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Effect of Retirement on Life Satisfaction in Canada: Evidence from the 2008–2009 Canadian Community Health Survey–Healthy Aging

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Parce qu'elle représente une transition majeure dans la vie de la population âgée, la retraite peut avoir une incidence sur le bien-être, en raison des changements liés au mode de vie, aux émotions et aux finances qui l'accompagnent. Dans cette étude, nous étudions empiriquement l'effet de la retraite sur la satisfaction à l'égard de la vie au Canada, à l'aide des données de l'Enquête sur la santé dans les collectivités canadiennes – Vieillesse en santé de 2008–2009. Isoler l'effet de la retraite sur la satisfaction à l'égard de la vie présente des difficultés intrinsèques : autosélection, causalité inverse et hétérogénéité non observée propre à la personne pouvant avoir une incidence à la fois sur la satisfaction à l'égard de la vie et sur la décision de prendre sa retraite. Pour tenir compte de ces facteurs, nous étudions les seuils pour l'âge de la retraite déterminés par la Sécurité de la vieillesse et du Régime de pensions du Canada/Régime de rentes du Québec en tant que variables instrumentales dans la décision de prendre sa retraite. Les estimations qui résultent de nos analyses donnent à penser que la retraite a un effet positif et important sur la satisfaction à l'égard de la vie de la population âgée au Canada. Cet effet demeure significatif après contrôle des variables de l'âge, du sexe, de l'état matrimonial, du niveau de scolarité, du revenu du ménage, de la race, du statut d'immigrant et des effets fixes à l'échelle provinciale.

Mots clés : retraite, satisfaction à l'égard de la vie, santé, vieillissement, bien-être, régression des variables instrumentales

Retirement is a major transition in the lives of the older population, potentially affecting well-being through the lifestyle, emotional, and financial changes that accompany the transition. In this study, we empirically investigate the effect of retirement on life satisfaction in Canada, using data from the 2008–2009 Canadian Community Health Survey–Healthy Aging. Identifying the effect of retirement on life satisfaction is inherently difficult because of self-selection, reverse causality, and unobserved individual-specific heterogeneity that may affect both life satisfaction and the decision to retire. To address these concerns, we explore the use of the age thresholds from

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the Old Age Security and the Canada Pension Plan/Quebec Pension Plan as instruments in the decision to retire. The resulting estimates suggest that retirement has a positive and significant effect on the life satisfaction of the older population in Canada. This effect remains significant after we control for age, gender, marital status, educational background, household income, race, immigrant status, and province-level fixed effects.

Keywords: retirement, life satisfaction, health, aging, well-being, instrumental variable regression

Introduction

The world is undergoing major demographic changes, as reflected in the rapid increase in the proportion of the older population, coupled with the equally rapid increase in the proportion of adult life spent beyond age 60 years that ensues from increasing life expectancy. According to the [United Nations \(2015\)](#), the proportion of the older population aged 60 years and older is on the rise in Canada and expected to jump from 22.3 percent in 2015 to 32.4 percent in 2050, implying that nearly one in three persons in Canada will be older than age 60 years in 2050. This demographic transition has important fiscal, social, and welfare implications because of, among other interrelated issues, higher health care costs, unsustainable pension commitments, a smaller pool of working-age people, and demand shifts arising out of age-dependent preferences.

At the individual level, retirement represents a major transition in life, a change that often brings about a loss in income, on the one hand, and a reduction in work-related stress and increased time available for leisure and social engagement, on the other hand—all of which are likely to affect well-being. Empirical evidence for the causal effect of retirement on well-being is key to the design of well-informed retirement policies that consider the fiscal and welfare consequences of retirement. If findings suggest that retirement is beneficial for the well-being of the older population, they provide justification for altering the incentives in income support programs toward earlier retirement. If, instead, findings point to retirement leading to a reduction in well-being, they provide justification for building incentives to work beyond the traditional retirement age into income security programs. In this study, we set out to investigate the effect of retirement on the well-being of the older population in Canada, taking life satisfaction as a measure of well-being. Life satisfaction is a distinct and important measure of subjective well-being that is gaining increasing appeal to complement more objective data on the quality of life and to gauge progress in human well-being. Its significance as a policy target has only grown over time and is now high on the statistical and political agenda of many countries. Economists' interest in this measure has also expanded over time as a result of an increased awareness of the impact of non-traded goods (such as social interaction with friends and participation in clubs, religious

bodies, political parties, unions, and civic and cultural organizations) on social welfare.

At the conceptual level, retirement can affect life satisfaction through several channels, some of which may imply a negative relationship between retirement and life satisfaction, although others point to a positive relationship. For instance, the loss in income that accompanies retirement may reduce life satisfaction because lack of financial comfort tends to be negatively associated with life satisfaction in general. Similarly, people who like their jobs may experience sadness and a loss of purpose in their lives when they retire. On the positive front, retirement increases the time available for leisure and social engagement and may lead to a reduction in work-related stress and an improvement in mental well-being, mood, and happiness, all of which may lead to increased life satisfaction. The ultimate effect of retirement on life satisfaction depends on which of these channels of influence dominates. This is essentially an empirical question.

The evidence to date from studies that consider (psychological) measures of well-being, and are thus closest in focus to our study that relies on (subjective) life satisfaction as a measure of well-being, is mixed: the effect of retirement on well-being is positive (e.g., [Belloni et al. 2016](#); [Charles 2004](#); [Latif 2011](#); [Mein et al. 2003](#); [Olds et al. 2018](#)), negative ([Bonsang et al. 2012](#); [Dave et al. 2008](#); [Nikolova and Graham 2014](#); [Szinovacz and Davey 2004](#)), or absent ([Abolhassani and Alessi 2013](#); [Bonsang and Klein 2012](#); [Coe and Zamarro 2011](#); [Fonseca et al. 2017](#); [Kesavayuth et al. 2016](#)). These differences do not necessarily suggest inconsistency, given the earlier noted opposing forces driving the effect, and they may result from spatial and temporal contextual differences, including differences in labour markets, health insurance, and social policies. Hence, inferring a positive or negative effect in Canada on the basis of evidence from another country may not be prudent. Concerns over external validity aside, identifying the causal effect of retirement is not straightforward because retirement is a choice, especially in countries such as Canada where there is no mandatory retirement age. People may retire if they have health issues, which have a negative impact on their life satisfaction, or if they have a fulfilling life outside of work, which has a positive impact on their life satisfaction; their decision regarding retirement is thus likely to take into consideration how happy or satisfied with life

they are. The implication is that retirement is likely to be endogenous and linked to life satisfaction. Likewise, there might be some unobserved factors (individual-specific characteristics or certain personality traits) that can affect both retirement and life satisfaction.

To address these endogeneity issues and identify the effect of retirement on life satisfaction, we follow the instrumental variable (IV) approach frequently adopted in the literature when a key explanatory variable is likely to be endogenous and explore the use of the eligible age for accessing retirement benefits as an exogenous instrument for retirement. Relying on IV regression, with pension eligibility thresholds as instruments in the retirement decision, is quite common in empirical analyses of the effect of retirement on health (physical and mental) and well-being. Many of these analyses rely on longitudinal or panel data (e.g., Belloni et al. 2016; Bonsang et al. 2012; Kesavayuth et al. 2016; Latif 2011; Mazzonna and Peracchi 2012), but there are studies that use cross-sectional data, with an emphasis on depression, and are thus most related to our study (e.g., Charles 2004, who uses US data and changes in laws affecting mandatory retirement and Social Security benefits as a source of identification, and Coe and Zamarro 2011, who rely on cross-country variation in the statutory retirement age as a source of identification).

Our results indicate that retirement has a positive and significant effect on the life satisfaction of the older population in Canada, and this effect remains significant after controlling for age, gender, marital status, educational background, household income, race, immigrant status, and provincial fixed effects. Our study adds to the few analyses of the relationship between life satisfaction and retirement, especially in the context of Canada. In fact, this is the first attempt to delve into the Canadian Community Health Survey (CCHS)-Healthy Aging data and investigate the causal relationship between life satisfaction and retirement in Canada. To the best of our knowledge, only two large-scale (longitudinal) studies on the impact of retirement account for the earlier noted endogeneity problem in the Canadian context: one about the effect on (self-reported) health (Latif 2012) and the other about the effect on happiness or psychological well-being (Latif 2011);¹ for both studies, only subjective retirement is available as a measure of retirement status.² Hence, to date, there has been no Canadian study on the effect of retirement on life satisfaction; furthermore, because external validity may be a challenge when there is conceptual ambiguity about the direction of impact, there is no a priori reason to assume that findings from another country hold for Canada, and a Canadian focus is thus in and of itself a notable contribution and a worthwhile undertaking. However, the CCHS-Healthy Aging dataset affords us the opportunity to contribute on other fronts.

The richness of the CCHS-Healthy Aging data allows us, in fact, to control for a variety of economic and socio-demographic factors such as ethnic origin and race, which are absent in previous studies but are quite likely to correlate with the specific world views and perspectives that inform the evaluation of life satisfaction. We also assess the robustness of our results by controlling for several factors that may influence life satisfaction, such as household size, emotional well-being, and community engagement. In addition, to verify the validity of our results, we use two measures of retirement: (a) subjective retirement, which is based on respondents' responses regarding whether they think of themselves as retired, and (b) objective retirement, which comes from Statistics Canada and follows the standard definition of retirement.

This article is organized as follows. Next, we present a critical review of the relevant literature and highlight how our study contributes to this literature, especially in the context of Canada. Then, we describe the data, provide descriptive statistics, and elaborate on our empirical strategy. In the "Results" section, we present our results along with various robustness checks. Finally, we provide concluding remarks.

Literature Review

Several studies have investigated the effect of retirement on various measures of subjective well-being, such as physical health, mental health, psychological well-being, life satisfaction, and happiness. Because the focus of our study is on life satisfaction, we primarily review studies that deploy life satisfaction as an indicator of subjective well-being while also mentioning studies on mental health, psychological well-being, and happiness that are closely related aspects of life satisfaction. A comprehensive review of this literature suggests that there is no conclusive evidence on the relationship between retirement and subjective measures of well-being; findings cover the full range of possibilities (positive, negative, or negligible effects).

Among the studies reporting a positive effect, we have evidence from several parts of the world. Beginning with the United Kingdom, Mein et al. (2003) and Fleischmann et al. (2020) conduct longitudinal analyses of civil servants and detect a positive association between retirement and improvement in mental health, particularly among higher socio-economic groups, in the former case, and for individuals who retire from jobs with higher psychosocial demands, lower decision authority, or lower work social support, in the latter case. On the basis of data from the Health Survey for England, Johnston and Lee (2009) add the finding of a positive effect on one's sense of well-being to the finding of improved mental health, and Rose (2020) finds that retirement raises life satisfaction and reduces depression for men after accounting

for the lag between retirement and the time of the survey. Outside of the United Kingdom, but still in Europe, [Eibich \(2015\)](#) uses data from the German Socio-Economic Panel Study (SOEP) in support of the improvement in mental health, and [Belloni et al. \(2016\)](#) use longitudinal data from the Survey on Health, Ageing and Retirement in Europe (SHARE) to analyze the effect of retirement on mental health during economic crises, uncovering a positive effect for blue-collar men working in the most hard-hit areas. Working with Australian data, [Tran and Zikos \(2019\)](#) and [Olds et al. \(2018\)](#) confirm the positive impact of retirement on mental health generally and measured in terms of depression, anxiety, and stress. For the United States, [Charles \(2004\)](#) and [Gorry et al. \(2018\)](#) use data from the Health and Retirement Study (HRS) to investigate the effect of retirement on various measures of subjective well-being (depression and feelings of loneliness in the former; mental health and life satisfaction in the latter), and their findings consistently suggest that retirement improves subjective well-being. In the context of Canada, [Latif \(2011\)](#) relies on longitudinal data from the 1994–2006 Canadian National Population Health Survey to discover a positive effect of retirement on happiness as a measure of psychological well-being.

In support of a negative relationship between subjective well-being and retirement, we also have evidence from various countries. For the United States, for example, [Dave et al. \(2008\)](#) use the HRS data and find that retirement increases depression; on the basis of the same data, [Bonsang et al. \(2012\)](#) detect a worsening of cognitive function after retirement that, although not instantaneous, does occur at the start of retirement. For Europe, [Mazzonna and Peracchi \(2012\)](#) rely on the SHARE data to examine the effect of retirement on cognitive functions, concluding that people (men and women alike) retiring early (at ages 60–65 y) tend to have significantly lower cognitive test scores in the long run. Combining Gallup World Poll (GWP) data from several European countries and the United States, [Nikolova and Graham \(2014\)](#) find that retirees have lower subjective well-being than late-life workers under voluntary part-time or full-time work arrangements.

