Chaire de recherche Industrielle Alliance
sur les enjeux économiques
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Playing with Fire? Debt near Retirement in Canada

CAHIER DE RECHERCHE
WORKING PAPER

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Décembre / December 2018

UNIVERSITÉ LAVAL
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Dépôt légal : Bibliothèque et Archives nationales du Québec et Bibliothèque et Archives Canada, 2018.
ISSN 2368-7207

Playing with Fire? Debt near Retirement in Canada *

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December 2018

Abstract

Because retired households cannot adjust quickly to shocks, for example by working more, they represent a vulnerable group when credit conditions deteriorate. We analyze the evolution of debt among households nearing retirement in Canada over the period 1999-2016. First, we find that debt as a ratio of income has risen considerably over that period and debt as a fraction of assets has also doubled even tough assets remain roughly five times as large as debt. Second, we report that mortgage debt has risen the most but that average mortgage payments have remained relatively constant over the period due to the downward trend in borrowing costs. Finally, we find that a small but significant fraction households are playing with fire, being vulnerable to a sudden rise on borrowing costs or a drop in house values which could jeopardize their standard of living in retirement.

Keywords: Household debt, mortgages, credit, retirement;

JEL Codes: D14, D15, D18, J14

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*We thank David Boisclair for comments made on earlier drafts. We acknowledge financial support from the Social Sciences and Humanities Research Council (435-2016-1109). Part of the analysis presented in this paper was conducted at the Quebec Interuniversity Centre for Social Statistics which is part of the Canadian Research Data Centre Network (CRDCN). The services and activities provided by the QICSS are made possible by the financial or in-kind support of the Social Sciences and Humanities Research Council (SSHRC), the Canadian Institutes of Health Research (CIHR), the Canada Foundation for Innovation (CFI), Statistics Canada, the Fonds de recherche du Québec - Société et culture (FRQSC), the Fonds de recherche du Québec – Santé (FRQS) and the Quebec universities. The views expressed in this paper are those of the author(s), and not necessarily those of the CRDCN or its partners. All errors are our own.

1 Introduction

Among OECD countries, Canada has experienced the fastest growth in household debt over the last 20 years (IMF, 2017). In Canada, the Governor of Canada has recently noted that: "This debt still poses risks to the economy and financial stability, and its sheer size means that its risks will be with us for some time".[1] News of rising debt among Canadians has been common in the media over recent years. [2] A number of Canadian studies have analyzed trends and composition of household debt in Canada but few to none has specifically focused on the near retiree group (Chawla and Uppal, 2012; Uppal and LaRochelle-Coté, 2015; Di Matteo, 2017; Fong, 2018).

Households nearing or in retirement with high level of debt may be particularly vulnerable to a changing environment Lusardi et al. (2017). Their diminished capacity to adjust to increases in borrowing costs may leave them exposed to variability in living standards if borrowing conditions were to worsen. Financial advisors typically recommend households nearing retirement pay off mortgages and debt before they enter retirement. Although this rule could make sense when borrowing costs are high, it is less clear when returns on savings and borrowing costs are low. It may be optimal in a low interest environment to hold some debt into retirement. This is particularly true when fixed-rate mortgages constitute the main source of debt of these households. In the U.S., Lusardi et al. (2017) document large increases in

[1] See https://www.bankofcanada.ca/2018/05/canada-economy-household-debt-how-big-the-problem/

[2] See https://www.theglobeandmail.com/report-on-business/economy/canadian-household-debt-hits-18-trillion-as-report-warns-of-domestic-risk/article38275250/ and https://www.cbc.ca/news/business/household-debt-canada-1.4823706

household debt as a ratio of income and a more modest increases in debt as a ratio of assets. Overall, they find that households bought larger houses with lower downpayments.

In this paper, we use the 1999,2005,2012 and 2016 Survey of Financial Security (SFS) to investigate the increase and composition of debt of Canadian households nearing retirement. As in Lusardi et al. (2017), we look at two older age groups, the 56-61 year olds and the 62 to 66 year olds. We decompose the increase in household debt among its components and look at the distribution of debt in these age groups. We look both at debt as a fraction of assets, a measure akin to a measure of net worth and debt as a fraction of income, which provides a rough indicator of the capacity to repay debt. We also look at various indicators of delinquency. Since the SFS is rich in terms of data on mortgages, we are able to look also at payments as well as mortgage characteristics in 2016. This allows us to perform a stress test for households in terms of how a deterioration of borrowing costs could affect their capacity to pay off debt. We also make a direct comparison with Americans of the same age in an attempt to contrast the Canadian experience.

The paper is structured as follows. First, we briefly describe the data we use. In section 3, we provide a summary of the evolution of household debt among the near elderly in Canada. In section 4, we look more specifically at the composition and evolution of household debt. Section 5 investigates the characteristics of mortgage debt in 2016 and performs a number of counterfactual exercises. Finally, section 6 concludes.

2 Data

The Survey of Financial Security is conducted roughly every 5 years in Canada to look at the balance sheet of households. It contains a consistent core set of questions which are comparable over time. At the time of writing this paper, the 1999, 2005, 2012 and 2016 surveys were available as micro data files in Research Data Center (RDCs) of Statistics Canada. Throughout, we use household survey weights provided by Statistics Canada.

