Research article

How Canadian seniors make decision about insolvency?

Samir Amine [a],[*], Wilner Predelus [a]

[a] *Université du Québec en Outaouais, Québec, Canada*

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ABSTRACT

This paper analyzes the growing insolvency phenomenon among Canadian seniors. It aims at situating the rise of insolvencies among seniors in the context of the demographic transition to understand the cause of their indebtedness. Furthermore, it feeds the scientific voice in the current debate to explain the rise of insolvencies among seniors. Our study is based on data of 1,285,000 insolvent debtors collected by the Canadian Office of the Superintendent of Bankruptcy (OSB) from 2008 to 2018. We observed that the rise in the share of insolvencies filed by seniors is consistent with the progression of their share in the total population. Therefore, the relative increase observe in seniors' insolvencies is attributable to their growing share in the total population, and not necessarily to an increase in seniors' insolvencies. Given the aging of the Canadian population and its impact on the labour market, policy makers should adjust the insolvency system to be more responsive to seniors' needs and align with other public policies.

1. Introduction

Over the last decade, the total insolvencies[1] filed by senior consumers (aged 65 and over) have significantly increased. According to data provided by the Office of the Superintendent of Bankruptcy (OSB), insolvencies filed by seniors increased by 91% in ten years, going from just 7800 files in 2008 to stand at 14,900 new files in 2018. During that same period, while the share of seniors in the population aged 18 and over increased by 4% point to reach 21.3% in 2018, the share of insolvencies attributable to seniors increased by 5.2% points, going from 6.7% in 2008 to 11.9% in 2018. Although proposals[2] represented 56% in total insolvencies filed by insolvent consumers in 2018, they accounted for only 38% in insolvencies filed by seniors. This situation seems to indicate that not only insolvencies grew faster amongst seniors but also, they are in a much dire financial situation than the general population. In fact, filing a proposal allows the debtors to keep all their assets, while bankruptcy[3] filers need to turn over their assets to the Licensed Insolvency Trustee (LIT).

As the Canadian population is aging, senior families who are in financial turmoil have increased significantly in number and proportion. Data produced by the Survey of Financial Security (SFS) shows that, in 18 years, the proportion of senior families with debt increased by 15% points, going from 27% in 1999 to 42% in 2016 [1]. This increase observed in the proportion of indebted seniors goes hand in hand with the request for innovative financial products, which drives up the cost of borrowing [2]. For instance, in a January 2020 statement, Home Equity reports having originated $820 million in reverse mortgages in Canada only for 2019, which brings their

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[1] Include both liquidation and debt restructuring procedures.
[2] A proposal in Canada is equivalent to debt restructuring in the US.
[3] A bankruptcy in Canada is equivalent to liquidation in the US.

portfolio to approximately $4 billion. Although Home Equity's Reverse Mortgage is available to Canadians aged 55 and over, and not all seniors own a home, these numbers provide nonetheless a clear picture of the hardship faced by senior citizens.

The rise observed in senior insolvencies has raised many questions and concerns and has recently received an extensive amount of media coverage. Most of the articles published in the media concludes that seniors have been in financial distress due to many factors, including credit card debt and high cost of living. Although the current demographic transition brings about a growing body of research related to Canadian seniors [3], it is fair to say that few studies, if any, are interested in seniors who turn to the insolvency system to deal with their debt issues. This study tries to fill this gap by analyzing the growing insolvency phenomenon among Canadian seniors. It aims at situating the rise of insolvencies among seniors in the context of the demographic transition to understand the cause of indebtedness among seniors. Furthermore, it feeds the scientific voice in the current debate to explain the rise of insolvencies among seniors.

Using advanced econometric techniques, this paper assesses indebtedness among seniors, and compares the insolvency choices of seniors with the rest of the population to test whether seniors are more likely than the rest of the population to file for bankruptcy, as opposed to proposal. Our paper goes further by looking at the outcome and the receipt of proposals filed by seniors in comparison with the rest of the population. But first, we analyze the relationship between the share of seniors in the total insolvencies and in the total population to observe that the rise in the share of insolvencies filed by seniors is consistent with the progression of their share in the total population. However, due to an increase in access to credit, the indebtedness of seniors has significantly increased over the years, and they are more likely than the rest of the population to file for bankruptcy. Proposals filed by insolvent seniors had a higher likelihood to complete than those filed by the rest of the population, while receipt of proposals filed by the former had no significant difference with those filed by the latter.

The rest of the paper is organized as follows. Section 2 presents a literature review. Section 3 provides a synopsis of the data and the model used. Section 4 provides the results of our analysis, whereas section 5 concludes.

2. Literature review

The factors often cited in the literature to explain this increase in insolvencies filed by seniors are consumerism, easy access to credit and rising cost of living, particularly the rise observed in housing cost [4,5]. In a recent article about the financial situation of seniors in the United States, Li and White [6] observe that the 2008 financial crisis, in part, worsen the financial distress of seniors. Also, Blanchet [7] finds that the last financial crisis has rendered it difficult for the retired to rely solely on their assets to achieve an acceptable living standard in the foreseeable future [8–10].

In fact, the effects of the last economic crisis have been widely reviewed in many theoretical and empirical studies (see for example [11–17]). However, these studies have largely focused on a specific category of households, especially young and less qualified people, although seniors have also been significantly affected by the crisis [18,19].

In fact, senior's insolvencies have recently received an extensive amount of media coverage, and the conclusion is that seniors have been in financial distress due to many factors, including credit card debt and high cost of living.

In this perspective, Boukrab and Lavoie [20] analyze the situation of workers aged between 45 and 64 on the labour market by comparing the systems of public intervention regarding pension in the United States, France and Canada. Through a review of the literature, they find that France puts in place more ambitious measures of income support for retiring workers than Canada and the US. This robust approach to social welfare has significant long-term fiscal implications for the government. In the same context, Castonguay [21] wonders how Canada will be able to reach its goal to maintain the living standard of its retirees with an aging population. He observes that more than 60% of the workers in Quebec are not in a position to maintain an acceptable standard of living following retirement [22].

Using the "LifePaths" model, Wolfson [23] also deals with the question of the preservation of the living standard following retirement in Canada. He finds that almost half of middle-class Canadians will experience a decrease of at least 25% in their living standard at retirement, if no mitigating measures are taken.

Furthermore, the financial difficulties of seniors not only have consequences on their indebtedness or their insolvency but also on their mental and physical health. So we think that the deterioration in the financial well-being of Canadian seniors would be a public health matter that requires a quick and appropriate remedy (see also Sweet et al. [24]).

To sum up, as we mentioned in the introduction, no study has focused on seniors and their insolvency choice (proposal or bankruptcy) when they decide to use the insolvency system. Hence the originality of our article and its important contribution to the literature.

3. Methodology

3.1. Institutional details

Before going further and to better understand the purpose and results of our article, it is important to understand the Canadian Insolvency System. According to the Bankruptcy and Insolvency Act (BIA), insolvency is the state of an individual or a corporation, who is, for any reason, unable to meet their obligations, as they generally become due, or the aggregate of whose property is not sufficient, if disposed of at a fair market price, to enable payment of all his obligations. The BIA proposes three options to assist insolvent debtors: Bankruptcy, Consumer Proposal or Div. II Proposal (total debt must be within $250,000, excluding outstanding mortgage debt on principal residence), and Division I proposal (offered to individuals and corporations, no matter their level of debt).

