# Profiles of Debt: Revolving Behavior and Financial Fragility

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**Abstract**

This paper examines the financial well-being and consumption dynamics of credit card users who carry revolving balances (i.e., Revolvers). Using microdata from the Bank of Canada's Digital Wallet and Payment Trends survey, I find limited evidence that Revolvers lack sufficient savings to absorb unexpected shocks and maintain adequate consumption during retirement. Despite earning less and appearing to face tighter liquidity constraints, Revolvers report financial assets, liabilities, and financial comfort similar to non-revolving consumers (i.e., Convenience users). Available evidence also undermines concerns that revolving cardholders experience sharp declines in consumption during retirement. While Revolvers' consumption levels are slightly lower than those of Convenience users near retirement, this pattern is more consistent with broader differences in age-consumption profiles across the two groups than with a sharp deterioration in consumption around retirement. Specifically, Revolvers consume

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more early in life but experience slower consumption growth during their prime working years, resulting in a more compressed hump-shaped consumption profile. Taken together, the findings are consistent with liquidity conditions playing an important role in revolving behavior.

**JEL Classification:** D12, D14, D15, G51

# 1 Introduction and Related Literature

## 1.1 Introduction

The prevailing narrative around credit card borrowing often portrays cardholders who carry revolving balances (i.e., Revolvers) as financially fragile, i.e., having insufficient savings to absorb unexpected shocks (Angeletos et al., 2001; Fulford and Schuh, 2024) or to maintain an adequate standard of living later in life (U.S. Government Accountability Office, 2021; Jacques, Leroux, and Stevanovic, 2021). By the second quarter of 2024, outstanding credit card debt in Canada had exceeded its highest level since 2007, with similar increases observed in the United States and the United Kingdom (Equifax Canada, 2024; Federal Reserve Bank of New York, 2026; Bank of England, 2026). These trends have heightened concerns about the financial vulnerability of Revolvers.

Yet, little is known about the financial health of Revolvers relative to their non-revolving counterparts (i.e., Convenience users), despite its importance for effective policy interventions. Consider policies that require higher minimum monthly credit card payments (Keys and Wang, 2019; Allen, Boutros, and Guttman-Kenney, 2024). If Revolvers lack the necessary savings for retirement, higher minimum payment thresholds can improve their readiness by curbing long-term debt accumulation. By contrast, if consumers carry debt to smooth consumption, higher minimum payments may restrict their cash flow and reduce welfare.[1]

This paper fills an important evidence gap regarding Revolvers' well-being by leveraging rich microdata on revolving status, consumption, and financial standing. Although Revolvers have lower average incomes and face tighter liquidity constraints than Convenience users, the data suggest that these disadvantages do not translate into substantially weaker financial standings among the former. Both groups of cardholders report broadly similar financial assets, liabilities, and levels of self-reported financial comfort. Furthermore, I find no evidence that revolving cardholders experience more pronounced declines in consumption

[1] Allen, Boutros, and Guttman-Kenney, 2024 also finds that these reductions may come at the cost of greater delinquency and more restricted credit access.

near retirement than their non-revolving counterparts (Lusardi, Mitchell, and Oggero, 2020). Thus, the evidence indicates that revolving behavior is more consistent with an important role for liquidity conditions than with overall lack of savings.

The main data source for this paper is the Bank of Canada's Digital Wallet and Payment Trends survey, an annual cross-sectional survey administered by the Institut Public de Sondage d'Opinion Secteur (IPSOS), a multinational firm specializing in market research. The dataset contains detailed individual-level information on spending, revolving status, demographic characteristics, and household financial conditions. This combination of credit card usage information and broader household balance-sheet measures makes the survey particularly useful for assessing whether revolving balances are systematically associated with financial fragility.

First, the data provide limited support for the common interpretation of revolving balances as an early indicator of financial fragility (Elul et al., 2010; Grodzicki and Koulayev, 2021; Zhao, Witts, and Xiao, 2026). Revolving and non-revolving cardholders have nearly identical distributions of financial asset holdings and only modest differences in liabilities. Consistent with these balance-sheet similarities, both groups also report comparable levels of financial comfort, with approximately 80% of cardholders in each group indicating that they are comfortable with their finances. This similarity persists after flexibly controlling for income, assets, liabilities, and other observable characteristics.

Second, although Revolvers report lower income on average than Convenience users, this difference largely reflects correlations between income and other characteristics, rather than an independent relationship between income and revolving behavior. The results show that income is a weak predictor of revolving behavior along both the extensive (i.e., the propensity to revolve) and intensive (i.e., the amount borrowed conditional on revolving) margins. Conditional on asset and liability levels, a CAD 10,000 increase in pretax income reduces the likelihood of revolving by less than one percentage point (pp), relative to the 21% sample average. Conditional on revolving, income is also not significantly associated with the

outstanding balance carried. By contrast, variables related to household asset composition are more strongly associated with revolving behavior. Investment account ownership predicts a 10 pp lower probability of revolving, whereas being a mortgagor predicts a 7 pp higher likelihood of revolving.

One possible interpretation is that investment-account ownership and mortgage ownership capture differences in household liquidity. Since mortgage payments draw directly on disposable income, they inherently tighten short-term cash flow constraints, holding other factors constant (Greene and Stavins, 2023). Investment accounts, by contrast, may reflect greater financial flexibility, especially when they consist of relatively liquid assets such as stocks and mutual funds. Thus, mortgage and investment account ownership proxy for opposite liquidity conditions among cardholders. This perspective is consistent with the similarly sized but opposite effects of these variables on the propensity to revolve, and echoes previous work emphasizing the role of liquidity in credit card borrowing (Telyukova, 2013). However, because the data do not contain direct measures of respondents' liquidity constraints, these interpretations should be approached with caution.

Third, this paper tests whether Revolvers are indeed vulnerable to a steep consumption decline in retirement (Angeletos et al., 2001). This concern rests on the standard prediction that patient Convenience users smooth their consumption through savings, while impatient Revolvers prioritize consumption over savings and thus exhibit more pronounced hump-shaped consumption profiles (Fulford and Schuh, 2024). Because long household panels containing detailed information on both consumption and credit card borrowing are rarely available, I construct synthetic life-cycle profiles from repeated cross-sectional observations, following the logic of the synthetic-cohort literature (Deaton, 1985; Gourinchas and Parker, 2002; Dang and Lanjouw, 2023). Specifically, I group respondents by age and revolving status and use older individuals observed in the same survey periods to approximate the future outcomes of otherwise comparable younger individuals. This approach requires revolving status to be sufficiently persistent over a one-year horizon. The resulting income profiles

exhibit plausible hump-shaped dynamics for both revolving and non-revolving cardholders, providing supporting evidence for the empirical framework.

Although Revolvers' post-retirement consumption is slightly lower than that of Convenience users, the constructed profiles provide little evidence that Revolvers experience sharper declines in spending near retirement. Revolvers consume more at younger ages, but experience slower consumption growth during their prime working years and decline less around retirement. Thus, while both groups exhibit the classic hump-shaped consumption profile (Gourinchas and Parker, 2002), the pattern is less pronounced among Revolvers. Differences in age-income profiles do not appear to explain these patterns: Revolvers exhibit neither faster income growth during their prime working years nor a meaningfully smaller decline in income around retirement. Nevertheless, because these profiles are constructed from repeated cross-sectional data rather than observed individual trajectories, the evidence should be interpreted as suggestive rather than conclusive.

Alternatively, the observed consumption profiles can be understood through a life-cycle model in which revolving and non-revolving consumers have similar lifetime resources and income dynamics, but the former are more impatient. In particular, greater impatience leads Revolvers to front-load consumption, resulting in higher consumption early in life and slower subsequent growth. This interpretation, nevertheless, presents a puzzle as greater impatience among Revolvers would also imply lower saving and weaker balance-sheet positions than Convenience users, whereas data suggest both groups exhibit broadly similar financial positions. To resolve this puzzle, I develop a model of ex-ante self-control in which Revolvers exhibit time-inconsistent preferences. Specifically, these cardholders behave as patient Investors when making investment decisions but as impatient Spenders when choosing consumption. By placing wealth in less accessible, illiquid assets, the Investor can preserve long-term savings while limiting the resources available for immediate consumption by the Spender. The model therefore provides one possible explanation for why Revolvers can maintain substantial assets despite facing tighter liquidity constraints and carrying credit card

debt. Through the lens of the model, revolving debt can arise as a cost of self-control rather than solely as an indicator of financial fragility.

## 1.2 Related literature

By combining descriptive profiling of Revolvers and Convenience users with careful regression analysis of credit card debt determinants, this study contributes to ongoing policy discussions about the relationship between credit card debt and financial vulnerability. Although some studies address related issues, they either focus on different questions (Bilyk and Peterson, 2015; Allen et al., 2022; Allen, Boutros, and Guttman-Kenney, 2024) or rely on credit report data, which lack key demographic information (Xiao, 2024; Bank of Canada, 2023b). As such, prior research offers limited insight into differences between Revolvers and Convenience users, particularly with respect to their financial circumstances.

The analysis of credit card debt determinants is closely related to Zhou, 2022 and Islam and Picault, 2025, which examine revolving behavior in Canada using the Survey of Financial Security (SFS). Because the SFS reports repayment behavior only in broad categories, these studies focus on the probability of revolving (i.e., the extensive margin), but not demand for outstanding balances conditional on revolving (i.e., the intensive margin). By contrast, this paper examines both the extensive and intensive margins of credit card borrowing. Although similar analyses exist for other markets (Kim and DeVaney, 2001; Del-Rio and Young, 2005; Lin et al., 2019), this paper is among the first to examine both margins in Canada. Given that consumer behavior is highly market-specific, the findings offer contextually relevant insights for Canadian regulators and policymakers.

Estimating the intensive margin may be subject to selection bias because balances are observed only for Revolvers (Heckman, 1979). Existing studies address this using the Heckman correction (Kim and DeVaney, 2001; Lin et al., 2019). Without a credible exclusion restriction, however, identification relies heavily on functional-form and distributional assumptions

(Koop and Steel, 2001; Del-Rio and Young, 2005).[2] This paper complements the existing literature by assessing the sensitivity of the intensive-margin estimates to alternative degrees of selection on unobservables. Following the logic of sensitivity analyses in Altonji, Elder, and Taber, 2005, I re-estimate the relationship between revolving debt and demographic characteristics over a range of assumed correlations between the unobserved determinants of revolving status and outstanding balances. While this approach does not resolve the lack of an exclusion restriction, it nevertheless illustrates the robustness of estimated relationships to different degrees of selection on unobservables.

This paper also contributes to a growing literature that incorporates credit cards into life-cycle models by providing new evidence on the consumption dynamics of Revolvers and Convenience users. Due to data limitations and difficulties in identifying revolving status (Fulford and Schuh, 2023), existing work has relied primarily on model-generated predictions rather than direct empirical comparisons between the two groups (Fulford and Schuh, 2024).

A related literature examines the relationship between revolving credit card debt and household liquidity. The literature documents the "credit card debt puzzle", whereby some households carry high-interest credit card debt while simultaneously holding liquid assets that could be used to repay them (Gross and Souleles, 2002). One explanation is that households preserve liquid balances to meet expenses for which credit cards cannot be used, making savings and available credit imperfect substitutes (Telyukova, 2013; Greene and Stavins, 2023). Alternative explanations emphasize self-control as a reason why consumers may jointly hold revolving debt and savings (Bertaut, Haliassos, and Reiter, 2009; Gathergood and Weber, 2014; Medina and Pagel, 2025).

Relative to this literature, my paper seeks to explain why revolving and non-revolving cardholders exhibit similar balance-sheet characteristics and levels of financial well-being, despite Revolvers facing seemingly tighter liquidity constraints. The Investor-Spender framework introduced in Section 6 builds upon the "accountant-shopper" model, in which the

[2]Specifically, we need a variable that affects propensity to revolve but not demand for outstanding balances conditional on revolving.

patient "accountant" chooses not to repay existing credit card debt to enforce a tighter borrowing limit on the impatient "shopper" (Bertaut, Haliassos, and Reiter, 2009). Applying this logic, my model interprets the potentially greater concentration of wealth in illiquid assets among Revolvers as a mechanism for the patient Investor to preserve long-term savings by restricting the resources immediately available to the impatient Spender.

# 2 Data

The main data source for this paper is the Digital Wallet and Payment Trends Survey (DWPT), a cross-sectional study administered by IPSOS. As the name suggests, the survey focuses on the landscape of Canada's payment market, tracking emerging trends and providing detailed insights into credit card ownership, usage patterns, revolving status, as well as the amount of outstanding balances conditional on revolving.

For each respondent, the survey provides rich demographic information, including age and household income, as well as detailed measures of financial standing, such as assets and liabilities. The breadth and depth of information available allow me to analyze differences between groups of credit card users without having to combine multiple data sources.

For example, one of the most extensively studied datasets of this kind, the Consumer Credit Panel (Lee and Klaauw, 2010; Fulford and Schuh, 2023; Fulford and Schuh, 2024; Haughwout et al., 2024), provides account-level data for credit card accounts in the U.S., but it captures only a snapshot of the total credit balance for each account. Because the total credit balance consists of both newly incurred spending (i.e., transacting balances) and revolving balances from previous periods, determining an individual's revolving status represents a nontrivial task even with panel data (Fulford and Schuh, 2023).

To illustrate this challenge, consider a case in which an analyst observes that an individual has a total credit card balance of $1,500 in a given period. This balance could reflect purchases made during the current billing cycle that will be fully paid off before interest

is charged, in which case the individual would be a Convenience user. Alternatively, some portion of the balance could reflect unpaid debt carried over from a previous period, in which case the individual would be a Revolver. Without additional information on credit card spending and repayment behavior, it is difficult to distinguish between these two cases, even when balances are observed over multiple periods.

By contrast, revolving status is readily available in the DWPT. Respondents are first asked, "Do you currently carry an outstanding balance on your card(s)?" Conditional on selecting yes, they are then asked to report the exact dollar amount of their outstanding balance. Based on these responses, the survey defines Revolvers as cardholders who carry an outstanding balance, and Convenience users as those who do not. Alternatively, Revolvers can be defined as anyone who does not "pay the entire amount owing" when asked "Do you usually pay the entire amount owing, pay the minimum amount owing, or somewhere in between?". These definitions of revolving status agree for 88% of respondents and yield similar shares of Revolvers (Table 1). The main analysis uses the definition based on outstanding balances, as the amount of revolving credit is required to study the intensive margin of credit card debt.[3] Results regarding Revolvers' financial well-being remain robust to using the alternative repayment-based definition of revolving status (Appendix A.6).

The data used in this analysis include the results from the 2021 and 2022 surveys. To focus on differences across types of credit card users, I limit the sample to individuals who own at least one credit card. This leaves me with 12,056 respondents equally divided between the two survey periods. Because the surveys coincided with various government income-support programs introduced in response to the COVID-19 pandemic, these programs may have affected comparisons of self-reported financial comfort between Revolvers and Convenience users. Nevertheless, longer-term financial indicators, such as assets and liabilities, should be less responsive to these temporary income transfers.

[3]Given that credit limits do not change on a monthly basis and utilization rates are highly persistent (Fulford and Schuh, 2024), I assume that the reported outstanding balance coincides with the average revolving balance.