We define broadly the near elderly as those age 56 to 66 years of age. We do this for two reasons. First, many households retire prior to being eligible to Canada Pension Plan (CPP) benefits at the age of 60. Hence, we look at a group who is approaching the time of retirement (56-61). We then look at the group 62 to 66 as those largely in the transition to retirement. For some analysis, we pool the two groups together. We define household debt as the sum of mortgage debt, credit card debt, line of credit and term loans. We define assets as the sum of financial and real assets (e.g. real estate, vehicles, etc). Our household income measure is after-tax as to reflect as close as possible disposable income. For mortgage payments, we annualize responses using the frequency at which respondents report such payments. We adjust all dollar figures to 2016 dollars using the Consumer Price Index.

In Table 1, we report statistics on the composition of the sample. Each year, we have a total of roughly 2,000 to 3,000 respondents, except in 2005 where the sample was much smaller (roughly 1000 respondents). In terms of composition, the sample becomes more educated over time and a smaller fraction is married. We observe that the fraction of owners who have paid out their

mortgage is decreasing over the period (from 50.7% to 44.2%). The percentage of home owners remains fairly constant while more Canadians are working in these age groups reflecting stronger labor force attachment of older households (Bissonnette et al., 2016). Hence, these households can react to changes in borrowing costs by working longer, an adjustment margin which has not been available in the past. This phenomenon should continue in years to come and may cushion against some the alarming figures we present.

3 Evolution of Debt

We first look at debt-to-income ratios as a measure of re-payment capacity. Indeed, debt is part of the balance sheet and may hamper future consumption but debt payments enter the budget constraint directly and impact consumption and ability to repay in the short term. In Table 2, we first see that among both age groups, the ratio of debt-to-income has increased substantially, from 0.611 in 1999 to 1.437 for those age 56-61 and from 0.379 to 0.931 for those age 62-66. On the other side of the balance sheet, assets as a fraction of income are much larger than debt in those age groups. In 2016, households age 56-61 had 13.3 times their income in assets on average compared to 1.437 in debt. Similarly, those age 62-66 had even higher asset levels, 17.6 times their income compared to 0.931 in debt. Those assets have clearly grown faster than income. From 1999 to 2016, those age 56-61 saw their asset-to-income ratio increase from 10.35 to 13.31, and similarly for those age 62-66, a staggering increase from 12.34 to 17.6 times their income. Some of this is due to what is happening to house prices in various cities around the country. In Figure 1,we

report data from the *Canadian Real Estate Association* on average house prices from 2005 to 2018. In Vancouver and Toronto, house prices are 2.5 times those found in 2005 while in Montreal, the increase has been closer to 70%. In the last column of Table 2, we see that debt has grown faster than assets in the 56-61 age group (debt as fraction of assets increased from 0.104 to 0.197). In the 62-66 age group, debt-to-asset has initially increased from 1999 to 2005 but stabilized by 2016 to 0.094. Hence, from a balance sheet perspective, debt is increasing, even as a fraction of assets, but the degree of leveraging of households nearing retirement remains modest.

These findings can be compared to those of Lusardi et al. (2017) who have looked into the balance sheet of the near elderly in the United States. Even though they use different data at slightly different times, they saw similar patterns than those presented above: American households near retirement have also experienced a growth in debt as a proportion of income and assets. Also, the growth in the debt-to-income ratio was larger than the growth in the debt-to-asset ratio. One explanation put forward for these results is the fact that Americans have accumulated more mortgage debt by purchasing more expensive houses.

To make a direct comparison, we use the 2016 Survey of Consumer Finance for the United States, the analog to the Survey of Financial Security for Canada. In Table 3, we find that the average debt-to-income ratio in 2016 is similar, if not larger, in Canada compared to the U.S. for the households near retirement (same age groups). While Canadians have on average a higher ratio (1.437 vs. 1.255) for those age 56-61, they have a slightly lower ratio among 62-66 households (0.931 vs. 1.068). There is some evidence from Table 3 that

the group doing worse is larger in Canada than in the U.S. (90th percentile 3.99 compared to 3.107 among those 56-61). Hence, a fraction of Canadian households hold more more debt, as a fraction of income, than their American counterparts.

In Figure 2, we show how the *distribution* of debt to income has evolved over time in Canada. We see that at the median, debt to income has not increased substantially. However, this masks large changes, in particular at the 90th percentile. Hence, a modest fraction of the population in those age groups is experiencing large increased in debt to income. In 2016, more than 10% of the population has debt-to-income ratios in excess of 3 for both age groups. Hence, averages are masking some important debt build-up in the population while a larger share of the population seems to have debt relatively under control. In Figure 3, we show that a similar picture, albeit less dramatic, is happening on the asset side. A small fraction is experiencing large increases in the value of their assets, likely driven by increases in house values. But the increase in dispersion appears to be more modest than for debt.