In this paper, since we are interested in insolvency among seniors, we are going to focus only on insolvencies filed by consumers, mainly bankruptcy and consumer proposal [25].

During a bankruptcy, the insolvent debtor turns over all their non-exempt property rights to the Licensed Insolvency Trustee (LIT) who sells them and distributes the proceeds between the creditors. Once the debtor makes an assignment into bankruptcy, creditors have the legal obligation to stop all collection activities, unless they obtain a court decision allowing the collection. However, a creditor can submit a proof of claim to the LIT to receive a share of the dividend paid to the creditors at the end of the bankruptcy proceeding. Contrary to the US where the bankrupt must wait for up to six years after a previous bankruptcy to file a new assignment in bankruptcy [26,27], in Canada, unless the insolvent debtor is an undischarged bankrupt at the time of the filing, there is no such a requirement.

As opposed to bankruptcy, consumer proposal, which offers quite a different option to the debtor, targets insolvent debtors with a regular and stable income. Thus, a consumer proposal is an agreement reached under the BIA between a debtor and their creditors that authorizes the former to modify the terms and the amount of their payments. For instance, the debtor may propose to pay a lower monthly installment, reschedule the payment over a longer period or pay down only a percentage of their debt. Insolvent debtors who file a consumer proposal are allowed to keep their entire asset against a repayment undertaking, which cannot be established over a period longer than five years or sixty months.

In general, when it is fully completed, the consumer proposal offers a more generous return to creditors than a bankruptcy. Contrary to the bankruptcy where an improvement in the undischarged bankrupt's financial situation may lead to a substantial contribution to the estate under the surplus income rule, once a proposal is accepted or deemed accepted, the debtor has no other obligations to the creditors apart from what is agreed on in the proposal. Following the fulfillment of the consumer proposal, the debtor is free from all debts and obligations targeted in the consumer proposal, excluding the un-dischargeable debts.

3.2. Data

The *Data and Business Analytics team* of the OSB provides the data used in this paper. In 2003, the OSB launched an electronic data collection process whereby in 2007 it became mandatory to file all insolvencies electronically. When an individual insolvent debtor decides to file for insolvency, the BIA requires the LIT to complete two initial forms: the Form 79, *Statement of Affairs*, and the Form 65, *Monthly Income and Expense Statement of the Bankrupt/Debtor and the Family Unit and Information (or Amended Information) Concerning the Financial Situation of the Individual Bankrupt*. Along with these two forms, the LIT is required to file an *Estate Information Summary* (EIS), which contains such information like language, occupation, nature of debts, etc. All the socioeconomic and financial data used in this research originate from these forms. To account for inflation, we converted the financial data in 2018 dollar.

For the purpose of this study, we collected data on 1,285,000 insolvent debtors, which represents the total consumer insolvencies filed with the OSB between January 2008 and December 2018. Geographically, we have divided the country into five regions: Atlantic, British Columbia, Ontario, Prairie and Quebec. The Atlantic region entails the provinces of Newfoundland, New Brunswick, Nova Scotia and Prince Edward Island. The regions of British Columbia, Ontario and Quebec entail respectively of the provinces of British Columbia, Ontario and Quebec. As for the Prairie region, it contains the province of Alberta, Manitoba and Saskatchewan. This grouping is based on the shared cultural, demographic, and economic similarities between the provinces belonging to each category.

Total insolvencies filed by senior consumers during the period amount to 122,015 files (9.5%), of which consumer proposals represent 27% and bankruptcies 73%. In comparison, consumer proposals filed by the rest of the population accounted for 39.5% of the total insolvencies filed by this group. Given that during a bankruptcy, the insolvent debtor must turn over all their non-exempt assets to the LIT, these numbers indicate that insolvent seniors who used the insolvency process are generally in a more difficult financial situation than the rest of the population.

In terms of senior representativity in total insolvencies, Fig. 1 provides an insight of the trend observed in the share of seniors in population aged 18 years and older in Canada and their contribution in total insolvencies. As it can be seen, over the last ten years, after experiencing a bump in the years following the great recession, the share of insolvencies filed by seniors has progressed relatively at the same pace as their share in the population aged 18 years and older. In fact, the correlation coefficient between these two indicators for
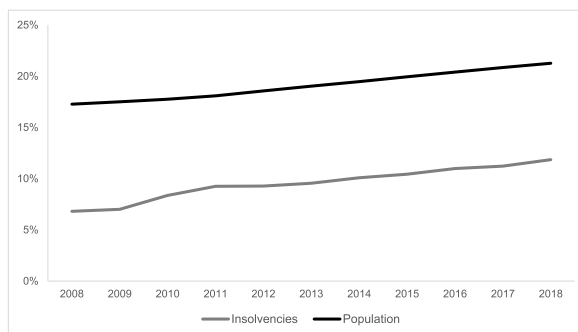

Fig. 1. Share of Seniors in the Population aged 18 and over and in Total insolvencies (2008–2018). *Source*: Office of the Superintendent of Bankruptcy (OSB).

the period 2008–2018 sits at 0.96. Since the recession period seemed to hit seniors harder than the rest of the population, due probably to low return on investment resulting from the bad performance of the financial market, we further calculate the correlation coefficient by removing the years 2008 and 2009. It then jumps to 0.99. This roughly perfect correlation between the share of insolvencies filed by seniors and their share in the population is a convincing indicator that these two variables have progressed at, virtually, the same pace.

This result is different from that observed in the USA where Thorne et al. [28] confirm that the growing share of seniors accounts only for part of their share in total bankruptcies, the relative increase observe in the insolvencies of seniors in Canada is attributable to their growing share in the total population.

By the same measure, one can assume that the share of insolvencies filed by non-senior consumers and their share in the population aged 18 years and older take a reverse pattern with the same amplitude as their senior counterpart. While senior consumers are underrepresented in total insolvency filings, every insolvency filed by seniors remains a case too many, for the second chance offers by the insolvency system is inherently not accessible to senior debtors seeking relief from their debt load.

Although insolvent seniors reported income of all the sources, employment and pension/annuity income represented their two main sources of income (reported respectively by 17,499 and 89,237 seniors). The fact that a relatively large number of senior consumers reported an income tied to the labour market is rather an important indicator of the level of financial difficulties that lead to their insolvencies. In fact, insolvent seniors reported a significantly lower income than non-seniors in both bankruptcy and proposal for all sources listed, except for pension/annuity income. While net income declared by insolvent seniors averaged $1581 in bankruptcies and $2239 in proposals, non-senior insolvent debtors declared an average of $1783 in bankruptcies and $2537 in proposals (Table 1).

On the debt and asset side, senior debtors declared a significantly lower asset value than non-seniors in both bankruptcies and proposals for all the categories of assets, except for cash surrender declared in proposals where the average was higher ($18,347 versus $13,307). This seems to indicate that seniors are more inclined to declare life insurance and assimilate in their proposals than non-seniors (see Table 2).