## 2.1 Sample Representativeness and Summary Statistics

Table 1 summarizes the demographics of the DWPT sample. Overall, I find the sample here to be representative of all credit card users in Canada in terms of age and income (Xiao, 2024).[4,5] Most credit card users own two cards, with roughly 20% of all users owning at least three. With 82% of the population owning at least one credit card (World Bank, 2021), there are more cards in circulation than there are Canadians. Given their popularity, it comes as no surprise that credit cards are the most used method of payment by value share at 62%, far outpacing debit cards and cash at 21.2% and 9.6%, respectively. These figures are consistent with reports from the Bank of Canada using the Method of Payment Survey, henceforth MPS (Henry, Shimoda, and Rusu, 2024).

Figure 1 and the accompanying table describe the distribution of outstanding balances conditional on revolving. The distribution is strongly right-skewed. Whereas the median Revolver carries less than CAD 2,000 in outstanding balances, about 25% owe more than CAD 5,000. Thus, relatively large credit card balances are concentrated among a subset of Revolvers, hinting at substantial heterogeneity in demand for revolving credit among revolving consumers.

[4]Technically, the DWPT reports only respondents' income brackets, not their exact income values. However, because these brackets are spaced in CAD 5,000 increments (Appendix A.1), I use the midpoint of each bracket and treat income as a continuous variable

[5]Cardholders are approximately nine years older than the average Canadian population, primarily because individuals must be at least 18 years old to be eligible for a credit card.

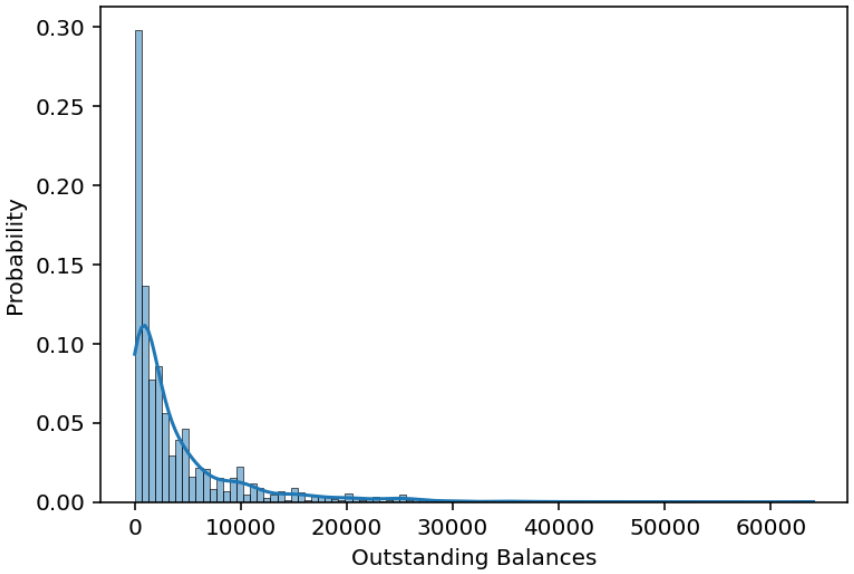
Table 1: Summary statistics for the selected sample.

*Notes*: Share of Wallet denotes the average percentage of monthly expenditures paid using each payment method. Credit card spending refers to average spending on credit cards. Total expense is inferred from credit cards' share of wallet and spending.
The DWPT defines Revolvers as respondents carrying a positive outstanding balance. The alternative definition classifies as Revolvers respondents who usually pay less than the entire balance.

| Variable | Mean | Std | Min | Median | 75th | Max |
|---|---|---|---|---|---|---|
| **Number of credit cards** | 1.8 | .77 | 1 | 2 | 2 | 3 |
| **Share of Wallet (%)**: | | | | | | |
| Cash | 9.6 | 15.1 | 0 | 5 | 10 | 99 |
| Debit cards | 21.2 | 27.5 | 0 | 9 | 35 | 100 |
| Credit cards | 62.0 | 32.4 | 0 | 75 | 90 | 100 |
| Other methods | 7.2 | 13.8 | 0 | 0 | 10 | 99 |
| **Credit card spending ($/month)** | 1377 | 2195 | 0.5 | 1000 | 1900 | 90,000 |
| **Share of Revolvers (%)** | | | | | | |
| DWPT definition | 21.67 | | | | | |
| Alternative definition | 22.26 | | | | | |
| Observations | 12056 | | | | | |

Figure 1: Distribution of Outstanding Balances: Revolvers Only

Source: Survey question "Do you currently carry an outstanding balance on your card(s)?"




*Notes:* Consistent Revolvers are respondents who carry an outstanding balance and do not select "Entire balance owing" when asked, "Do you usually pay the entire amount owing, pay the minimum amount owing, or somewhere in between?"

Inconsistent Revolvers are respondents who carry an outstanding balance but selected "Entire balance owing" in response to the same question.

| Outstanding balance (CAD) | Mean | Stdev | p25 | p50 | p75 | p80 | p90 |
|---|---|---|---|---|---|---|---|
| Full sample | 868 | 3180 | 0 | 0 | 0 | 117.6 | 2000 |
| Revolvers only | 4037 | 5851 | 500 | 1800 | 5000 | 6000 | 10948 |
| Consistent Revolvers only | 4751 | 6169 | 800 | 2500 | 6000 | 8000 | 12000 |
| Inconsistent Revolvers only | 1854 | 4122 | 200 | 600 | 1700 | 2000 | 4500 |

## 2.2 Persistent vs. Transitory Revolvers

**Measurement Gaps Between Surveys and Administrative Data**: Under the DWPT's definition, roughly 21% of credit card users are Revolvers, less than half the 46% reported in studies utilizing administrative credit bureau data (Xiao, 2024; Allen, Boutros, and Guttman-Kenney, 2024).

Discrepancies in measured credit card borrowing across data sources are well documented across markets. In Canada, the MPS reports a comparable revolving rate of 26% (Henry, Shimoda, and Rusu, 2024).[6] Similar discrepancies also appear in the U.S. market. Account-level data on balances and repayment behavior indicate that 66% of U.S. credit card users are Revolvers (Grodzicki and Koulayev, 2019). By contrast, the Survey of Consumer Payment Choice (SCPC), which applies a definition of revolving similar to those used in the DWPT and MPS, reports a substantially lower rate of 45% (Federal Reserve Bank of Atlanta, 2023).[7] Although these estimates may not be directly comparable due to differences in unit of observation and survey wording, they illustrate a broader pattern: survey-based measures tend to produce lower revolving rates than administrative account-level data.

These discrepancies are likely attributable to how revolving status is operationalized. Because credit reports (i.e., TransUnion) allow for the observation of monthly balances and repayments, researchers often define Revolvers as anyone failing to fully repay their balance for more than two consecutive months (Grodzicki and Koulayev, 2019; Xiao, 2024). This approach captures both persistent Revolvers, who regularly carry balances, and transitory Revolvers, who may carry balances only temporarily following unexpected shocks. By contrast, survey-based measures such as the DWPT rely on respondents' self-reported revolving status. In the DWPT, 75% of users identified as Revolvers also report that they "usually" repay less than the full amount (Figure 12, Appendix A.2).[8] This pattern suggests that the DWPT is more likely to capture persistent revolving behavior, while less salient borrowing episodes may go unrecorded.

A complementary explanation for the relatively low revolving rate reported in the DWPT

[6]The MPS identifies a revolver as any respondent who indicates that they "had a balance owing last month and did not pay off the full amount." Notably, this definition does not require respondents to report the exact amount borrowed.

[7]Note that Grodzicki and Koulayev, 2019's analysis is at the account level whereas the SCPC's unit of observation is individual. Part of the difference in revolving rate may be because one individual borrows on multiple accounts.

[8]The remaining 25% of Revolvers may include respondents with temporary borrowing episodes or measurement error between self-reported outstanding balances and usual repayment habits. Demographically, these cardholders are more similar to Convenience users than the "consistent" Revolvers.

is the systematic underreporting of debt in survey data (Brown et al., 2011). Because such underreporting is often unintentional (Zinman, 2009; Akana and Lee, 2025), consumers who revolve only occasionally may fail to recall these transitory debts due to their lower salience. This suggests that larger and more persistent debts are more likely to be salient to respondents and therefore more accurately reported. In accordance with this interpretation, "consistent" Revolvers, whose self-reported revolving status and repayment habits align, report significantly higher outstanding balances than those with inconsistent profiles (Figure 1).[9] Consequently, the results in this paper apply most directly to persistent Revolvers, and may not fully generalize to transitory Revolvers.

# 3 Portrait Of Revolvers

This section develops a descriptive portrait of Revolvers by comparing their demographic characteristics, balance-sheet positions, and reported financial well-being with those of Convenience users. Although Revolvers tend to be younger, have lower levels of education, and face seemingly tighter liquidity constraints, the two groups report broadly similar financial assets, liabilities, and levels of financial comfort. These patterns suggest that revolving status alone is not a sufficient indicator of financial fragility.

## 3.1 Demographic Profiles

Table 2 highlights differences between Convenience users and Revolvers across various dimensions. There is a substantial difference in education level between Revolvers and Convenience users: 35.5% of the former have a bachelor's degree versus 49.5% of the latter. Since education is strongly correlated with financial sophistication (Lusardi and Mitchell, 2014; Lusardi and Tufano, 2015), this gap might point to lower average financial literacy among Revolvers. While this is a possibility, the available evidence suggests that any such difference

[9]Respondents are asked, "Do you currently carry an outstanding balance on your card(s)?" and, if so, to enter the dollar amount of such balances.

in financial management skill does not translate into economically meaningful disparities in balance-sheet positions.

On average, revolving cardholders earn about CAD 11,000 less in pretax income than their non-revolving counterparts. Since earnings are highly correlated with other characteristics, such as education, the observed difference in this dimension alone does not establish income as an important determinant of consumers' revolving behavior. Despite the lower earnings, Revolvers report approximately 22.6% higher monthly consumption than Convenience users (Table 2). This seemingly surprising aggregate difference is driven primarily by Revolvers aged 39 and younger, who consume significantly more than Convenience users in the same age groups (Figure 2a). After age 39, average monthly consumption does not differ significantly between the two groups. These descriptive comparisons therefore provide little evidence that older Revolvers have markedly lower consumption than their non-revolving counterparts (U.S. Government Accountability Office, 2021).

Preliminary evidence indicates that Revolvers earn consistently less than Convenience users across all age brackets (Figure 2b), suggesting that differences in life-cycle income dynamics alone cannot account for this consumption disparity between these groups. Section 5.2 examines the joint income and consumption dynamics of revolving and non-revolving cardholders in greater detail.

Table 2: Demographics of Convenience Users and Revolvers

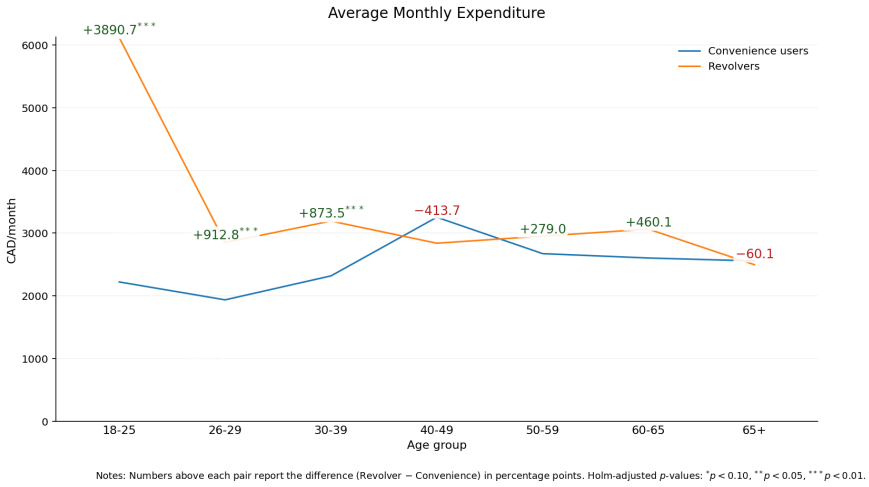
*Notes:* Married individuals include both married couples and common-law partnerships. Pretax income is measured using the midpoints of the reported CAD 5,000 income brackets and treated as a continuous variable. After-tax income is approximated from reported pretax income using federal and provincial tax schedules. The calculation does not account for other tax credits. Monthly consumption is inferred by dividing monthly credit card spending by the share of total expenditure paid by credit card. Reported $p$-values are corrected for multiple-hypothesis testing using Holm-Bonferroni correction. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

| Variable | Convenience users | Revolvers | Difference |
|---|---|---|---|
| Pretax Income (CAD/year) | 86,696 | 75,545 | 11,151*** |
| After-tax Income (CAD/year) | 61,573 | 54,377 | 7,196*** |
| Monthly consumption (CAD) | 2602 | 3191 | 589*** |
| Age | 51.32 | 45.84 | 5.48*** |
| Share with a bachelor's degree (%) | 49.5% | 35.5% | 14.0%*** |
| Share with a mortgage (%) | 31.1% | 40.0% | -8.9%*** |
| Share with an investment account (%) | 63.9% | 45.5% | 18.4%*** |
| Share male (%) | 50.0% | 46.0% | 4.0% |
| Share married individuals (%) | 62.5% | 60.6% | 1.9% |
| Household size (persons) | 2.41 | 2.37 | 0.04 |
| Number of credit cards | 1.80 | 1.83 | -0.03 |
| Observations | 9441 | 2615 | |

Figure 2: Average Consumption And Income By Age Group And Revolving Status

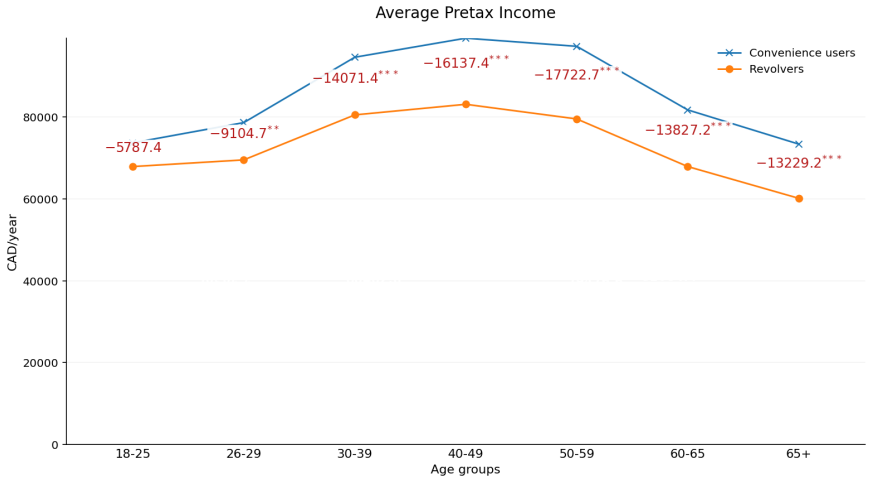
Income is measured using the midpoints of the reported CAD 5,000 income brackets and treated as a continuous variable. Monthly consumption is inferred by dividing monthly credit card spending by the share of total expenditure paid by credit card. Reported $p$-values are corrected for multiple-hypothesis testing. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

(a) Average Monthly Consumption




Notes: Numbers above each pair report the difference (Revolver − Convenience) in percentage points. Holm-adjusted $p$-values: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

(b) Average Pretax Income




Notes: Numbers above each pair report the difference (Revolver − Convenience).Holm-adjusted $p$-values: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

## 3.2 Financial Standing

**Balance-sheet measures:** Figure 3 documents the cumulative and density distributions of financial assets and liabilities among Revolvers and Convenience users, respectively. Since participants select values from a set of predefined ranges that best reflect their situations, the

data on these variables are categorical. I employ the Mann–Whitney U test to assess whether Revolvers' responses differ in a statistically significant manner from those of Convenience users. I use this test instead of the more commonly used Kolmogorov–Smirnov (KS) test because the data are categorical. A key assumption of the standard KS test is that the underlying distribution is continuous. In situations where the distribution's support is sparse, the KS test is not suitable.[10]

Figures 3a and 3b show that Revolvers report slightly higher levels of both financial assets and liabilities than Convenience users. Although these distributional differences are statistically significant for assets ($p = .0003$) and liabilities ($p = .002$), their magnitudes are economically negligible. Because balance-sheet measures are reported in discrete bins, the data may obscure finer differences in financial asset and liability levels between revolving and non-revolving cardholders. Nevertheless, the broadly similar distributions suggest that any such differences are unlikely to be substantial and challenge the notion that Revolvers lack the financial buffers needed to withstand unexpected economic shocks. The same pattern holds when the sample is restricted to cardholders aged 50 and older (Figure 13), providing little evidence that older Revolvers face substantially weaker balance-sheet positions than their non-revolving counterparts. Section 5.3 revisits the discussion regarding Revolvers' outcomes.