The portrait painted in Table 2 shows large increases in debt. In Figure 4, we look at the evolution of the composition of debt. For both age groups, mortgage debt is relatively flat until 2012. From 2012 to 2016, there is an increase in the proportion of debt which is held in mortgages. On the other hand, the share held in lines of credit, often secured by housing, increases significantly but has been relatively stable in recent year. Interestingly, credit card debt as a fraction of all debt is decreasing for both age groups compared to 1999. Hence, there is no drastic shift in the composition of debt over the 17

year period. Hence, we cannot conclude from this figure that households are holding more debt with higher borrowing costs. For example, the increase use of lines of credit at the expense of credit cards makes sense if households want to minimize borrowing costs given that home equity has been freed up from the ramp up in house prices.

We can compare the composition of debt in 2016 to that for the U.S. In Table 3, we see that mortgage debt is much larger as a share of all debt in the U.S. Americans age 56-61 have on average 57% of debt held as mortgages compared to 48% among Canadians. Mortgage debt declines in Canada among the 62-66 group by 10 percentage points while it declines by only 4.2 percentage points among Americans. In terms of credit card debt, Canadians and Americans hold similar fraction of their debt in credit cards. A similar finding emerges for term loans. However, while Canadians hold less debt as mortgage near retirement, they make a much more heavy use of lines of credit. Among those 62-66, 17.9% of debt is held on average in lines of credit while the comparable figure for the U.S. is 4%.

4 Debt and Payments

4.1 Mortgages

Since mortgages as a share of total debt held by these households has increased since 2012, we look at both the balance of mortgages and monthly payments as a fraction of household income in Table 5. We see that mortgage balances have increased substantially: by 177% for those age 56-61 from 1999

to 2016 and 186% for those age 62 to 66. But regular mortgage payments have in fact decreased over the period. They represented 24.4% (28.2%) of income in 1999 and 20.7% (27.3%) in 2016 for those age 56 to 61 (62 to 66). The declining trend in mortgage rates over the last 20 years explains this difference.

In Table 6, we show the types of mortgages held by households in 2016 (no data is available in prior years). First, we see that the average interest rate on mortgages (for those with a mortgage) is roughly 3%. Historically, those are low rates. Back in the 1990s and early 2000s the prevailing mortgage rates were in the 5 to 10% range. Interestingly, most households in 2016 (more than three quarters) have fixed rate mortgages. Only 20% have pure variable rate mortgages and 4% have mixed rate mortgages.

To investigate how lower borrowing cost may explain why mortgage payments have not followed mortgage balances, we do a simple counterfactual experiment which is presented in Table 7. We first compute the implied fixed rate on mortgages in 1999 using data on years remaining, payments and balance. We obtain 11.29% which is in the ball park of the rates that were contracted in the past. We do the same for 2016 to check that our approximation works well and obtain an average implied interest rate (2.87%) which is very close to the average rate reported by respondents (3.0%). We then apply 1999 rates to 2016 mortgage balances to compute the counterfactual mortgage payments that these households would face had rates not declined over the period. We obtain that mortgage payments would be 68.3% higher. Hence, declining borrowing costs may help explain why households were able to take on more mortgage debt without feeling the sting in terms of making payments every month. Overall, we do not see a deterioration of the type of

debt held by households: larger debt is partially met with declining borrowing costs and therefore lower mortgage payments.

4.2 Delinquency and Re-Payment Difficulties

A number of indicators are available in the Survey of Financial Security to measure whether households have difficulties repaying debt or are delinquent. Table 4 reports statistics on various indicators. For example, a large number of credit cards is typically a signal that households are carrying substantial credit card debt and maxing out credit limits on various cards. However, it could also signal that they are exploiting various offers such as zero-interest balance transfers or teaser rate offers. The fraction of households with 5 or more cards increases slightly from 1999 to 2016 (from 14.1% to 17.9%). The fraction of households without a card decreases from 16.8% to 10.98%. In this case, the transition towards cash-free payment methods and e-commerce may explain why the fraction without a card has declined. In terms of delinquency, we can look at the fraction of households who report that someone has been denied a credit card. That fraction has increased substantially from 2005 to 2012, probably an indication that stricter eligibility rules have been put in place following the great recession rather than an indication of worsening credit among households. A similar trend has occured in the U.S. (Lusardi et al., 2017).

We can measure whether households typically pay their entire credit card balance each month and the type of payments they make. We see from Table 4 that the fraction paying their balance each month has remained fairly stable.

In this age group, more than three quarters of households pay their balance in full each month. In 2016, that question changed and hence responses are not directly comparable. If anything, the 2016 data shows that the vast majority of households pay their balance in full and fewer than 4% make minimum payments or less. Finally, we can measure whether households have skipped or delayed a non-mortgage payment (such as term loans). For Canada overall, only 6% of households have skipped or delayed a payment. This fraction varies somewhat across provinces, with Quebec and New Brunswick having the highest delinquency rates. Overall, data from Table 4 does not reveal an alarming picture in terms of debt trouble indicators or delinquency but shows that a small fraction of households nearing retirement probably do not have their debt under control.

5 Sensitivity to Borrowing Costs

Although declining borrowing costs may have helped households absorb the increase in debt, it may be that a significant fraction of households are financially fragile: a sudden increase in borrowing costs would make payments on their mortgage unbearable relative to income. We conduct a few stress tests to help gauge that fragility. In the financial industry, a simple stress test is to check whether payments are less than 32% of income.[3] We use that rule to compute the fraction of households for whom mortgage payments represent

[3]This rule of thumb refers to the Gross Debt Service Ratio (GDS) which is essentially calculated by dividing annual gross income from annual occupancy costs. For the present analysis, we compute the GDS by dividing annual net income from annual mortgage payments. See https://www.ratehub.ca/debt-service-ratios

more than 32% of their income by province. In Table 8, we find that 7.6% of Canadians have high payments relative to their income. Respondents from British Columbia stand out with 12.4% having high payments relative to income.