However, while seniors come first in terms of tax and credit card debts declared in both bankruptcies and proposals, non-seniors dominated the other categories with significantly higher debt level than seniors. Driven mainly by credit card debts, the total average unsecured debt declared by seniors in proposal files were higher, but non-seniors declared higher secured and total debts in both bankruptcy and proposal. This is the result of insolvent non-senior consumers being more likely than their senior counterpart to declare and carry out higher mortgage debts in both bankruptcies and proposals. In fact, while 27% of insolvencies filed by non-senior consumers had mortgage debts (21.7% for bankruptcies and 35.4% for proposals), only 17.8% of insolvencies filed by senior consumes contained such debts 12.5% for bankruptcies and 32% for proposals. As for the level of mortgage debts, non-senior consumers declared an average debt of $166,000 in bankruptcies and $199,600 in proposals, whereas seniors declared an average debt of $139,300 in bankruptcies and $158,800 in proposals. If bankruptcy seems to be more prevalent among senior consumers, it is revealing to observe that those who filed for bankruptcy are less likely to own a house (Tables 3 and 4).

3.3. Model

In this section, we estimate several econometric models where we cross-analyze insolvency choice of seniors, success rates and outcome of proposals in space and time, with the rest of the population. We further analyze the sociodemographic and financial characteristics responsible for indebtedness among seniors.

Given the interrelation between bankruptcy and proposal in Canada, and to account for differences at the regional level, we consider a random utility maximization leading to the specification of a nested logit model as the best way to proceed. The idea behind this consideration is that the choice between bankruptcy and proposal is made according to a hierarchical structure of the decision-making process. The utility function to be maximized can be represented as follows:

$$U_n^i = V_n^i + \varepsilon_n^i \tag{1}$$

Where i and n represents respectively the insolvency choice and the insolvent debtor. In this equation, i can take two values: 1, 2.

If $i = 1$, the insolvent debtor chooses bankruptcy.

Table 1
Source of Income of insolvent seniors vs. non seniors.

Source of Income	Bankruptcies					Proposals				
	Non Seniors		Seniors		p-value	Non Seniors		Seniors		p-value
	Files	Mean (Stand. Dev.)	Files	Mean (Stand. Dev.)		Files	Mean (Stand. Dev.)	Files	Mean (Stand. Dev.)	
Employment	409,151	1872 (899)	9993	1329 (992)	<.0001	352,370	2497 (1088)	7506	1809 (1268)	<.0001
Pension/Annuity	68,970	903 (709)	82,361	1342 (556)	<.0001	31,731	1257 (1021)	6876	1607 (872)	<.0001
Employment Insurance	58,485	1166 (486)	1335	861 (554)	<.0001	22,040	1456 (507)	670	1250 (570)	<.0001
Welfare	56,652	692 (337)	1006	467 (419)	<.0001	8845	797 (457)	356	562 (437)	<.0001
Self Employment	53,535	1520 (1140)	2573	1060 (1297)	<.0001	40,400	1933 (1432)	2027	1478 (1686)	<.0001
Debtor's Income	642,985	1783 (950)	87,845	1581 (705)	<.0001	445,308	2537 (1071)	32,460	2239 (1169)	<.0001
Family's Income	261,867	2158 (1305)	20,216	1904 (1337)	<.0001	212,209	3207 (1611)	64,400	2815 (1549)	<.0001

Table 2

Assets of insolvent seniors vs. non senior.

Type of Asset	Bankruptcies						Proposals				
	Non Seniors		Seniors		p-value		Non Seniors		Seniors		p-value
	Files	Mean (Stand. Dev.)<	Files	Mean (Stand. Dev.)			Files	Mean (Stand. Dev.)	Files	Mean (Stand. Dev.)	
Cash Surrender Value	247,494	8834 (29,621)	32,551	8732 (36,131)	0.6243		228,794	13,307 (37,612)	15,257	18,347 (62,868)	<.0001
House	152,564	176,087 (141,374)	12,297	141,544 (140,699)	<.0001		162,581	226,509 (520,844)	11,853	189,739 (159,137)	<.0001
Automobile	455,235	7310 (8950)	51,765	5093 (7268)	<.0001		345,432	9798 (11,761)	24,463	7642 (9769)	<.0001
Exemption Value	651,640	17,991 (61,399)	82,483	13,580 (48,190)	<.0001		435,657	36,936 (95,561)	31,327	34,868 (90,552)	<.0001
Non-Exempt Value	459,791	51,217 (96,956)	53,322	28,808 (73,896)	<.0001		317,692	94,504 (130,062)	22,113	84,994 (124,161)	<.0001
Total Asset	693,471	51,541 (106,822)	87,820	30,776 (81,681)	<.0001		455,411	102,553 (149,251)	32,624	93,080 (146,331)	<.0001

Table 3

Liabiities of insolvent seniors vs. non seniors.

Types of Debt	Bankruptcy						Proposal				
	Non Seniors		Seniors		p-value		Non Seniors		Seniors		
	Files	Mean (Stand. Dev.)	Files	Mean (Stand. Dev.)			Files	Mean (Stand. Dev.)<	Files	Mean (Stand. Dev.)	p-value
Mortgage	152,790	165,978 (175,330)	11,162	139,325 (170,633)	<.0001		162,777	199,675 (235,308)	10,580	158,831 (133,057)	<.0001
Bank Loans	403,032	25,206 (76,766)	41,943	22,421 (69,677)	<.0001		282,078	25,049 (75,413)	17,635	24,801 (72,739)	0.6614
Finance Company Loans	244,083	13,864 (69,471)	19,942	11,634 (45,407)	<.0001		170,171	13,534 (58,006)	9002	13,822 (86,158)	0.7539
Credit Cards Debt	535,324	15,299 (25,148)	72,646	18,734 (20,447)	<.0001		372,243	16,788 (18,490)	27,056	22,283 (22,685)	<.0001
Credit Cards Debt (other issuers)	376,834	7555 (12,033)	53,494	9620 (10,886)	<.0001		265,609	8023 (9775)	21,135	11,010 (11,551)	<.0001
Total Credit Card Debt	614,248	17,968 (27,320)	81,228	23,090 (23,614)	<.0001		417,897	20,053 (21,029)	30,212	27,658 (26,146)	<.0001
Tax Debt	319,246	28,715 (177,629)	35,119	30,881 (228,712)	0.0857		186,696	19,133 (150,700)	14,586	31,357 (250,576)	<.0001
Unsecured Debt	701,368	57,237 (94,877)	88,688	49,535 (91,635)	<.0001		457,644	48,710 (67,178)	32,717	54,367 (86,300)	<.0001
Secured Debt	348,303	86,851 (124,650)	35,064	60,631 (108,492)	<.0001		303,747	114,949 (134,139)	20,099	93,967 (121,674)	<.0001
Total Debt	701,936	107,464 (172,979)	88,789	77,762 (161,824)	<.0001		457,803	131,690 (168,816)	32,752	129,913 (181,163)	0.6429

If $i = 2$, the insolvent debtor chooses proposal.

The error terms ε_{1n} and ε_{2n} are taken to be distributed according to Gumbel extreme value type B with correlation coefficient 1-β,[2] for all $0 < \beta \leq 1$. The random perturbation ε_0 is taken to follow a Wiebull distribution.

According to McFadden [29], the probability for an insolvent debtor to choose bankruptcy, conditional to the accession of the insolvency system is given:

$$P(i = 1 | z_n) = \frac{e^{(V_n^1/\beta)}}{e^{(V_n^0/\beta)} + e^{(V_n^1/\beta)}} \tag{2}$$

Here, z_n represents the information set revealed to the insolvent debtor and upon which is based the decision to choose between bankruptcy and proposal.