Finally, a few articles report a statistically insignificant effect of retirement on subjective well-being, and they are mostly based on data from Europe. For example, [Bonsang and Klein \(2012\)](#) and [Abolhassani and Alessi \(2013\)](#) use the German SOEP data and focus on life satisfaction. [Kesavayuth et al. \(2016\)](#) also consider the impact of retirement on life satisfaction but work with the British Household Panel Survey data. [Fonseca et al. \(2014\)](#) use three waves of the SHARE data and investigate the effect of retirement on depression. Looking at both life satisfaction and depression, [Fonseca et al. \(2017\)](#) combine the US HRS data and the SHARE data over the 1992–2012 period.

Although some of the differences in findings may be attributable to differences in datasets, in approaches implemented to define life satisfaction and retirement, and in identification strategies deployed, an important explanation for the variation may relate to differences in socio-economic demographics and country-specific characteristics corresponding to cultural and institutional set-ups governing social security incentives, as well as general welfare and retirement policies in each country. For example, [Cho and Lee \(2013\)](#) find that complete retirement yields higher life satisfaction in Korea but lower life satisfaction in Germany and Switzerland.

Some studies find that the effects of retirement on psychological well-being and life satisfaction are heterogeneous according to education, gender, marital status, retirement duration, and whether the retirement is voluntary. For instance, [Wetzel et al. \(2016\)](#) report that the long-term effect of retirement on life satisfaction depends on the educational status of retirees: more educated people can sustain their life satisfaction after retirement in the long run, whereas less educated people show a progressive decline in their life satisfaction after retirement. Exploring the question of whether the mental health effects of retirement in the Netherlands vary by gender and marital status, [Picchio and Ours \(2020\)](#) conclude that retirement has no effect among single people and partnered women but improves the mental health of partnered men. With respect to retirement duration, [Zhu and He \(2015\)](#) discover, in an analysis of women in Australia, that retirement leads to an immediate increase in life satisfaction but a decrease in life satisfaction as the duration of retirement increases. Likewise, [Kim and Moen \(2002\)](#) detect differences between short- and long-term effects for male retirees, based on US data: in the first two years, retirement boosts morale but being continuously retired corresponds to greater depressive symptoms. In yet another study encompassing 16 Western European countries and the United States, [Horner \(2014\)](#) examines both short- and long-term effects of retirement on subjective well-being and concludes that, whereas the short-term effect is positive and large, it fades over a few years. As for the impact of mandatory retirement, using the German SOEP data, [Bonsang and Klein \(2012\)](#) find that, although the overall effect of retirement on life satisfaction is inconclusive, the effect of involuntary retirement is negative, a result that [Hershey \(2014\)](#) confirms in the context of the Netherlands when comparing voluntary and involuntary retirement in terms of their effects on perceived well-being, which leads to the detection of an improvement under the former and a worsening under the latter. Relatedly, working with the four waves of the US HRS data, [Szinovarcz and Davey \(2004\)](#) discover that depressive symptoms among older adults increase if retirement is abrupt and perceived as too early or imposed.

Our study contributes to the literature that considers the effect of retirement on subjective well-being on several accounts. First, we exploit a rich dataset that differs from the datasets in existing studies and can thus offer additional evidence on how retirement affects life satisfaction. Second, we use a more comprehensive set of control variables, including race and immigrant status. Third, we focus on Canada and provide evidence for the Canadian context, which is important because the findings from other countries may not be generalizable; as noted earlier, the only other large-scale Canada-based study (Latif 2011) relies on a one-question measure of happiness and subjective retirement. Fourth, but connected to the previous point, we adopt a broader and widely used measure of subjective well-being that relates to, but is distinct from, happiness (e.g., Deaton 2008). Last, but not least, we verify the robustness of our results by using two different measures of retirement (objective and subjective), by including a variety of other relevant controls such as emotional state and community engagement and by addressing more directly, at least in part, the endogeneity problem when removing respondents who report choosing retirement for health-related reasons or as a result of job elimination due to organizational restructuring.

Description of Data and Variables

The dataset we use consists of cross-sectional data collected via the 2008–2009 CCHS–Healthy Aging, a comprehensive collection of information across 37 modules (in addition to the entry and exit modules) from 30,865 individuals aged older than 45 years across the 10 Canadian provinces. The dataset contains details on individual and household income levels and a wide range of socio-demographic variables, including immigrant status, country of birth, ethnic origin, and language. Other modules cover questions on: general health and well-being; factors, influences, and processes that contribute to healthy aging; use of health care services; social engagement; and work and retirement transitions.

For this study, our focus is on life satisfaction, which we measure with the life satisfaction score (*LS*) from the classification of the five life satisfaction statements included in the survey: (a) “in most ways, my life is close to my ideal”; (b) “the conditions of my life are excellent”; (c) “I am satisfied with my life”; (d) “so far, I have gotten the important things in my life”; and (e) “if I could live my life over, I would change almost nothing.”³ Survey respondents consider these statements after providing general information about their age and physical health but before answering questions about their mental health, use of health care services, lifestyle, and labour force participation. Respondents rate each statement on a scale ranging from 1 to 7 (1 = *strong disagreement*, 4 = *indifference*, 7 = *strong agreement*).⁴ The *LS* variable is then

the sum of the ratings across the five statements;⁵ the minimum score is 5, the maximum score is 35, and higher scores indicate greater satisfaction with life. Because *LS* as computed reflects a measure of well-being in wide use and is one of the derived variables included in the dataset, we do not attempt to generate our own *LS* via factor analysis; however, to underscore the validity of the score-generating process, we provide summary statistics for its components in Table A.1 of the Appendix and correlation coefficients between any two components and between the score and each of its components in Table A.2. As the two tables illustrate, all five components are positively correlated, and the correlation coefficient between *LS* and each of its components is above 0.7, which indicates a strong (positive) linear relationship. Furthermore, the coefficients between *LS* and its five components are of similar magnitude, ranging from 0.75 to 0.84, which justifies deriving the score as the arithmetic average of its five components.

Turning to Table A.3, we note that the (weighted) average score value for life satisfaction is 27.1, which, on the basis of a detailed description of the meaning of specific score ranges available in Pavot and Diener (2013), suggests that individuals living in Canada are, on average, satisfied with their life but see an opportunity for growth and exploration in at least one area. When we separate retired and non-retired respondents and condition the mean scores on age⁶, we find that the average *LS* tends to increase with age for both groups under subjective retirement and for the retired group under objective retirement, which may be indicative of an age effect on life satisfaction that is independent of retirement (see Figure 1). Furthermore, regardless of how we measure retirement, there seems to be some age dependency in how retired people’s life satisfaction compares with that of non-retired people, with the obvious caveat that the figures illustrate only average scores.

To underscore the validity of *LS*, a few remarks are in order. The scale is a widely used measure of subjective well-being with good psychometric properties and a high test-retest coefficient (i.e., consistency in results when the same participants complete the scale more than once), according to Diener et al. (1985). Research shows that it is reliable vis-à-vis other measures of life satisfaction (Pavot and Diener 2008; Pavot et al. 1991) and measures of happiness (Lyubomirsky and Lepper 1999); it also correlates well with the meaning-of-life measure (Steger et al. 2006) and the Adult Trait Hope Scale (Bailey and Snyder 2007). The only acknowledged shortcoming relates to the last statement encompassed in the measure (i.e., “if I could live my life over, I would change almost nothing”) because it may encourage respondents to reflect on their desire for change as opposed to their present sense of life satisfaction (Pavot and Diener 1993) and may then be weakly associated with life satisfaction;

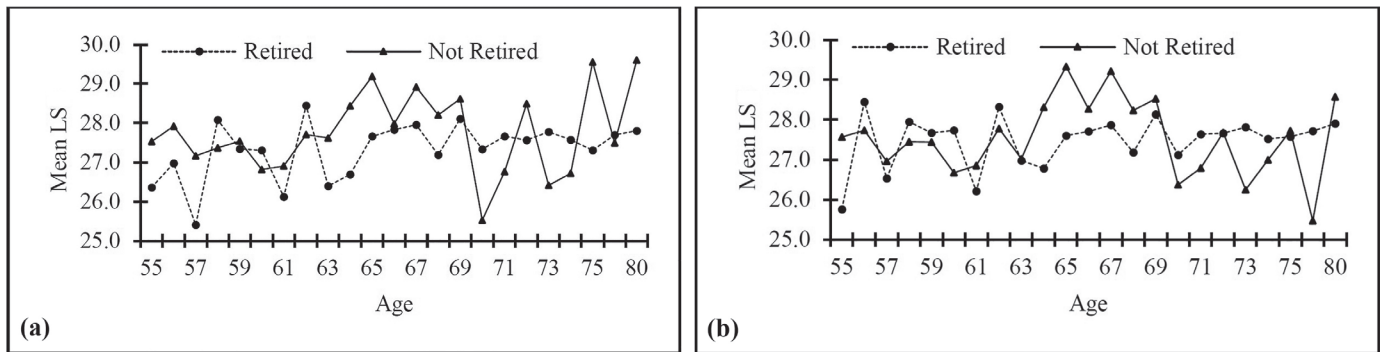


Figure 1: LS by Age: (a) Subjective Retirement and (b) Objective Retirement

Note: LS = Life Satisfaction Score.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

however, the correlation coefficients in Table A.2 do not indicate inconsistencies across the five components to warrant concern over the potential shortcoming.

Our main explanatory variable of interest is retirement status, and we measure it both subjectively and objectively to underscore that the estimated effect of retirement holds independently of how we define it but also to highlight that stated preferences are a fairly accurate approximation of revealed preferences when dealing with large datasets. The subjective measure is based on self-perception and comes from a question about whether respondents consider themselves completely retired, partially retired, or not retired. Partial retirement encompasses a variety of situations that fall, however, into two main categories: (a) returning to work after retirement and (b) still working but less than before or part time. Although we briefly address the question of how partial retirement affects life satisfaction in relation to full retirement in the basic model, expecting a priori a smaller effect, we mostly rely on a binary measure of subjective retirement, collapsing the absence of retirement and the presence of partial retirement into one category, for consistency with the objective retirement measure that only allows for complete retirement. Our second measure is in fact based on the standard definition of retirement in Canada, according to which a person is considered retired if they (a) are aged older than 54 years, (b) are not in the labour force, and (c) receive 50 percent or more of their income from retirement-like sources. For the sake of consistency between the analysis under subjective retirement, which can arise at any age, and the analysis under objective retirement, which requires an age older than 54 years, we consider only observations pertaining to respondents aged 55–85 years, and our final dataset, which also excludes observations with missing data on the main set of controls (e.g., income), consists of 13,919 observations.

Besides retirement status, which we treat as endogenous and instrument with eligible age for accessing

retirement benefits, we have several controls to account for economic, social, demographic, and contextual dimensions. Among socio-demographic factors, all at the individual (respondent) level, we include gender (male and female), marital status (married or common law, widow or widower, divorced or separated, and single), age, education (less than secondary school graduation, secondary school graduation, some post-secondary education, and post-secondary degree or diploma), immigrant status, and whether the respondent is White. At the household level, we use income to capture the economic dimension and size to reflect some contextual information that may speak to both economic and social elements.

Additional regressors we incorporate into the full-sample model are physical health as reflected by the number of chronic conditions the respondent experiences⁷, which other studies find to correlate with life satisfaction (e.g., hypertension in Mojon-Azzi and Susa-Poza 2011), and provincial indicators (with Ontario as the default province) to control for potential inter-provincial variation in well-being and life satisfaction. For the robustness checks, we add a few variables that measure social support and social participation and engagement. For the former, we have (a) positive social interaction for the availability of people with whom to positively interact and (b) affection for the presence of expressions of love and affection; in both instances, the value corresponds to the sum of frequency ranks (ranging from 0 = *never* to 4 = *always*) across four questions in one case and three questions in the other case (hence, the maximum values are 16 and 12).⁸ For the latter, we have (a) a sense of belonging to the community, which ranges from very weak to very strong, and (b) the frequency of participation in community-level activities, which spans from no participation to weekly participation. Our final control, as part of our robustness checks, is the Physical Activity Scale for the Elderly (PASE), which records the sum of the amounts of time spent in each of 12 activities

over the preceding week multiplied by the corresponding activity weights.⁹ In terms of interaction variables, we have age interacting with marriage (legal or common law), to assess whether the effect of having a companion on life satisfaction varies with age, and household size interacting with household income, to assess whether the effect of household income varies with household size.

The list of variables we use is available in Appendix Table A.3, which provides weighted summary statistics, and Table A.4, which describes the variables. The weights are part of the dataset, and we apply them consistently throughout the empirical analysis. They reflect adjustments at several levels (e.g., to account for household-level non-response and person-level non-response) and ensure that the sample is representative of the Canadian population; the weight each respondent receives corresponds to how many people in the population the respondent represents.