For respondents with variable rate mortgages, interest rate changes transmit to payment almost one-to-one. But those with fixed mortgages typically renegotiate their term every 5 years and can elect to absorb the hike by extending the term of their mortgages. But extending the term of a mortgage at older ages can be dangerous as financial needs at older ages, for example to finance long-term care, may be more accute. It is also possible that financial institutions do not extend the term of mortgages for older households. Here we take the most unfavorable assumption and assume fixed rate mortgage payments increase like variable rate mortgages. We consider a 2% rate hike which is well within the possible outlook for mortgage rates in the next few years. Overall, we get an increase from 7.6% to 12.3%, a 4.7% increase in the fraction of households with high mortgage payments from a modest 2 percentage point increase in borrowing costs. We see that in Atlantic provinces and Quebec, households are relatively shielded from rate hikes, there is increase in the fraction with high mortgage payments relative to income of a 3 percentage points in Quebec and similarly in Atlantic provinces. In Ontario, we see a slightly bigger impact but the large impacts are found out Western provinces. In particular, there is an increase from 12.3% of households with large payments to 18.5% if rates increased by 2 percentage points in British Columbia. The effect is even larger in Prairies, with Manitoba and Alberta who went from 5.92% and 3,38% to 17.29% and 12.25%, respectively. Hence,

a fraction of households in this age group is exposed to rate hikes if those translate to higher mortgage payments, and the issue is even more worrying in Western provinces. However, it is important to note that it is unclear whether such an increase in borrowing costs translate into higher payments or longer maturities.

Another type of stress test is to simulate a housing market meltdown and observe how many households end up "under water", the value of their asset being lower than debt on the asset. This is particularly relevant for older households as the house is often part of the retirement plan to finance old age consumption (by selling it and moving into a smaller home). A housing market crash can seriously jeopardize a retirement plan.

To reflect the financial situation of a household trying to sell his house, we first reduce residence value by 3% to reflect selling costs and we compute the ratio of households with a mortgage balance higher than house value. The results are presented in Table 8. Then, we consider a 30% decrease in the value of the house and recompute the previous mentioned ratio. We obtain a substantial increase in the fraction "under water" (from 3.3% to 10.5% over all provinces). Alberta and Manitoba are particularly vulnerable of a decline in house prices and they were also largely affected by the interest rate hike. Alternatively, at the exception of Newfoundland and Labrador, the Atlantic provinces are vulnerable of a house meltdown whereas they were relatively unaffected by the interest rate hike of the previous stress test. Although this fraction remains small, it shows the vulnerability of some households to house price shocks. Households who count on their house to deliver significant equity to finance consumption in old age should worry about a housing

market meltdown.

6 Conclusion

Rising debt levels are making the headlines. Canada has certainly experienced a large increase in debt relative to other countries and the near elderly are a particularly vulnerable group as they have fewer margins of adjustment and count on their net worth to maintain their standard of living at older ages. In this paper, we ask two questions: a) what is the anatomy of the increase in debt for the near elderly and how does it relate to the value of their assets? b) are households in this age range playing with fire, meaning that they are exposed to interest rates changes or shocks to the housing market.

On the first question, we find that the increase in debt is not entirely matched with an increase in the value of assets. Debt, even as a fraction of assets, has more than doubled over the last 20 years even tough the amount of leverage remains relatively small for the near elderly (debt represents about 20% of assets). The increase in the largest component of debt, mortgages, has been absorbed by decreases in borrowing costs which have kept payments relatively low. This probably explains why this debt overhang has not yet affected standards of living of the near elderly. There is no particular component of debt which has increased much faster than others, which suggest overall that the increase in household debt has been beneficial to many households taking advantage of growth in asset values financed by relatively low cost debt. Canadians and American have similar levels of debt-to-income but somewhat different holding of debt, Canadians using lines of credit more fre-

quently and having lower mortgage balances that Americans of the same age. A fraction of Canadians hold much more debt than their American counterfacts and some delinquency indicators are on the rise.

On the second question, the answer is more nuanced. Overall, a vast majority of households in this age group do not appear to be playing with fire. But a smaller group, in particular in western Canada, is more financially fragile, meaning that rising borrowing costs could lead to reductions in household spending on other goods or that a housing crash could prevent them from going ahead with a retirement strategy which involves selling their home to finance retirement consumption.

Households near retirement have fewer margins of adjustments and significant changes in the environment can have real impacts on their standard of living. It may be optimal for many to carry more debt into retirement, for example, to consume part of the increase in house equity or because of the low interest rate environment. However, some households potentially jeopardize their standard of living at older ages by leveraging more their assets in times when conditions are most favorable in terms of borrowing costs. A close monitoring of the situation, in particular in some regions of the country is needed and efforts could be devoted to explaining the risks of carrying excessive amounts of debt into retirement when income decreases and margins of adjustments disappear.