The criterion governing the choice between bankruptcy and proposal deduced from Manski and McFadden [30]'s estimator for choice-based sampling:

$$L_1(\theta_1) = \sum_{n=1}^{N} ln \frac{P(i_n | z_n, \theta_1) \omega_i}{\sum_{j \in C} P(j_n | z_n, \theta_1) \omega_j} \tag{3}$$

Table 4

Outcome of insolvency files seniors vs. non seniors.

Outcome	Bankruptcies					Proposals				
	Non Seniors		Seniors		p-value	Non Seniors		Seniors		p-value
	Files	Mean (Stand. Dev.)	Files	Mean (Stand. Dev.)		Files	Mean (Stand. Dev.)	Files	Mean (Stand. Dev.)	
Proposal Value	–	–	–	–	–	420,044	16,122 (12,794)	29,765	17,994 (15,743)	<.0001
Total Receipt	620,172	4244 (9059)	74,742	4050 (11,163)	<.0001	285,556	13,276 (16,778)	18,380	16,070 (24,030)	<.0001
Total disbursements	620,183	2276 (4951)	74,743	2684 (5506)	<.0001	285,582	4199 (4102)	18,381	4815 (6398)	<.0001
Dividend	620,286	1442 (5717)	74,753	1353 (8814)	0.0066	285,695	9057 (13,689)	18,389	11,210 (19,340)	<.0001
Levy	189,572	173 (218)	14,376	180 (495)	0.0020	75,121	544 (814)	19,680	652 (559)	<.0001
Administration Fees	620,292	2111 (2310)	74,754	1972 (2210)	<.0001	285,714	3602 (2995)	18,391	4074 (3940)	<.0001

$P(i_n|z_n,\theta_1)$: is the conditional probability of the nth debtor to choose the alternative i from the set S = {1, 2}, given the information set z_n and a parameter vector θ_1.

According to Manski and McFadden [30], ω_i is given: $\omega_i = H_i/Q_i$ where H_i is the distribution according to which the choice is sampled and Q_i is the population distribution of choice i, conditional on θ_1. Finally, the information set in equation (2) is parametrized to provide the following:

$$y = X\beta + Z\alpha + \in \tag{4}$$

Here, we have a mix effects model that we use to determine the socioeconomic and financial characteristics associated with the probability of filing for bankruptcy, as well as the probability for a proposal to be successful, where:

- y is a N x 1 column vector, the outcome variable.
- X is a N x p matrix of p predictor variables. Following Domowitz and Sartain [31], Dawsey and Ausubel [32], Agwaral et al. [11] and Braucher et al. [33] this matrix contains financial and socio-demographic information, like: income, assets, unsecured debts, secured debt, credit card debt, homeownership, marital status (living with or without a spouse or partner). In addition to these variables, we control for the mortgage debt, the exemption and non-exempt value, the filing year, the region of residence.

Table 5
Financial and socioeconomic factors associated with indebtedness among seniors.

Coefficients	Estimate	Std. Error	t value	Pr (>|t|)
(Intercept)	325,960	14040.55	23.216	<2e-16 ***
Region British Columbia	19604.37	893.37	21.944	<2e-16 ***
Region Prairies	19503.04	841.76	23.169	<2e-16 ***
Region Ontario	12812.71	645.84	19.839	<2e-16 ***
Region Atlantic	−18501.8	850.01	−21.767	<2e-16 ***
Filing year 2008	−14964.2	1201.18	−12.458	<2e-16 ***
Filing year 2009	−11036.5	1105.61	−9.982	<2e-16 ***
Filing year2010	−10359.3	1081.61	−9.578	<2e-16 ***
Filing year 2011	−5605.05	1077.1	−5.204	1.96e-07 ***
Filing year 2012	−2164.39	1086.58	−1.992	0.046382 *
Filing year 2013	−1043.45	1076.2	−0.97	0.332262
Filing year 2015	2510.66	1045.39	2.402	0.016323 *
Filing year 2016	2985.5	1022.74	2.919	0.003511 **
Filing year 2017	2752.62	1024	2.688	0.007187 **
Filing year 2018	5869.01	1005.79	5.835	5.38e-09 ***
Bankruptcy (yes = 1, no = 0)	11366.57	571.31	19.896	<2e-16 ***
Couple (yes = 1, no = 0)	17475.86	507.42	34.44	<2e-16 ***
Age at filing (log)	−70575.2	3247.92	−21.729	<2e-16 ***
Employment income (yes = 1, no = 0)	9781.42	733.68	13.332	<2e-16 ***
Pension income (yes = 1, no = 0)	−14640.7	982.3	−14.905	<2e-16 ***
Employment insurance income (yes = 1, no = 0)	−1435.5	1785.44	−0.804	0.421395
Welfare income (yes = 1, no = 0)	−10529.5	2086.21	−5.047	4.49e-07 ***
Self-employment income (yes = 1, no = 0)	43667.55	1214.44	35.957	<2e-16 ***
Mortgage debt (log)	13672.03	61.45	222.476	<2e-16 ***
Total income (log)	1236.97	366.85	3.372	0.000747 ***
Credit card debt (log)	1640.32	79.89	20.531	<2e-16 ***
Rent/Mortgage (log)	−1006.44	123.75	−8.133	4.24e-16 ***
Property/Condo (log)	5168.07	162.78	31.75	<2e-16 ***
Dining, Lunch, Restaurant (log)	119.78	132.63	0.903	0.366467
Allowances (log)	1153.2	353.89	3.259	0.001120 **
Prescriptions (log)	−30.06	140.9	−0.213	0.831035
Dental (log)	2977.62	203.95	14.6	<2e-16 ***
Smoking (log)	−2626.65	122.87	−21.377	<2e-16 ***
Alcohol (log)	2566.61	193.89	13.237	<2e-16 ***
Entertainment/Sport (log)	−251.51	135.23	−1.86	0.062906.
Other medical expenses (log)	89.1	207.14	0.43	0.667104
Food and groceries (log)	−1547.36	186.02	−8.318	<2e-16 ***
Laundry, Dry cleaning (log)	−117.7	164.18	−0.717	0.473449
Grooming Toiletries	−451.22	161.02	−2.802	0.005077 **
Clothing (log)	66.55	149.76	0.444	0.656785
Car lease payments (log)	1915.04	102.26	18.726	<2e-16 ***
Repair, maintenance, gas (log)	791.7	158.73	4.988	6.11e-07 ***
Vehicle insurance (log)	−347.74	183.62	−1.894	0.058249.
Gifts/Donation (log)	−560.09	163.25	−3.431	0.000602 ***
Signif. codes: 0 '***' 0.001 '***' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Residual standard error: 78,680 on 120,656° of freedom				
Multiple R-squared: 0.4525, Adjusted R-squared: 0.4523				
F-statistic: 2319 on 43 and 120,656 DF, p-value: <2.2e-16				

- *Z* is the N x q design matrix for the q random effects (the random effects complement to the fixed effects). Given that each case in the literature is different, in this study, this matrix is formed of the variables filing year and province of residence.
- β is a p x 1 column vector of the fixed-effects regression.
- α is a q x 1 vector of the random effects (the random complement to the fixed β)
- ∈ is a N × 1 column vector of residuals, that part of *y* that is not explained by the model.

The use of the mix model enables us to account for differences between the provinces and the year of filing.
As for the indebtedness, the success rate and the outcome proposal, the model used is specified as follows:

$$Y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_k x_{ik} + \varepsilon \tag{5}$$

Where:Y represents the total debt reported by seniors at filing;x_1, x_2, x_3, ...x_k represent the explanatory variables;*i* the individuals
Ordinary Least Square is used (OLS) to estimate (5), and log-transformation is performed on the continuous variables, so their coefficients are interpreted as measure of elasticity.

