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Assessing the Retirement Income Prospects of Canada's Future Elderly: A Review of Five Studies

Five different studies give very different impressions of the extent to which the future elderly are likely to experience a decline in their standard of living during retirement. But they share a common conclusion: this is a largely a problem for middle- and upper-middle income earners.

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THE STUDY IN BRIEF

Since an inter-governmental review of Canada's retirement income sufficiency was launched in 2009, a number of high-profile expert studies have analyzed the level of preparedness of Canada's future retirees. Each of the five studies reviewed in this *Commentary* has a "headline conclusion" for which it is widely associated, and each gives a very different impression of the extent to which the future elderly are likely to experience a decline in their standard of living in retirement. The partisan roles in which the studies have been cast have diverted attention from some conclusions common to some or all of them and that are important in considering the retirement income situation of the future elderly.

This *Commentary* reviews these studies with an aim to look beyond the headline conclusions in the five papers to assess the degree of difference among them when they focus on a commonly defined population and to make note of any shared conclusions.

A McKinsey (2012) report concludes that 23 percent of the future elderly will suffer a decline in their standard of living in retirement, with that number falling to 17 percent in its 2015 report (McKinsey 2015). Horner concludes that 22 percent of the future elderly will suffer a significant decline in their standard of living, while Moore, Robson and Laurin (MLR 2010) and Wolfson (2011), concludes the future elderly will face declines of 44 percent and 50 percent, respectively.

The studies use different methodologies in coming up with these results. The MRL and Wolfson studies both make use of Statistics Canada's LifePaths microsimulation model. These studies employ complex datasets and probability assumptions to simulate future outcomes of synthetic individuals.

In contrast, the two McKinsey studies use proprietary survey results, while Horner relies on income tax data. McKinsey and Horner use a deterministic approach, projecting current states forward at a steady rate.

The five studies give very different impressions of outlook for the future elderly. If attention is focused on young middle-income earners, however, the differences in results diminish significantly. The risk of a declining standard of living is largely a middle- and upper-income earner problem, concentrated among the youngest age group and those not participating in a workplace pension plan.

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In June 2009, federal, provincial and territorial ministers of finance launched a review of the retirement income prospects of Canada's future elderly.

The review was prompted by concerns expressed by several expert commissions that were established to advise provincial governments on issues related to workplace pension plans in Canada.¹ The ministers established a Research Working Group on Retirement Income Adequacy, and commissioned Jack Mintz of the School of Public Policy at the University of Calgary to oversee the production of a number of research projects and papers, including Keith Horner's (2009) *Retirement Saving by Canadian Households*.

In his paper, Horner tries to determine what portion of the future elderly population likely would experience a decline in their standard of living in retirement. In the following years, a number of other high profile studies have addressed the same question, including McKinsey (2012, 2015); Moore, Robson and Laurin (2010; hereafter referred to as MRL); and Wolfson (2011) – henceforth, I cite these studies only by name except to distinguish between the two McKinsey studies.

All five studies rely on data on individuals and households, rather than on averages of larger

populations. Accordingly, in this *Commentary*, I have chosen to review these particular studies because they address questions related to the distribution of outcomes, not just average or representative outcomes. Two pairs of the studies have very similar methodologies: MRL and Wolfson both make use of Statistics Canada's LifePaths microsimulation model; and the two McKinsey studies. The assumptions and methodologies used in these studies are discussed below. Despite the similarities of the two studies in each pair, there is enough difference in the conclusions they reach to make it worth taking a separate look at them.

Each study reaches a specific “headline conclusion” with which it is associated, and these vary widely. McKinsey (2012) concludes that 23 percent of the future elderly will suffer a decline in their standard of living in retirement, but in its 2015 report, McKinsey had lowered this estimate to 17 percent. Horner concludes that 22 percent of the future elderly would suffer a significant decline in their standard of living,² while MRL and Wolfson

I received very helpful comments from Peter Hicks, Keith Horner, Kevin Moore and Barbara Zvan on an earlier version of this *Commentary*. I also want to thank the participants in the peer review process who steered me away from a number of problems. Particular thanks are due to Alex Laurin for helpful comments and encouragement. Any shortcomings that remain are my responsibility.