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Figures

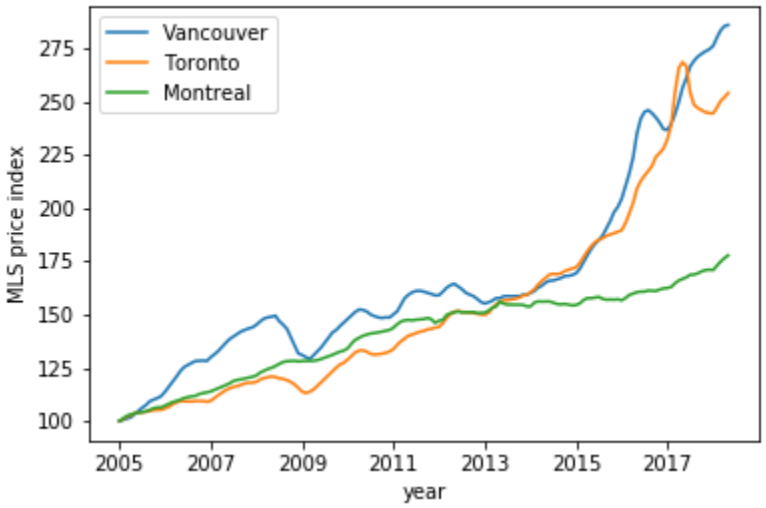

Figure 1: **House Prices in Vancouver, Toronto and Montreal**: Average prices as reported by the Canadian Real Estate Association (CREA). We normalize to base 100 in 2005.

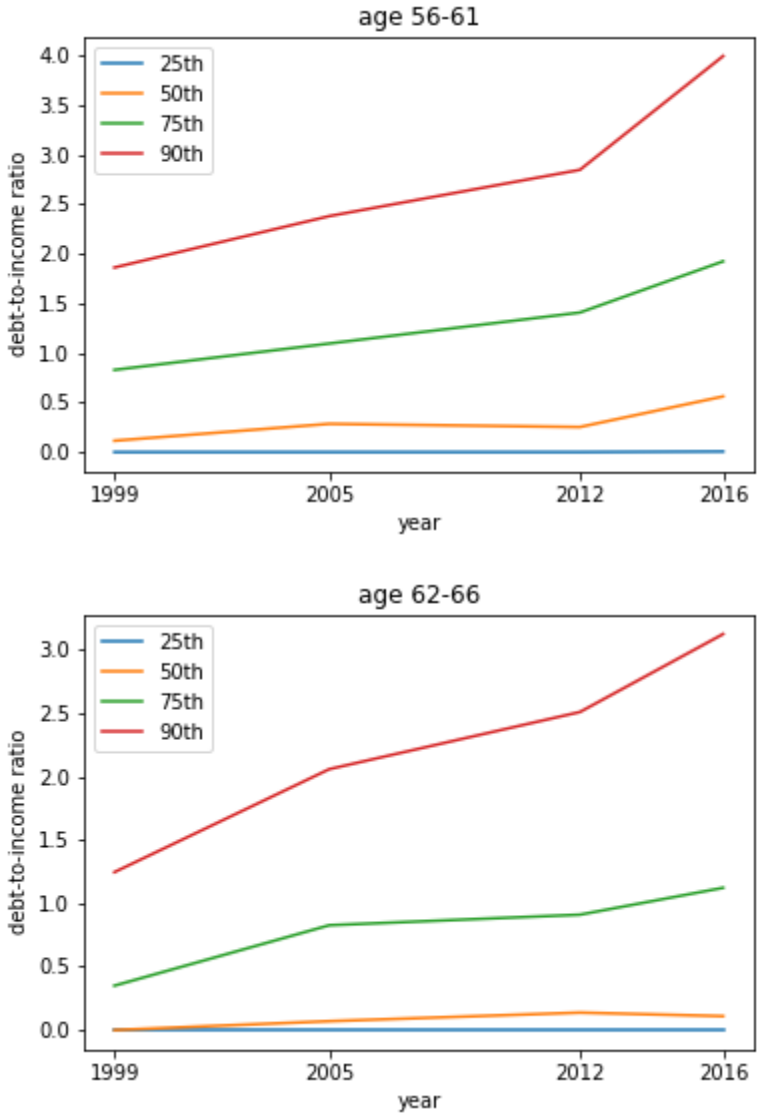

Figure 2: **Evolution of Debt-to-Income Ratio**: Quantiles from the Survey of Financial Security 1999, 2005, 2012, 2016. Sample weights used.