4. Results and discussion

4.1. Factors associated to the indebtedness of seniors in Canada

Before analyzing the insolvency choices of seniors and their results, we look at the main factors that contribute to their indebtedness and the evolution of these factors in space and time. For this, we estimate a model for which we produce the results in Table 5.

After accounting for the province of residence and the year of filing, we observed that, except for insolvent seniors in the Atlantic region, insolvent seniors in Quebec carry out less debt than elsewhere in Canada. In fact, with an average total debt that is $19,500 higher than Quebec, insolvent seniors in the regions of the Prairies and British Columbia declared the highest level of debt in the country, followed by the region of Ontario, with an average total debt that is $12,800 higher than the region of Quebec. For its part, with an average total debt that is $18,500 lower than the region of Quebec, insolvent debtors in the Atlantic region carry out the lightest debt burden. This disparity in seniors' total debt across the country can be explained by a gap in the cost of living, specifically the cost associated with the real estate market. In fact, these findings are consistent with the quarterly data published by Equifax, which always show debtors in western Canada and Ontario carrying out higher level of debt than the rest of the country.

Furthermore, when we look at the indebtedness of seniors over the time, we observe an ascending trend in the level of debt they carry out over the years. In fact, while seniors who used the insolvency system in 2008 carried out an average of $14,964 of debt lower than those who used the system in 2014, those who filed their insolvency in 2018 had $5869 more debt. This is probably the result of seniors having more access to credit over the time, namely through the blooming of reverse mortgage business and other credit products. Another plausible hypothesis would be that the 2009 amendments, which make consumer proposal more popular, might allow a new category of seniors with more debt to access the insolvency system without turning over their asset. However, one should not lose sight of the fact that these issues might also well tie to a broader and more sophisticated financial and economic context that leads Canadian seniors to take on more and more debt to cover their regular expenses. For, easy access to credit is not necessarily the only factor responsible for the trend observed in the indebtedness of seniors across the country.

In terms of income, we observe a positive relationship between debt and income. In other words, the higher the senior's income, the higher their level of debt. For instance, all things being equal, an increase of 1% in senior's income leads to an increase of $1237 in the total debt. In fact, a way to explain these findings is that seniors with higher income tend to have more access to credit, and therefore carry out higher level of debt. Likewise, seniors who declared a self-employment income had the highest level of debt, followed by those who declared an employment income. This is undoubtedly the reason they remain on the labour market even after the retirement age. Those with the lowest level of debt are seniors who declared a pension or annuity income followed by those who declared a welfare income.

Another striking and significant observation is the relationship between age and debt. In fact, the older the senior, the less debt they carry out. For instance, all things being equal, a 1% increase the senior' age will lead to $70,575 decrease in the total debt. This result is very significant and translates the fact that older seniors have less access to credit. In addition to this, we observe that seniors who lived with a partner had significantly higher debt than those who were single ($17,476) and those who filed for bankruptcy carried out more debt than those who filed a proposal ($11,367).

In the chapter of expenses, the variables that have the highest positive and significant impact on the indebtedness of seniors are property condominium expenses, dental care expenses, alcohol, and car lease payments. On the other hand, smoking, food/grocery and rent had the highest negative impact on the indebtedness of seniors. For instance, all things being equal, an increase of 1% in condominium expenses will lead to an increase of $5200 in total debt. These findings, though interesting, are not surprising, since increase in these expenses necessarily means more debt for seniors.

4.2. The insolvency choice of seniors

For the insolvency choice of seniors, we estimated two models. In the first model (Table 6) we create a dummy variable with the variable "age at filing" (senior) which takes 1 if the debtor is 65 years old and over, and 0 otherwise. Then, we create an interaction between this new variable and the year of filing, on the one hand, and the province of residence of the debtor, on the other hand, to

capture any relationships between these variables.

In the second model (Table 7), the viable age is divided into three groups: 18 and 44 years old, 45 and 64 years old and 65 years old and over. In this second model, the interaction is created between the variable age and all the other independent variable.

The result of the Likelihood Ratio (LR) test (Table 8), which compares the two models, indicates that the first model better represents our data.

In fact, as anticipated, after accounting for the province of residence and the year of filing, we observe that senior consumers are 94% more likely than non-senior consumers to choose bankruptcy over proposal. This result indicates that if the share of insolvencies filed by seniors does not grow faster than their share in the total population, those who use the insolvency system are in a more difficult financial situation than the rest of the population.

From a regional standpoint, despite that insolvents in the region of British Columbia and Ontario were less likely to file for bankruptcy than those in the region of Quebec, seniors in the regions of the British Columbia, Ontario and the Prairies were more likely than seniors in Quebec to choose bankruptcy. In fact, compared to seniors in the region of Quebec, seniors in the regions of the Prairies and British Columbia were respectively 6.1% and 6.6% more likely to choose bankruptcy over proposal. As for the insolvent seniors in the Maritime, they were 41.8% less likely to choose bankruptcy.

Likewise, when we look at the insolvency choice of insolvent debtors over time, we observe a striking contrast between seniors and the rest of the population. In fact, while proposals have become more attracting to the rest of the population over the years, they have become less attracting to seniors. For instance, compared to the year of 2014, insolvent debtors were consistently more likely from 2015 and forward and less likely from 2013 and backward to choose bankruptcy over proposal. Insolvent seniors, though, were less likely before and more likely after 2014 to choose bankruptcy over proposal. These results indicate that insolvent seniors are financially worst off than other insolvent debtors with time.

Table 6

First Model/Financial and socioeconomic factors associated with insolvency choice.