In Table A.5, also in the Appendix, we present means or proportions for a subset of variables, separating retired and non-retired respondents. As the table illustrates, there are no noticeable differences between the two groups, regardless of the retirement measure; a couple of comments are nonetheless in order: (a) retired respondents are more likely to be female than they are to be widowed, whereas non-retired respondents are more likely to be married or in a common-law relationship; (b) retired respondents are more likely to have less than secondary education and less likely to have post-secondary education; and (c) retired respondents tend to have more chronic conditions and to spend less time on physical activities.

Empirical Strategy: Framework and Motivation

Our initial empirical strategy stems from the conjecture that we can write individual j 's life satisfaction in reduced form as

$$LS_j = \alpha + \beta R_j + \gamma' X_j + e_j, \quad (1)$$

where LS denotes life satisfaction, R is a dummy variable that is equal to 1 if the individual is completely retired and zero otherwise; X is a vector of (exogenous) control variables that include age, gender, race, immigrant status, marital status, education, physical health status, household size, income, and provincial dummies; e represents the zero-mean error term; and the subscript j denotes the individual. In this equation, β represents the causal effect of retirement on life satisfaction, which we can estimate with the standard ordinary least squares (OLS) estimation procedure.

However, in our observational dataset, retirement status is not a randomly assigned treatment and may be related to the other covariates we measure and account

for in Eq. (1) or even to unobservable or unobserved factors that affect life satisfaction (the outcome). The implication here is that individuals experiencing the treatment may differ substantially from those not experiencing the treatment in terms of both observable and unobservable factors, and we may be in violation of the ignorable treatment assignment assumption (i.e., the assumption that, conditional on X , assignment to treatment is independent of the outcomes under treatment and non-treatment).

Formally, retirement is a dichotomous age-dependent decision (hence, an endogenous choice) resulting from a comparison of the expected utility from retiring, EU^R , with the expected utility from staying in the labour force, EU^{NR} , and we can then express the choice or participation decision as

$$R_j = EU_j^R - EU_j^{NR} = \alpha_R + \delta_R' W_j + e_{Rj}, \quad (2)$$

where W is the vector of the observed determinants of the difference in expected utilities, and e_R embeds the unobserved determinants of the difference in expected utilities, has zero (conditional) mean, and is uncorrelated with W . Because people retire only if $R > 0$, the OLS estimation of β in Eq. (1) produces an unbiased and consistent estimate of the causal effect of retirement on life satisfaction only if $cov(e, e_R) = 0$ and W does not include LS ; that is, the unobserved factors affecting the decision to retire are unrelated to those affecting the level of life satisfaction (unmeasured confounding is absent and the ignorability assumption holds), and there is no simultaneity or reverse causality in the relationship between retirement and life satisfaction.

Now, it is quite likely for unmeasured factors such as personality traits and attitudes that influence the level of life satisfaction through e to affect how positively or negatively one experiences job-related situations (e.g., deadlines and conflicts, which may cause stress and anxiety, and contributions to society, which may generate a sense of accomplishment) that influence the retirement decision through e_R ; hence, the two error terms are likely to be correlated. In addition, it is quite possible for how happy or satisfied one is with life to affect the decision of whether to retire, although we cannot sign a priori the direction of influence (both a high level of life satisfaction and a low level of life satisfaction may lead to the decision to retire); simultaneity is then likely to be present. As a result, $cov(e, e_R) \neq 0$, W includes LS , or both, resulting in $cov(e, R) \neq 0$; that is, we have endogeneity and cannot rely on the OLS procedure to produce an unbiased and consistent estimate of β .

To obtain an unbiased and consistent estimate of β , we need to isolate variation in retirement status that is independent of both e and e_R and thus exogenous. Although the dataset contains information about reasons for retiring, which allows us to omit respondents who report

retiring for health-related reasons or because of a loss of employment resulting from organizational restructuring, thus removing some of the sources of endogeneity, we must resort to appropriate estimation techniques to deal with all possible causes of endogeneity. In fact, the previously noted omission only serves as a partial remedy in that, for example, it ignores that those choosing to retire may be very different people from those opting against retiring or that people may self-select into retirement because they enjoy a full and exciting life outside of work.

In congruence with related studies (e.g., Belloni et al. 2016; Bonsang 2012; Kesavayuth et al. 2016; Latif 2011; Mazzonna and Peracchi 2012), we exploit age-specific retirement incentives or pension eligibility cut-offs to attempt to isolate the exogenous variation in retirement status. Specifically, we implement the IV approach and deploy the age of eligibility for accessing retirement benefits as an exogenous instrument for retirement.¹⁰ In Canada, the eligible ages to receive Old Age Security (OAS) and Canada Pension Plan/Quebec Pension Plan (CPP/QPP) payments lie between 60 and 70 years. Specifically, OAS benefits are accessible at age 65 years; CPP/QPP benefits, however, are accessible at age 60 years, although there is a 0.6 percent reduction in payment per month (or by 7.2 percent per year) if someone retires at age 60 years; retirement after age 65 years results, instead, in a 0.7 percent increase in payment per month (or by 8.4 percent per year). Because of the coupling of OAS and CPP/QPP benefits at age 65 years, we expect the indicator for being aged at least 65 years to be a main source of exogenous variation in retirement status, and this is consistent with the average age at which people tend to retire. In Canada, for example, the average age and median age at retirement in 2021 sit at 64.4 and 64.5 years, with the figures for men being slightly higher than the corresponding figures for women in both cases (64.9 vs. 63.8 y for average age and 64.8 vs. 64.0 y for median age; Statistics Canada 2023).

As Figure 2 highlights, the proportion of retirees jumps substantially between ages 60 and 65 years (from 23 percent to 65 percent under the subjective retirement measure and from 22 to 65 percent under the objective retirement measure), reaching 82 percent in one case and 85 percent in the other case at age 70 years; the greatest jump occurs around age 65 years (between ages 63 and 65 years, to be precise), with the proportion increasing by 30 percentage points.¹¹ Because we do not have panel data, we cannot estimate hazard rates to confirm that the propensity to retire changes at the cut-off points, therefore providing a first attempt at validating the use of pension eligibility thresholds as instruments, but the two figures do suggest that the standard retirement age of 65 years is likely the most important threshold affecting retirement behaviour; indeed, the threshold at age 65 years turns out to be the only statistically significant exogenous instrument for retirement, and we thus drop the other two cut-offs in the final empirical specifications. In addition, the two figures suggest stark similarities between the two retirement measures, at least up to and including age 74 years; by age 75 years, 96 percent of the population is retired under the objective measure, whereas 88 percent is retired under the subjective measure, but these differences turn out to be inconsequential for the qualitative effect of retirement on life satisfaction.

Although the discontinuous age cut-offs are likely to affect retirement, there is no reason to believe that they have any independent effect on life satisfaction. Our revised empirical strategy, then, consists of a two-equation, two-stage framework that includes the discrete choice of whether to retire (i.e., the IV) as a function of pension age thresholds (i.e., the instruments that have no direct impact on life satisfaction), among other covariates, and life satisfaction as a function of the estimated probability of retiring and additional regressors as mentioned earlier, that is,

$$R_j = \alpha_R + \beta'_R Z_j + \gamma'_R X_j + e_{Rj} \quad (3)$$

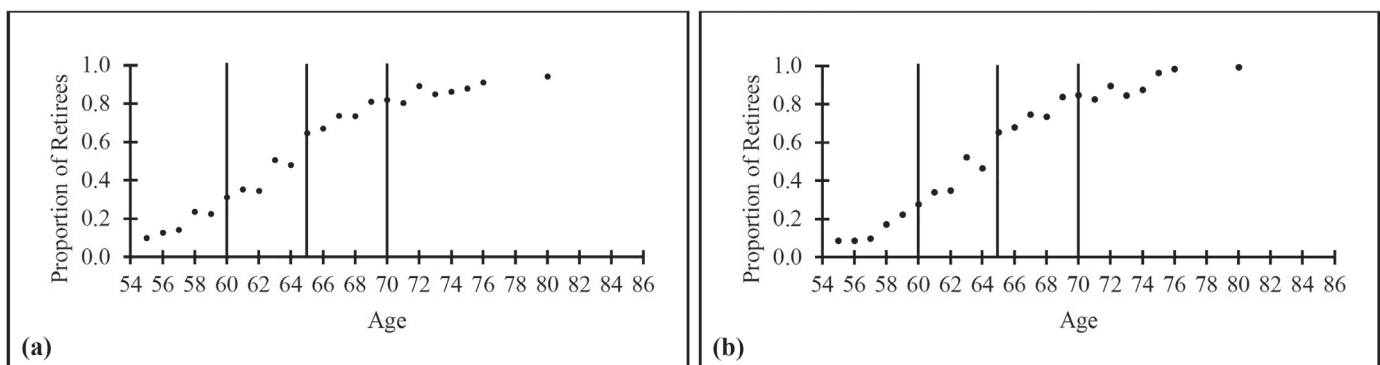


Figure 2: Proportion of Retirees by Age: (a) Subjective Retirement and (b) Objective Retirement

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

and

$$LS_j = \alpha + \beta \hat{R}_j + \gamma' X_j + e_j, \quad (4)$$

where Z is the vector of the instruments in the retirement equation and \hat{R} is the predicted probability of retiring from the first-stage regression. We account for the full set of control variables as reflected in the vector X in both stages (equations) to enhance the effectiveness of isolating the variation in R that generates solely through the instrument or instruments. The basic idea of the IV two-stage least squares (2SLS) set-up is to generate exogenous variation in an otherwise endogenous regressor in a first-stage regression and use this exogenous variation to estimate the causal effect of the regressor on the outcome variable of interest (second-stage regression).

For completeness, we report both the OLS results that assume $cov(R, e) = 0$ as the benchmark and the IV 2SLS results that account for $cov(R, e) \neq 0$ and help identify the causal effect of retirement on life satisfaction. However, some conditions must hold for this causal effect to be accurate: (a) the instrument or instruments must be exogenous, (b) the instrument or instruments must be highly correlated with the retirement decision (relevance assumption), (c) the instrument or instruments should have no direct impact on life satisfaction and be orthogonal to e (exogeneity assumption), and (d) there are no individuals who would choose not to retire in the presence of retirement incentives but would retire in the counterfactual case that entails no retirement incentives (monotonicity assumption).

Although we cannot directly test for the absence of a direct impact of the instrument or instruments on life satisfaction, it is reasonable to assume that there are no changes in life satisfaction that coincide with the pension eligibility cut-offs; furthermore, we cannot think of other changes that kick in at the eligibility cut-offs that might affect life satisfaction. In addition, because the literature has extensively relied on pension eligibility thresholds as instruments for retirement in related studies, including about the health and cognitive effects of retirement (e.g., Bonsang et al. 2012; Celidoni et al. 2017; Coe and Zamarro 2011; Heller-Sahlgren 2017; Rose 2020), we are confident that the conditions above noted stand but, nonetheless, verify the relevance and exogeneity assumptions for the dataset under consideration in the next section.

Results

The first set of estimation results, in Tables 1 and 2, compares the OLS benchmark case with the IV 2SLS case for the full sample as well as a sub-sample that excludes respondents reporting having retired for health-related reasons or because of job elimination resulting from organizational restructuring. Although most people retire

within the eligible ages for accessing retirement benefits, there may be some individuals whose retirement ensues from an employment shock or a health-related shock. The exclusion of instances in which either one of the two shocks triggers retirement allows us to comment on the validity of the pension eligibility age-based thresholds in the decision of retiring more accurately in the absence of individual-specific choice-restricting circumstances. Furthermore, for the IV 2SLS model, results from the initial specification of the first stage, which includes all pension eligibility thresholds (at ages 60, 65, and 70 y) as exogenous instruments for retirement, suggest that the only relevant (statistically significant) source of exogenous variation in retirement status is the jump in retirement incentives at age 65 years, and we then omit the other two cut-offs in the final specification of the first stage to avoid having an overidentified model but partially report on the second-stage estimates for the initial empirical model with all instruments in the Appendix (Table A.6).