Around 35% of Revolvers report having "No debt" when asked: *"Which of the following categories best describes your household's TOTAL FINANCIAL LIABILITIES?, including ... outstanding balance on credit cards"* (Figure 3b). A similar inconsistency persists under the alternative definition of Revolvers as respondents who usually do not pay their "Entire owing balance" (Figure 16).

For the purpose of this analysis, the exact level of reported liabilities is less important than whether the measurement error differs systematically between Revolvers and Convenience users. The empirical comparisons rely on relative differences in liabilities across the two

[10]While the KS test can be modified for discrete distributions, popular implementations of the test often assume continuity

groups rather than on interpreting reported liability levels as precise measures of household indebtedness. Thus, even if liabilities are underreported in levels, the comparison remains informative as long as the degree of misreporting is broadly similar across revolving status. To assess this, I conduct a series of balance tests comparing Revolvers who report their liabilities correctly with those who misreport, as well as comparing Revolvers and Convenience users who report having "No Debt".

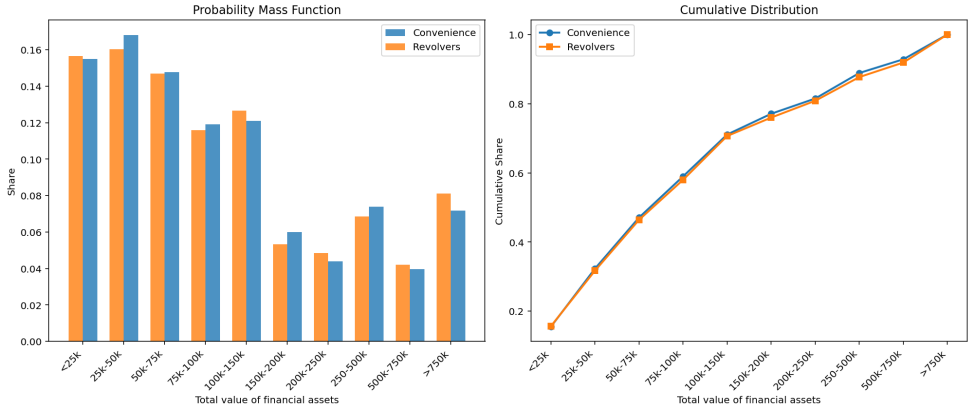
Because credit card borrowing is normally associated with a lack of financial sophistication (Agarwal et al., 2026), one possibility is that some Revolvers misreport their liabilities because they misunderstand the survey questions. If this is the case, we would expect Revolvers who misreport their liabilities to carry higher outstanding balances and to exhibit characteristics associated with weaker financial management skills, such as being younger and having lower educational attainment (Lusardi and Tufano, 2015). Balance tests reveal no significant differences in either demographic characteristics or the amount of outstanding balances between these Revolvers, and thus provide little support for this hypothesis (Table 5a, Appendix A.2).[11]

Using similar logic, if misreporting were systematic and disproportionately concentrated among Revolvers, we would expect the demographic differences between Convenience users and Revolvers who report "No Debt" to differ from those observed in the full sample. The balance tests show that these differences are instead broadly similar, providing little evidence that liability misreporting is systematically related to revolving status (Table 5b, Appendix A.2).[12]

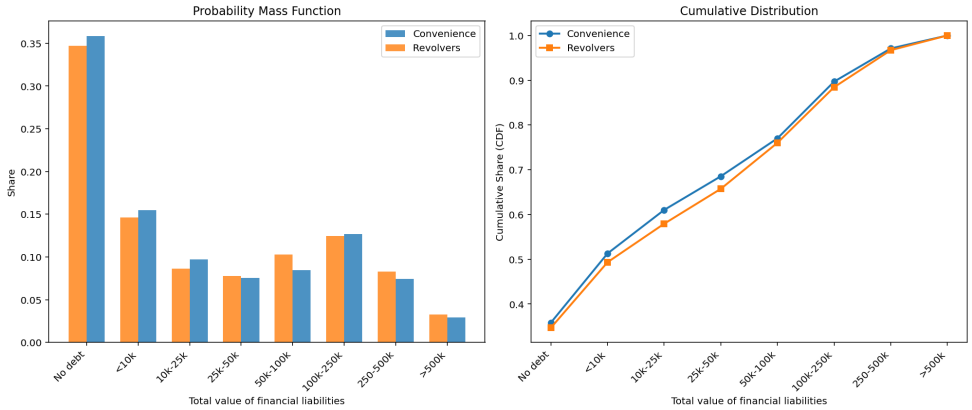
[11]The survey explicitly defines outstanding balances as credit card balances that incur interest and uses this terminology consistently throughout the questionnaire. Thus, confusion over what constitutes an outstanding balance is unlikely to explain the pattern in Figure 3b.

[12]Given that about 70% of Canadians have some form of debt (Statistics Canada, 2017), it appears unlikely that more than one-third of Convenience users truly have no financial liabilities.

Figure 3: Cumulative distribution of financial assets and liabilities




(a) The DWPT asks: "*What is the total value of your household's financial assets?*"




(b) The DWPT asks: "*Which of the following categories best describes your household's TOTAL FINANCIAL LIABILITIES?*"

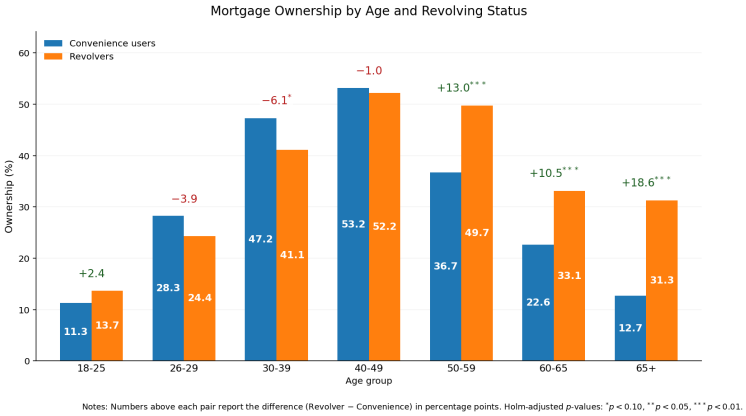
**Liquidity conditions:** Figure 4 reports mortgage and investment-account ownership rates by age and revolving status. Mortgage-ownership rates are broadly similar across revolving status through age 49 but diverge sharply thereafter (Figure 4a). The data indicate that Revolvers are between 10 and 18.6 percentage points more likely to hold a mortgage after age 50 than Convenience users, with the differences remaining statistically significant after correcting for multiple-hypothesis testing. The observed gap may reflect either later homeownership and mortgage origination or slower mortgage repayment among Revolvers. Because differences in mortgage ownership before age 50 are statistically insignificant, the data are more supportive of the latter explanation. Without information on mortgage origination dates or amortization schedules, this interpretation remains suggestive rather than

conclusive. Regardless of the underlying mechanism, mortgages represent financial obligations that restrict the amount of disposable income available for other uses. Thus, the higher likelihood of being a mortgagor likely reflects tighter liquidity constraints among revolving cardholders.

Similar logic applies to their lower rate of investment account ownership. Since these accounts are typically associated with more liquid assets (i.e., stocks and bonds), low ownership of investment accounts among Revolvers (Figure 4b) suggests that consumers might allocate more of their wealth toward illiquid assets and therefore face tighter liquidity constraints.

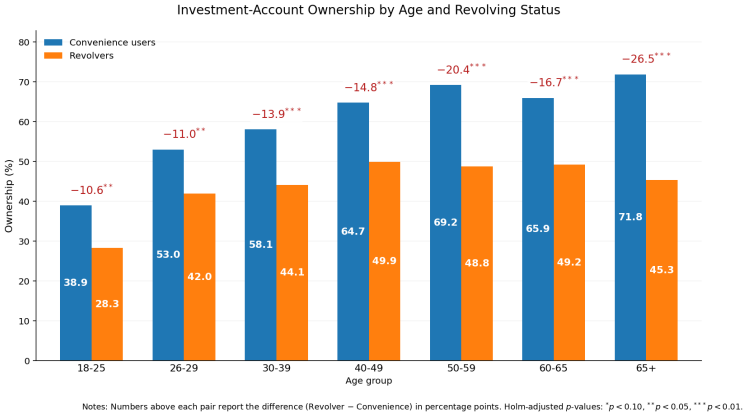
Figure 4: Mortgage and Investment-Account Ownership by Age and Revolving Status

(a) Share of cardholders with mortgage




Notes: Numbers above each pair report the difference (Revolver − Convenience) in percentage points. Holm-adjusted $p$-values: $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$.

(b) Share of cardholders with investment account




Notes: Numbers above each pair report the difference (Revolver − Convenience) in percentage points. Holm-adjusted $p$-values: $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$.

## 3.3 Self-Reported Financial Well-Being

**Revolving versus Delinquency**: The narrative surrounding credit card debt and financial vulnerability often centers on the relationship between credit card debt and delinquencies on other credit products (Keys, Mahoney, and Yang, 2023; Zhao, Witts, and Xiao, 2026). Evidence from administrative data indicates that among delinquent mortgagors, incidents of delinquency on non-mortgage debt, including credit cards, rise sharply twelve months before the initial missed mortgage payment (Zhao, Witts, and Xiao, 2026). Evidence on delinquency, however, does not directly establish financial fragility among Revolvers because revolving and delinquency are conceptually distinct.

This distinction matters because revolving status and delinquency are conceptually different. A credit card account is delinquent when the cardholder fails to make at least the required minimum payment (Capital One, 2025). A Revolver may continue making payments above the minimum while carrying part of the balance forward. Thus, although delinquent cardholders are Revolvers, most Revolvers are not delinquent. In fact, administrative data indicate that the 30-plus-day credit card delinquency rate within the sample period was exceptionally low at approximately 1.47% (DBRS Morningstar, 2023). Furthermore, the correlation between mortgage and non-mortgage delinquencies is not unique to credit cards and extends to other products such as home equity lines of credit (Chan et al., 2016). This broader pattern indicates that financial distress manifests as delinquencies across multiple credit products, rather than revolving credit use alone.

**Subjective Measure of Financial Comfort**: To assess whether revolving debt is directly linked to financial fragility, I compare the self-reported financial comfort levels of Revolvers and Convenience users. If revolving balances are a reliable indicator of financial vulnerability, Revolvers should report lower perceived financial comfort than their non-revolving counterparts.

Figure 5 plots the distribution of participants' responses to the question: *"How comfortable are you managing your current debt load?"*. Since this question was optional and

asked only to respondents who did not select "No debt" when reporting their financial liabilities, the sample size is limited to fewer than half of all respondents (5,722 observations). Of the missing observations, 66.7% are due to participants answering "No debt", while the remaining 33.3% are due to participants skipping the question.

Conditional on selecting "No debt", the differences between Revolvers and Convenience users across observed characteristics closely resemble those in the full DWPT sample (Table 5b, Appendix A.2). Therefore, selection into this subgroup, or equivalently, non-observation of comfort levels due to selecting "No debt", does not appear to be systematically related to revolving status.

Among those who did not pick "No debt" and skipped the comfort question, balance tests show similar characteristics across most variables, although respondents who skipped the question are slightly younger (Table 6, Appendix A.2).[13] A similar pattern holds among Convenience users: those who do not report their financial comfort are also slightly younger than those who do. Meanwhile, Revolvers who skip the question report slightly lower outstanding balances than those who answer it, but are otherwise similar across observable characteristics. Taken together, these findings suggest that observable selection into the financial-comfort sample is limited and unlikely to materially affect the results.[14]

In line with earlier analysis of financial assets and liabilities, differences in responses between Revolvers and Convenience users are tested using the Mann–Whitney U test. Overall, I find no significant difference in reported financial comfort levels between Revolvers and Convenience users (p-value = 0.12). The lack of a significant difference in reported financial comfort between Revolvers and Convenience users remains robust to an ordinal regression model that allows the two groups to apply different subjective thresholds when evaluating the same objective financial conditions (Appendix A.3, Table 9).[15] Together, these findings

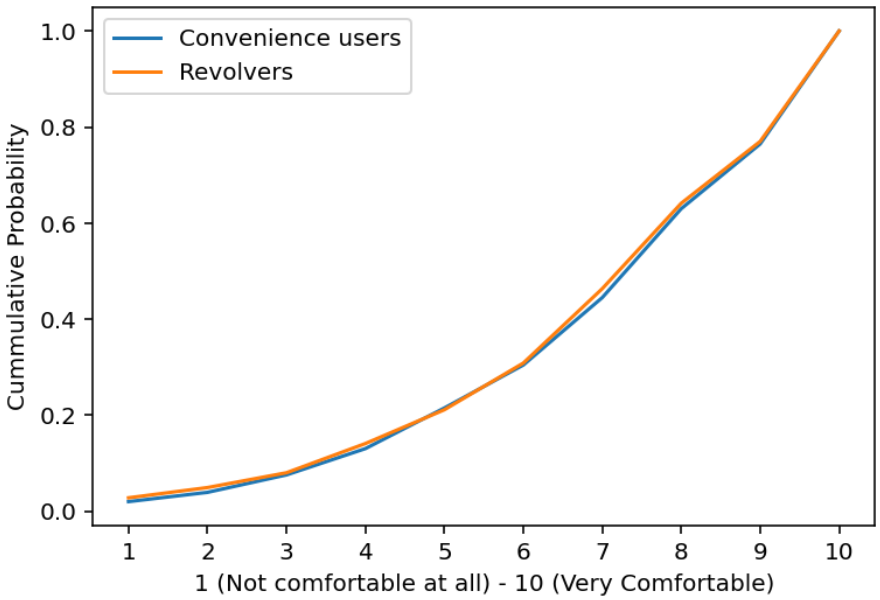
[13]Recall that 35% of Revolvers misreport their total financial liabilities as "No debt".