	Estimate	Std. Error	z value	Pr (>|z|)
(Intercept)	1.5510	0.1426	10.878	<2e-16 ***
Senior (yes = 1, no = 0)	0.6629	0.0249	26.598	<2e-16 ***
Region British Columbia	−0.1175	0.2031	−0.579	0.562705
Region Prairies	0.0637	0.1658	0.384	0.700993
Region Ontario	−0.4981	0.1975	−2.522	0.011655 *
Region Atlantic	0.9495	0.1589	5.974	2.31e-09 ***
Filing year 2008	1.1570	0.0109	106.392	<2e-16 ***
Filing year 2009	1.1640	0.0100	116.205	<2e-16 ***
Filing year2010	0.6980	0.0098	70.979	<2e-16 ***
Filing year 2011	0.4467	0.0099	45.103	<2e-16 ***
Filing year 2012	0.3096	0.0099	31.185	<2e-16 ***
Filing year 2013	0.1848	0.0099	18.746	<2e-16 ***
Filing year 2015	−0.1509	0.0103	−14.673	<2e-16 ***
Filing year 2016	−0.2562	0.0097	−26.495	<2e-16 ***
Filing year 2017	−0.4228	0.0098	−43.364	<2e-16 ***
Filing year 2018	−0.5752	0.0097	−59.013	<2e-16 ***
Couple (yes = 1, no = 0)	−0.3150	0.0044	−71.577	<2e-16 ***
Home ownership (yes = 1, no = 0)	0.6470	0.0304	21.311	<2e-16 ***
Mortgage debt (log)	−0.0748	0.0026	−28.593	<2e-16 ***
Total income (log)	−0.4562	0.0032	−144.819	<2e-16 ***
Total Asset (log)	−0.1364	0.0017	−79.487	<2e-16 ***
Exemption (log)	−0.0272	0.0009	−29.617	<2e-16 ***
Non-exempt value (log)	−0.0063	0.0007	−9.277	<2e-16 ***
Unsecured debt (log)	0.4212	0.0027	156.076	<2e-16 ***
Secured debt (log)	0.0000	0.0007	−0.027	0.978696
Credit card debt (log)	−0.0533	0.0007	−75.128	<2e-16 ***
Senior: Region British Columbia	0.0638	0.0264	2.414	0.015785 *
Senior: Region Prairies	0.0596	0.0252	2.363	0.018132 *
Senior: Region Ontario	0.0273	0.0175	1.557	0.119364
Senior: Region Atlantic	−0.5416	0.0267	−20.255	<2e-16 ***
Senior: Filing year 2008	−0.0808	0.0445	−1.816	0.069390.
Senior: Filing year 2009	−0.2309	0.0386	−5.987	2.14e-09 ***
Senior: Filing year 2010	−0.1358	0.0351	−3.873	0.000108 ***
Senior: Filing year 2011	−0.0842	0.0338	−2.491	0.012732 *
Senior: Filing year 2012	−0.1118	0.0333	−3.354	0.000797 ***
Senior: Filing year 2013	−0.0194	0.0329	−0.59	0.554867
Senior: Filing year 2015	0.0270	0.0313	0.862	0.388524
Senior: Filing year 2016	0.0432	0.0305	1.417	0.156461
Senior: Filing year 2017	0.2134	0.0305	7.004	2.49e-12 ***
Senior: Filing year 2018	0.2104	0.0297	7.079	1.46e-12 ***
Signif. codes: 0 '***'	' 0.001 '**'	' 0.01 '*'	0.05 '.'	0.1 ' ' 1

Table 7

Second Model/Financial and socioeconomic factors associated with insolvency choice.

	Estimate	Std. Error	z value	Pr (>|z|)
(Intercept)	0.4149397	0.1431825	2.898	0.003756 **
Age: 45-64	1.7279091	0.0684391	25.247	<2e-16 ***
Age: 65 & +	6.8177962	0.1448804	47.058	<2e-16 ***
Region British Columbia	−0.2379562	0.1966535	−1.210	0.226268
Region Prairies	−0.0090026	0.1591073	−0.057	0.954878
Region Ontario	−0.5867893	0.2075595	−2.827	0.004697 **
Region Atlantic	0.9999529	0.1568856	6.374	1.84e-10 ***
Filing year 2008	1.2563120	0.0143057	87.819	<2e-16 ***
Filing year 2009	1.2436948	0.0133564	93.116	<2e-16 ***
Filing year2010	0.7830828	0.0132821	58.958	<2e-16 ***
Filing year 2011	0.5123840	0.0134409	38.121	<2e-16 ***
Filing year 2012	0.3559798	0.0135078	26.354	<2e-16 ***
Filing year 2013	0.2156147	0.0134116	16.077	<2e-16 ***
Filing year 2015	−0.1554679	0.0140403	−11.073	<2e-16 ***
Filing year 2016	−0.2589248	0.0131150	−19.743	<2e-16 ***
Filing year 2017	−0.4599241	0.0132302	−34.763	<2e-16 ***
Filing year 2018	−0.6263489	0.0131919	−47.480	<2e-16 ***
Couple (yes = 1, no = 0)	−0.2846950	0.0062550	−45.515	<2e-16 ***
Home ownership (yes = 1, no = 0)	1.1017223	0.0450193	24.472	<2e-16 ***
Mortgage debt (log)	−0.1125557	0.0038539	−29.206	<2e-16 ***
Total income (log)	−0.4470018	0.0043656	−102.391	<2e-16 ***
Total Asset (log)	−0.1143491	0.0023547	−48.562	<2e-16 ***
Exemption (log)	−0.0316826	0.0012958	−24.449	<2e-16 ***
Non-exempt value (log)	0.0032022	0.0009728	3.292	0.000996 ***
Unsecured debt (log)	0.5127569	0.0039616	129.432	<2e-16 ***
Secured debt (log)	0.0017864	0.0009327	1.915	0.055451.
Credit card debt (log)	−0.0686911	0.0009922	−69.231	<2e-16 ***
Age 45–64: Region British Columbia	0.2423247	0.0173614	13.958	<2e-16 ***
Age 65 & + : Region British Columbia	0.2110604	0.0303957	6.944	3.82e-12 ***
Age 45–64: Region Prairies	0.1527969	0.0168010	9.095	<2e-16 ***
Age 65 & + : Region Prairies	0.1566851	0.0304804	5.141	2.74e-07 ***
Age 45–64: Region Ontario	0.1939601	0.0119660	16.209	<2e-16 ***
Age 65 & + : Region Ontario	0.1185568	0.0214453	5.528	3.23e-08 ***
Age 45–64: Region Atlantic	−0.1392729	0.0180208	−7.728	1.09e-14 ***
Age 65 & + : Region Atlantic	−0.4731399	0.0303380	−15.596	<2e-16 ***
Age 45–64: Filing year 2008	−0.2116253	0.0220096	−9.615	<2e-16 ***
Age 65 & + : Filing year 2008	−0.2944535	0.0463486	−6.353	2.11e-10 ***
Age 45–64: Filing year 2009	−0.1709093	0.0201291	−8.491	<2e-16 ***
Age 65 & + : Filing year 2009	−0.3829437	0.0404197	−9.474	<2e-16 ***
Age 45–64: Filing year 2010	−0.1769820	0.0196884	−8.989	<2e-16 ***
Age 65 & + : Filing year 2010	−0.2980001	0.0372457	−8.001	1.23e-15 ***
Age 45–64: Filing year 2011	−0.1377011	0.0198093	−6.951	3.62e-12 ***
Age 65 & + : Filing year 2011	−0.1939925	0.0358468	−5.412	6.24e-08 ***
Age 45–64: Filing year 2012	−0.0974013	0.0198682	−4.902	9.47e-07 ***
Age 65 & + : Filing year 2012	−0.1750292	0.0352666	−4.963	6.94e-07 ***
Age 45–64: Filing year 2013	−0.0657576	0.0197264	−3.333	0.000858 ***
Age 65 & + : Filing year 2013	−0.0616338	0.0349505	−1.763	0.077823.
Age 45–64: Filing year 2015	0.0206010	0.0206650	0.997	0.318813
Age 65 & +: Filing year 2015	−0.0500021	0.0360422	−1.387	0.165344
Age 45–64: Filing year 2016	0.0110372	0.0193609	0.570	0.568626
Age 65 & +: Filing year 2016	0.0487096	0.0324971	1.499	0.133901
Age 45–64: Filing year 2017	0.0866030	0.0195402	4.432	9.33e-06 ***
Age 65 & +: Filing year 2017	0.2601865	0.0326022	7.981	1.46e-15 ***
Age 45–64: Filing year 2018	0.1176249	0.0195383	6.020	1.74e-09 ***
Age 65 & +: Filing year 2018	0.2838664	0.0317948	8.928	<2e-16 ***
Age 45–64: couple	−0.0596771	0.0092347	−6.462	1.03e-10 ***
Age 65 & +: couple	0.0519831	0.0168976	3.076	0.002095 **
Age 45–64: Home ownership	−0.6573359	0.0622634	−10.557	<2e-16 ***
Age 65 & +: Home ownership	−1.6296864	0.1140465	−14.290	<2e-16 ***
Age 45–64: Mortgage debt	0.0569666	0.0053618	10.625	<2e-16 ***
Age 65 &+: Mortgage debt	0.1220220	0.0099976	12.205	<2e-16 ***
Age 45–64: Total income	−0.0019986	0.0062867	−0.318	0.750554
Age 65 & +: Total income	−0.3486560	0.0182528	−19.102	<2e-16 ***
Age 45–64: Total asset	−0.0485788	0.0036513	−13.304	<2e-16 ***
Age 65 & +: Total asset	−0.0842862	0.0065224	−12.923	<2e-16 ***
Age 45–64: Exemption	0.0080121	0.0019258	4.160	3.18e-05 ***
Age 65 & +: Exemption	0.0283838	0.0034925	8.127	4.40e-16 ***
Age 45–64: Non-exempt value	−0.0146810	0.0014174	−10.358	<2e-16 ***