- 1 Alberta and British Columbia had a joint inquiry. Formally structured inquiries were also undertaken in Nova Scotia and Ontario. Less structured inquiries were undertaken in Quebec and in the federal jurisdiction. Although financing problems faced by defined-benefit pension plans were at the heart of the inquiries' mandates, their reports reflect stakeholders' concerns about declining participation in workplace pension plans. For a summary of the reports from the three structured inquiries, see Baldwin and FitzGerald (2010).
- 2 Other than in Horner, the headline conclusion is established by the author(s) – usually in the abstract or executive summary of the paper. In Horner's case, the headline is that of Mintz (2009) in his summary of the research projects he oversaw. Mintz's headline number is based on Horner's conclusion regarding the portion of the entire population that would have post-retirement consumption possibilities of 90 percent or less of pre-retirement possibilities. Horner himself focuses more on the results for modest and middle-income earners (see Horner 2009, 5).

predict that the decline would be felt by 44 percent and 50 percent, respectively.

Analyses of retirement income adequacy feed directly into debates on pension reform that are almost inevitably fractious as fact, analysis and political philosophy are simultaneously at play. Not surprisingly the McKinsey (2015) conclusion is given prominence by advocates of limited reforms and Wolfson by advocates of more ambitious reforms. The partisan roles in which the studies have been cast have diverted attention from some conclusions common to some or all of them and that are important in considering the retirement income situation of the future elderly. This diversion of attention has also precluded a more relaxed evaluation of what can be learned from the studies about issues to consider in assessing future retirement incomes.

What is needed is a look beyond the headline conclusions in the five papers to assess the degree of difference among them when they focus on a commonly defined population and to make note of any shared conclusions.

The discussion that follows is qualitative, and relies primarily on the contents of the studies themselves. Each study includes a discussion of methods and assumptions.³ The two that rely on LifePaths (MRL and Wolfson) employ more

complex datasets, assumptions and methodology than do the other studies.⁴

The five studies gathered income and earnings data from different years and group them differently: sometime by quintile, sometimes by categories such as modest and middle-income earners. The appendix to this *Commentary* offers some comparability of income data in the studies by providing income information in constant 2013 dollars and by identifying key income and earnings ranges used in the studies.

Table 1 summarizes the studies' headline conclusions, along with information on the cohort and earnings levels that underline them.

LOOKING BEYOND THE HEADLINES: CONVERGENCE ON SOME KEY POINTS

Some of the variation in the headline conclusions in the five studies stems from their use of different methods, data and assumptions, but much of the variation can be explained by differences in the studies' focus on different age cohorts and earnings (income) groups.⁵ The headline conclusions of Horner and the two McKinsey studies are based on the analysis of all earnings levels in all age groups combined; that of MRL is based on the projected

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- 3 For the McKinsey studies, results of the 2012 study, but not of the 2015 study, are broken down by age and income group. I obtained the disaggregated results of the 2015 study from McKinsey.
- 4 In 2014, Statistics Canada announced that it would no longer provide financial support to LifePaths. However, it indicated at the time that it might develop a broadly similar type of model. In the meantime there has been some discussion of reviving the LifePaths model. Given the possibility of there being a "LifePaths type" model in the future, this paper includes some discussion of the strengths and limitations of the model.
- 5 Earnings from employment and self-employment are the form of income that must be replaced in retirement. In principle, property income (dividends, interest payments, rent and so on) and government transfer payments can carry on in retirement. Thus, I typically refer to earnings, rather than income, in discussing pre-retirement living standards; Horner, MRL and Wolfson also present data and analysis in terms of pre-retirement earnings, while the two McKinsey studies make use of income data in their assessment of pre-retirement living standards. Through most of the income and earnings distribution, the use of income versus earnings data should not have a significant effect.

Table 1: Summary of Headline Results and Cohort and Earnings Focus, Five Canadian Retirement Income Studies

Study	Percent Experiencing Decline	Cohort Focus	Earnings Focus
Horner	22	All adult	All levels
McKinsey 2012	23	All adult	All levels
McKinsey 2015	17	All adult	All levels
MRL	40	Birth year 1980–85	All levels
Wolfson	50	Birth year 1960–65	Middle earners

Source: Author’s compilation.