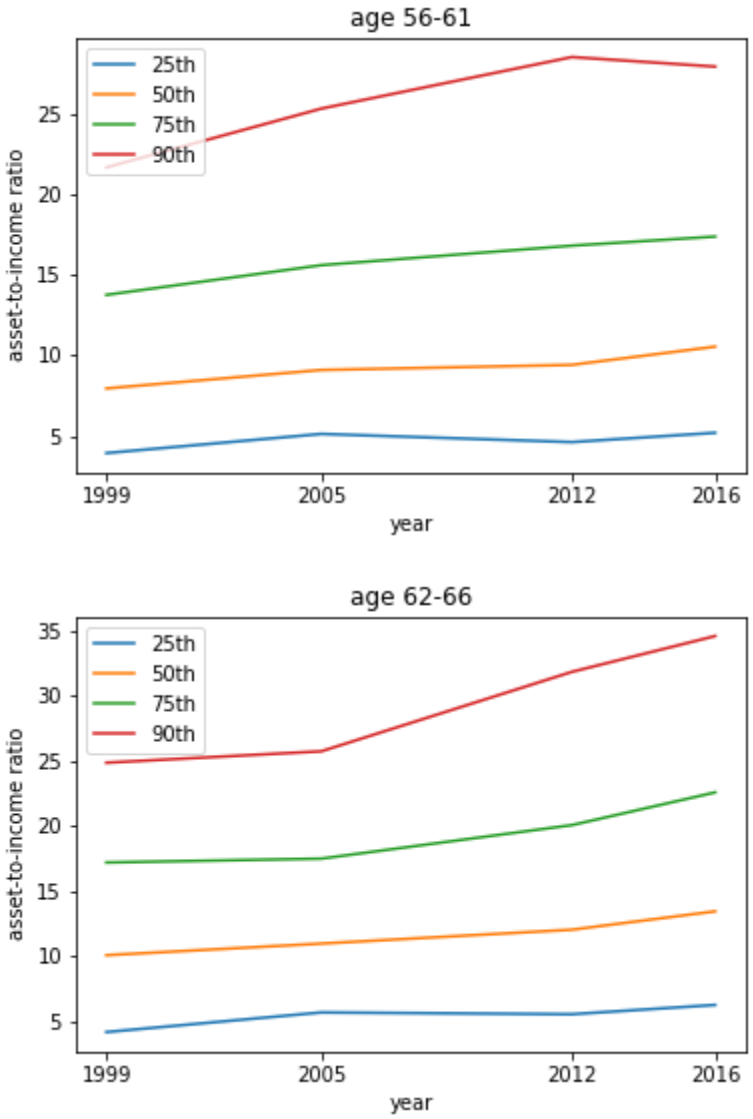

Figure 3: **Evolution of Asset-to-Income Ratio**: Quantiles from the Survey of Financial Security 1999, 2005, 2012, 2016. Sample weights used.

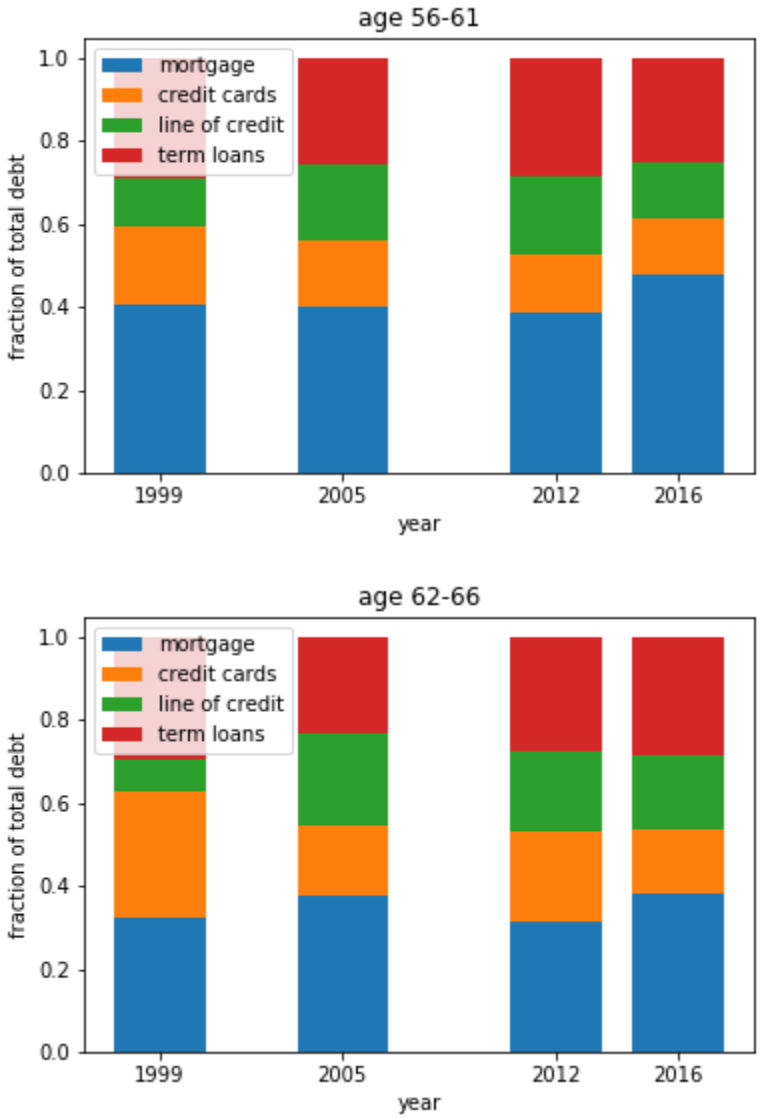

Figure 4: **Evolution of Composition of Debt**: Proportions from the Survey of Financial Security 1999, 2005, 2012, 2016. Sample weights used.