Before interpreting the results in Tables 1 and 2, we must confirm the validity of the IV set-up by establishing whether the aforementioned conditions (relevance and exogeneity assumptions, to be precise) hold. To this end, with specific reference to the full sample, we note that, for both measures of retirement, the values of the first-stage F -statistic on the excluded variable (i.e., the instrument) in Tables 1 and 2, also reported in Table 3, are statistically significant at the 1 percent level. These values are based on the hypothesis that the estimated coefficient of the instrument in the first-stage regression is not different from zero, and rejection thus suggests that the retirement incentive at age 65 years has significant explanatory power in the retirement decision, after we control for other factors; however, according to Hall et al. (1996), having a statistically significant first-stage F -statistic on the excluded variable does not necessarily mean that our instrument is strong, and we then rely on Stock and Yogo (2005) for some additional testing. In particular, we use the characterization that defines an instrument to be weak if the IV estimates suffer from severe size distortions and entails choosing the largest rejection rate of a nominal 5 percent Wald or t -test we are willing to tolerate (e.g., 10, 15, 20, or 25 percent). For instance, if we set the tolerable rejection rate at no more than 10 percent (i.e., we define the instrument to be weak when the worst-case size of the nominal 2SLS t -test exceeds 10 percent), we can reject the null hypothesis of a weak instrument as the critical F -value from Stock and Yogo (2005) corresponding to one endogenous variable, one instrument, and the set rejection rate of acceptable tolerance is 16.38, which falls short of the F -values in Table 3.¹² The (unreported) correlation coefficient between the instrument and the endogenous variable in the first-stage estimation of each of the four cases (sample and sub-sample under both objective retirement and

Table 1: Objective Retirement (Ages 55–85 y)

Dependent Variable = <i>LS</i>	Full Sample		Sample without Health and Job Shocks	
	OLS Model	IV 2SLS Model	OLS Model	IV 2SLS Model
Objective retirement	0.38** (0.18)	4.94** (2.19)	0.88*** (0.19)	3.39** (1.59)
Female (ref. = male)	0.54*** (0.14)	0.35** (0.18)	0.40*** (0.16)	0.28 (0.17)
Age	0.20 (0.16)	−0.71 (0.52)	0.16 (0.18)	−0.28 (0.38)
Age ²	−0.00 (0.00)	0.00 (0.00)	−0.00 (0.00)	0.00 (0.00)
White (ref. = not White)	0.48 (0.33)	0.16 (0.35)	0.56 (0.36)	0.42 (0.36)
Immigrant (ref. = not immigrant)	−0.70*** (0.24)	−0.61** (0.26)	−0.66** (0.27)	−0.60** (0.29)
Marital status (ref. = married or common law)				
Widow or widower	−1.49*** (0.22)	−1.52*** (0.24)	−1.60*** (0.26)	−1.63*** (0.27)
Divorced or separated	−3.02*** (0.24)	−2.75*** (0.28)	−2.64*** (0.27)	−2.45*** (0.28)
Single	−2.12*** (0.34)	−1.96*** (0.36)	−2.30*** (0.39)	−2.21*** (0.40)
Education (ref. = less than secondary)				
Secondary	0.71*** (0.21)	0.82*** (0.22)	0.49** (0.23)	0.55** (0.24)
Some post-secondary	0.43 (0.29)	0.50* (0.30)	0.03 (0.33)	0.06 (0.33)
Post-secondary	0.82*** (0.17)	0.80*** (0.18)	0.67*** (0.19)	0.64*** (0.19)
Physical health (chronic conditions)	−0.65*** (0.04)	−0.70*** (0.05)	−0.54*** (0.04)	−0.55*** (0.04)
Household size	−0.03 (0.10)	0.03 (0.11)	−0.06 (0.11)	−0.03 (0.11)
Household income	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Province (ref. = ON)				
NL	0.23 (0.27)	−0.15 (0.33)	0.05 (0.28)	−0.16 (0.31)
PE	0.44* (0.27)	0.62** (0.30)	0.41 (0.29)	0.49 (0.30)
NS	0.16 (0.24)	−0.14 (0.28)	−0.01 (0.26)	−0.18 (0.28)
NB	0.37 (0.27)	0.09 (0.32)	0.43 (0.27)	0.30 (0.28)
QC	1.11*** (0.20)	0.93*** (0.21)	0.99*** (0.22)	0.86*** (0.23)
MB	−0.17 (0.23)	−0.12 (0.25)	−0.22 (0.26)	−0.19 (0.27)
SK	0.50* (0.27)	0.63** (0.29)	0.29 (0.30)	0.32 (0.30)
AB	0.23 (0.23)	0.44* (0.27)	0.20 (0.25)	0.28 (0.26)
BC	−0.1 (0.21)	−0.10 (0.23)	−0.20 (0.23)	−0.21 (0.24)
Constant	17.62*** (5.58)	51.03*** (18.61)	19.90*** (6.135)	36.47*** (13.73)
<i>N</i>	13,919	13,919	10,950	10,950
<i>R</i> ²	0.14	0.06	0.11	0.09
Excluded instrument		Age ≥ 65		Age ≥ 65
First-stage result				
Age ≥ 65		0.15*** (0.02)		0.21*** (0.03)
First-stage <i>F</i> statistic (excluded variable)		34.72***		

Notes: Robust standard errors in parentheses. IV 2SLS = instrumental variable two-stage least squares; *LS* = life satisfaction score;

OLS = ordinary least squares; ref. = reference group.

p* < 0.10; *p* < 0.05; ****p* < 0.01.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

subjective retirement) further supports that the relevance condition holds but also implies that the second-stage estimation is likely to be more precise.

A second testing exercise in the context of the IV model relates to the endogeneity of our instrumented regressor, for which we rely on two tests: Wooldridge's score test, which follows a χ^2_1 distribution, and a regression-based

test, which follows an $F_{1,k}$ distribution, where $k = 13,895$ for our full sample. For both tests, the null hypothesis is that retirement is an exogenous variable, and rejection thus lends support to the decision of treating retirement as an endogenous variable.¹³ As the results of the two tests given in Table 3 clearly show, the estimated values of the two test statistics lie in rejection regions for levels

Table 2: Subjective Retirement (Ages 55–85 y)

Dependent Variable = <i>LS</i>	Full Sample		Sample without Health and Job Shocks	
	OLS Model	IV 2SLS Model	OLS Model	IV 2SLS Model
Subjective retirement	0.24 (0.17)	4.87** (2.17)	0.90*** (0.18)	3.39** (1.60)
Female (ref. = male)	0.54*** (0.14)	0.16 (0.23)	0.36** (0.16)	0.14 (0.21)
Age	0.23 (0.16)	−0.63 (0.48)	0.16 (0.18)	−0.28 (0.38)
Age ²	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
White (ref. = not White)	0.50 (0.33)	0.35 (0.34)	0.59 (0.36)	0.52 (0.36)
Immigrant (ref. = not immigrant)	−0.71*** (0.24)	−0.71*** (0.24)	−0.68** (0.27)	−0.67** (0.27)
Marital status (ref. = married or common law)				
Widow or widower	−1.48*** (0.22)	−1.37*** (0.24)	−1.58*** (0.25)	−1.54*** (0.26)
Divorced or separated	−3.03*** (0.24)	−2.72*** (0.28)	−2.62*** (0.27)	−2.38*** (0.30)
Single	−2.12*** (0.34)	−1.81*** (0.39)	−2.28*** (0.39)	−2.11*** (0.41)
Education (ref. = less than secondary)				
Secondary	0.71*** (0.21)	0.78*** (0.22)	0.47** (0.23)	0.48** (0.23)
Some post-secondary	0.44 (0.29)	0.71** (0.34)	0.07 (0.33)	0.20 (0.36)
Post-secondary	0.82*** (0.17)	0.91*** (0.18)	0.68*** (0.19)	0.68*** (0.19)
Physical health (chronic conditions)	−0.65*** (0.04)	−0.73*** (0.06)	−0.54*** (0.04)	−0.55*** (0.04)
Household size	−0.03 (0.10)	0.04 (0.11)	−0.06 (0.11)	−0.04 (0.11)
Household income	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Province (ref. = ON)				
NL	0.25 (0.26)	0.01 (0.30)	0.08 (0.27)	−0.05 (0.29)
PE	0.45* (0.27)	0.80** (0.34)	0.45 (0.29)	0.62* (0.32)
NS	0.17 (0.24)	−0.1 (0.27)	−0.01 (0.26)	−0.15 (0.27)
NB	0.38 (0.26)	0.16 (0.31)	0.44 (0.27)	0.33 (0.28)
QC	1.12*** (0.20)	0.96*** (0.21)	0.99*** (0.22)	0.88*** (0.22)
MB	−0.16 (0.23)	−0.06 (0.25)	−0.20 (0.26)	−0.12 (0.27)
SK	0.50* (0.27)	0.77** (0.31)	0.31 (0.30)	0.41 (0.31)
AB	0.23 (0.23)	0.49* (0.28)	0.21 (0.25)	0.31 (0.26)
BC	−0.10 (0.21)	−0.02 (0.24)	−0.18 (0.24)	−0.14 (0.25)
Constant	16.43*** (5.54)	47.38*** (17.19)	20.07*** (6.10)	36.47*** (13.83)
<i>N</i>	13,919	13,919	10,950	10,950
<i>R</i> ²	0.14	0.04	0.12	0.09
Excluded instrument		Age ≥ 65		Age ≥ 65
First-stage result				
Age ≥ 65		0.15*** (0.02)		0.21*** (0.03)
First-stage <i>F</i> statistic (excluded variable)		36.49***		

Notes: Robust standard errors in parentheses. IV 2SLS = instrumental variable two-stage least squares; *LS* = life satisfaction score;

OLS = ordinary least squares; ref. = reference group.

p* < 0.10; *p* < 0.05; ****p* < 0.01.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

of statistical significance below 5 percent in both cases, and we then conclude that retirement, whether we measure it objectively or subjectively, is not an exogenous regressor in the life satisfaction equation, so that running an OLS regression to estimate the equation would yield a biased estimate of the causal effect of retirement on life satisfaction.

The preceding discussion confirms the validity of implementing the IV approach for the question under investigation in this article, and we thus proceed with the analysis of the IV results¹⁴, drawing comparisons with the OLS results as need arises. For our main variable, we should emphasize that the IV estimation only identifies a local average treatment effect; in other words,

Table 3: Instrumental Variable Tests (Ages 55–85 y)

Null Hypothesis and Test Statistic	Objective Retirement		Subjective Retirement	
	Statistic Value	p-value	Statistic Value	p-value
H_0 : instruments are weak				
First-stage F statistic $\sim F_{1,13894}$	34.72	0.0000	36.49	0.0000
H_0 : retirement is exogenous				
Robust score $\sim \chi^2_1$	12.24	0.0005	12.93	0.0003
Robust regression $\sim F_{1,13895}$	5.16	0.0232	5.46	0.0195

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

the detected causal effect of retirement on life satisfaction pertains to the subgroup of individuals who react to the pension cut-off point (i.e., the compliers) and may not be generalizable (Imbens and Angrist 1994).

Qualitatively, the findings are similar both between the two estimation procedures and between the sample and the sub-sample. Quantitatively, the estimates under objective retirement (Table 1) resemble the estimates under subjective retirement (Table 2), particularly in terms of the effect of retirement, which is our key variable. In fact, independently of how we measure it, retirement has a statistically significant positive effect on life satisfaction at the 1 percent level of significance, but the IV estimates show a substantially larger effect, making retirement the most influential predictor of life satisfaction among the regressors included in the empirical analysis. Specifically, on average, retirement increases LS by 5 points for the full sample and 3.4 points for the sub-sample; in comparison, the average increases according to the OLS estimates are 0.38 and 0.88 points, respectively, under objective retirement and statistically not different from zero and 0.9, respectively, under subjective retirement.

In both tables, the IV results suggest that immigrants tend to be less satisfied, and being in a relationship, whether a legal marriage or a common-law marriage, increases life satisfaction (being divorced or separated, single, or widowed is associated with an LS score that is 1.4–2.8 points lower), a result that resonates with the positive contribution of social interactions we encounter in the section on robustness checks; we note, however, that there may be some age dependency in the effect, because the estimated coefficient of the interaction between age and being in a relationship is consistently negative, albeit very small, and statistically significant for all robustness specifications in Table 4. Education has a statistically significant positive effect that may, however, be non-monotonic; in fact, the LS score of those with secondary or post-secondary education is about 0.8 to 0.9 higher than the LS score of those with less than secondary education for the full sample (and about 0.5–0.7 higher for the sub-sample), but having some post-secondary education is either equivalent in terms of its impact on

life satisfaction to having less than secondary education (for the sub-sample) or has a lower effect than secondary education. Whereas the estimated coefficient of income is consistently positive and statistically significant at the 1 percent level, its magnitude suggests that only substantial income increases translate into greater satisfaction with life; this result holds regardless of whether income is at the household or individual level.¹⁵ Neither household size, whether directly or through household income, nor age seems to matter, and having chronic conditions reduces life satisfaction. Across provinces, there are not noticeable differences, with the exception of Quebec, which fares consistently better in that its residents tend to be, on average, happier or more satisfied with life than residents of other Canadian provinces; for the full sample, however, although at higher levels of significance and according to the IV 2SLS results, other provinces with higher LS scores, which persist with the addition of controls for robustness checks as per Table 4, are Alberta, Prince Edward Island, and Saskatchewan.