[14]If anything, the lower outstanding balances among Revolvers who skipped the question suggest that these consumers may be more financially comfortable, which would strengthen the finding of similar comfort levels among revolving and non-revolving cardholders.

[15]In particular, revolving status is allowed to generate a common shift in the thresholds separating adjacent comfort categories.

provide little evidence that Revolvers are in more fragile financial states than Convenience users.[16]

Figure 5: The DWPT asks: "How comfortable are you managing your current debt load?"




# 4 Revolving Behavior And Consumer Characteristics

This section analyzes how demographic and financial characteristics relate to the likelihood of revolving (i.e., the extensive margin) and the amount borrowed conditional on revolving (i.e., the intensive margin). The results are consistent with liquidity conditions playing an important role in revolving behavior.

## 4.1 Revolving Status

Let $\Pr(Revolve_i = 1 \mid X_i, D_i, Z_{2i})$ denote the probability that respondent $i$ is a Revolver conditional on vectors of observable characteristics. To understand factors associated with

[16] I revisit the relationship between Revolvers' financial situations and self-reported comfort level in Section 5.3

consumers' decisions to revolve, I estimate the following relationship

$$\Pr(Revolve_i = 1 \mid X_i, D_i, Z_{2i}) = f\left(X_i, D_i, Z_{2i}\right), \tag{1}$$

where $X_i$ contains age, interest, and income controls, including quadratic terms for age and income. The vector $D_i$ contains indicators for investment-account ownership, mortgage status, and university education. Finally, $Z_{2i}$ contains categorical controls for reported levels of financial assets and liabilities, province of residence, and PRIZM segmentation codes.[17, 18]

The function $f(\cdot)$ maps respondents' observable characteristics into their probability of revolving. Following the literature (Kim and DeVaney, 2001; Del-Rio and Young, 2005), I use a probit model as the main specification.[19] To assess the robustness of the estimated relationships, I also estimate logit and linear probability model (LPM) specifications of Eq. (1). The estimated relationships are broadly consistent across specifications.[20]

## 4.2 Outstanding Balance

As *Balance* is observed only for Revolvers, estimating the intensive-margin equation by OLS on this selected subsample may produce biased estimates due to selection (Kim and DeVaney, 2001). A common approach to account for this bias is to employ the two-stage Heckman method (Heckman, 1979). This method involves estimating a probit specification of Eq. (1) in the first stage. In the second stage, researchers can include the inverse Mills ratio derived from the first-stage estimates to correct for potential sample-selection bias.

[17] These controls are included to reduce concerns about omitted-variable bias.

[18] PRIZM is a widely used customer segmentation tool in marketing research (`https://environicsanalytics.com/en-ca/data/segmentation/prizm`). The DWPT assigns respondents to PRIZM segments based on their survey responses.

[19] This means setting $f(\cdot) = \Phi(\cdot)$, where $\Phi(\cdot)$ denotes the cumulative distribution function of the standard normal distribution.

[20] The latent utility index is assumed to be linear in $\boldsymbol{X}, \boldsymbol{D}$ and $\boldsymbol{Z_2}$.

Formally, the estimating equation in the second stage is:

$$\log Balance = \beta_0 + \log X\boldsymbol{\beta_1} + D\boldsymbol{\beta_2} + Z_2\boldsymbol{\beta_3} + \rho\sigma_\nu \frac{\phi(X, D, Z_2)}{\Phi(X, D, Z_2)} + \nu, \tag{2}$$

where $X, D, Z_2$ are as described in Eq. (1) and $\frac{\phi(X,D,Z)}{\Phi(X,D,Z)}$ is the Inverse Mills ratio (IMR) calculated using the probit specification of Eq. (1).[21]

Barring scenarios where issuers purposefully limit access to credit for specific subgroups of consumers, it is difficult to identify demand-side factors that affect only the decision to revolve but not the outstanding balance carried (Del-Rio and Young, 2005). Without credible exclusion restrictions for the selection equation, $\rho$ is not well identified, and estimates of intensive-margin relationships may be sensitive to violations of the assumptions about the joint distribution of unobservable characteristics in the selection and outcome equations (Koop and Steel, 2001).

As a robustness check, I re-estimate Eq. (2) over a range of imposed values of $\rho$ (Altonji, Elder, and Taber, 2005). For each assumed correlation, I recalculate the selection-adjusted outcome and estimate the corresponding intensive-margin coefficients. Although this does not resolve the lack of a credible exclusion restriction, it shows how strong the correlation between the unobserved factors underlying revolving status and outstanding balances would need to be to materially alter the estimated relationships. The main results regarding the relationships between demographics and revolving credit remain robust across a wide range of assumed values of $\rho$. Details regarding the implementation of the robustness check can be found in Appendix A.4.

## 4.3 Results

For the extensive margin, I report the average marginal effects of each variable on the probability of revolving (Table 3). Following the convention in the macroeconomic literature

[21] $Income^2$ and $Age^2$ are included as the *log* terms squared.

(Gourinchas and Parker, 2002; Fulford and Schuh, 2023), I estimate the relationship between debt and other characteristics (i.e., intensive margin) using a log-log specification (Table 4). Thus, $\boldsymbol{\beta_2}$ represents the differences in outstanding balances among Revolvers with and without an investment account, a mortgage and a bachelor's degree, respectively.

Given the image of struggling individuals turning to credit card debt to make ends meet, it is striking that income plays only a minimal role in consumers' borrowing behavior. Controlling for assets and liabilities, a CAD 10,000 difference in pretax income is associated with approximately a 1 percentage point (pp) lower probability of revolving, relative to the sample's revolving rate of 21%. On the intensive margin, I find no robust association between *Income* and outstanding balances. Although the estimated coefficients are marginally significant at the 10% level in some specifications (Table 4), this significance does not persist across alternative values of $\rho$ (Figure 6). The observed relationship, or lack thereof, between income and revolving behavior suggests that the gap in income between revolving and non-revolving cardholders reflects a correlation between this variable and other demographic characteristics, rather than a direct relationship with revolving behavior. Education level is one likely source of this correlation.

Holding a bachelor's degree (i.e., $University = 1$) is associated with an 8 pp reduction in the probability of revolving (specification (1), Table 3). Conditional on revolving, it is also associated with approximately 29% lower outstanding credit card balances (specification (1), Table 4). Although the magnitude of this association varies substantially with the assumed value of $\rho$, it remains statistically significant across the range of $\rho$ considered (Figure 6).

Given the positive correlation between education and financial literacy (Lusardi and Mitchell, 2014; Goyal and Kumar, 2021), the negative association between $University$ and revolving behavior aligns with the perception of Revolvers as financially naive (Han, 2023; Agarwal et al., 2026). Nevertheless, any such differences do not appear to translate into economically meaningful differences in observed balance-sheet outcomes (Figure 3) or self-reported financial comfort (Figure 5) between Revolvers and Convenience users. Because

the DWPT does not directly measure financial literacy, discussion regarding the association between financial sophistication and revolving behavior remains necessarily tentative.

Conditional on assets, liabilities, and the remaining covariates, investment-account ownership is associated with a 10 pp lower probability of revolving (Table 3). Interestingly, mortgage ownership exhibits the opposite relationship, corresponding to a 7 pp higher probability of revolving. Conditional on the other covariates, $Invest$ and $Mortgage$ serve as proxies for respondents' liquidity. Specifically, since most financial assets are liquid (i.e., mutual funds and stocks), owning an investment account plausibly reflects a greater allocation of wealth toward these assets and hence indicates looser liquidity constraints. Conversely, mortgages represent financial obligations that must be paid from disposable income, and therefore likely indicate tighter liquidity constraints. The negligible effect of income, combined with the opposing impacts of $Invest$ and $Mortgage$, is consistent with liquidity-related factors playing an important role in revolving behavior.

In terms of the intensive margin (Table 4), *Mortgage* is strongly associated with increases in outstanding balances. The corresponding coefficient remains statistically significant across a wide range of values of $\rho$ (Figure 6). This pattern is consistent with evidence from the U.S. market showing that some Revolvers use liquid assets to pay down mortgage debt while relying on revolving credit to finance consumption (Greene and Stavins, 2023). Although the coefficients associated with investment-account ownership are statistically insignificant, point estimates remain negative across all specifications (Table 4). This aligns with the hypothesis that $Invest = 1$ indicates stronger liquidity conditions.

Table 3: Average Marginal Effects on the Propensity to Revolve

*Notes:* Standard errors are reported in parentheses. Assets, liabilities, PRIZM, and province controls are included in all specifications. *Interest*, *Age*, and *Income* enter all specifications in levels. *Interest* denotes the interest rate on outstanding balances. Observations with missing PRIZM codes are excluded. $^{*}$ $p \leq 0.10$, $^{**}$ $p \leq 0.05$, $^{***}$ $p \leq 0.01$.

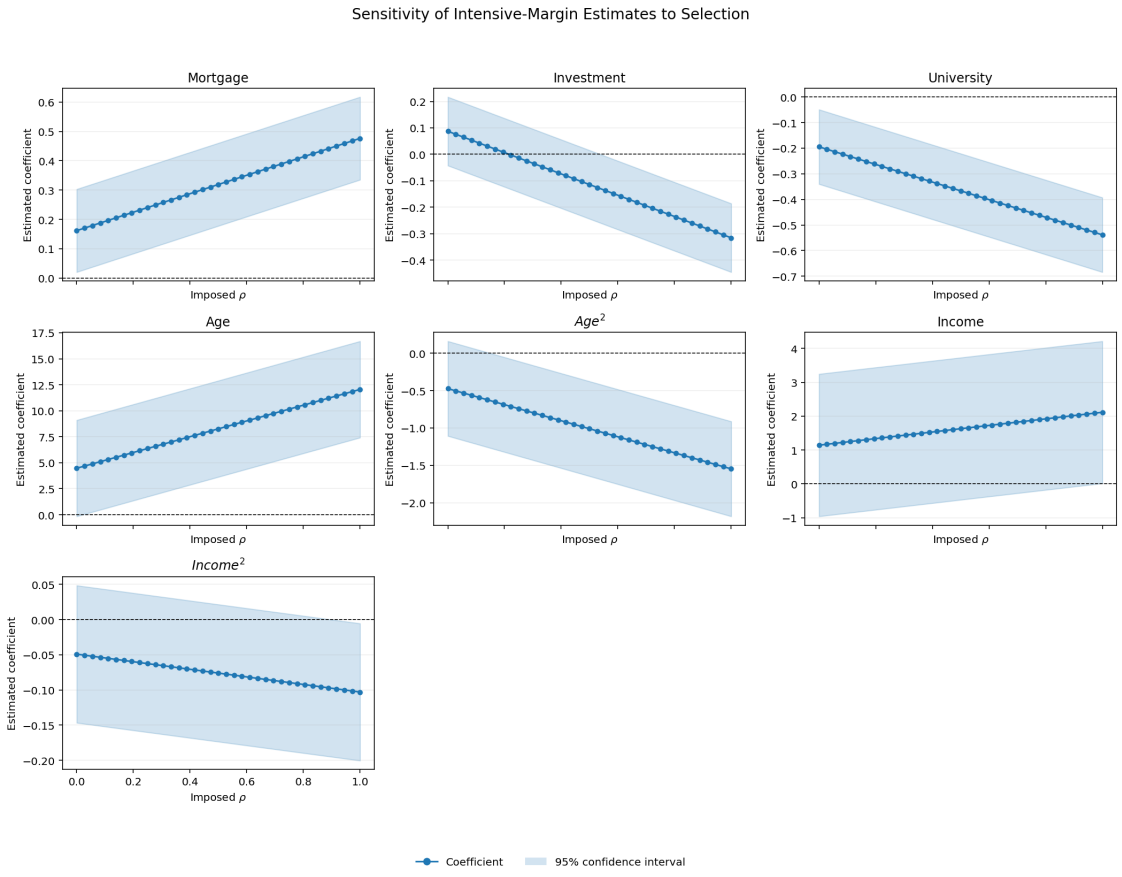
| | **Probit** (1) | **Logit** (2) | **LPM** (3) |
|---|---|---|---|
| *Interest* | -0.0121*** | -0.0142*** | -0.02*** |
| | (0.002) | (0.001) | (0.003) |
| *Age* | 0.0132*** | 0.0136*** | 0.01*** |
| | (0.002) | (0.001) | (0.002) |
| $Age^2$ | -0.0002*** | -0.0002*** | -0.0001*** |
| | (1.55e-05) | (1.26e-05) | (1.73e-05) |
| *Income*(CAD 10,000) | -0.01*** | -0.009*** | -0.01*** |
| | (0.002) | (0.002) | (0.002) |
| $Income^2$ | 0.0002 | 0.0001 | 0.0002* |
| | (0.000) | (0.000) | (9.45e-05) |
| *University* | -0.0831*** | -0.0838*** | -0.10*** |
| | (0.008) | (0.008) | (0.009) |
| *Mortgage* | 0.071*** | 0.0682*** | 0.07*** |
| | (0.008) | (0.008) | (0.009) |
| *Invest* | -0.098*** | -0.0948*** | -0.10*** |
| | (0.008) | (0.008) | (0.008) |
| Observations | 11,554 | 11,554 | 11,554 |
| (Pseudo) $R^2$ | 0.08 | 0.08 | 0.08 |

Table 4: Intensive Margin Estimates

*Notes:* Heteroskedasticity-robust standard errors are reported in parentheses. The first-stage probit specification and estimated inverse Mills ratio are held fixed across specifications. *Interest, Limit* denote the interest rate on outstanding balance and available credit limits, respectively. Assets, liabilities, PRIZM, and province controls are included in all second-stage specifications. Income is in per CAD 10,000. $^{*}$ $p \leq 0.10$, $^{**}$ $p \leq 0.05$, $^{***}$ $p \leq 0.01$.

| | **Log Balance** | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *Mortgage* | 0.311*** | 0.303*** | 0.295*** |
| | (0.117) | (0.105) | (0.106) |
| *Invest* | -0.022 | -0.043 | -0.045 |
| | (0.136) | (0.121) | (0.122) |
| log(*Interest*) | -1.274*** | -1.331*** | -1.297*** |
| | (0.365) | (0.342) | (0.344) |
| log(*Limit*) | 0.184*** | | |
| | (0.033) | | |
| log(*Age*) | 9.395*** | 10.082*** | 9.444*** |
| | (3.480) | (3.116) | (3.135) |
| log(*Age*)$^2$ | -1.169** | -1.263*** | -1.179*** |
| | (0.485) | (0.433) | (0.436) |
| log(*Income*) | 1.424 | 1.865* | 1.615 |
| | (1.081) | (1.039) | (1.034) |
| log(*Income*)$^2$ | -0.063 | -0.083* | -0.071 |
| | (0.051) | (0.049) | (0.048) |
| log(*Expenditure*) | | 0.275*** | 0.976*** |
| | | (0.033) | (0.291) |
| log(*Expenditure*)$^2$ | | | -0.047** |
| | | | (0.019) |
| *University* | -0.344*** | -0.367*** | -0.356*** |
| | (0.128) | (0.115) | (0.116) |
| IMR | 0.567 | 0.623 | 0.585 |
| | (0.458) | (0.393) | (0.400) |
| Observations | 2502 | 2502 | 2502 |
| F-statistic | 3.74 | 4.37 | 4.40 |
| $R^2$ | 0.120 | 0.138 | 0.140 |
| Adjusted $R^2$ | 0.082 | 0.101 | 0.103 |

Figure 6: Sensitivity Analysis




# 5 Consumption Path

## 5.1 Revolving Debt And Life-Cycle Consumption

The following subsection summarizes the benchmark life-cycle patterns that motivate the empirical analysis. Consider a two-population framework in which consumers differ in patience (Fulford and Schuh, 2024). Relatively impatient consumers place greater weight on current consumption, save little, and carry revolving balances on their credit cards. These consumers correspond to Revolvers. More patient consumers, by contrast, save part of their income and repay their credit card balances in full each period, corresponding to Convenience users.