Tables

	1999	2005	2012	2016
Age	60.633	60.544	60.739	60.642
After-Tax HH Income	53624	58631	67053	74369
Female	0.320	0.380	0.415	0.398
Work	0.490	0.527	0.542	0.568
Less than High School	0.374	0.270	0.171	0.137
High School	0.199	0.221	0.283	0.271
College	0.245	0.274	0.269	0.291
University	0.182	0.235	0.277	0.301
Married	0.608	0.567	0.531	0.507
Common law	0.042	0.044	0.067	0.082
Separated	0.037	0.032	0.036	0.041
Divorced	0.153	0.192	0.176	0.149
Widow(ed)	0.093	0.098	0.061	0.066
Single	0.069	0.067	0.130	0.155
Owner without Mortgage	0.507	0.481	0.474	0.442
Owner with Mortgage	0.232	0.274	0.256	0.323
Renter	0.261	0.245	0.270	0.235
Sample Size	2242	919	2668	2789

Table 1: **Socio-Economic Characteristics of the Near Elderly**: Means and fractions from the Survey of Financial Security (SFS) of 1999, 2005, 2012 and 2016. Sample weights used. 2016 dollars using the Consumer Price Index. Statistics of the reference person (unless otherwise specified).

	Debt/Income	Asset/Income	Debt/Asset
Age 56-61			
1999	0.611	10.354	0.104
2005	0.785	11.745	0.128
2012	1.043	12.636	0.178
2016	1.437	13.302	0.197
Age 62-66			
1999	0.379	12.342	0.059
2005	0.646	13.709	0.085
2012	0.831	15.614	0.111
2016	0.931	17.591	0.094

Table 2: **Debt and Assets over Time**: Means of ratios in Survey of Financial Security 1999, 2005, 2012 and 2016. Sample weights used.

	56-61		62-66	
Debt-to-income	Canada	U,S,	Canada	U,S,
p10	0.000	0.000	0.000	0
p25	0.005	0.020	0.000	0
p50	0.562	0.462	0.110	0.302
p75	1.925	1.554	1.123	1.271
p90	3.997	3.107	3.126	2.948
mean	1.437	1.255	0.931	1.068
Share of total				
mortgage	0.480	0.571	0.380	0.529
credit cards	0.134	0.133	0.155	0.194
line of credit	0.136	0.034	0.179	0.040
term loans	0.250	0.262	0.286	0.237

Table 3: **U.S. - Canada Comparison of Household Debt**: We use the 2016 Survey of Consumer Finance (U.S.) and Survey of Financial Security (Canada) to compare both the debt-to-income ratio as well as the composition of debt among respondents age 56-66. We use sample weights provided in both datasets. In the SCF, there are 4,400 respondents age 56-61 and 3,115 age 62-66.

	1999	2005	2012	2016
Nbr of Credit Cards				
None	0.1680	0.1478	0.1382	0.1098
1 to 2	0.4413	0.4364	0.4181	0.4667
3 to 4	0.2500	0.2514	0.2665	0.2445
5 or More	0.1407	0.1644	0.1771	0.1791
Someone in HH has Been Refused a Credit Cards				
Yes	0.1258	0.1760	0.2591	0.2564
Balance of HH Credit Cards is Usually Paid Each Month				
Yes	0.7736	0.7345	0.7753	
On Credit Cards, HH Usually Pay...				
Less than Min Payment				0.0082
Min payment				0.0399
More than Min Pay., but Less than Bal.				0.2583
Total Balance				0.6937
HH has Skipped or Delayed a Non-Mortgage Payment				
Newfoundland and Lab.				0.0000
Prince Edward Island				0.0445
Nova Scotia				0.0598
New Brunswick				0.0849
Quebec				0.0789
Ontario				0.0654
Manitoba				0.0441
Saskatchewan				0.0097
Alberta				0.0551
British Columbia				0.0368
Canada				0.0607

Table 4: **Delinquency and Repayment Difficulties Indicators**: From Survey of Financial Security 1999-2016. Note that one variable is not available for 2016 and two others are only available in 2016. Except for the variable on the number of credit cards, all variables refer to the last 12 months. Data express fractions of households. Sample weights used.

	as fraction of HH Income				
	1999	2005	2012	2016	Pct Change 1999-2016
Age 56-61					
Payments	0.244	0.238	0.218	0.207	-15.049
Balance	0.249	0.314	0.401	0.690	177.321
Age 62-66					
Payments	0.282	0.207	0.224	0.273	-3.199
Balance	0.124	0.243	0.262	0.354	186.774

Table 5: **Mortgage Balance and Monthly Payments as a Fraction of Income**: Means of ratios using the Survey of Financial Security of 1999, 2005, 2012, 2016. Sample weights used.

	Age 56-61	Age 62-66
Payments	15309	13167
Balance	183700	146789
Interest Rate		
10th	2.3	2.25
25th	2.5	2.5
median	2.9	2.9
75th	3.25	3.5
90th	4	4.2
mean	3.0	3.1
Type (fraction)		
Fixed	0.761	0.764
Variable	0.198	0.196
Mixed	0.041	0.040

Table 6: **Mortgage Characteristics in 2016**: From Survey of Financial Security. Sample weights used. 2016 dollars using Consumer Price Index.