When we eliminate respondents reporting health and employment shocks as reasons for retiring, we find that the qualitative considerations above noted still hold, and the estimates are generally similar. The role of retirement in life satisfaction in Tables 1 and 2 remains dominant but is lower, around 1.5 points, under both measures of retirement; an interesting finding, however, is that the corresponding OLS estimates are larger, possibly suggesting less heterogeneity in the sub-sample. This is because the OLS estimate relies on the entire variation across the sample and describes the average difference in life satisfaction between retired and non-retired individuals, whereas the IV 2SLS estimate relies only on the variation that is attributable to the (exogenous) instrument and gives the effect of retiring only for individuals whose choice of retirement derives from the instrument; if there is heterogeneity in the sample, the IV 2SLS estimate is larger than the OLS estimate. Analogously, when we estimate the OLS and IV 2SLS models for men and women separately (Table A.8 in the Appendix), the gap between the two estimates of the retirement effect is narrower for women than the gap for the entire sample as

Table 4: Robustness Checks: Full Sample (Age 55–85 Y)

Dependent Variable = LS	IV 2SLS Model									
	Objective Retirement					Subjective Retirement				
Retirement	4.94 ^{***} (2.19)	5.04 ^{***} (2.20)	5.28 ^{***} (2.23)	5.25 ^{***} (2.21)	4.99 ^{***} (2.13)	5.07 ^{***} (2.10)	5.07 ^{***} (2.09)	4.95 ^{***} (2.11)	4.87 ^{***} (2.17)	4.95 ^{***} (2.17)
Female	0.35 ^{***} (0.17)	0.33 ^{***} (0.17)	0.31 ^{***} (0.18)	0.31 ^{***} (0.18)	0.18 ^{***} (0.17)	0.23 ^{***} (0.17)	0.43 ^{***} (0.15)	0.40 ^{***} (0.15)	0.16 ^{***} (0.23)	0.14 ^{***} (0.23)
Age	-0.71 ^{***} (0.52)	-0.65 ^{***} (0.52)	-0.71 ^{***} (0.52)	-0.78 ^{***} (0.51)	-0.70 ^{***} (0.49)	-0.77 ^{***} (0.48)	-0.70 ^{***} (0.47)	-0.70 ^{***} (0.47)	-0.63 ^{***} (0.48)	-0.58 ^{***} (0.49)
Age ²	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.01 ^{***} (0.00)	0.00 ^{***} (0.00)	0.01 ^{***} (0.00)	0.01 ^{***} (0.00)	0.01 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)
White	0.16 ^{***} (0.35)	0.17 ^{***} (0.35)	0.18 ^{***} (0.35)	0.25 ^{***} (0.36)	-0.22 ^{***} (0.35)	-0.22 ^{***} (0.34)	-0.46 ^{***} (0.36)	-0.46 ^{***} (0.36)	0.35 ^{***} (0.34)	0.36 ^{***} (0.34)
Immigrant	-0.61 ^{***} (0.26)	-0.60 ^{***} (0.26)	-0.59 ^{***} (0.26)	-0.50 ^{***} (0.24)	-0.47 ^{***} (0.23)	-0.40 ^{***} (0.23)	-0.39 ^{***} (0.23)	-0.39 ^{***} (0.23)	-0.71 ^{***} (0.24)	-0.70 ^{***} (0.25)
Marital status										
Widow or widower	-1.52 ^{***} (0.24)	-4.59 ^{***} (1.56)	-4.86 ^{***} (1.57)	-4.71 ^{***} (1.55)	-4.47 ^{***} (1.51)	-4.79 ^{***} (1.50)	-4.91 ^{***} (1.46)	-5.00 ^{***} (1.46)	-1.37 ^{***} (0.24)	-3.91 ^{***} (1.56)
Divorced or separated	-2.75 ^{***} (0.28)	-5.55 ^{***} (1.42)	-5.77 ^{***} (1.42)	-5.48 ^{***} (1.40)	-4.95 ^{***} (1.36)	-5.28 ^{***} (1.35)	-5.35 ^{***} (1.31)	-5.42 ^{***} (1.31)	-2.72 ^{***} (0.28)	-5.04 ^{***} (1.40)
Single	-1.96 ^{***} (0.36)	-4.75 ^{***} (1.45)	-4.99 ^{***} (1.45)	-4.80 ^{***} (1.43)	-3.86 ^{***} (1.39)	-4.29 ^{***} (1.36)	-4.28 ^{***} (1.33)	-4.33 ^{***} (1.34)	-1.81 ^{***} (0.39)	-4.12 ^{***} (1.43)
Education										
Secondary	0.82 ^{***} (0.22)	0.83 ^{***} (0.22)	0.81 ^{***} (0.22)	0.80 ^{***} (0.22)	0.74 ^{***} (0.22)	0.70 ^{***} (0.22)	0.61 ^{***} (0.21)	0.60 ^{***} (0.21)	0.78 ^{***} (0.22)	0.79 ^{***} (0.22)
Some post-secondary	0.50 ^{***} (0.30)	0.51 ^{***} (0.30)	0.50 ^{***} (0.31)	0.42 ^{***} (0.30)	0.40 ^{***} (0.30)	0.40 ^{***} (0.29)	0.33 ^{***} (0.29)	0.30 ^{***} (0.29)	0.71 ^{***} (0.34)	0.73 ^{***} (0.34)
Post-secondary	0.80 ^{***} (0.18)	0.82 ^{***} (0.18)	0.80 ^{***} (0.18)	0.73 ^{***} (0.18)	0.68 ^{***} (0.17)	0.68 ^{***} (0.17)	0.59 ^{***} (0.17)	0.55 ^{***} (0.17)	0.91 ^{***} (0.18)	0.92 ^{***} (0.18)
Chronic conditions	-0.70 ^{***} (0.05)	-0.70 ^{***} (0.05)	-0.70 ^{***} (0.05)	-0.68 ^{***} (0.05)	-0.65 ^{***} (0.05)	-0.63 ^{***} (0.05)	-0.57 ^{***} (0.04)	-0.57 ^{***} (0.04)	-0.73 ^{***} (0.06)	-0.73 ^{***} (0.06)
Household size	0.03 ^{***} (0.11)	0.03 ^{***} (0.11)	0.34 ^{***} (0.19)	0.36 ^{***} (0.19)	0.18 ^{***} (0.18)	0.20 ^{***} (0.18)	0.14 ^{***} (0.18)	0.14 ^{***} (0.18)	0.04 ^{***} (0.11)	0.04 ^{***} (0.11)
Household income	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)	0.00 ^{***} (0.00)
Province										
NL	-0.15 ^{***} (0.33)	-0.16 ^{***} (0.33)	-0.18 ^{***} (0.33)	-0.54 ^{***} (0.32)	-0.50 ^{***} (0.31)	-0.45 ^{***} (0.31)	-0.25 ^{***} (0.29)	-0.23 ^{***} (0.29)	0.01 ^{***} (0.30)	0.00 ^{***} (0.30)
PE	0.62 ^{***} (0.30)	0.61 ^{***} (0.30)	0.64 ^{***} (0.31)	0.47 ^{***} (0.30)	0.52 ^{***} (0.29)	0.51 ^{***} (0.29)	0.52 ^{***} (0.29)	0.51 ^{***} (0.29)	0.80 ^{***} (0.34)	0.80 ^{***} (0.34)

(Continued)

Table 4: Continued

Dependent Variable = LS	IV 2SLS Model									
	Objective Retirement					Subjective Retirement				
NS	-0.14 (0.28)	-0.15 (0.28)	-0.15 (0.28)	-0.32 (0.27)	-0.25 (0.27)	-0.26 (0.27)	-0.22 (0.26)	-0.21 (0.26)	-0.10 (0.27)	-0.11 (0.27)
NB	0.09 (0.317)	0.08 (0.320)	0.08 (0.318)	0.04 (0.324)	0.06 (0.318)	0.07 (0.319)	0.16 (0.31)	0.18 (0.305)	0.16 (0.31)	0.16 (0.31)
QC	0.93*** (0.21)	0.93*** (0.21)	0.93*** (0.21)	1.07*** (0.21)	1.13*** (0.20)	1.09*** (0.20)	0.96*** (0.21)	1.25*** (0.19)	0.96*** (0.21)	0.96*** (0.21)
MB	-0.12 (0.25)	-0.10 (0.25)	-0.10 (0.25)	-0.13 (0.25)	-0.06 (0.24)	0.03 (0.24)	-0.06 (0.26)	-0.10 (0.23)	-0.06 (0.25)	-0.06 (0.25)
SK	0.63** (0.29)	0.63** (0.29)	0.63** (0.29)	0.46* (0.28)	0.44* (0.26)	0.48* (0.26)	0.77** (0.31)	0.42* (0.25)	0.77** (0.31)	0.77** (0.31)
AB	0.44* (0.27)	0.45* (0.27)	0.46* (0.27)	0.58* (0.26)	0.52** (0.26)	0.59** (0.26)	0.49* (0.28)	0.51** (0.24)	0.49* (0.28)	0.49* (0.28)
BC	-0.10 (0.23)	-0.10 (0.23)	-0.10 (0.23)	-0.12 (0.23)	-0.12 (0.22)	-0.13 (0.22)	-0.02 (0.24)	-0.15 (0.22)	-0.02 (0.24)	-0.02 (0.24)
Age × Married	-0.04** (0.02)	-0.05** (0.02)	-0.05** (0.02)	-0.05** (0.02)	-0.06** (0.02)	-0.06** (0.02)	-0.04** (0.02)	-0.06** (0.02)	-0.04** (0.02)	-0.04** (0.02)
Size × Income	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)
Sense of belonging	1.04*** (0.09)	1.04*** (0.09)	1.04*** (0.09)	0.89*** (0.08)	0.82*** (0.08)	0.73*** (0.08)	1.09*** (0.09)	0.70*** (0.09)	1.09*** (0.09)	1.09*** (0.09)
Affection	0.54*** (0.03)	0.54*** (0.03)	0.54*** (0.03)	0.10** (0.05)	0.09* (0.05)	0.09* (0.05)	0.54*** (0.03)	0.09* (0.05)	0.54*** (0.03)	0.54*** (0.03)
Social interaction	0.41*** (0.04)	0.41*** (0.04)	0.41*** (0.04)	0.41*** (0.04)	0.41*** (0.04)	0.41*** (0.04)	0.41*** (0.04)	0.39*** (0.04)	0.41*** (0.04)	0.41*** (0.04)
PASE	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Social participation	0.27*** (0.12)	0.27*** (0.12)	0.27*** (0.12)	0.00 (0.12)	0.00 (0.12)	0.00 (0.12)	0.27*** (0.12)	0.00 (0.12)	0.27*** (0.12)	0.27*** (0.12)
Constant	51.0*** (18.61)	50.8*** (18.66)	52.4*** (18.83)	51.8*** (18.40)	44.8*** (17.83)	46.7*** (17.49)	47.4*** (17.19)	42.2*** (16.70)	47.4*** (17.19)	47.2*** (17.25)
N	13,919	13,919	13,919	13,919	13,655	13,629	13,919	13,607	13,919	13,919
R ²	0.06	0.05	0.05	0.08	0.13	0.14	0.03	0.16	0.04	0.04
First-stage result										
Age ≥ 65	0.15*** (0.02)	0.15*** (0.02)	0.14*** (0.02)	0.14*** (0.02)	0.14*** (0.02)	0.14*** (0.02)	0.15*** (0.02)	0.14*** (0.02)	0.15*** (0.02)	0.15*** (0.02)

Notes: Robust standard errors in parentheses. IV 2SLS = instrumental variable two-stage least squares; PASE = Physical Activity Scale for the Elderly.

*p < 0.10; **p < 0.05; ***p < 0.01.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

given in Tables 1 and 2; at the same time, the gap is wider for men. More importantly, however, the IV 2SLS estimate for women becomes statistically insignificant, and this result holds regardless of how we measure retirement, whereas the corresponding estimate for men remains statistically significant but at the 10 percent level.

