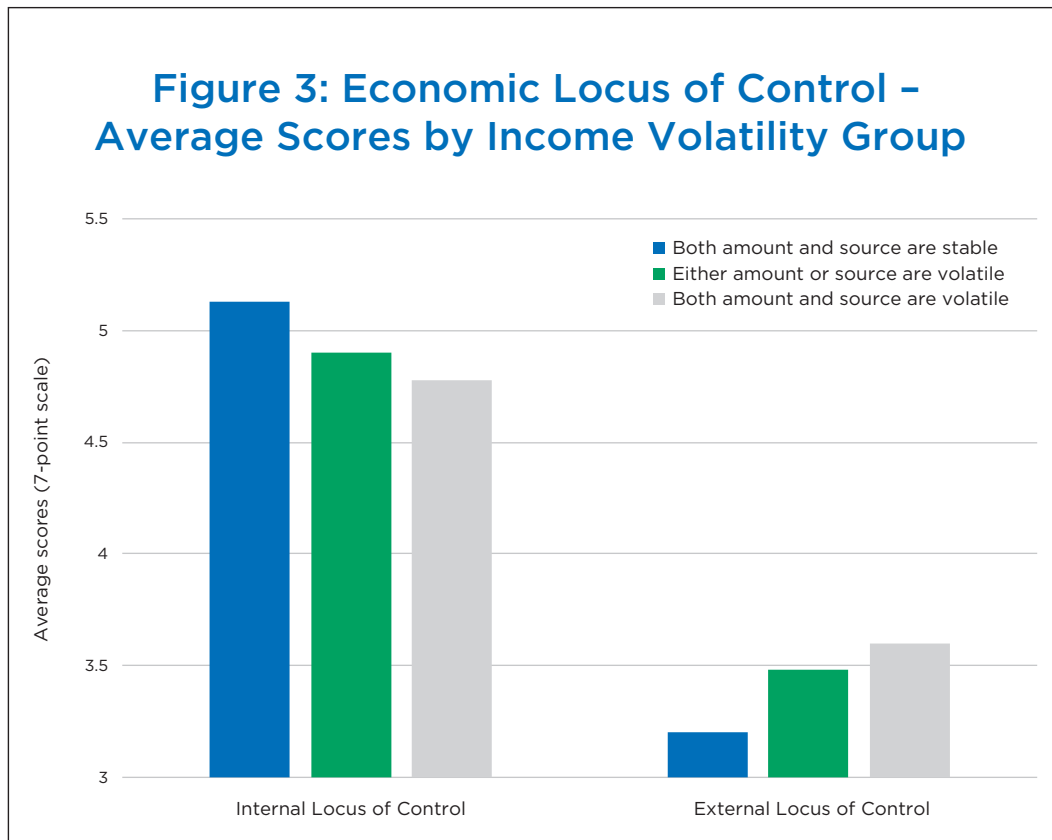


4.4 Is volatility associated with differences in economic beliefs?

Next, we look at differences in average scores on the economic beliefs scales. The group reporting no volatility in their income in the survey sample reported stronger beliefs in internal factors such as ability and effort and weaker beliefs in external factors such as chance and fate than the groups reporting any kind of income volatility. Moderate and high volatility groups did not statistically differ in the beliefs about locus of economic control. The gap in scores is illustrated in Figure 3 (below).

To sum up our results so far, we find that income volatility is reported by a minority (between six per cent and 25 per cent) of respondents. Women, younger adults and lower income adults are more likely to report volatility. However, only modest income was statistically significant as a predictor of higher volatility in the regression model.

Volatility in turn is also associated with lower scores on measures of financial knowledge and all five domains of financial capability. Finally, volatility is associated with greater belief that external forces (such as luck), rather than individual ones (such as skills and effort), determine personal financial outcomes.



5. Results: Modelling the effects of income volatility on financial knowledge, capability and beliefs

Following the bivariate analysis above, we use regression analysis to test how well financial capability, financial knowledge, and financial beliefs in our sample are each predicted by income volatility, taking demographic traits into account.⁷ These demographic traits include age, gender, household income and the level of education of the respondent. Previous research suggests that these are relevant to explaining individual differences in financial knowledge and financial capability (OECD, 2017).