Under a standard hump-shaped earnings profile (Gourinchas and Parker, 2002; Telyukova, 2013; Fulford and Schuh, 2024), the framework implies different life-cycle consumption patterns across the two groups. Because impatient consumers accumulate fewer assets, their consumption should track current income more closely. Accordingly, the consumption profile of Revolvers should exhibit a more pronounced hump-shaped pattern than that of Convenience users, who can smooth consumption by accumulating assets during their working years and drawing them down later in life. Such predictions motivate concern that Revolvers could experience significant reductions in consumption as they enter retirement.

Standard frameworks also provide a benchmark for the age profile of revolving balances. Conditional on revolving, consumers may accumulate balances during the early stages of the life cycle, when expected future income is rising, and reduce them as they approach retirement. A terminal repayment or bequest motive therefore generates a hump-shaped age profile of outstanding balances: debt rises during early working ages, peaks in midlife, and subsequently declines.

For ease of reference, the two benchmark implications are summarized as follows:

**Benchmark 1.** Revolvers exhibit a more pronounced hump-shaped consumption profile than Convenience users.

**Benchmark 2.** Conditional on revolving, outstanding balances rise during the early stages of the life cycle and decline as consumers approach retirement.

These benchmarks have important policy implications. If Revolvers' consumption tracks income more closely over the life cycle, they may experience sharper consumption declines during retirement, when earnings fall and repayment obligations remain. The corresponding policy concern is that Revolvers may enter retirement with both limited savings and outstanding credit card debt. Policies targeting this group would therefore seek to strengthen financial buffers before retirement, either by encouraging precautionary saving or by reducing

the accumulation of high-interest debt earlier in the life cycle.[22]

## 5.2 Constructing A Synthetic Cohort

Because long household panels with detailed consumption and credit card borrowing information are rarely available, the literature often relies on synthetic cohorts constructed from cross-sectional surveys (Deaton, 1985; Gourinchas and Parker, 2002; Dang and Lanjouw, 2023). Following this approach, I use repeated cross-sections from the DWPT to construct age profiles of consumption and credit card debt by revolving status.

Let $Y_{i,a}$ denote an outcome of interest (e.g., consumption, outstanding balance) for individual $i$ at age $a$. The main identifying restriction of the synthetic cohort approach is:

$$E[Y_{i,a+h} \mid Revolve_{i,a}, \boldsymbol{X}] = E[Y_j \mid A_j = a + h, Revolve_j, \boldsymbol{X}],$$

where $\boldsymbol{X}$ denotes the vector of observable characteristics.

Such a condition implies that the cross-sectional outcomes of older individuals serve as a valid proxy for the future average outcomes of today's younger consumers, conditional on observables and revolving status. The following assumptions describe the economic conditions under which this conditional-mean restriction is plausible.

**Assumption 1.** *Individuals behave as if there are no major structural changes in the economy. In particular, consumers expect their wages to follow the observed historical patterns, conditional on their characteristics (e.g., age, current income, and education).*

**Assumption 2.** *Revolving behavior is sufficiently persistent so that older Convenience users/Revolvers are representative of the future average outcomes of younger Convenience users/Revolvers, conditional on observed characteristics.*

[22] One possible approach is to impose higher minimum-payment thresholds, particularly during prime working ages when income is relatively high.

Standard life-cycle models of consumption and savings often feature similar versions of Assumption 1, in which agents' expectations of future income, conditional on current state variables, are time-invariant (Gourinchas and Parker, 2002; Telyukova, 2013; Fulford and Schuh, 2024). Since individuals' consumption and saving decisions depend on their expectations of future earnings, Assumption 1 and its variations imply that consumers with similar income trajectories and characteristics (e.g., ability, education level, etc.) would exhibit similar consumption dynamics over the life cycle.[23] Empirically, expected income growth among Canadians has remained stable over the sampling periods, thus supporting the plausibility of Assumption 1 (Figure 15).[24]

Whereas Assumption 1 allows us to infer general consumption dynamics, Assumption 2 is necessary to compare the life-cycle consumption profiles of Convenience users and Revolvers from cross-sectional data. By assuming revolving status is sufficiently persistent, data on older Revolvers can be used to proxy the future consumption trajectories of younger Revolvers. While Assumption 2 is admittedly restrictive, the synthetic-cohort analysis is implemented using one-year increments (i.e., $h = 1$). The assumption therefore requires revolving status to be sufficiently persistent only for older Revolvers to approximate the outcomes of younger Revolvers one year later. Empirically, this local persistence condition finds support in the fact that a continuous revolving spell lasts approximately ten months on average (Grodzicki and Koulayev, 2021).

As a validation exercise, I apply the same synthetic-cohort procedure to household income, an outcome that is directly observed and whose life-cycle pattern is well established. Under Assumptions 1 and 2, income observations for otherwise comparable individuals of different ages can likewise be stitched together to approximate an age-income trajectory. The resulting profile rises during working ages and declines around retirement, consistent

[23]Formally, Assumption 1 requires that $E_t[Income_{t+1}|\mathbf{S}] = E_{t+k}[Income_{t+k+1}|\mathbf{S}]$ where $\mathbf{S}$ denotes the vector of state variables. A canonical example satisfying this condition is an AR(1) income process with time-invariant parameters.

[24]A notable yet unsurprising exception is the COVID-19 pandemic in 2020, which falls outside the sampling periods of 2021 and 2022.

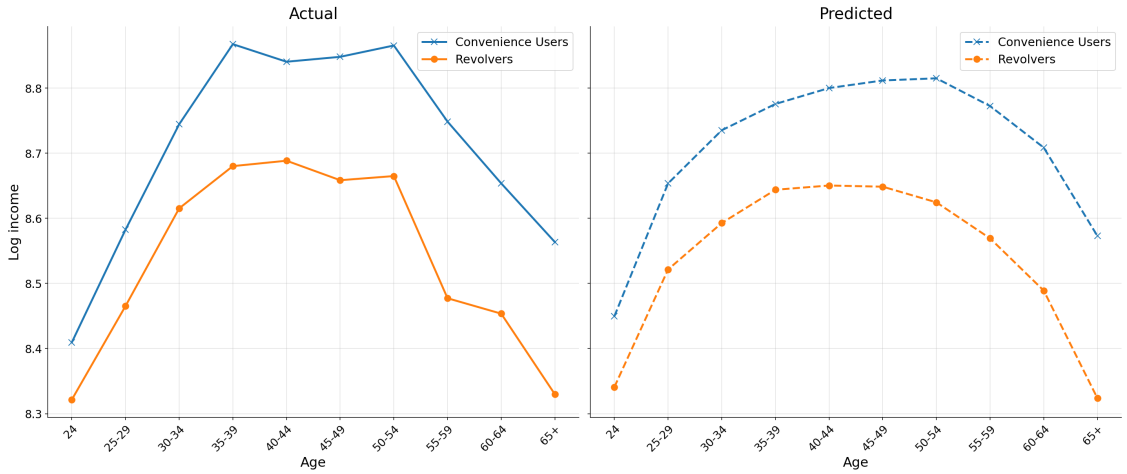
with standard life-cycle income dynamics (Gourinchas and Parker, 2002). The ability of the procedure to reproduce this familiar pattern provides supporting evidence that the estimated consumption and debt profiles capture economically meaningful age dynamics.

Figure 7: Actual vs. Predicted Income Path

Predicted income is constructed using estimates from the following regression:

$$\log(Income_i) = \alpha_1 + \gamma_1 Revolver_i + \boldsymbol{\beta Z_i} + \alpha_2 Age_i + \alpha_3 Age_i^2 + \gamma_2 Age_i \cdot Revolver_i + \gamma_3 Age_i^2 \cdot Revolver_i$$

$\boldsymbol{Z}_i$ includes household size, the number of children, and educational attainment. The full regression results are reported in Table 8.




## 5.3 Empirical Patterns

Before presenting the results, it is important to note that the DWPT consists of repeated cross-sectional data, not panel data. Therefore, the estimated profiles should be interpreted as suggestive rather than definitive depictions of life-cycle patterns.

**Benchmark 1 (Consumption Paths)**: To test the empirical validity of Benchmark 1, I estimate the following equation:

$$\begin{aligned}\log(consumption_i) = &\alpha_1 + \gamma_1 Revolver_i + \boldsymbol{\beta Z} + \alpha_2 Age_i + \alpha_3 Age_i^2 \\ &+ \gamma_2 Age_i \cdot Revolver_i + \gamma_3 Age_i^2 \cdot Revolver_i\end{aligned} \tag{3}$$

where *consumption* is average monthly expense and *Age* is the respondent's age.[25] The indicator function *Revolver* equals 1 if $i$ is a Revolver and 0 otherwise. Finally, $\mathbf{Z}$ is a vector of control variables consisting of household size, the number of children, and education level. Income is intentionally excluded from Eq. (3) so that the estimated age profile does not condition away life-cycle variation in income that is itself associated with age.

Figure 8 plots the average predicted values of log(*consumption*) by age cohort and compares them with the corresponding observed averages.[26] While both Convenience users and Revolvers exhibit the canonical hump-shaped consumption profile (Gourinchas and Parker, 2002), the pattern is more compressed for Revolvers (Figure 8), suggesting that the latter experience relatively less consumption drop-off in retirement. Revolvers exhibit significantly higher consumption at younger ages but experience tempered growth during their prime working years. The two profiles cross between ages 50 and 54. Beyond this point, their trajectories diverge: Revolvers' consumption begins a gradual decline, while Convenience users' consumption plateaus, leaving the former with slightly lower spending (Figure 8). Overall, the findings do not support the prediction that Revolvers experience sharper consumption declines near retirement.

Standard models view Revolvers as impatient individuals without sufficient savings for consumption smoothing, resulting in consumption profiles that closely resemble their income profiles (Angeletos et al., 2001; Fulford and Schuh, 2024). Under this view, the more compressed consumption profile of Revolvers would require correspondingly different life-cycle income dynamics. The data, however, provide little evidence of such differences: income follows broadly similar age profiles for the two groups, with no evidence of substantially different income growth during working years or declines near retirement (Figure 7).

Alternatively, the observed dynamics could arise from a two-population Permanent Income Hypothesis model (Friedman, 1957), in which Convenience users are patient consumers,

[25] Consumption is not directly observed in the DWPT but can be inferred from credit card spending and share-of-wallet measures.

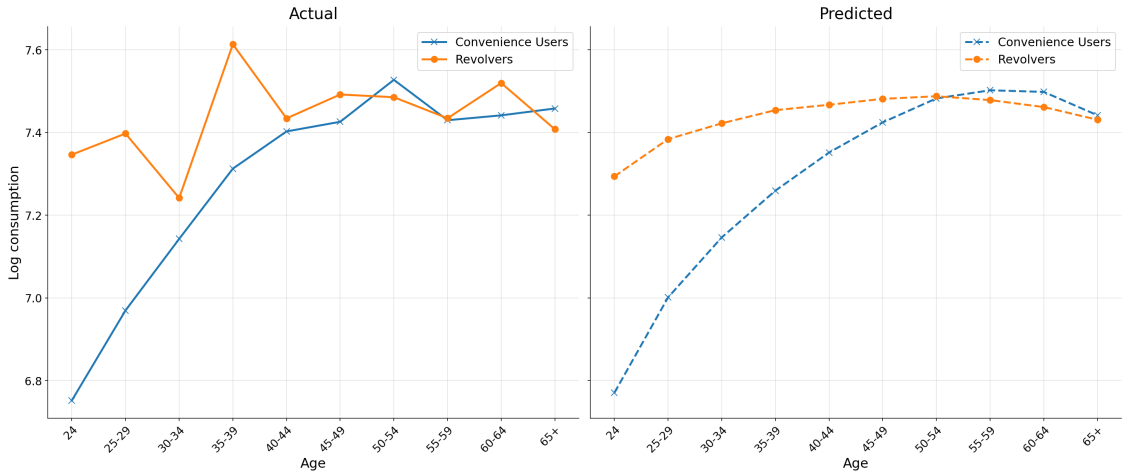
[26] The full regression results of Eq. (3) are reported in the Table 7 (Appendix A.2).

whereas Revolvers are impatient. Given their time preferences, Revolvers prioritize current consumption by delaying debt repayment. Assuming that revolving and non-revolving consumers have the same lifetime resources, this front-loading generates a higher initial level of consumption but leaves fewer resources available later in life.[27] Consequently, Revolvers' consumption growth slows earlier and eventually falls below that of Convenience users, despite potentially similar income dynamics (Figure 7, Table 8). This interpretation of Figure 8 is also consistent with the observation that Revolvers carry mortgage debt further into the life-cycle (Figure 4a).

This interpretation nevertheless presents a puzzle as greater impatience would ordinarily lead Revolvers to accumulate fewer assets and therefore leave them with fewer accumulated financial resources later in life. Section 6 develops a framework in which Revolvers behave patiently when making investment decisions but impatiently when choosing current consumption. The framework therefore provides one possible explanation for how relatively impatient spending behavior can coexist with substantial asset holdings.

Figure 8: Actual vs. Predicted Consumption Path

*Notes:* This figure plots the means of the observed and predicted values of log *consumption* by age cohorts. Predicted consumption is constructed using estimates from Eq. (3). The full regression results are reported in Table 7.



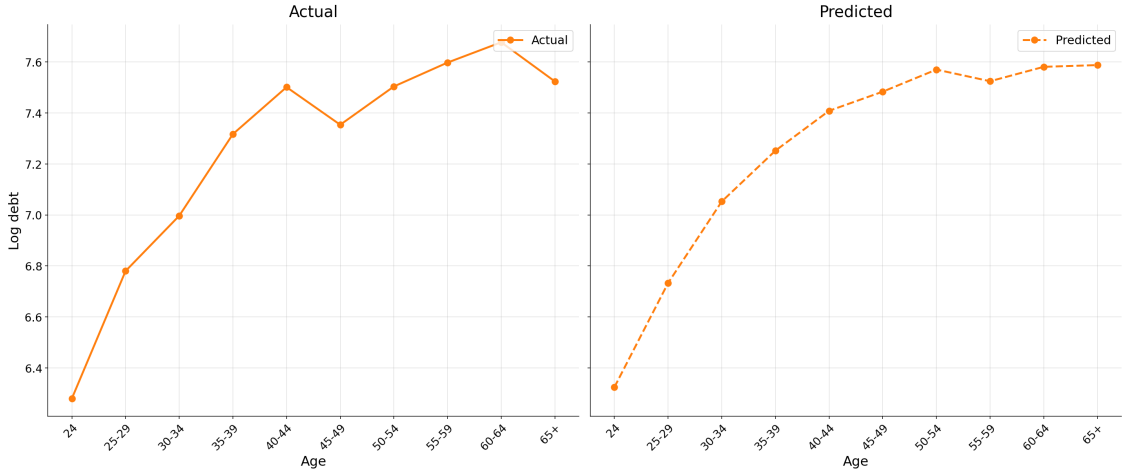

**Benchmark 2 (Debt Dynamics)**: Benchmark 2 is broadly consistent with the es-

[27] Lifetime resources comprise both income and returns on accumulated assets. Empirically, Revolvers and Convenience users exhibit broadly similar financial positions.

timated age profile of outstanding balances. Predicted balances rise at younger ages and decline at later ages, producing a hump-shaped profile (Table 4, Figure 9). This pattern is consistent with standard life-cycle models in which individuals borrow against future resources earlier in life and reduce debt later in life due to repayment or bequest motives (Fulford and Schuh, 2024). The result remains robust across the range of assumed correlations between the selection and outcome equations (Figure 6).