Because the question informing the subjective measure of retirement gives respondents the option to indicate whether their retirement is partial or complete, we have the opportunity for a more nuanced examination of the effect of retirement by separating between partial status and complete status in the regression analysis. The findings, which are available in the Appendix (Table A.9), underscore the strength of full retirement in explaining life satisfaction but do not provide support for the possibility of partial retirement also contributing to well-being, although the OLS estimated coefficient of partial retirement is not only positive and statistically significant but also slightly larger than the OLS estimated coefficient of complete retirement. Hence, the OLS evidence indicates that the average difference in life satisfaction between retired and non-retired individuals is approximately the same independent of whether the retired individuals are partially or completely retired; when we consider individuals retiring in response to the instruments, life satisfaction increases only for those who react to the pension incentives by retiring completely, and, in line with the results in Tables 1 and 2, only the retirement incentive jump at age 65 years causes exogenous variation in complete retirement. It is interesting that the jumps at ages 60 and 65 years represent a source of exogenous variation in partial retirement but in the opposite direction: the early incentive encourages partial retirement, whereas the later incentive discourages it, presumably because people are more likely to opt for complete retirement at age 65 years.

The final set of results we discuss, which we report in Table 4, is part of some robustness checks we implement to validate the positive impact of retirement on life satisfaction, with the caveat that experiences are likely to differ between men and women and that men are more likely to benefit from retirement, a result that merits further investigation in order to deepen our understanding of what drives the difference and how it relates to differences in lifetime earnings, life expectancy, risk aversion, financial confidence and literacy, and caregiving responsibilities. A key message that emerges from Table 4 is that retirement retains its relevance in explaining life satisfaction when we account for other potential determinants of well-being that capture the benefits of social interaction and participation (e.g., a sense of belonging to the community and affection) and of physical activity and some interaction terms (i.e., between age and marital status and between household size and household income). Furthermore, under both objective retirement

and subjective retirement, the effect remains substantial (about a 5-point increase in the *LS* score) at the 5 percent level of statistical significance.

A second key message pertains to the consistency in the relevance of the additional variables. Although not reported, these variables are inconsequential in the retirement decision (i.e., the first-stage regression) but do contribute to well-being. In particular, the stronger the sense of belonging to the community, the more frequent the opportunities for affection, the more frequent the social interactions, or the more frequent the participation in a host of different social activities (e.g., friendship, church, club, community, and charity), the more satisfied with life people are. Spending time on physical activities (e.g., walking, exercising, and gardening) also contributes to life satisfaction, but its marginal effect is trivial and noticeably smaller than the marginal effect of each of the social engagement measures. The implication of the last result is that an active social life is as important to overall well-being as (or even more important than) an active physical life, and this is consistent with a growing body of research that highlights the role of social health on well-being (e.g., Diener and Oishi 2005; Helliwell and Putnam 2004; Rohrer et al. 2018). There is, however, no indication that engagement in social and physical activities matters more for the life satisfaction of the older population or during retirement.

To ascertain whether social engagement may be a channel of transmission through which retirement bolsters life satisfaction, we obtain, and report in the Appendix in Table A.10, the estimates from the OLS regression of the *LS* on all regressors, including the ones we consider for the robustness checks, by retirement status (present vs. absent). The results do not provide evidence in support of the idea that retirement may increase life satisfaction by enabling retirees to engage more actively in various community activities; what we find instead is that, on the one hand, the impact of the frequency of participation in various social activities is either larger for non-retirees or comparable between the two groups. Affection, on the other hand, only affects the life satisfaction of retired individuals; physical activities also matter only for retired individuals, but their effect on life satisfaction is negligible. We take these findings to imply that the opportunity retirement affords for a more socially active life does not translate into a positive impact on life satisfaction, and there are likely other channels through which retirement increases life satisfaction.

Conclusion

Canada's population is aging rapidly, and retirement not only represents an important transition in the lives of the aging population but also holds crucial policy relevance due to its fiscal and welfare implications because of, among other interrelated issues, higher health care costs,

unsustainable pension commitments, a smaller pool of working-age people, and demand shifts arising out of age-dependent preferences. Using the 2008–2009 CCHS–Healthy Aging, we provide evidence on the well-being implications of retirement in Canada, with life satisfaction serving as a measure of well-being. After addressing the issue of self-selection and unobserved individual-specific heterogeneity that can bias the causal effect of retirement, we find that the effect of retirement on life satisfaction is positive and statistically significant. This effect is robust to the inclusion of several socio-economic and demographic controls, social life measures, affection, and physical activity, and it holds regardless of whether we measure retirement subjectively or objectively. The effect remains valid and strong when we omit respondents who report retiring for health and job loss reasons in the empirical analysis, but it partially disappears in the IV 2SLS model when we estimate the relationship by gender; in fact, our findings suggest that men are likely to experience an increase in life satisfaction upon retiring but women are not. All in all, the evidence from our empirical analysis underscores the importance for policymakers, when designing retirement policies in Canada, to weigh the fiscal costs of retirement at an earlier age against the benefits of retirement in terms of improvement in life satisfaction and psychological well-being and to account for possible gender-based differences in life satisfaction during retirement.

Although the evidence provided in this study is critical to inform policy, some caveats are in order. First, these results are not strictly comparable with those for other countries because of variation in life satisfaction measures that are often based on slightly different questions and measured on different scales in different surveys. For instance, unlike our measure, which incorporates the extent of agreement or disagreement with five statements rated on a 1–7 scale, life satisfaction in both the Household, Income and Labour Dynamics in Australia dataset and the German SOEP dataset is measured on a 0–10 scale and based on a single and direct question about life satisfaction (e.g., [Abolhassani and Alessi 2013](#); [Zhu and He 2015](#)); the OECD Better Lives Index also relies on one direct question about life satisfaction and a 0–10 scale (Organisation for Economic Co-operation and Development n.d.). Second, the *LS* we use is helpful in giving us a sense of satisfaction with life in its entirety, based on one's cognitive judgment, but it does not measure satisfaction in specific areas of life (e.g., relationships); hence, further exploration, with tools and resources that can tackle satisfaction in specific life domains, is necessary for a thorough reflection on the kind of changes that one should implement to build a greater sense of life satisfaction. Third, being a subjective measure of well-being, life satisfaction is not independent of a person's emotional state at the time of interview, as well as other situational

factors such as the time of the survey (weekends vs. weekdays) that may affect one's judgment (e.g., [Diener et al. 2013](#)). Fourth, the study is based on cross-sectional data collected in 2008–2009, during a period of financial crisis, and our efforts to isolate and remove the effect of employment shocks on retirement do not address the possible influence of the crisis on respondents' perceptions of life satisfaction. Fifth, although attempting to draw inferences about potential channels or pathways through which retirement may affect life satisfaction, our analysis leaves untapped the question of what drives the positive relationship between retirement and well-being; this is important to shed light on what could explain differences between male and female respondents, including the possibility that gender influences subjective assessments. Finally, notwithstanding the wide reliance on subjective measures of well-being in research, future work should consider whether the relationship between retirement and well-being holds with more objective indicators such as physical health and mental health.

With respect to estimation procedures, we underscore that, given the cross-sectional nature of our dataset, we are unable to explore the validity and applicability of different techniques in our efforts to address the likely endogeneity of retirement status, such as the difference-in-differences and the fixed-effects models that require panel data. We thus adopt the IV 2SLS approach, which enjoys widespread adoption but is nevertheless not immune to criticism. For example, in a simulation-based study of 1,309 IV regressions across 30 articles published in American Economic Association journals, [Young \(2022\)](#) shows that, if errors are not independent and identically distributed (non-*iid*), the first-stage *F*-statistic (on the excluded variables) is more likely to lead to the rejection of the hypothesis that instruments are weak when they are completely irrelevant in highly leveraged regressions, and the IV 2SLS benefits (e.g., in terms of information regarding the degree to which OLS estimates are biased) are thus lost.

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Notes

- 1 The measure of psychological well-being is based on ordered responses about extent of happiness, ranging from *so unhappy in life* (1) to *happy in life* (5).
- 2 Two other studies ([Gall et al. 1997](#); [Thériault 1994](#)) rely on very small samples (117 and 39) and do not account for the likely endogeneity of retirement.

- 3 The CCHS life satisfaction score, which is a derived variable provided by Statistics Canada, is a more comprehensive measure of life satisfaction than the GWP measure; nonetheless, in both instances, the mean score in Canada is high, although, relative to the best possible scenario, Canada's mean CCHS score (27/35) is lower than its mean GWP score (8.1/10). The implication of this difference is that a more nuanced measure of life satisfaction, one that considers different aspects of life, may provide a less optimistic view.
- 4 For the remaining values, 2 = *disagreement* and 3 = *slight disagreement*, while 5 = *slight agreement* and 6 = *agreement*.
- 5 A description of the psychometric properties of the scale is available in Pavot and Diener (1993).
- 6 Because of internal guidelines for releasing results based on Canadian microdata at Statistics Canada Research Data Centres, the last two average scores in Figure 1 correspond to the age categories 76–79 years and 80–85 years.
- 7 These chronic conditions include asthma, arthritis, osteoporosis, back problems, hypertension, migraine headaches, chronic bronchitis, emphysema, chronic obstructive pulmonary disorder, diabetes, angina, cardiovascular diseases, cancer, stomach or intestinal ulcers, stroke, urinary incontinence, bowel disorder, cataracts, glaucoma, thyroid condition, mood disorder, and other physical or mental conditions.
- 8 The social support variables are based on the Medical Outcomes Study Social Support Survey, which provides indicators of four categories of social support, including emotional or informational support and tangible social support, in addition to the two categories considered in this article (Sherbourne and Steward 1991).
- 9 The 12 activities are as follows: walking outside; light, moderate, and strenuous sport or recreational activities; muscle strength and endurance exercises; light and heavy housework; home repairs; lawn work or yard care; outdoor gardening; caring for another person; and work for pay or as a volunteer. For more information about PASE and the weights assigned to the activities, see Washburn et al. (1993).
- 10 Other common techniques to address endogeneity (e.g., fixed effects, difference in differences) require panel data, and our dataset is cross-sectional. As a seeming alternative to the IV estimation, some studies (e.g., Eibich 2015; Johnston and Lee 2009; Rose 2020) use a fuzzy regression discontinuity (RD) design and implement a two-stage least squares (2SLS) strategy to derive RD estimates, so that, in practice, RD designs are not different from IV settings; in fact, we can conceptualize the fuzzy RD

design as a local IV model, that is, an IV regression with weights that decline as observations move away from pension eligibility cut-offs (see, e.g., Wooldridge 2010, pp. 957–959). Nonetheless, on the basis of its adoption to date, IV has broader appeal to address endogeneity more generally, regardless of its source (omitted variables, simultaneity, selection of treatment, and measurement errors), whereas RD targets endogeneity from selection of treatment (see Hill et al. 2021).

- 11 As in Figure 1, the last two proportions (at 76 and 80) pertain to age categories: ages 76–79 and 80–85 years (see Note 6 for reasons).
- 12 As a rule of thumb, according to Stock et al. (2002), an F -value > 10 is indicative of the presence of strong instruments when there is one endogenous instrumented regressor.
- 13 The essential idea of the two endogeneity tests is to include the estimated error (\hat{e}_R) from the first-stage regression in the structural model (i.e., Equation [1]), estimate the structural model with the additional variable by OLS, and test whether the coefficient of \hat{e}_R is equal to zero, which would imply that $cov(e, e_R) = 0$ and that R (i.e., retirement) is not endogenous.
- 14 Our focus is on the second-stage results, but we do report the first-stage results in the Appendix (Table A.7) for completeness.
- 15 Table A.6 in the Appendix shows partial results of the OLS and IV models when we replace household income with individual income.