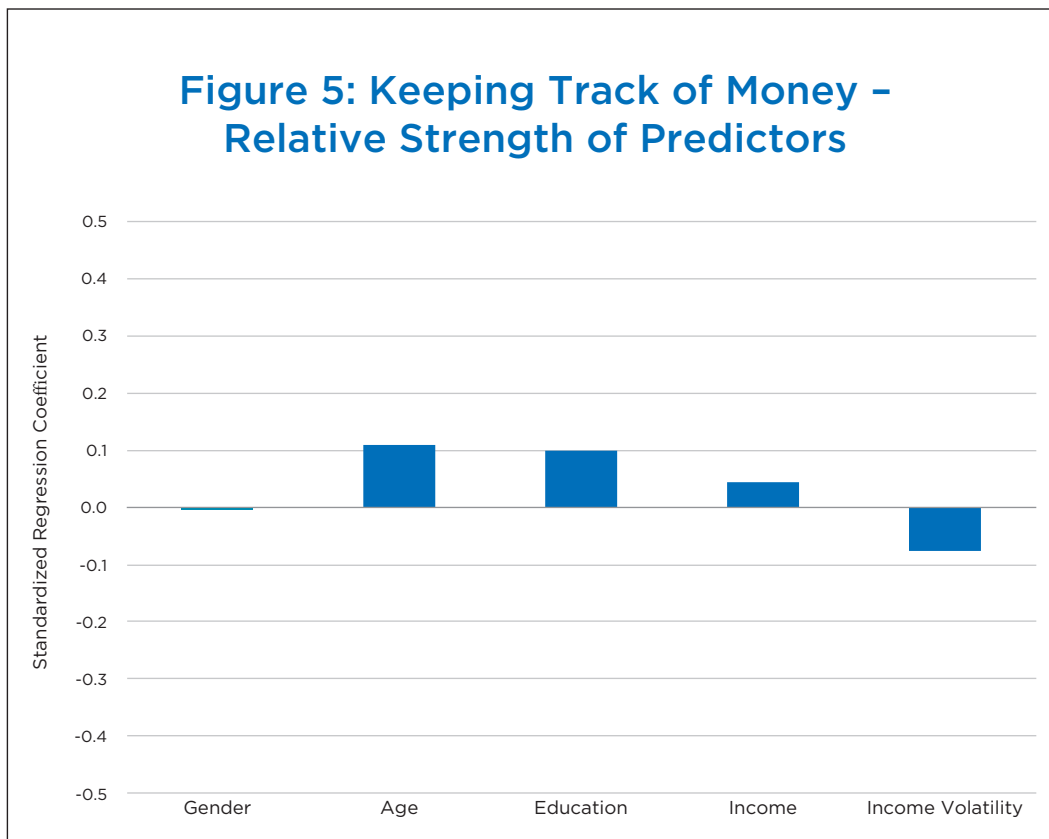
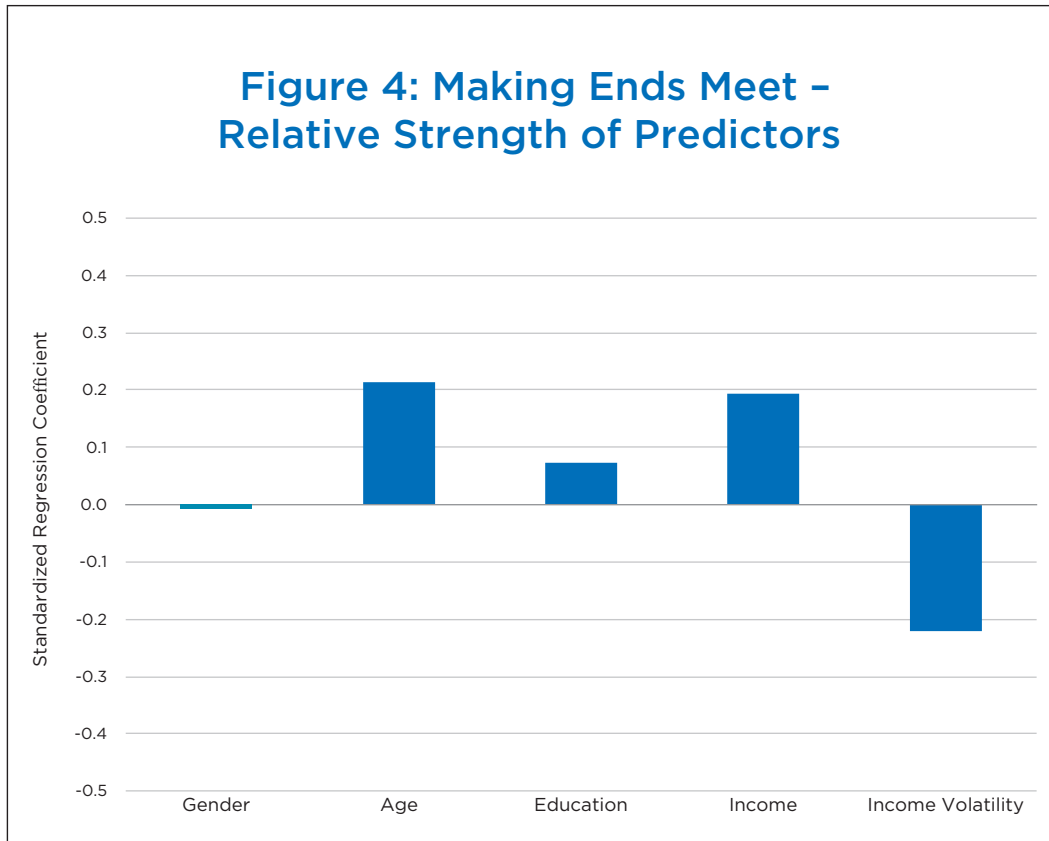
The total variance in individual scores explained by the regression models was as follows:

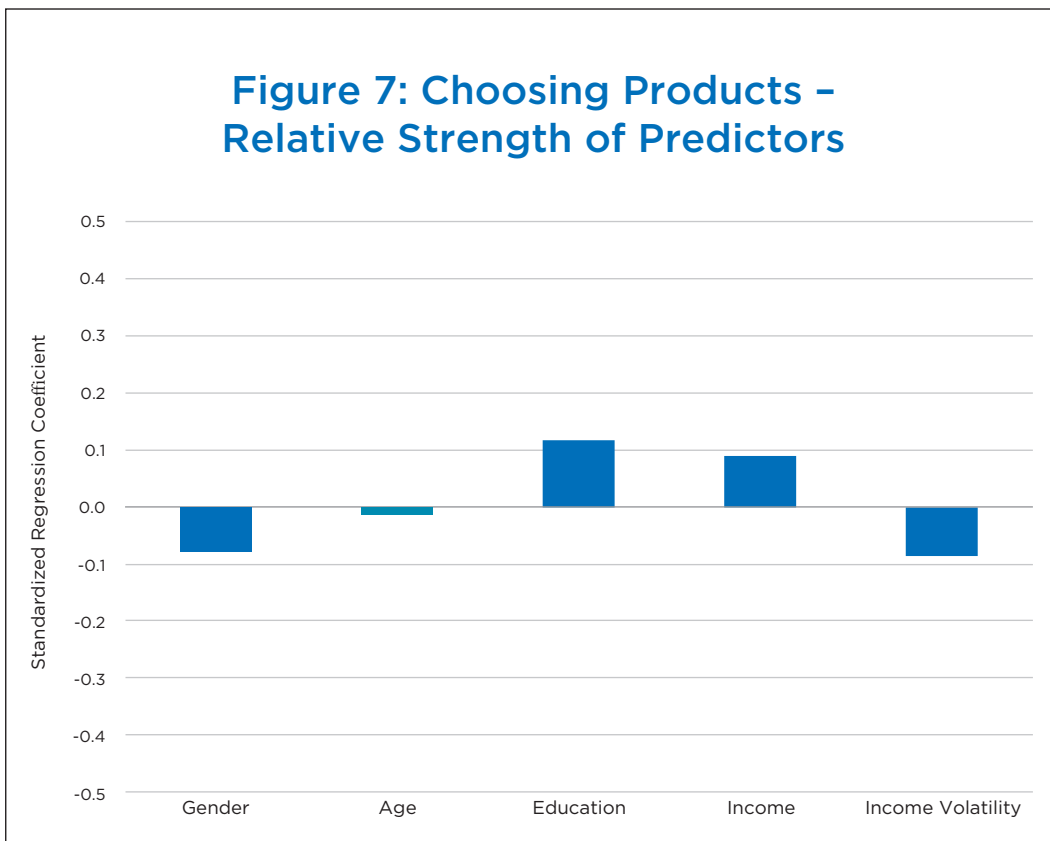
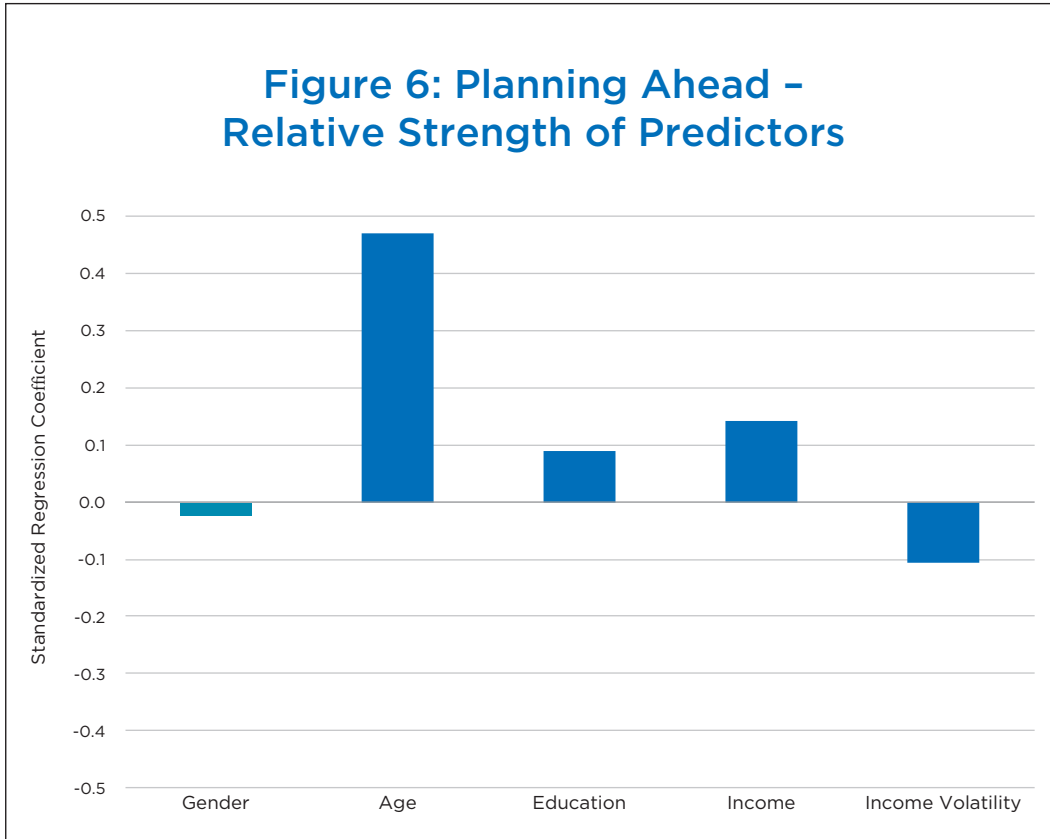
- Making ends meet: 16 per cent
- Keeping track: 3 per cent
- Planning ahead: 26 per cent
- Choosing products: 5 per cent
- Staying informed: 11 per cent