Figure 9: Actual vs. Predicted Debt Dynamics

This figure plots the means of the observed and predicted values of log *Balance* by age cohorts.
Predicted debt is constructed using estimates from Eq. (2).
The full regression results are reported in Table 4.




# 6 Liquidity, Revolving Debt and Financial Well-Being

## 6.1 Investor-Spender Model of Self-Control

**Model**: Consider a model in which investment and consumption decisions occur sequentially within each period. Revolvers exhibit time-inconsistent preferences. More specifically, they behave as relatively patient Investors when allocating wealth across assets, but as relatively impatient Spenders when choosing current consumption. For expositional clarity, consider a simplified two-period version of the model. Taking the Spender's decisions as given, I focus

on the Investor's problem:

$$V = \max_{L,K} U(C_1) + \beta_I \mathbb{E}\left[U(C_2)\right] \tag{4}$$

subject to

$$C_1 = y_1 - L - K + \theta_L L + \theta_K pK,$$
$$C_2 = y_2 + (1 - \theta_L)L + (1 - \theta_K)pK,$$

where $y_t$ denotes exogenous income, while $L$ and $K$ represent investments in liquid and illiquid assets, respectively. Finally, $p < 1$ reflects the price of illiquid assets relative to liquid assets.

Because the Spender may liquidate either type of asset to finance first-period consumption, only the remaining fractions, $1 - \theta_L$ and $1 - \theta_K$, are carried into period 2. Hence, the Investor takes $\theta_L, \theta_K$ as given when making investment decisions.

**Proposition 1.** *Suppose $p < 1$ and $\theta_L > \theta_K$. The Investor allocates positive wealth to illiquid assets only if the Spender is sufficiently impatient to exhaust all liquid assets while being unable to fully liquidate the illiquid asset.*

*Proof.* See Appendix A.5. □

The intuition is straightforward. When the Spender leaves some liquid wealth unconsumed, liquid assets dominate illiquid assets because they avoid the liquidation penalty. Nevertheless, once the Spender is sufficiently impatient and exhausts all liquid assets (i.e., $\theta_L = 1$), liquid savings can no longer transfer resources to the second period, making illiquid assets the only available means of preserving savings for future consumption.[28] Insofar as investment accounts primarily represent relatively liquid financial assets such as stocks and

[28]Recall that $\theta_k < \theta_L = 1$

bonds, this mechanism presents one possible explanation for the systematically lower rate of investment-account ownership among Revolvers across all age groups (Figure 4b).

The model provides a possible mechanism explaining differences in asset composition and overall liquidity conditions between revolving and non-revolving cardholders. Within the model, allocating wealth to less accessible assets allows the Investor to preserve financial buffers while restricting the resources immediately available to the Spender. Once revolving credit is introduced, the tighter liquidity position created by the Investor may induce the Spender to borrow on credit cards.[29] The model is therefore consistent with empirical evidence that some cardholders use revolving credit as a financial stopgap (Greene and Stavins, 2023). Through the lens of the model, revolving debt should not be interpreted solely as a symptom of financial fragility, but rather as a potential cost of self-control.

## 6.2 Simulation

To illustrate the dynamic implications of the "Investor-Spender" mechanism, I extend Eq. (4) to a finite-horizon setting that endogenizes credit card revolving and numerically solve the resulting model. The exercise is intended to illustrate that the framework can qualitatively reproduce the consumption and debt patterns observed in the data. Accordingly, parameter values are chosen for illustration and are not calibrated to the data.

Generally, the simulated consumption dynamics qualitatively resemble the patterns observed in the data. More specifically, Revolvers start out at a higher consumption level but experience less growth during prime working ages, eventually falling below the consumption level of Convenience users. Thus, revolving cardholders exhibit a flatter consumption profile than their non-revolving counterparts. Furthermore, simulated debt rises during early life-

[29] Let $b(y_1, y_2, K)$ denote borrowing chosen by the Spender conditional on income and the Investor's allocation to illiquid assets. The corresponding budget constraints become

$$C_1 = y_1 - K + \bar{\theta}_k pK + b(y_1, y_2, K),$$
$$C_2 = y_2 + (1 - \bar{\theta}_k)pK - (1 + r)b(y_1, y_2, K).$$

Allowing for credit card borrowing therefore does not alter the underlying mechanism.

cycle stages before steadily declining, reflecting the dynamics observed in the data. Details regarding the simulation exercise are available in Appendix A.5.

Figure 10: Actual vs. Simulated Consumption Path

*Notes:* Simulated paths assume Convenience users exhibit time-consistent discount factors, whereas Revolvers have time-inconsistent discount factors.

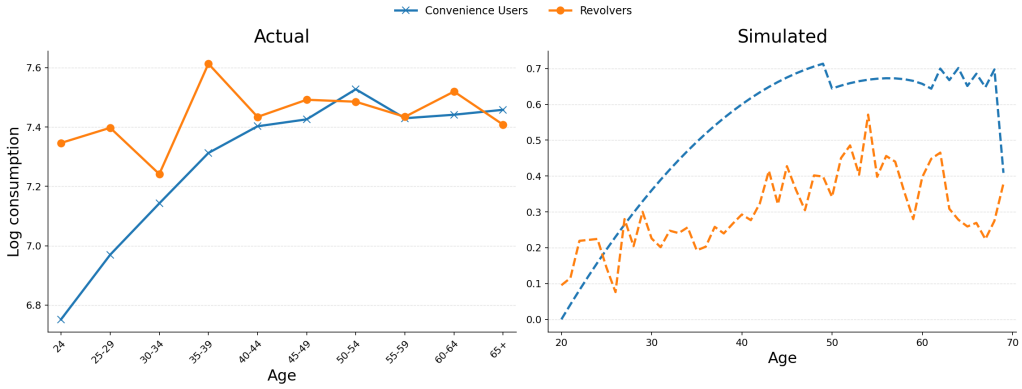
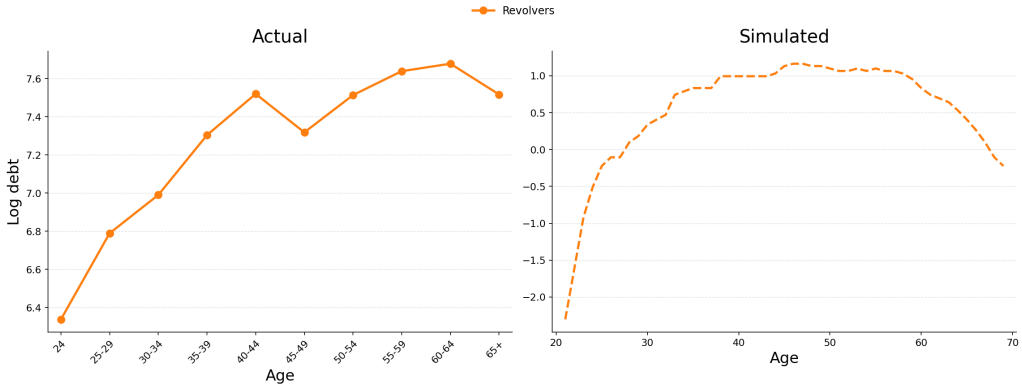



Figure 11: Actual vs. Simulated Outstanding Balance

*Notes:* Simulated paths assume Convenience users exhibit time-consistent discount factors, whereas Revolvers have time-inconsistent discount factors.




# 7 Conclusion

In this paper, I analyze differences between Convenience users and Revolvers and assess the validity of the narratives around credit card debt. Leveraging microdata, I find limited support for the prevailing image of Revolvers as financially fragile consumers with no savings. While Revolvers do earn less and exhibit characteristics consistent with tighter liquidity

constraints than Convenience users, these disadvantages do not translate into either substantially weaker balance-sheet positions or lower self-reported financial comfort. The paper also documents new evidence on the consumption dynamics of Revolvers and Convenience users. Although both groups exhibit hump-shaped consumption profiles, this pattern is less pronounced among Revolvers. This result provides little support for concerns that revolving cardholders may experience significant declines in consumption as they approach retirement. Because the results suggest that liquidity conditions play an important role in revolving behavior, policies intended to reduce credit card debt should also consider their potential effects in this respect. For example, although increasing the minimum required payment can limit long-term debt accumulation, it can also tighten liquidity constraints among already cash-strapped Revolvers. Similarly, because banks can adjust the credit limits available to cardholders, an interest rate cap could induce banks to reduce credit supply and further worsen Revolvers' liquidity conditions.

# A Appendix

## A.1 Income Definition

The DWPT asks participants to choose from 25 income brackets. The first 20 brackets are equally spaced in CAD 5,000 increments, ranging from under CAD 5,000 to CAD 95,000-CAD 99,999. The last five income brackets are CAD 100,000–CAD 124,999, CAD 125,000–CAD 149,999, CAD 150,000–CAD 199,999 , CAD 200,000–CAD 249,999 and over CAD 250,000.

## A.2 Additional Tables and Figures

Figure 12: 75% of Revolvers Consistently Carry an Outstanding Balance

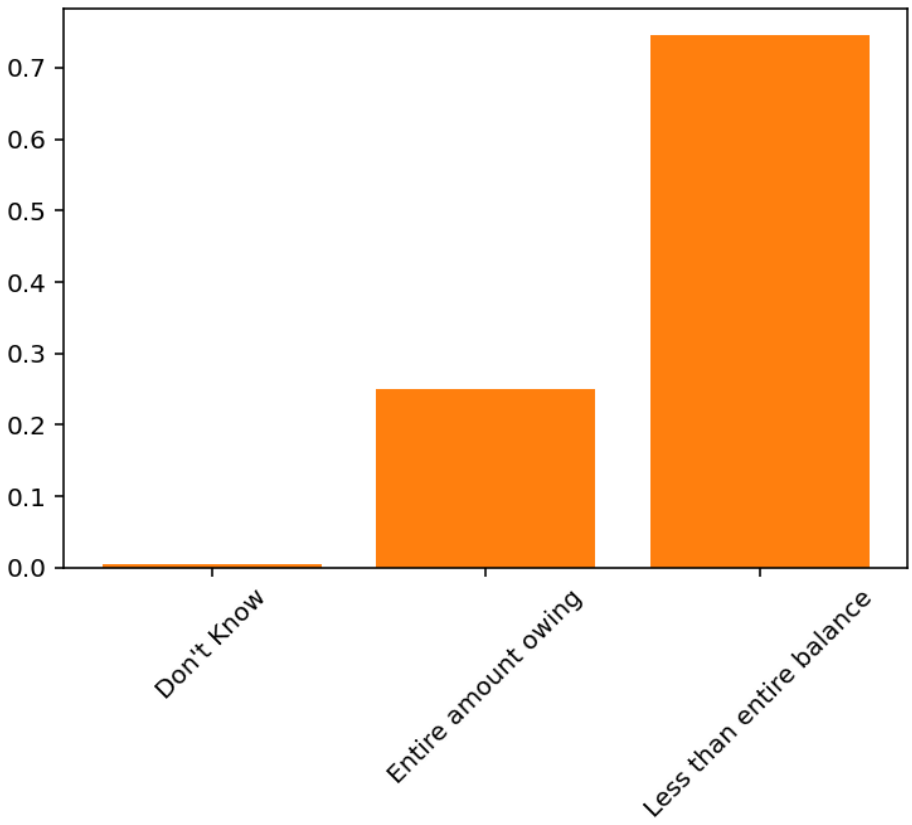
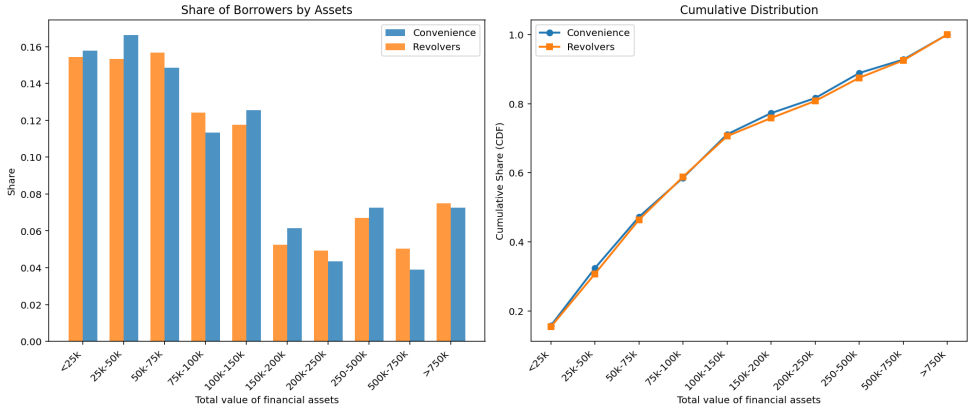
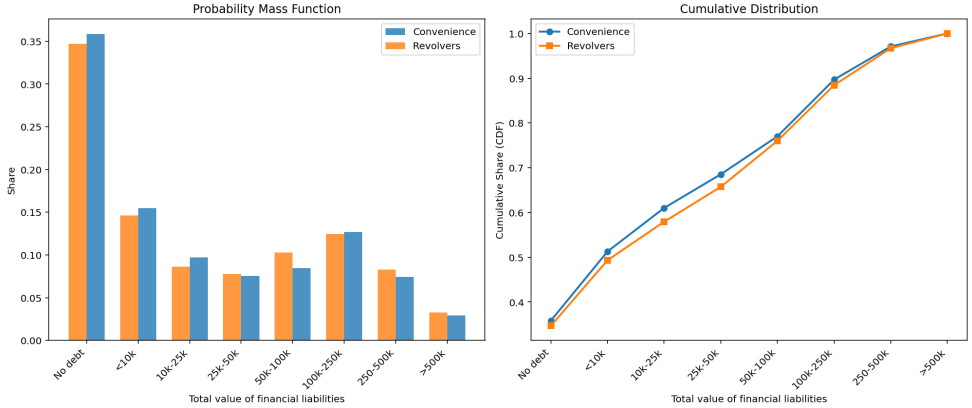


Figure 13: Cumulative distribution of financial assets and liabilities-50 or older




(a) The DWPT asks: "*What is the total value of your household's financial assets?*"




(b) The DWPT asks: "*Which of the following categories best describes your household's TOTAL FINANCIAL LIABILITIES?*"

Figure 14: The DWPT asks: "How comfortable are you managing your current debt load?"- 50 or older