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APPENDIX A

Table A.1: Summary Statistics for Life Satisfaction and Its Components

Component	Statement	Mean (SD)	Range, Min–Max
SLS_01	In most ways, my life is close to my ideal	5.50 (0.01)	1–7
SLS_02	The conditions of my life are excellent	5.47 (0.02)	1–7
SLS_03	I am satisfied with my life	5.75 (0.01)	1–7
SLS_04	So far, I have gotten the important things I want in life	5.76 (0.01)	1–7
SLS_05	If I could live my life over, I would change almost nothing	5.01 (0.02)	1–7
LS		27.49 (0.06)	5–35

Note: LS = life satisfaction score; SLS = satisfaction with life scale.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

Table A.2: Correlation Coefficient Matrix for Life Satisfaction and Its Components

	SLS_01	SLS_02	SLS_03	SLS_04	SLS_05	LS
SLS_01	1.00					
SLS_02	0.67	1.00				
SLS_03	0.67	0.71	1.00			
SLS_04	0.52	0.54	0.60	1.00		
SLS_05	0.46	0.46	0.47	0.48	1.00	
LS	0.82	0.84	0.84	0.76	0.75	1.00

Note: LS = life satisfaction score; SLS = satisfaction with life scale.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

Table A.3: Weighted Summary Statistics (Ages 55–85 y)

Variable	No. of Observations	Mean or Proportion (SD)	Range, Min–Max
Objective retirement	19,809	0.63 (0.48)	0–1
Subjective retirement	19,809	0.62 (0.49)	0–1
Female	19,809	0.56 (0.50)	0–1
Age	19,809	67.60 (8.60)	55–85
White	19,312	0.93 (0.26)	0–1
Immigrant	19,778	0.20 (0.40)	0–1
Marital status	19,809		1–4
Married or common law		0.57 (0.49)	
Widow or widower		0.22 (0.41)	
Divorced or separated		0.14 (0.35)	
Single		0.07 (0.26)	
Education	19,670		1–4
Less than secondary		0.32 (0.47)	
Secondary		0.16 (0.37)	
Some post-secondary		0.05 (0.22)	
Post-secondary		0.47 (0.50)	
Physical health (chronic conditions)	19,809	3.07 (2.36)	0–16
Household size	19,809	1.86 (0.93)	1–11
Household income, \$	14,702	54,305 (49,333)	
Individual income, \$	15,743	34,523 (34,964)	

(Continued)

Table A.3: Continued

Variable	No. of Observations	Mean or Proportion (SD)	Range, Min–Max
Province	19,809		1–10
ON		0.21 (0.41)	
NL		0.07 (0.25)	
PE		0.05 (0.22)	
NS		0.07 (0.26)	
NB		0.07 (0.26)	
QC		0.18 (0.38)	
MB		0.07 (0.26)	
SK		0.07 (0.26)	
AB		0.08 (0.27)	
BC		0.12 (0.33)	
Sense of belonging to community	19,809		1–4
Very weak		0.09 (0.29)	
Somewhat weak		0.21 (0.40)	
Somewhat strong		0.42 (0.49)	
Very strong		0.26 (0.44)	
Affection	18,935	10.26 (2.68)	0–12
Positive social interaction	18,927	13.25 (3.58)	0–16
PASE	19,776	125.85 (76.75)	0–605
Frequency of community participation	19,769		0–4
Not participate		0.02 (0.15)	
Participate yearly		0.05 (0.21)	
Participate monthly		0.18 (0.38)	
Participate weekly		0.62 (0.49)	
Participate daily		0.13 (0.34)	
Life satisfaction score	19,307	27.08 (5.79)	5–35

Note: PASE = Physical Activity Scale for the Elderly.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

Table A.4: Descriptions of Variables

Variable	Description
Retirement	Indicator: completely retired = 1; not completely retired = 0
Female	Indicator: female = 1; male = 0
Age	Age in years
White	Indicator: White = 1, not White = 0
Immigrant	Indicator: immigrant = 1; not immigrant = 0
Marital status	Indicators: married or common law (reference indicator); widow or widower; divorced or separated; single
Education	Indicators: less than secondary (reference indicator); secondary; some post-secondary; post-secondary
Physical health (chronic conditions)	No. of applicable chronic conditions out of 22 possible conditions
Household size	No. of household members
Household income	Household income level in dollars
Individual income	Individual income level in dollars
Province	Indicators: 12 provinces; 11 indicators, with Ontario as the reference province
Sense of belonging to community	Description of how strong sense of belonging to community is based on categories: 1 = very weak; 2 = somewhat weak; 3 = somewhat strong; 4 = very strong

(Continued)

Table A.4: Continued

Variable	Description
Affection	Sum of frequency scores across 3 questions <ul style="list-style-type: none"> Frequency scores between 0 (<i>never</i>) and 4 (<i>always</i>) Questions are about whether respondents have (a) someone that shows him or her love; (b) someone to hug; (c) someone to love him or her and make them feel wanted
Positive social interaction	Sum of frequency scores across 4 questions <ul style="list-style-type: none"> Frequency scores between 0 (<i>never</i>) and 4 (<i>always</i>) Questions are about whether respondents have someone to (a) have a good time with; (b) get together with for relaxation; (c) do things with to get his or her mind off things; (d) do something enjoyable with
Physical Activity Scale for the Elderly	Sum of the amounts of time spent in each of 12 activities over past week multiplied by the corresponding activity weights <ul style="list-style-type: none"> Activities: (1) walking outside; (2/3/4) light, moderate, or strenuous sport or recreational activities; (5) muscle strength or endurance exercises; (6/7) light or heavy housework; (8) home repairs; (9) lawn work or yard care; (10) outdoor gardening; (11) caring for another person; (12) work for pay or as a volunteer Weights corresponding to above activities: (1) 20; (2) 21; (3) 23; (4) 23; (5) 30; (6) 25; (7) 25; (8) 30; (9) 36; (10) 20; (11) 35; (12) 21
Frequency of community participation	Sum of frequency scores across 8 activities over past 12 months <ul style="list-style-type: none"> Frequency scores between 0 = no participation; 1 = yearly participation; 2 = monthly participation; 3 = weekly participation; 4 = daily participation Activities: (1) family/friendship activities outside the household; (2) church or religious activities; (3) sports or physical activities; (4) educational and cultural activities; (5) service club or fraternal organization activities; (6) neighbourhood, community, or professional activities; (7) volunteer or charity work; (8) any other recreational activity
Life satisfaction score	Sum of agreement/disagreement scores across 5 statements <ul style="list-style-type: none"> Scores: 1 = <i>strong disagreement</i>; 2 = <i>disagreement</i>; 3 = <i>slight disagreement</i>; 4 = <i>neither disagreement nor agreement</i>; 5 = <i>slight agreement</i>; 6 = <i>agreement</i>; 7 = <i>strong agreement</i> Statements: (1) in most ways, my life is close to my ideal; (2) the conditions of my life are excellent; (3) I am satisfied with my life; (4) so far, I have gotten the important things in my life; (5) if I could live over, I would change almost nothing

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

Table A.5: Weighted Summary Statistics by Retirement Status

Key Variables	Mean or Proportion			
	Objective Retirement		Subjective Retirement	
	Not Retired	Retired	Not Retired	Retired
Female	0.49	0.59	0.47	0.61
Age, y	60.59	71.76	61.46	71.42
Marital status				
Married or common law	0.66	0.52	0.65	0.52
Widow or widower	0.07	0.31	0.09	0.30
Divorced or separated	0.18	0.11	0.18	0.12
Single	0.09	0.06	0.09	0.06
Education				
Less than secondary	0.19	0.40	0.20	0.40
Secondary	0.19	0.15	0.18	0.15
Some post-secondary	0.06	0.05	0.06	0.05
Post-secondary	0.57	0.41	0.57	0.41
Physical health (chronic conditions)	2.31	3.53	2.29	3.56

(Continued)

Table A.5: Continued

Key Variables	Mean or Proportion			
	Objective Retirement		Subjective Retirement	
	Not Retired	Retired	Not Retired	Retired
Sense of belonging to community				
Very weak	0.08	0.09	0.08	0.10
Somewhat weak	0.23	0.19	0.22	0.20
Somewhat strong	0.44	0.42	0.44	0.42
Very strong	0.23	0.27	0.25	0.27
Affection	10.38	10.18	10.35	10.20
Positive social interaction	13.50	13.10	13.45	13.12
PASE	167.71	101.05	167.56	99.94
Frequency of community activity participation				
Not participate	0.02	0.03	0.02	0.03
Participate yearly	0.04	0.05	0.04	0.05
Participate monthly	0.21	0.16	0.21	0.16
Participate weekly	0.62	0.62	0.62	0.62
Participate daily	0.11	0.14	0.11	0.14
Life satisfaction score	27.04	27.10	27.16	27.03

Note: PASE = Physical Activity Scale for the Elderly.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

Table A.6: Partial Results (Ages 55–85 y): All Instruments and Individual Income

Dependent Variable = LS	Objective Retirement		Subjective Retirement	
	OLS Model	IV 2SLS Model	OLS Model	IV 2SLS Model
All Instruments				
Retirement	0.38** (0.18)	4.67** (2.17)	0.24 (0.17)	4.67** (2.15)
⋮	⋮	⋮	⋮	⋮
N	13,919	13,919	13,919	13,919
R ²	0.14	0.07	0.14	0.05
Excluded instruments		Age ≥ 60, Age ≥ 65, Age ≥ 70		Age ≥ 60, Age ≥ 65, Age ≥ 70
First-stage results				
Age ≥ 60		0.03 (0.03)		0.02 (0.03)
Age ≥ 65		0.16*** (0.03)		0.16*** (0.03)
Age ≥ 70		0.01 (0.02)		0.00 (0.02)
Individual Income				
Retirement	0.37** (0.18)	4.54** (2.12)	0.26 (0.17)	4.45** (2.09)
⋮	⋮	⋮	⋮	⋮
Individual income	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
⋮	⋮	⋮	⋮	⋮
N	14,892	14,892	14,892	14,892
R ²	0.14	0.07	0.14	0.06
First-stage result				
Age ≥ 65		0.15*** (0.02)		0.15*** (0.02)

Notes: Robust standard errors in parentheses. IV 2SLS = instrumental variable two-stage least squares; LS = life satisfaction score; OLS = ordinary least squares.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

Table A.7: IV 2SLS First-Stage Results (Ages 55–85 y)

Dependent Variable = Retirement	Objective Retirement	Subjective Retirement
Female (ref. = male)	0.04*** (0.01)	0.08*** (0.01)
Age	0.16*** (0.01)	0.14*** (0.01)
Age ²	−0.00*** (0.00)	−0.00*** (0.00)
White (ref. = not White)	0.07*** (0.02)	0.03 (0.02)
Immigrant (ref. = not immigrant)	−0.02 (0.01)	−0.00 (0.01)
Marital status (ref. = married or common law)		
Widow or widower	0.01 (0.02)	−0.02* (0.01)
Divorced or separated	−0.06*** (0.02)	−0.06*** (0.02)
Single	−0.04* (0.02)	−0.07*** (0.02)
Education (ref. = less than secondary)		
Secondary	−0.02 (0.02)	−0.01 (0.02)
Some post-secondary	−0.02 (0.02)	−0.06*** (0.02)
Post-secondary	0.01 (0.01)	−0.02 (0.01)
Physical health (chronic conditions)	0.01*** (0.00)	0.02*** (0.00)
Household size	−0.01* (0.01)	−0.02** (0.01)
Household income	−0.00*** (0.00)	−0.00*** (0.00)
Province (ref. = ON)		
NL	0.08*** (0.02)	0.05*** (0.02)
PE	−0.04** (0.02)	−0.08*** (0.02)
NS	0.07*** (0.02)	0.06*** (0.02)
NB	0.06*** (0.02)	0.05*** (0.02)
QC	0.04*** (0.01)	0.03*** (0.01)
MB	−0.01 (0.02)	−0.02 (0.02)
SK	−0.03 (0.02)	−0.06*** (0.02)
AB	−0.05*** (0.02)	−0.06*** (0.02)
BC	0.00 (0.02)	−0.02 (0.02)
Age ≥ 65	0.15*** (0.02)	0.15*** (0.02)
Constant	−5.67*** (0.44)	−5.01*** (0.46)
N	13,919	13,919
R ²	0.47	0.41

Notes: Robust standard errors in parentheses. IV 2SLS = instrumental variable two-stage least squares; ref. = reference group.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

Table A.8: Retirement by Gender (Ages 55–85 y)

Dependent Variable = LS	Male		Female	
	OLS Model	IV 2SLS Model	OLS Model	IV 2SLS Model
	Objective Retirement			
Objective retirement	0.14 (0.23)	6.77* (3.70)	0.69*** (0.27)	3.42 (2.73)
Age	0.44** (0.22)	−0.53 (0.66)	−0.11 (0.24)	−0.80 (0.79)
Age ²	−0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)
White (ref. = not White)	1.05** (0.43)	0.39 (0.54)	−0.10 (0.50)	−0.18 (0.50)
Immigrant (ref. = not immigrant)	−0.44 (0.28)	−0.31 (0.34)	−0.92** (0.38)	−0.86** (0.40)
Marital status (ref. = married or common law)				
Widow or widower	−1.85*** (0.41)	−1.98*** (0.55)	−1.22*** (0.26)	−1.23*** (0.26)
Divorced or separated	−3.33*** (0.38)	−3.15*** (0.42)	−2.71*** (0.31)	−2.50*** (0.37)
Single	−3.17*** (0.45)	−3.01*** (0.49)	−1.07** (0.49)	−0.95* (0.52)

(Continued)