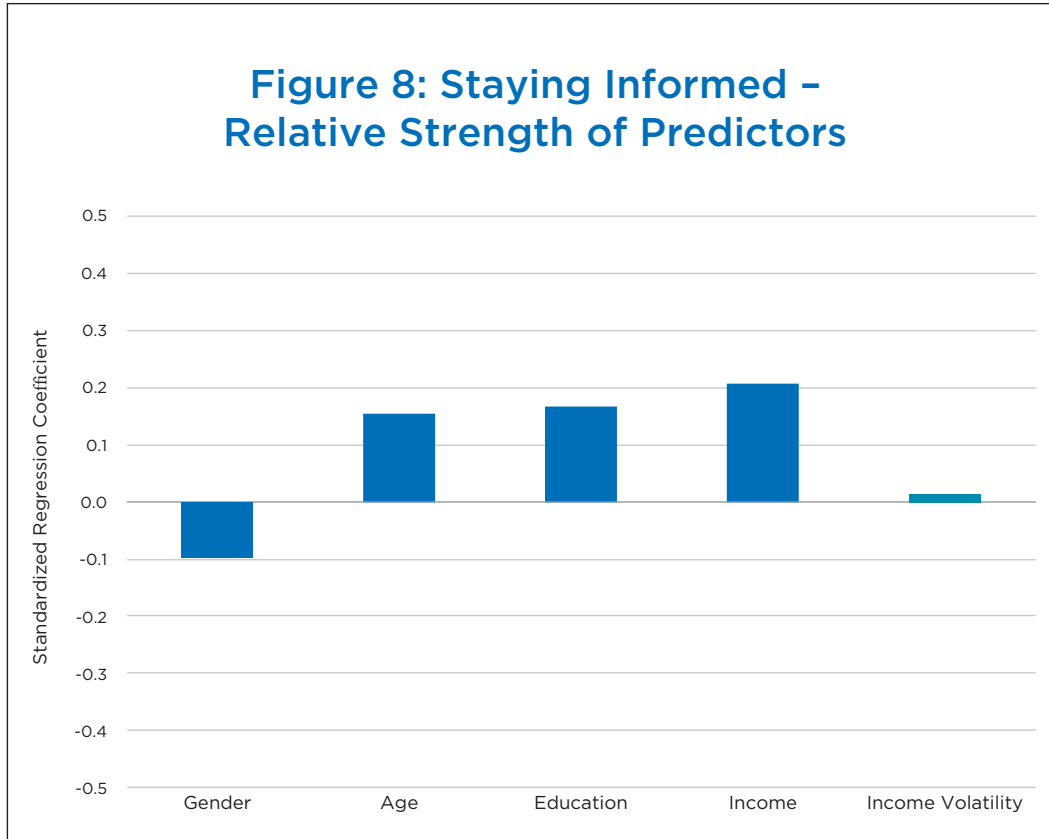
The fact that the models had the strongest explanatory value for “planning ahead” and “making ends meet” is very consistent with the literature (reviewed earlier) that suggests income volatility generates financial difficulties in matching spending to income and may also discourage consumers from thinking about longer-term needs as they cope with short-term uncertainty. However, it’s important to recall that this overall explanatory power includes the demographic variables as well. To better understand the specific effects of income volatility, we must also look at the strength of each of the variables included in the model.