	1999	2016
Payments	11987	14650
Balance	86549	172393
HH Income	53624	74369
Years Remaining	15.79	14.56
Implicit Interest Rate	11.29	2.87
Payment with 1999 Rate		24658
Pct Change Payment		68.31

Table 7: **Mortgage Annual Payments keeping Interest Rates to 1999 Level**: Data from the 2016 Survey of Financial Security ages 56-66. Statistics based on respondents who reported having mortgage payments. We assume the duration of mortgages is 25 years and compute years remaining using the year in which the house was purchased. We use a fixed term mortgage formula to back out the implicit interest rate and recompute payments in 2016 using the 1999 implicit rate, the current balance and years remaining.

	Interest Rate Hike		House Price Decline	
Province	Baseline	Rate Hike	Baseline	Meltdown
Newfoundland and Lab.	0.0431	0.0472	0.0323	0.0569
Prince Edward Island	0.1204	0.1730	0.0132	0.1260
Nova Scotia	0.0799	0.1289	0.0406	0.1919
New Brunswick	0.0605	0.0401	0.0065	0.1332
Quebec	0.0581	0.0858	0.0357	0.0857
Ontario	0.0882	0.1332	0.0205	0.0903
Manitoba	0.0592	0.1729	0.0262	0.1228
Saskatchewan	0.0397	0.0510	0.0323	0.0973
Alberta	0.0338	0.1225	0.0971	0.2060
British Columbia	0.1237	0.1851	0.0196	0.0726
Canada	0.0760	0.1225	0.0333	0.1051

Table 8: **Stress Test for Mortgages in 2016**: We report results from two stress-tests: a) interest rate hike (2% more on each mortgages), b) house price decline (meltdown) of 30%. For the interest rate hike, we compute the fraction of households with a ratio of payment to income larger than 32%, a threshold commonly used in the financial industry. For the house price meltdown, we compute the fraction of households with a mortgage balance larger than the new house value (97% of the value to reflect selling costs). Sample weights used.

A Data

We use the Survey of Financial Security (SFS) of Statistics Canada which has collected data in 1999, 2005, 2012 and 2016. A list of the variables used in this article is presented in Table A.1, which can be found below. Variables can either be related to a reference person or an economic family. Statistics Canada defines a reference person as the adult mainly responsible for the financial support of the family and refers to an economic family as a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law union, adoption or a foster relationship. Unless otherwise specified, statistics in this paper refer to the economic family. An additional precision on variable definitions concerns the valuation of the employer pension plans included in the asset variable of households. Statistics Canada values these defined benefit pension plans using a going concern valuation and a termination valuation. The main differences between these two valuation methods are the salary increases assumption and interest rates used. The termination valuation does not take into account potential future salary increases whereas the going concern valuation does. Also, the termination valuation uses interest rates based on current market whereas the going concern valuation uses longer term interest rates. The asset variable used in this article includes employer pension plans valued according to the termination method.

Among all waves, the one from 2016 offers a greater amount of variables related to household mortgages. It is the only survey in which we find data on the interest rate, the rate type and the number of years remaining to mort-

gage payments. All other variables listed in Table A.1 are available in the four surveys. Across these surveys, variables' definitions and codes have stayed unchanged except for two variables. First, education distinguishes new subcategories of College and University levels for the 2012 and 2016 surveys. These subcategories have been grouped in a way that makes them consistent with previous surveys. Second, the different categories of the variable regarding the frequency of mortgage payments change throughout the different surveys. This is not a problem for the present analysis as the unique purpose of this variable is to annualize the mortgage payments of the economic family. The mortgage payment is collected in the SFS as the amount of each payment that an economic family makes. To be comparable, this variable has been transformed to an annual basis using the frequency of mortgage payment variable.

Before producing any results, some changes have been made to the data. First, all monetary variables used in the present article have been converted to Canadian dollars of 2016 using the Consumer Price Index of Statistics Canada. Second, extreme values have been removed. This change represents the withdrawal of the first and last percentile of all monetary variables for each survey year and age group. The same process of removing extreme values has been applied to any subsequent ratio calculated in this article.

Variable	Description
Age	Age of the reference person
Woman	The reference person is a woman
Work	The reference person is currently working at a job/business
Marital Status	Marital status of the reference person
Education	Highest level of education obtained by the reference person
Owner status	Owner status of the reference person (owner without mortgage, owner with mortgage or renter)
Income	After tax income of the economic family
Mortgage debt	Total mortgage debt on real estate and property other than principal residence
Credit cards debt	Total debt on all credit cards
Line of credit	Total debt on lines of credit
Term loans	Total debt on term loans including car loans, student loans and other debts
Total debt	Total debt of the economic family (Mortgage + Credit cards + Line of credit + Term loans)
Asset	Total asset of the economic family, including employer pension plans (using termination valuation)
Freq of payments	Frequency of each mortgage payment
Mortgage payment	Amount of every mortgage payment (has been annualized using frequency variable)
Purchase year	Year of purchase of the actual property
Rate type	Rate type on mortgage (fixed, variable or a combination)
Interest rate	Interest rate on mortgage
Remaining years	Remaining years of mortgage payments

Table A.1: **Name and Description of the Variables Used**: Survey of Financial Security of 1999, 2005, 2012, 2016.