Table A.8: Continued

	Male		Female	
Dependent Variable = <i>LS</i>	OLS Model	IV 2SLS Model	OLS Model	IV 2SLS Model
Education (ref. = less than secondary)				
Secondary	1.04*** (0.29)	1.27*** (0.34)	0.40 (0.29)	0.43 (0.30)
Some post-secondary	0.55 (0.42)	0.64 (0.46)	0.30 (0.40)	0.34 (0.40)
Post-secondary	1.16*** (0.23)	1.05*** (0.26)	0.37 (0.25)	0.38 (0.25)
Physical health (chronic conditions)	− 0.60*** (0.05)	− 0.71*** (0.09)	− 0.68*** (0.05)	− 0.71*** (0.06)
Household size	− 0.07 (0.15)	0.00 (0.19)	− 0.01 (0.12)	0.03 (0.13)
Household income	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Province (ref. = ON)				
NL	0.15 (0.35)	− 0.17 (0.43)	0.29 (0.40)	− 0.04 (0.50)
PE	0.73** (0.37)	0.92** (0.44)	0.15 (0.39)	0.29 (0.43)
NS	0.08 (0.33)	− 0.34 (0.43)	0.29 (0.33)	0.10 (0.37)
NB	0.20 (0.39)	− 0.07 (0.48)	0.55 (0.36)	0.32 (0.43)
QC	1.12*** (0.25)	0.98*** (0.29)	1.11*** (0.30)	0.96*** (0.30)
MB	− 0.17 (0.31)	0.05 (0.37)	− 0.16 (0.34)	− 0.19 (0.36)
SK	0.42 (0.34)	0.80* (0.44)	0.66 (0.43)	0.66 (0.42)
AB	− 0.15 (0.33)	0.24 (0.42)	0.63* (0.33)	0.73** (0.35)
BC	− 0.60** (0.31)	− 0.67* (0.35)	0.48* (0.29)	0.52* (0.30)
Constant	8.67 (7.66)	45.45* (24.43)	29.61*** (8.10)	54.20* (28.04)
<i>N</i>	6,641	6,641	7,278	7,278
<i>R</i> ²	0.15	0.13	0.15	0.12
Excluded instrument		Age ≥ 65		Age ≥ 65
First-stage result				
Age ≥ 65 y		0.12*** (0.03)		0.16*** (0.04)
Subjective Retirement				
Subjective retirement	− 0.07 (0.23)	5.27* (2.73)	0.57** (0.25)	4.27 (3.51)
Age	0.47** (0.22)	− 0.32 (0.53)	− 0.06 (0.23)	− 0.87 (0.87)
Age ²	− 0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)
White (ref. = not White)	1.07** (0.43)	0.66 (0.47)	− 0.06 (0.50)	0.01 (0.52)
Immigrant (ref. = not immigrant)	− 0.44 (0.28)	− 0.48 (0.30)	− 0.93** (0.38)	− 0.89** (0.39)
Marital status (ref. = married or common law)				
Widow or widower	− 1.85*** (0.41)	− 1.76*** (0.44)	− 1.20*** (0.26)	− 1.12*** (0.28)
Divorced or separated	− 3.34*** (0.38)	− 3.24*** (0.41)	− 2.71*** (0.31)	− 2.37*** (0.45)
Single	− 3.17*** (0.45)	− 3.01*** (0.47)	− 1.05** (0.49)	− 0.68 (0.63)
Education (ref. = less than secondary)				
Secondary	1.03*** (0.29)	1.12*** (0.32)	0.41 (0.29)	0.45 (0.30)
Some post-secondary	0.54 (0.42)	0.76* (0.46)	0.33 (0.41)	0.60 (0.48)
Post-secondary	1.16*** (0.23)	1.09*** (0.26)	0.40 (0.25)	0.56* (0.31)
Physical health (chronic conditions)	− 0.60*** (0.05)	− 0.71*** (0.08)	− 0.68*** (0.05)	− 0.74*** (0.08)
Household size	− 0.08 (0.15)	0.03 (0.18)	− 0.02 (0.12)	0.02 (0.12)
Household income	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Province (ref. = ON)				
NL	0.16 (0.35)	− 0.01 (0.39)	0.33 (0.40)	0.07 (0.47)
PE	0.72* (0.37)	1.11** (0.46)	0.16 (0.39)	0.46 (0.51)
NS	0.09 (0.33)	− 0.17 (0.36)	0.29 (0.33)	0.04 (0.40)
NB	0.21 (0.38)	0.03 (0.45)	0.57 (0.36)	0.34 (0.43)
QC	1.13*** (0.25)	0.99*** (0.28)	1.13*** (0.30)	0.98*** (0.30)
MB	− 0.17 (0.31)	− 0.04 (0.34)	− 0.14 (0.34)	− 0.06 (0.38)

(Continued)

Table A.8: Continued

Dependent Variable = <i>LS</i>	Male		Female	
	OLS Model	IV 2SLS Model	OLS Model	IV 2SLS Model
SK	0.41 (0.34)	0.76* (0.42)	0.69 (0.43)	0.87* (0.47)
AB	−0.16 (0.33)	0.18 (0.40)	0.63* (0.33)	0.82** (0.38)
BC	−0.60** (0.31)	−0.60* (0.34)	0.49* (0.30)	0.62* (0.34)
Constant	7.51 (7.68)	37.02* (19.23)	27.81*** (7.93)	56.01* (30.29)
<i>N</i>	6,641	6,641	7,278	7,278
<i>R</i> ²	0.15	0.01	0.15	0.09
Excluded instrument		Age ≥ 65		Age ≥ 65
First-stage result				
Age ≥ 65 y		0.16*** (0.03)		0.13*** (0.04)

Notes: Robust standard errors in parentheses. IV 2SLS = instrumental variable two-stage least squares; *LS* = life satisfaction score; OLS = ordinary least squares; ref. = reference group.

p* < 0.10; *p* < 0.05; ****p* < 0.01.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

Table A.9: Partial versus Complete Subjective Retirement (Ages 55–85 y)

Dependent Variable = <i>LS</i>	OLS Model	IV 2SLS Model
Partial retirement	0.60*** (0.23)	2.67 (4.26)
Complete retirement	0.41** (0.19)	5.95** (2.91)
Female (ref. = male)	0.53*** (0.14)	0.13 (0.24)
Age	0.15 (0.33)	−1.01 (0.81)
Age ²	−0.00 (0.00)	0.01 (0.01)
White (ref. = not White)	0.47 (0.33)	0.20 (0.40)
Immigrant (ref. = not immigrant)	−0.68*** (0.23)	−0.64** (0.28)
Marital status (ref. = married or common law)		
Widow or widower	−1.46*** (0.22)	−1.30*** (0.28)
Divorced or separated	−3.01*** (0.24)	−2.61*** (0.34)
Single	−2.14*** (0.34)	−1.79*** (0.39)
Education (ref. = less than secondary)		
Secondary	0.71*** (0.21)	0.71*** (0.24)
Some post-secondary	0.43 (0.29)	0.68** (0.34)
Post-secondary	0.81*** (0.17)	0.82*** (0.23)
Physical health (chronic conditions)	−0.65*** (0.04)	−0.74*** (0.06)
Household size	−0.03 (0.10)	0.06 (0.12)
Household income	0.00*** (0.00)	0.00*** (0.00)
Province (ref. = ON)		
NL	0.24 (0.26)	−0.02 (0.31)
PE	0.45* (0.27)	0.86** (0.36)
NS	0.17 (0.24)	−0.17 (0.30)
NB	0.38 (0.26)	0.17 (0.31)
QC	1.13*** (0.20)	0.96*** (0.21)
MB	−0.17 (0.23)	−0.08 (0.25)
SK	0.50* (0.27)	0.78** (0.32)
AB	0.22 (0.23)	0.490 (0.28)
BC	−0.11 (0.21)	−0.08 (0.26)

Table A.9: Continued

Dependent Variable = <i>LS</i>	OLS Model	IV 2SLS Model
Constant	18.52 (11.82)	60.30** (27.84)
<i>N</i>	13,919	13,919
<i>R</i> ²	0.15	0.03
Excluded instruments		Age ≥ 60, Age ≥ 65, Age ≥ 70
First-stage results—partial retirement		
Age ≥ 60		0.05** (0.02)
Age ≥ 65		−0.06*** (0.02)
Age ≥ 70		−0.03 (0.02)
First-stage results—complete retirement		
Age ≥ 60		0.02 (0.03)
Age ≥ 65		0.16*** (0.03)
Age ≥ 70		0.00 (0.02)

Notes: Robust standard errors in parentheses. IV 2SLS = instrumental variable two-stage least squares; *LS* = life satisfaction score; OLS = ordinary least squares; ref. = reference group.

p* < .10; *p* < 0.05; ****p* < 0.01.

Source: 2008–2009 Canadian Community Health Survey—Healthy Aging.

Table A.10: Life Satisfaction Score by Retirement Status (Ordinary Least Squares Results)

Dependent Variable = <i>LS</i>	Objective Retirement		Subjective Retirement	
	Not Retired	Retired	Not Retired	Retired
Female (ref. = male)	0.39* (0.21)	0.52*** (0.17)	0.26 (0.21)	0.60*** (0.17)
Age	0.48 (0.44)	0.21 (0.19)	0.04 (0.30)	0.27 (0.19)
Age ²	−0.00 (0.00)	−0.00 (0.00)	0.00 (0.00)	−0.00 (0.00)
White (ref. = not White)	0.29 (0.47)	−0.31 (0.43)	0.36 (0.48)	−0.34 (0.43)
Immigrant (ref. = not immigrant)	−0.18 (0.37)	−0.63*** (0.23)	−0.15 (0.38)	−0.69*** (0.22)
Marital status (ref. = married or common law)				
Widow or widower	−5.03 (3.32)	−5.37*** (1.69)	−5.49** (2.56)	−5.05*** (1.75)
Divorced or separated	−5.90* (3.23)	−6.17*** (1.61)	−6.04** (2.42)	−5.98*** (1.67)
Single	−4.87 (3.23)	−4.76*** (1.63)	−5.12** (2.44)	−4.49*** (1.68)
Age × Married or Common Law	−0.07 (0.05)	−0.07*** (0.02)	−0.07* (0.04)	−0.06*** (0.02)
Education (ref. = less than secondary)				
Secondary	0.72** (0.34)	0.43* (0.24)	0.81** (0.34)	0.40* (0.24)
Some post-secondary	−0.14 (0.47)	0.59* (0.32)	0.08 (0.48)	0.62** (0.30)
Post-secondary	0.78*** (0.30)	0.43** (0.18)	0.88*** (0.29)	0.41** (0.19)
Physical health (chronic conditions)	−0.49*** (0.06)	−0.55*** (0.04)	−0.47*** (0.06)	−0.56*** (0.04)
Household size	0.16 (0.24)	−0.32* (0.20)	0.03 (0.25)	−0.11 (0.19)
Household income	0.00** (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)
Household Size × Household Income	−0.00 (0.00)	0.00** (0.00)	−0.00 (0.00)	0.00 (0.00)
Province (ref. = ON)				
NL	0.14 (0.41)	0.08 (0.31)	0.19 (0.38)	0.01 (0.32)
PE	0.49 (0.37)	0.24 (0.34)	0.50 (0.35)	0.21 (0.36)
NS	−0.11 (0.37)	0.28 (0.28)	−0.13 (0.38)	0.25 (0.27)
NB	1.15*** (0.38)	0.03 (0.34)	1.13*** (0.37)	−0.02 (0.35)
QC	1.30*** (0.32)	1.43*** (0.21)	1.38*** (0.32)	1.36*** (0.21)
MB	−0.29 (0.35)	0.19 (0.26)	−0.21 (0.34)	0.13 (0.27)
SK	0.47 (0.37)	0.21 (0.28)	0.49 (0.35)	0.17 (0.29)
AB	0.67** (0.31)	−0.06 (0.29)	0.64** (0.31)	−0.04 (0.30)
BC	−0.44 (0.30)	0.13 (0.26)	−0.16 (0.30)	−0.12 (0.27)

(Continued)

Table A.10: Continued

Dependent Variable = <i>LS</i>	Objective Retirement		Subjective Retirement	
	Not Retired	Retired	Not Retired	Retired
Sense of belonging	0.81*** (0.14)	0.61*** (0.09)	0.84*** (0.14)	0.61*** (0.09)
Affection	0.02 (0.08)	0.17*** (0.06)	0.01 (0.08)	0.18*** (0.06)
Social interaction	0.50*** (0.06)	0.32*** (0.04)	0.49*** (0.06)	0.32*** (0.04)
PASE	0.00 (0.00)	0.01*** (0.00)	0.00 (0.00)	0.01*** (0.00)
Social participation	0.40** (0.18)	0.38*** (0.11)	0.45** (0.19)	0.32*** (0.10)
Constant	1.31 (14.05)	11.09* (6.51)	15.06 (9.74)	8.44 (6.49)
<i>N</i>	5,325	8,282	5,472	8,135
<i>R</i> ²	0.23	0.26	0.23	0.27

Notes: Robust standard errors in parentheses. *LS* = life satisfaction score; PASE = Physical Activity Scale for the Elderly; ref. = reference group.

p* < 0.10; *p* < 0.05; ****p* < 0.01.

Source: 2008–2009 Canadian Community Health Survey–Healthy Aging.

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