The figures below show the relative predictive strength of income volatility, gender, age, education and household income level when entered as simultaneous predictors in a regression for each dimension of financial capability, the quiz results and internal/external locus of control beliefs. Statistically significant predictors ($p < .05$) are marked in dark blue, non-significant predictors are marked in light blue. The direction of the bar (above or below the horizontal axis), displays the direction of the effect of that predictor variable. All regression coefficients have been standardized to make them easier to report.

7 We use OLS regression with robust estimation of standard errors.

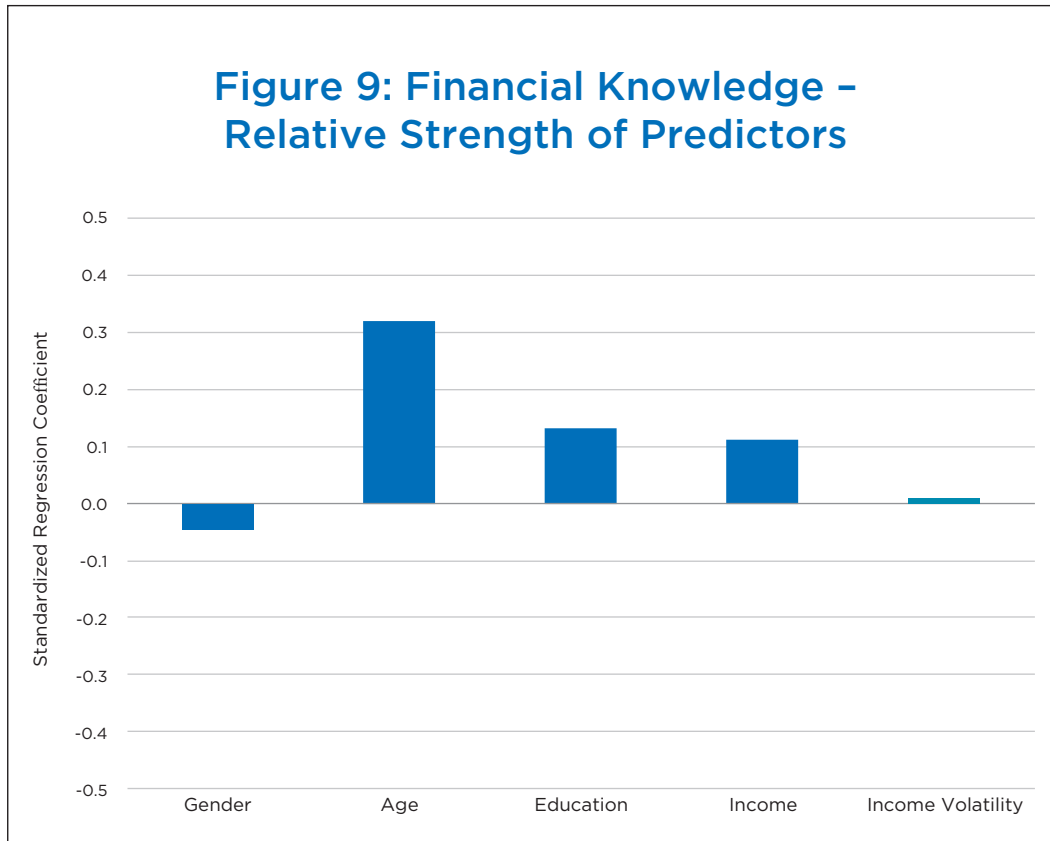




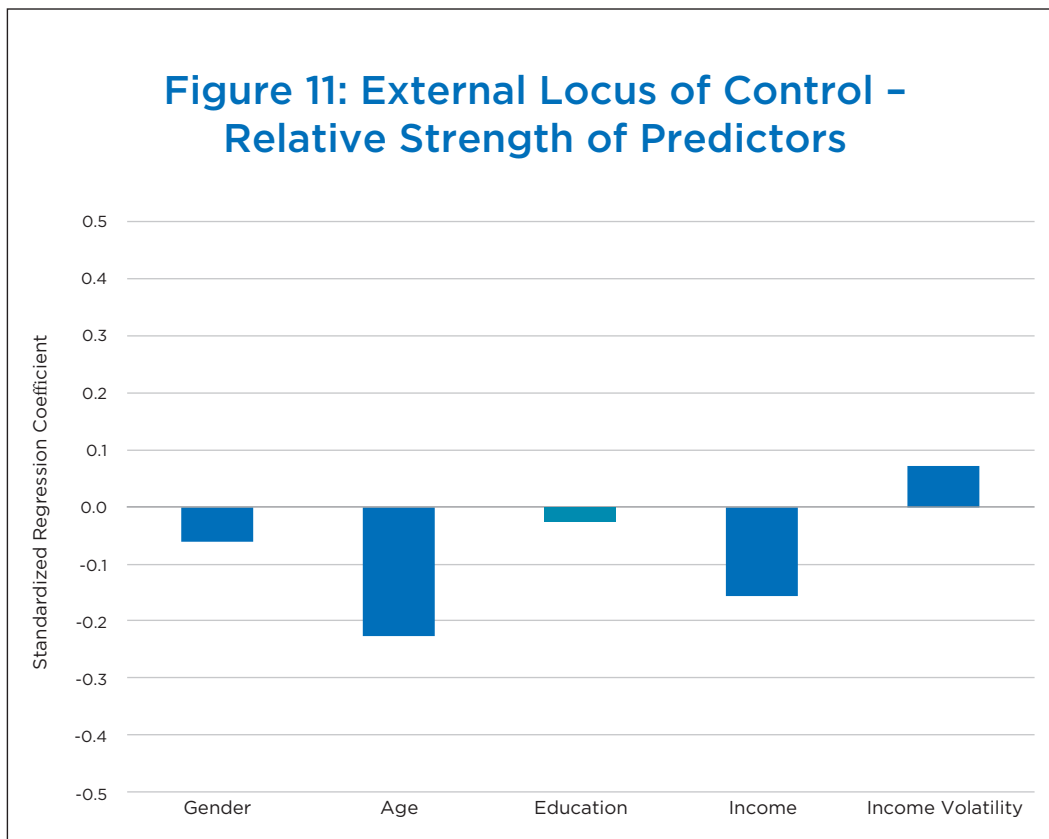
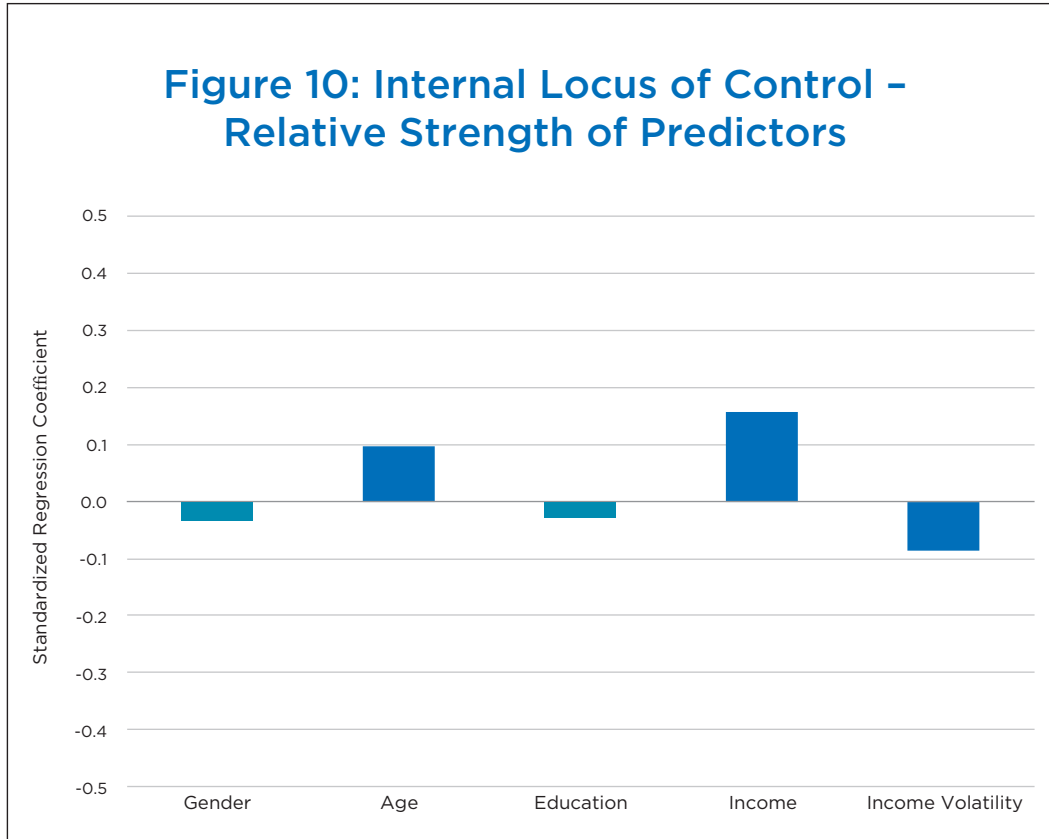


Across four of the five indicators above, income volatility was significantly linked to lower financial capability. Respondents who reported income volatility scored lower in “making ends meet,” “keeping track” of money, “planning ahead,” and “choosing products,” even after controlling age, gender, household income, and the level of education of the respondent.

Volatility was most predictive of “making ends meet,” a domain of financial capability that involves the day-to-day managing of expenses, such as keeping up with bills. Of the other three scales of financial capability, volatility proved significant but less powerful than the other variables in the model. It is only on the scale of “staying informed” that income volatility was not a significant predictor. This suggests that it is the demographic factors, more than income volatility, that are explaining individual differences in staying up to date on financial matters or pursuing more learning about personal finances, among survey participants.