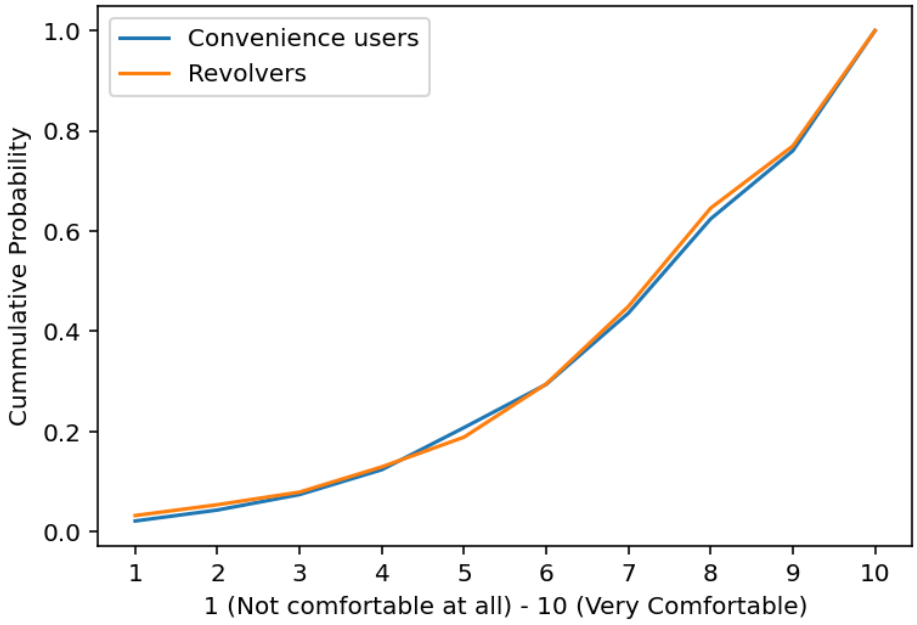


Table 5

Table a. Balance Check for Misreporting: Revolver Subsample

A Revolver is classified as "Correctly reported" if the respondent selects any category other than "No Debt" when asked about total financial liabilities.

| Variable | Misreported | Correctly reported | p-value |
|---|---|---|---|
| Pretax Income (CAD/year) | 72481 | 77,172 | 0.130 |
| Age | 46.02 | 45.75 | 1.000 |
| Household size (persons) | 2.41 | 2.34 | 0.668 |
| Number of credit cards | 1.82 | 1.83 | 1.000 |
| Outstanding balance (CAD) | 4,137 | 3,968 | 1.000 |
| Share with a bachelor's degree (%) | 36.4 | 35.0 | 1.000 |
| Share with a mortgage (%) | 36.1 | 42.0 | 0.064 |
| Share with an investment account (%) | 43.3 | 46.7 | 0.668 |

Table b. Convenience Users vs. Revolver "No Debt" Subsample

Married individuals include both married couples and common-law partnerships.

| Variable | Convenience users | Revolvers |
|---|---|---|
| Pretax Income (CAD/year) ($) | 85,807 | 75,052 |
| Age | 51.65 | 45.31 |
| Share with a bachelor's degree (%) | 49.8 | 34.3 |
| Share with a mortgage (%) | 30.5 | 38.9 |
| Share with an investment account (%) | 70.0 | 48.1 |
| Share male (%) | 48.2 | 44.8 |
| Share married individuals (%) | 63.0 | 61.7 |
| Household size (persons) | 2.12 | 2.10 |
| Number of credit cards | 1.82 | 1.83 |

Table 6: Balance Check: Observed vs. Missing Financial-Comfort Responses

*Notes:* Responses are classified as "Missing" if respondents did not select "No debt" **and** did not report a comfort level. Pretax income is annualized from monthly figures ($12 \times$ monthly income). $p$-values are reported for tests of differences between the Observed and Missing samples.

Full Sample

| Variable | Observed | Missing | $p$-value |
|---|---|---|---|
| Age | 50.55 | 48.76 | 0.0005 |
| Pretax Income (CAD/year) | 83,715 | 85,656 | 1.000 |
| After-tax Income (CAD/year) | 59,552 | 60,890 | 0.594 |
| Number of credit cards | 1.79 | 1.79 | 0.594 |
| Household size (persons) | 2.55 | 2.55 | 1.000 |
| Share of revolvers (%) | 22.1 | 21.8 | 1.000 |
| Share with a bachelor's degree (%) | 45.6 | 48.1 | 0.816 |
| Share with a mortgage (%) | 33.3 | 33.2 | 1.000 |
| Share with an investment account (%) | 57.2 | 55.9 | 1.000 |

Convenience Users Subsample

| Variable | Observed | Missing | $p$-value |
|---|---|---|---|
| Age | 51.74 | 49.65 | 0.0002 |
| Pretax Income (CAD/year) | 86,502 | 87,369 | 1.000 |
| After-tax Income (CAD/year) | 61,359 | 62,030 | 0.000 |
| Number of credit cards | 1.79 | 1.77 | 1.000 |
| Household size (persons) | 2.56 | 2.56 | 1.000 |
| Share with a bachelor's degree (%) | 48.3 | 51.3 | 1.000 |
| Share with a mortgage (%) | 31.4 | 31.0 | 0.301 |
| Share with an investment account (%) | 60.9 | 59.6 | 1.000 |

Revolvers Subsample

| Variable | Observed | Missing | $p$-value |
|---|---|---|---|
| Age | 46.34 | 45.55 | 1.000 |
| Pretax Income (CAD/year) | 73,893 | 79,519 | 0.247 |
| After-tax Income (CAD/year) | 53,187 | 56,805 | 0.247 |
| Number of credit cards | 1.82 | 1.83 | 0.258 |
| Household size (persons) | 2.50 | 2.51 | 1.000 |
| Share with a bachelor's degree (%) | 36.0 | 36.3 | 1.000 |
| Share with a mortgage (%) | 40.1 | 40.9 | 1.000 |
| Share with an investment account (%) | 44.2 | 42.9 | 1.000 |
| Outstanding Balance (CAD) | 4,297 | 3,624 | 0.000 |

Table 7: Consumption Dynamics

| | log(consumption) |
|---|---|
| Revolver | 1.234*** |
| | (.211) |
| Age | .057*** |
| | (.004) |
| Revolver × Age | -.038*** |
| | (.009) |
| $Age^2$ | -.0005*** |
| | (.00003) |
| Revolver × $Age^2$ | .0003*** |
| | (.00009) |
| University | .168*** |
| | (.017) |
| Children | -.004 |
| | (.014) |
| Household Size | -.007 |
| | (.009) |
| Constant | 5.691*** |
| | (.092) |
| $R^2$ | .050 |
| Observations | 12,056 |

*Notes:* Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

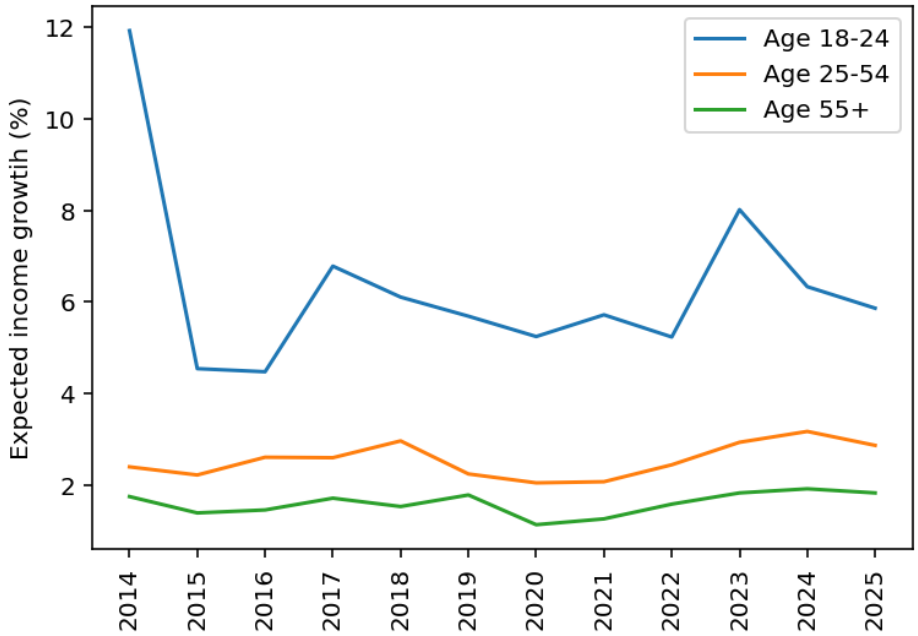
Table 8: Income Dynamics

| | log(*Income*) |
|---|---|
| Revolver | -.121 |
| | (.156) |
| *Age* | .041*** |
| | (.003) |
| *Revolver* × *Age* | .004 |
| | (.007) |
| $Age^2$ | -.0004*** |
| | (.00003) |
| *Revolver* × $Age^2$ | -.00008 |
| | (.00007) |
| *University* | .335*** |
| | (.012) |
| *Children* | .011 |
| | (.010) |
| *Household Size* | -.002 |
| | (.007) |
| *Constant* | 7.616*** |
| | (.071) |
| $R^2$ | .098 |
| Observations | 12,056 |

*Notes:* The dependent variable is the logarithm of annual household income. Heteroskedasticity-robust HC0 standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.10$.

Figure 15: Expected Income Growth over the Next Year by Age Group

Source: Canadian Survey of Consumer Expectations (Bank of Canada, 2023a).




## A.3 Ordinal Regression for *Comfort*

Because comfort is subjective, Revolvers may report levels of comfort similar to those of Convenience users even if objective indicators, such as income, assets, or liabilities, suggest weaker financial positions.

To account for this possibility, I estimate the following ordinal regression model of financial comfort:

$$U_i = \delta_0 + \delta_1 \mathbf{1}_{Revolve} + \boldsymbol{Z}_i \boldsymbol{\beta} + \epsilon_i, \tag{5}$$

where $U_i$ is a latent variable measuring an individual's comfort level, $\mathbf{1}_{Revolve}$ is an indicator function for revolving status, and $Z_i$ is a vector of control variables including age, income, financial assets and liabilities.

Cardholders report a comfort level according to the following rule:

$$Comfort_i = \begin{cases} 1 & \Leftrightarrow U_i \leq \mu_1, \\ 2 & \Leftrightarrow \mu_1 < U_i \leq \mu_2, \\ \vdots & \\ 10 & \Leftrightarrow \mu_9 < U_i \end{cases}$$

where $Comfort_i$ is individual $i$'s response to the question "*How comfortable are you managing your current debt load?*".

Let $U(\mathbf{Z}_i)$ denote the latent index conditional on balance-sheet measures and other demographics. Revolvers' comfort level is determined by:

$$Comfort_i^{Rev} = \begin{cases} 1 & \Leftrightarrow U(\mathbf{Z}_i) + \delta_1 \leq \mu_1 \Leftrightarrow U(\mathbf{Z}_i) \leq \tilde{\mu}_1 \\ 2 & \Leftrightarrow \tilde{\mu}_1 < U(\mathbf{Z}_i) \leq \tilde{\mu}_2, \\ \vdots & \\ 10 & \Leftrightarrow \tilde{\mu}_9 < U(\mathbf{Z}_i) \end{cases}$$

where $\tilde{\mu}_k = \mu_k - \delta_1$.

Thus, $\delta_1$ captures differences in how Revolvers perceive financial comfort relative to Convenience users, conditional on the same objective financial indicators. Specifically, a statistically significant $\delta_1 < 0$ raises the effective thresholds faced by Revolvers, making them more likely to report a lower level of financial comfort for the same vector of observables $\mathbf{Z}$. Conversely, $\delta_1 > 0$ lowers these thresholds, suggesting that Revolvers map the same objective financial state into higher categories of financial comfort.

**Results**: Table 9 summarizes the results of this exercise. $\delta_1$ is statistically insignificant across all specifications, suggesting no systematic difference in comfort levels between Revolvers and Convenience users.

Table 9: Ordinal Regression for $Comfort$

*Note:* The OLS model treats $Comfort$ as continuous and uses robust standard errors.
I(*Mortgage*), I(*Invest*), I(*University*) indicate ownership of a mortgage, an investment account, and a bachelor's degree, respectively.

| **Variable** | **Ordered Probit** | **Ordered Logit** | **OLS** |
|---|---|---|---|
| I(*Mortgage*) | .020 | .034 | .063 |
| | (.030) | (.051) | (.067) |
| I(*Invest*) | .238*** | .397*** | .558*** |
| | (.029) | (.050) | (.066) |
| I(*University*) | -.038 | -.060 | -.093 |
| | (.029) | (.049) | (.064) |
| Age | .001 | .001 | .001 |
| | (.001) | (.001) | (.002) |
| Annual Income ($10k) | -.006* | -.009* | -.013** |
| | (.003) | (.005) | (.007) |
| Revolver | .001 | .013 | .004 |
| | (.034) | (.058) | (.077) |
| Assets | Y | Y | Y |
| Liabilities | Y | Y | Y |
| Observations | 5722 | 5722 | 5722 |
| $R^2$ | | | .017 |

### Double Machine Learning Estimate of Financial Comfort

As a robustness check, I also use double machine learning to allow for more flexible, potentially nonlinear relationships between financial comfort and the observed balance-sheet and demographic characteristics (Chernozhukov et al., 2018; Bach et al., 2022). The empirical framework consists of two nuisance components:

$$\begin{aligned} Comfort_i &= g(\mathbf{1}_{Rev,i}, \boldsymbol{Z}_i) + \nu_i, \\ \Pr(\mathbf{1}_{Rev,i} = 1 \mid \boldsymbol{Z}_i) &= m(\boldsymbol{Z}_i) \end{aligned} \tag{6}$$

where $g(\cdot)$ captures the relationship between reported financial comfort, revolving status and observable characteristics. Meanwhile, $m(\boldsymbol{Z}_i)$ denotes the propensity score, or the predicted probability that individual $i$ is a Revolver conditional on observables.

Following the standard Double Machine Learning approach (Chernozhukov et al., 2018; Bach et al., 2022), I treat $g(\cdot)$ and $m(\cdot)$ as nuisance functions and estimate them using

random forests.[30] This approach allows for flexible, nonlinear relationships between financial comfort and observable characteristics without imposing a specific functional form. However, machine-learning estimators can introduce regularization bias because of model selection and hyperparameter tuning. To reduce this bias, I use a doubly robust estimator that is less sensitive to small estimation errors in the nuisance functions.

The estimated observation-level orthogonal score (i.e., $\tilde{\theta}^i_{Rev}$) is computed as:

$$\hat{g}(1, \boldsymbol{Z}_i) - \hat{g}(0, \boldsymbol{Z}_i) + \frac{\mathbf{1}_{Rev,i} \left( Comfort_i - \hat{g}(1, \boldsymbol{Z}_i) \right)}{\hat{m}(\boldsymbol{Z}_i)} - \frac{(1 - \mathbf{1}_{Rev,i}) \left( Comfort_i - \hat{g}(0, \boldsymbol{Z}_i) \right)}{1 - \hat{m}(\boldsymbol{Z}_i)}.$$

Averaging these scores across individuals provides an estimate of the average conditional difference in financial comfort associated with being a Revolver.