Table 7 (*continued*)

	Estimate	Std. Error	z value	Pr (>|z|)
Age 65 & +: Non-exempt value	−0.0289310	0.0025041	−11.553	<2e-16 ***
Age 45–64: Unsecured debt	−0.1345467	0.0056359	−23.873	<2e-16 ***
Age 65 & +: Unsecured debt	−0.3138533	0.0097357	−32.237	<2e-16 ***
Age 45–64: Secured debt	−0.0059245	0.0013802	−4.293	1.77e-05 ***
Age 65 & +: Secured debt	0.0144090	0.0024391	5.908	3.47e-09 ***
Age 45–64: Credit card debt	0.0248511	0.0014895	16.684	<2e-16 ***
Age 65 & +: Credit card debt	0.0510435	0.0027904	18.293	<2e-16 ***
Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

Table 8
Result of the LR test.

#Df LogLik Df Chisq Pr (>Chisq)
Model 1 42 -715,706
Model 2 77 –711,729 35 7953.6 < 2.2e-16 ***
Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 9
Financial and socioeconomic factors associated with the success of proposals.

Fixed effects	Estimate	Std. Error	z value	Pr (>|z|)
(Intercept)	−1.75017	0.114577	−15.275	<2e-16 ***
Region British Columbia	0.488928	0.099867	4.896	9.79e-07 ***
Region Prairies	0.083575	0.082357	1.015	0.310207
Region Ontario	0.304235	0.098545	3.087	0.002020 **
Region Atlantic	−0.09838	0.082143	−1.198	0.231032
Filing year 2008	−0.61522	0.021362	−28.8	<2e-16 ***
Filing year 2009	−0.3279	0.020223	−16.214	<2e-16 ***
Filing year 2010	−0.08521	0.019678	−4.33	1.49e-05 ***
Filing year 2011	0.058221	0.019762	2.946	0.003217 **
Filing year 2012	0.093176	0.019637	4.745	2.09e-06 ***
Filing year 2013	0.06764	0.019118	3.538	0.000403 ***
Filing year 2015	−0.55103	0.02068	−26.646	<2e-16 ***
Filing year 2016	−1.07549	0.020874	−51.523	<2e-16 ***
Filing year 2017	−1.59744	0.02398	−66.614	<2e-16 ***
Filing year 2018	−2.05557	0.030134	−68.214	<2e-16 ***
Senior (yes = 1, no = 0)	0.08374	0.058974	1.42	0.155627
Couple (yes = 1, no = 0)	0.255398	0.009684	26.374	<2e-16 ***
Age at filing (log)	−0.01238	0.018274	−0.677	0.498221
Home ownership (yes = 1, no = 0)	−0.20313	0.068902	−2.948	0.003197 **
Mortgage debt (log)	0.035738	0.005908	6.05	1.45e-09 ***
Total income (log)	−0.11626	0.005539	−20.988	<2e-16 ***
Total Asset (log)	0.049298	0.003662	13.463	<2e-16 ***
Exemption (log)	0.013739	0.002049	6.704	2.03e-11 ***
Non-exempt value (log)	0.023015	0.001452	15.856	<2e-16 ***
Unsecured debt (log)	0.239117	0.006428	37.201	<2e-16 ***
Secured debt (log)	−0.02456	0.001454	−16.898	<2e-16 ***
Credit card debt (log)	0.091969	0.001471	62.54	<2e-16 ***
Senior: Region British Columbia	−0.30306	0.074142	−4.088	4.36e-05 ***
Senior: Region Prairies	−0.06684	0.068554	−0.975	0.329582
Senior: Region Ontario	−0.18926	0.045798	−4.132	3.59e-05 ***
Senior: Region Atlantic	−0.13195	0.077254	−1.708	0.087643.
Senior: Filing year 2008	0.622523	0.109377	5.692	1.26e-08 ***
Senior: Filing year 2009	0.203811	0.091033	2.239	0.025165 *
Senior: Filing year 2010	0.037131	0.081026	0.458	0.646763
Senior: Filing year 2011	−0.02111	0.077778	−0.271	0.786078
Senior: Filing year 2012	0.03611	0.076742	0.471	0.637975
Senior: Filing year 2013	0.030128	0.074875	0.402	0.687406
Senior: Filing year 2015	−0.05934	0.075594	−0.785	0.432478
Senior: Filing year 2016	0.051901	0.078434	0.662	0.508152
Senior: Filing year 2017	0.147635	0.091189	1.619	0.105447
Senior: Filing year 2018	0.467156	0.106554	4.384	1.16e-05 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

4.3. Completion of proposals by seniors

If insolvent seniors are less likely to file a proposal, those who file a proposal seem to have a higher likelihood than the rest of the population to complete their proposal (Table 9). In fact, insolvent seniors are 8.7% more likely to complete their proposals than the rest of the population. Regionally, when we compare the behaviour of insolvent debtors in the other regions of Canada with those in the region of Quebec, we observe a striking difference between seniors and the rest of the population in Quebec when it comes to the outcome of proposals. In fact, while insolvent debtors in the regions of British Columbia, Ontario and the Prairies were more likely than those living in Quebec to complete their proposals, seniors in Quebec were more likely than insolvent seniors living in these regions to complete their proposals. Seniors living in the region of British Columbia experienced the widest gap where the likelihood of a consumer proposal to be fully completed was 26% higher than in the region of Quebec. These results are revealing, since they highlight significant differences between insolvent seniors and other debtors in the region of Quebec, on the one hand, and between insolvent seniors in the region of Quebec and elsewhere in the country, on the other hand.

Likewise, while only consumer proposals filed between 2011 and 2013 where more likely than those filed in 2014 to be fully completed, only proposals filed by seniors in 2011 and 2015 where less likely to be fully completed. Compared with the year of 2014, consumer proposals filed by seniors had the highest likelihood to complete in 2008 with 86.4%, and in 2018 with 59.5%.

4.4. Receipt of proposals filed by seniors

Overall, we observe no notable differences between the amounts of money paid toward consumer proposals filed by insolvent seniors and the rest of the population. In fact, the total receipt of consumer proposals filed by insolvent seniors is on average only $163 lower than those filed by the rest of the population. If we combine the facts that fully completed proposals paid $10,200 more than failed proposals, and that proposals filed by seniors have a higher likelihood to be fully completed, this outcome seems to indicate that receipt form fully completed proposals are far lower for seniors than the rest of the population (Table 10).