After controlling age, gender, household income, and the level of education of the respondent, income volatility did not significantly predict scores on the test of financial knowledge. This finding suggests that the difference in financial knowledge scores between the group of respondents who reported no volatility in their household income and those who reported some or a lot of volatility (see Table 2 and Figure 1 at section 4.2) can be attributed to differences in the demographic variables among these groups of respondents rather than to an independent link of volatility with financial knowledge.



Income volatility did predict stronger beliefs in external factors of financial success (chance, fate) and weaker beliefs in internal factors (hard work, ability), even after controlling for demographic and socio-economic factors. However, on both subscales, age and income level were more powerful predictors in the model.

6. Discussion: Limitations and potential implications

Financial service providers have, in the last several years, strongly encouraged households to use behavioral strategies that pre-commit them to automated savings, bill payments and investment purchases. For households with predictable income, these behavioral strategies are likely effective financial management strategies. But when income swings from month to month, particularly if income is already very low, then efforts to encourage or even require monthly pre-authorized payments may at least dissuade certain consumers and, at worst, might be actively harmful to a consumer's interest. Financial institutions are uniquely placed to use account data and behavioral insights to track client's income and spending patterns. That data can support the development of products and services that both help households access affordable and flexible ways to cope with month-to-month volatility through credit and savings that are responsive to the consumer's needs and circumstances. The available evidence here suggests that financial knowledge and financial capability among consumers is too low to continue to expect individuals and families to weather these monthly swings on their own.

We strongly encourage future research to make use of administrative data. This study relies on self-reported volatility and is not able to look at objective information on either the magnitude, cause, or direction of the monthly swings. However, it may be that perception of volatility is at least as stressful for a household as are actual swings in income.

Indeed, the perception of volatility as measured in CPA Canada's survey mattered. Respondents who reported experiencing substantial volatility in either or both source and amount of their income:

- scored lower on a financial knowledge test
- scored lower on five indicators of financial capability, especially "making ends meet" and "planning ahead"
- were more likely to believe that financial success or failure is due to external factors and less likely to believe in internal factors

When taking age, gender, education and household income into account, volatility continued to be a significant predictor of scores on financial capability scales, specifically “making ends meet,” “keeping track” of money, “planning ahead,” “choosing financial products,” and were predictive of belief in internal vs. external causes of financial outcomes.

With respect to public policy, a key question arises: are public income transfers succeeding in helping households to smooth income swings on a within year basis in the same way that researchers have said they helped reduce inter-year instability? On the one hand, some benefits (such as child benefits) are paid monthly, providing a stable, if modest, basic flow of income. But others, such as the refundable GST/HST credit are paid quarterly, creating some of the very month to month swings that research suggests can prove problematic. What’s more, the eligibility and administrative systems for many income-tested benefits can generate within-year income swings as households wait for payments to begin or resume. In designing new (such as the proposed new national housing benefit) or reviewing existing public transfers (such as proposed amendments to the Canada Workers Benefit, formerly known as the Working Income Tax Benefit), policy-makers should also pay close attention to how the planned and actual timing of payments can affect household well-being.

Existing income programs such as Employment Insurance benefits and provincial welfare benefits seem to be associated with greater monthly volatility. These programs often have regular reporting requirements that recipients are required to meet in order to continue to receive benefits. Amounts of benefits are changed on a month to month basis, in response to those reports. While this structure may help programs reach target populations, it may also be putting recipients at greater risk of financial strain and the other negative outcomes associated with income volatility. One option would be to lengthen reporting and adjustment periods to, for example, 3 months at a time. This may be one way to ensure incomes are more predictable, while still preserving program integrity.

The results above are from one study using one set of survey data and, as such, should always be interpreted with caution. This is only the second survey to report findings on monthly income volatility in Canada. The international literature points to the prevalence of monthly income volatility and the negative effects it can have on the financial health of households. While this current study has made an important contribution, monthly income volatility is an area that is ripe for further study in Canada. Canadian social research has made tremendous strides in understanding income poverty and how to tackle it. But, as we stated at the outset of this

report, households who may or may not be income poor may still be struggling due to monthly income volatility. It's time to broaden our understanding of financial security and well-being.

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