Intuitively, $\tilde{\theta}^i_{Rev}$ compares individual $i$'s predicted comfort under Revolver status with that under an observationally equivalent Convenience-user status (i.e., $\hat{g}(1, \boldsymbol{X}_i) - \hat{g}(0, \boldsymbol{X}_i)$). The adjustment terms then correct for prediction errors in the outcome model ($\hat{g}(.)$) using the observed comfort levels and estimated propensity scores, making the final estimate less sensitive to regularization bias in the nuisance functions. The model is cross-fitted to avoid overfitting bias (Bach et al., 2022).

Table 10 reports the Double Machine Learning estimate of the conditional relationship between revolving status and reported financial comfort. The average orthogonal score, $\mathbb{E}[\tilde{\theta}^i_{Rev}]$, is close to zero and statistically insignificant. This result suggests that Revolvers do not report systematically lower financial comfort than comparable Convenience users, even after flexibly controlling for observable financial conditions.

[30] Specifically, I use `sklearn`'s `RandomForestClassifier` to estimate the propensity score and `RandomForestRegressor` to estimate the outcome model.

Table 10: Double ML Estimates: Financial Comfort

| | *Comfort* |
|---|---|
| $\mathbb{E}[\tilde{\theta}^i_{Rev}]$ | -.020 |
| | (.060) |
| Observations | 5,722 |
| Controls | Yes |
| Outcome learner | Random Forest |
| Propensity learner | Random Forest |

Notes: Standard errors are reported in parentheses.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

## A.4 Sensitivity Checks For Determinants of Debt

Given a fixed $\rho$, intensive-margin relationships are estimated as:

$$\log\ \mathit{Balance} = \beta_0 + \log X\boldsymbol{\beta_1} + D\boldsymbol{\beta_2} + Z_2\boldsymbol{\beta_3} + \rho\sigma_\nu \frac{\phi(X, D, Z_2)}{\Phi(X, D, Z_2)} + \nu$$

Let $P_{X,D,Z_2}$ denote the projection matrix onto the plane spanned by $X, D, Z_2$. Thus, $M = I - P_{X,D,Z_2}$ represents the corresponding residual marker matrix. Given $\rho$, $\hat{\sigma}_\nu$ is

$$\hat{\sigma}_\nu(\rho) = \arg\max_{\sigma_\nu > 0} \sum_i \log \phi_{\sigma_\nu}(e_i)$$

where $e_i = M \log\ \mathit{Balance} - \sigma_\nu \cdot M \cdot \rho \cdot IMR$, and $\phi_{\sigma_\nu}(.)$ is the probability density function of a normal distribution with variance $\sigma^2_\nu$.

The intensive-margin relationships given $\rho$ are thus:

$$\log\ \mathit{Balance} - \rho\hat{\sigma}_\nu IMR = \beta_0 + \log X\boldsymbol{\beta_1} + D\boldsymbol{\beta_2} + Z_2\boldsymbol{\beta_3}$$

## A.5 Proof of Proposition 1 and Simulation Details

### Proof of Proposition 1

*Proof.* For both assets to be held in strictly positive amounts, the first-order conditions must hold with equality:

$$\frac{\partial V}{\partial L} = -(1-\theta_L)U_{C_1} + \beta_I(1-\theta_L)U_{C_2} = 0 \implies U_{C_1} = \beta_I U_{C_2},$$
$$\frac{\partial V}{\partial K} = -(1-p\theta_K)U_{C_1} + \beta_I(1-\theta_K)pU_{C_2} = 0 \implies (1-p\theta_K)U_{C_1} = \beta_I(1-\theta_K)pU_{C_2}.$$

This requires

$$\frac{(1-\theta_k)p}{1-\theta_k p} = 1 \Leftrightarrow p = 1.$$

Thus, when $p < 1$, consumers will hold only liquid assets.

If the Spender is sufficiently impatient to exhaust all liquid assets and liquidate the maximum accessible share of illiquid assets, then $\theta_L = 1$ and $\theta_K = \bar{\theta}_k < 1$. This changes the Investor's budget constraints to:

$$C_1 = y_1 - K + \bar{\theta}_k pK + L - L,$$
$$C_2 = y_2 + (1-\bar{\theta}_k)pK.$$

Liquid assets can no longer transfer resources to the second period because they are fully consumed by the Spender. Thus, agents invest in illiquid assets to preserve savings for second-period consumption. □

### Simulation

Convenience users have a time-consistent discount factor ($\beta_I$), so they do not need to rely on illiquid assets as commitment devices and invest only in liquid assets. Income is assumed to be deterministic so that revolving arises only when consumers are sufficiently impatient

when making spending decisions.

Hence, the Bellman equation is given by:

$$V_t^{Conv}(y_t, L_t, b_t) = \max_{I_t, b_{t+1}} U(C_t) + \beta_I V_{t+1}^{Conv}(y_{t+1}, L_{t+1}, b_{t+1}) \tag{7}$$

subject to

$$\begin{aligned} C_t + I_t &= y_t - (1 + r_{cc})b_t + r_l L_t + b_{t+1}, \\ L_{t+1} &= L_t + I_t, \\ I_t &\geq - L_t, \end{aligned}$$

where $L_t$ and $b_t$ denote the stocks of liquid assets and outstanding balances, respectively. Similarly, $r_l$ and $r_{cc}$ denote return on liquid assets and interest rate on outstanding balances. For a sufficiently high discount factor, i.e. $\beta_I$, the consumer optimally chooses not to carry credit card debt and therefore behaves as a Convenience user.

By contrast, Revolvers exhibit a time-inconsistent discount factor. Because the Spender exhausts the stock of liquid assets and sells off the maximum allowed share of illiquid assets, the Investor would invest only in illiquid assets to maintain long-term savings. The within-period decisions are sequential: the Investor first chooses illiquid investment $\tilde{I}_t$, after which the Spender chooses credit card borrowing $b_{t+1}$. Let the stock of illiquid assets available to the Spender after the investment decision be given by:

$$A_t = (1 + r_k)K_t + \tilde{I}_t.$$

Under the parameterization considered here, the Spender is sufficiently impatient and thus will liquidate up to $\bar{\theta}_k$ fraction of the available stock of illiquid assets (i.e., $A_t$). Conditional

on $A_t$, the Spender solves

$$V^{Rev}_{Spend}(y_t, b_t, A_t) = \max_{b_{t+1}} U(C_t) + \beta_S V^{Rev}_{Invest}(y_{t+1}, b_{t+1}, K_{t+1}) \tag{8}$$

subject to

$$\begin{aligned} C_t &= y_t - \tilde{I}_t - (1 + r_{cc})b_t + p\bar{\theta}_k A_t + b_{t+1}, \\ K_{t+1} &= (1 - \bar{\theta}_k)A_t, \\ 0 \leq & b_{t+1} \leq \bar{D}_t = \kappa y_t, \end{aligned}$$

where $r_k$ denotes the return on illiquid assets, and $p < 1$ is the liquidation value of the illiquid asset. Finally $\bar{D}_t$ denotes credit limit as a fixed fraction of income.

Let $b^*_{t+1}(y_t, b_t, A_t)$ denote the borrowing policy function of the Spender. Anticipating this response, the Investor solves:

$$V^{Rev}_{Invest}(y_t, b_t, K_t) = \max_{\tilde{I}_t} U(C_t) + \beta_I V^{Rev}_{Invest}(y_{t+1}, b^*_{t+1}, K_{t+1}) \tag{9}$$

subject to

$$\begin{aligned} C_t + \tilde{I}_t &= y_t - (1 + r_{cc})b_t + p\bar{\theta}_k A_t + b^*_{t+1}(y_t, b_t, A_t), \\ K_{t+1} &= (1 - \bar{\theta}_k)A_t, \\ A_t = & (1 + r_k)K_t + \tilde{I}_t, \\ \tilde{I}_t \geq & - K_t. \end{aligned}$$

The simulation imposes terminal debt repayment, requiring consumers to fully pay off all remaining obligations by the end of the life cycle. Incomes are normalized so that income at the initial age equals one.

Table 11: Simulation Parameters

*Notes*: Both models use the same hump-shaped life-cycle income profile. The time-consistent benchmark permits saving in liquid assets, whereas the Investor-Spender model permits investment in illiquid assets and distinguishes between the Investor's and Spender's discount factors. The parameter values are selected for illustrative purposes and are not calibrated to match empirical moments.

| Parameter | Description | Time-consistent | Investor-Spender |
|---|---|---|---|
| *Life-cycle income profile* | | | |
| $T$ | Number of periods | 50 | 50 |
| Starting age | Age in the first period | 20 | 20 |
| Retirement age | Beginning of retirement | 65 | 65 |
| *Preference and return parameters* | | | |
| $\beta_I$ | Investor's discount factor | 0.97 | 0.97 |
| $\beta_S$ | Spender's discount factor | — | 0.78 |
| $\gamma$ | Coefficient of relative risk aversion | 2.00 | 2.20 |
| $R_L$ | Gross return on liquid assets | 1.03 | — |
| $R_K$ | Gross return on illiquid assets | — | 1.07 |
| $R_{cc}$ | Gross credit-card interest rate | 1.20 | 1.20 |
| $\bar{\theta}_k$ | Maximum share of illiquid assets liquidated | — | 0.12 |
| $p$ | Liquidation value of illiquid assets | — | 0.97 |
| $\kappa$ | Borrowing limit as a share of income | — | 0.70 |

## A.6 Robustness Checks with an Alternative Definition of Revolving

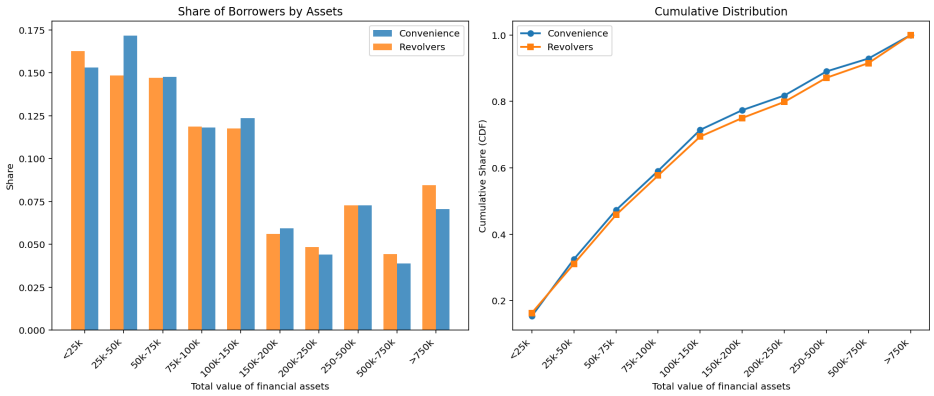
This section reproduces Table 2 and Figures 3 and 5 using an alternative definition of Revolvers based directly on respondents' usual repayment behavior. Under this definition, Revolvers are respondents who do not select "Entire amount owing" when asked whether they usually pay the entire amount owing, the minimum amount owing, or an amount somewhere in between. The results presented here are consistent with the main results.

Table 12: Demographics of Convenience users and Revolvers

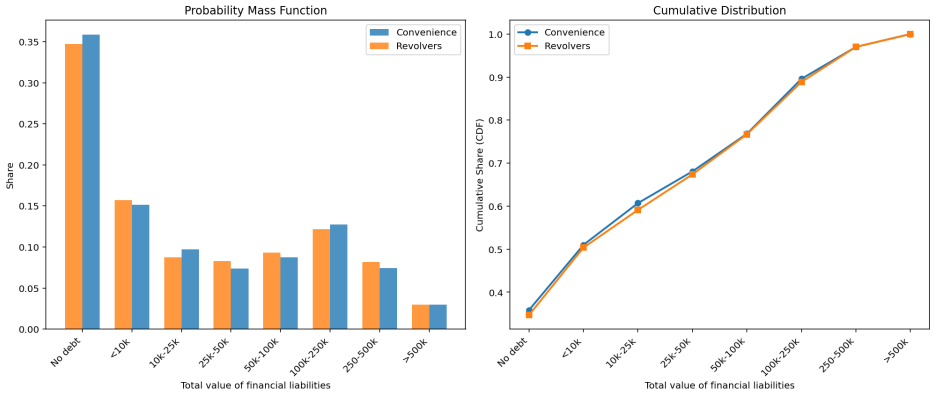
| Variable | Convenience users | Revolvers |
|---|---|---|
| Pretax Income (CAD/year) ($) | 87,736 | 72,203 |
| Age | 51 | 46 |
| Share with a bachelor's degree (%) | 50 | 33 |
| Share with a mortgage (%) | 31.1 | 39.89 |
| Share with an investment account (%) | 64.7 | 43.2 |
| Share male (%) | 50 | 46 |
| Share married individuals (%) | 62.5 | 60.7 |
| Household size (persons) | 2.4 | 2.38 |
| Number of credit cards | 1.8 | 1.79 |

Married individuals include both married couples and common-law partnerships.
Revolvers are cardholders who usually do not repay the whole balance.

Figure 16: Cumulative distribution of financial assets and liabilities



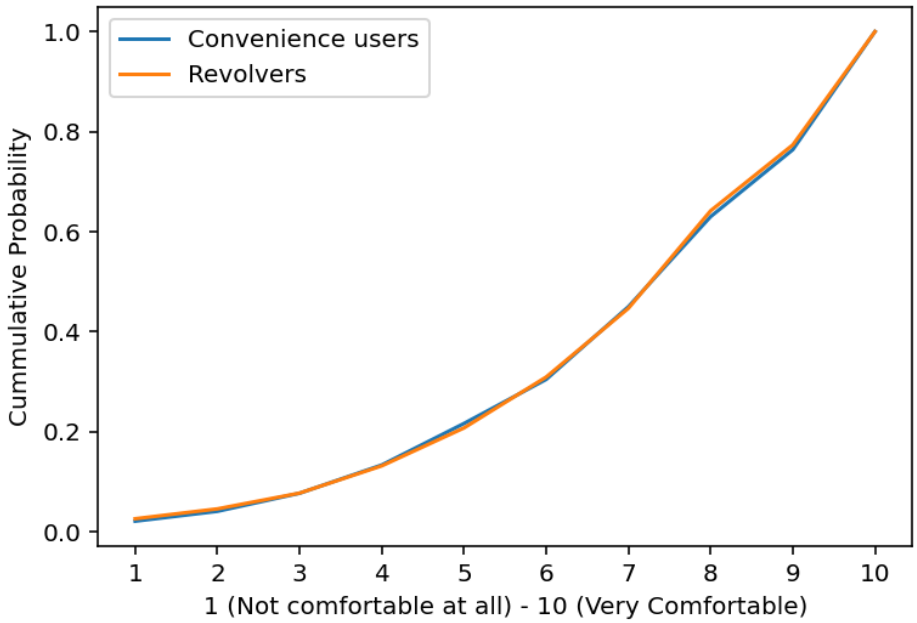

(a) The DWPT asks: "*What is the total value of your household's financial assets?*"




(b) The DWPT asks: "*Which of the following categories best describes your household's TOTAL FINANCIAL LIABILITIES?*"

Figure 17: The DWPT asks: "How comfortable are you managing your current debt load?"

*Notes:* Revolvers are respondents who did not select "Entire balance owing" when asked, "Do you usually pay the entire amount owing, pay the minimum amount owing, or somewhere in between?"



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