Regionally, although total receipt of consumer proposals is lower elsewhere in Canada than in the region of Quebec, total receipt of consumer proposals filed by insolvent seniors in Quebec is higher than elsewhere in Canada. In fact, with an amount that is on average $1316 higher than what they pay in the region of Quebec, insolvent seniors in the region of Ontario paid the highest total receipt in Canada. Given that proposals filed by insolvent seniors in the region of Quebec have a higher likelihood to be fully completed, it is to wonder if the outcome of proposals is not tied to the value of the proposal.

However, when we look at the receipt through the lens of time, we observe that consumer proposals filed by insolvent seniors in 2008 and 2018 had the highest total receipt, whereas those filed in 2011 and 2012 had the lowest total receipt. All together, proposals filed in 2015 had the highest total receipt, and those filed in 2018, the lowest receipt. However, one needs to be careful when reading these results, for failed proposals tend to close early in the process and pay a lower receipt. At the time of the data collection, in January 2020, most of the proposals filed in 2017 through 2018 were still open.

5. Conclusion

The share of insolvencies filed by seniors has indeed been in the rise over the last decade, but so is their share in the population aged 18 years old and over. Data collected on insolvencies and population between 2008 and 2018 show a perfect correlation between these two variables, which leads to the rejection of the notion that insolvencies have increased among seniors. As forecasted by Statistics Canada, because of the demographic transition that Canada has experienced now for some time, the share of seniors in the total population will continue to grow, and their share in total insolvencies will follow suit. Now, the only cause of concern remains the growing number of bankruptcies filed by seniors as opposed to proposals compared to the rest of the population. This might hint that insolvent seniors are in a direr financial situation than the rest of the population, since filing for bankruptcy requires the debtor to turn over their entire non-exempt asset the LIT. Again, the findings indicate that if seniors are less likely than the rest of the population to file a proposal as opposed to bankruptcy, their proposals are more likely to complete. This seems to indicate that seniors are wiser and more consistent in their insolvency choice than the rest of the population. In fact, after accounting for the province of residence and the year of filing, we observe no significant difference in the total receipt of proposals filed by seniors and the rest of the population.

Furthermore, the findings display an undisputable disparity in the indebtedness of seniors over the years and across the country. Such results, which are consistent with the trends observed in the economy, are attributable to the growing access to credit, namely through the rising popularity of reverse mortgage, and the difference in the rising cost of living between the provinces. As seniors aged, their access to credit drops dramatically, which creates a positive relationship between age and indebtedness. In other words, the older the senior, the lighter the debt load.

However, if the findings do not justify the recent animated debate in the media over the insolvencies of seniors, and that seniors are not as insolvent as it appears, one should not forget that each insolvency filed by seniors remains a very unfortunate situation. For, the "fresh start" proposed by the insolvency system is, by all mean, out of the reach of seniors who cannot enjoy the benefits of an active life where they can improve their financial situation through the labour market.

It is possible that the growing number of insolvent seniors who are still active on the labour market after the official retirement age might be a symptom of seniors struggling to survive in a tough economic environment.

In other words, in the current context, labour shortage makes it more likely that seniors will remain in the Canadian labour market, and thus the issue of their insolvency will be more important. Public policies to support low incomes need to be better aligned with other labour market policies (which focus on ageing and labour shortages) to protect older people from financial difficulties. This need

Table 10

Financial and socioeconomic factors associated with the Receipt of insolvencies.

Coefficients	Estimate	Std. Error	t value	Pr (>|t|)
(Intercept)	−105900	584.50	−181.153	<2e-16 ***
Region British Columbia	−1315	122.60	−10.728	<2e-16 ***
Region Prairies	−271	115.70	−2.339	0.019340 *
Region Ontario	−1062	78.52	−13.528	<2e-16 ***
Region Atlantic	−3228	151.40	−21.326	<2e-16 ***
Filing year 2008	−372	137.90	−2.696	0.007013 **
Filing year 2009	−559	123.50	−4.529	5.93e-06 ***
Filing year 2010	−378	115.90	−3.261	0.001109 **
Filing year 2011	−200	113.90	−1.754	0.079370.
Filing year 2012	35	112.90	0.309	0.757157
Filing year 2013	88	111.40	0.787	0.431348
Filing year 2015	223	133.80	1.668	0.095321.
Filing year 2016	−493	144.40	−3.412	0.000645 ***
Filing year 2017	−418	174.50	−2.395	0.016624 *
Filing year 2018	−1588	226.90	−6.997	2.62e-12 ***
Senior (yes = 1, no = 0)	−163	368.70	−0.443	0.657763
Proposal completed (yes = 1, no = 0)	10,200	69.71	146.381	<2e-16 ***
Couple (yes = 1, no = 0)	703	60.28	11.655	<2e-16 ***
Age at filing (log)	2135	122.00	17.502	<2e-16 ***
Employment income (yes = 1, no = 0)	638	94.50	6.747	1.51e-11 ***
Pension income (yes = 1, no = 0)	395	120.00	3.289	0.001006 **
Employment insurance income (yes = 1, no = 0)	−1270	148.60	−8.544	<2e-16 ***
Welfare income (yes = 1, no = 0)	472	216.10	2.186	0.028803 *
Self-employment income (yes = 1, no = 0)	94	121.10	0.78	0.435585
Home ownership (yes = 1, no = 0)	−3747	436.90	−8.577	<2e-16 ***
Mortgage debt (log)	314	37.36	8.405	<2e-16 ***
Total income (log)	−828	30.33	−27.288	<2e-16 ***
Total Asset (log)	448	24.54	18.249	<2e-16 ***
Exemption (log)	70	13.03	5.344	9.12e-08 ***
Non-exempt value (log)	168	9.06	18.571	<2e-16 ***
Unsecured debt (log)	10,500	40.37	260.035	<2e-16 ***
Secured debt (log)	−120	9.30	−12.948	<2e-16 ***
Credit card debt (log)	−395	10.34	−38.157	<2e-16 ***
Senior: Region British Columbia	678	446.70	1.517	0.129143
Senior: Region Prairies	194	434.40	0.446	0.655747
Senior: Region Ontario	1316	285.10	4.616	3.91e-06 ***
Senior: Region Atlantic	877	491.70	1.784	0.074422.
Senior: Filing year 2008	2867	640.10	4.478	7.53e-06 ***
Senior: Filing year 2009	739	538.90	1.371	0.170285
Senior: Filing year 2010	76	474.10	0.159	0.873443
Senior: Filing year 2011	−383	449.40	−0.853	0.393734
Senior: Filing year 2012	−268	436.60	−0.614	0.53931
Senior: Filing year 2013	15	430.90	0.035	0.972035
Senior: Filing year 2015	1457	494.20	2.949	0.003184 **
Senior: Filing year 2016	1534	538.60	2.848	0.004405 **
Senior: Filing year 2017	1179	652.30	1.808	0.070644.
Senior: Filing year 2018	2778	823.50	3.373	0.000744 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1. Residual standard error: 15,220 on 297,365° of freedom. Multiple R-squared: 0.3278, Adjusted R-squared: 0.3277. F-statistic: 3153 on 46 and 297,365 DF, p-value: <2.2e-16

to strengthen public action, in the field of seniors insolvency, has become more urgent with the very significant rise in inflation (particularly in housing) affecting Canadian households.

Further research that includes data for other seniors who do not use the insolvency system will provide a clearer picture of the financial situation of seniors and improve our understanding of their insolvency.

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