Table 2: Additional Conclusions in Horner and McKinsey

Study	Percent Experiencing Decline	Cohort/Age	Earnings Level
Horner	28	All	Modest
Horner	29	All	Middle
McKinsey 2012	31	25-34	3rd quintile
McKinsey 2012	29	25-34	4th quintile
McKinsey 2015	29	25-34	3rd quintile
McKinsey 2015	31	25-34	4th quintile

Source: Author’s compilation.

outcome for people ages 25 to 30 in 2010 at all levels of earnings; while Wolfson’s is based on an analysis of middle-income earners in the single birth cohort of 1960–65.⁶

Each of the five studies has a number of conclusions in addition to the headline conclusion. McKinsey (2015) concludes that 29 percent of young adults ages 25 to 34 in the third income quintile and 31 percent in the fourth quintile will suffer a decline in their standard of living in retirement; in McKinsey (2012), however, the findings are reversed, at 31 percent and 29 percent,

respectively. Of the five studies, only Horner does not present results by age group, but notes that, for all age groups, 28 percent of modest earners and 29 percent of middle-income earners will experience a decline in their post-retirement consumption possibilities (see Box 1).⁷ There is clearly a gap between these conclusions and those of MRL and Wolfson, but the gap is much smaller than would be inferred from the headline numbers alone (see Table 2). The five studies, however, reach some important common qualitative conclusions.

6 In view of the role of the Wolfson (2011) findings in the current debate, it is noteworthy that the portion of the population likely to experience a serious decline in standard of living would be larger had attention focused on younger cohorts.

“Middle-income earners” refers to the 50 percent of the earnings distribution between the twenty-fifth and seventy-fifth percentiles of the distribution. This results in an earnings range between \$35,000 and \$80,000 in 2010 dollars.

7 The results cited here refer to the percentages of savers whose post-retirement consumption possibilities amount to less than 90 percent of their pre-retirement possibilities. But 40 percent of modest earners and 37 percent of middle-income earners are likely to have post-retirement consumption possibilities that are less than 100 percent of their pre-retirement possibilities.

Box 1: Measuring the Maintenance of Living Standards

Two standard types of measures are used to determine whether the standard of living of a person or household has been maintained after the transition from work to retirement has occurred.

1. *Gross replacement rate.* This involves a straightforward comparison of total income in retirement to earnings from employment prior to retirement. For many years, pension policy discourse in Canada and elsewhere has assumed that a gross replacement rate of 70 per cent permits living standards to be maintained. In Canada, a consensus has begun to emerge that for people with middle to high earnings a somewhat lower gross replacement rate of 50 to 70 per cent probably achieves this objective.
2. *Net replacement rate (consumption possibilities).* A more refined measure of replacement rates makes adjustments to the gross replacement rates in order to determine what is available for purchases of goods and services before and after retirement. In the pre-retirement period, adjustments are made to take account of the cost of raising children, saving for retirement, mortgage payments and taxes including CPP contributions and EI premiums. Taxes are also taken into account in the post-retirement period. In both periods, an addition to income can be made to reflect the value of home equity. A net replacement rate of 100 per cent is indicative of a full maintenance of living standards or consumption possibilities.

A Problem Mainly for Middle- and Upper-Income Earners

The first common conclusion is that the decline in post-retirement living standards is largely a problem for people with middle and upper-middle levels of earnings. Subject to a minor qualification, the studies conclude that people with low levels of pre-retirement earnings will be able to maintain their standard of living with the income they receive from Old Age Security (OAS), the Guaranteed Income Supplement (GIS) and the Canada/Quebec Pension Plans (C/QPP). Based on the values of OAS, GIS and C/QPP in 2013 and income data from that year, it can be generalized that unattached

individuals in the lowest two quintiles and family units in the lowest quintile will have incomes from these sources amounting to 75 percent or more of their pre-retirement earnings. Most analysts agree this is sufficient to allow such retirees to maintain their standard of living – assuming long periods of residence and employment in Canada.⁸

It should be noted, however, that both McKinsey (2012) and MRL show a non-trivial increase in the portion of the population at low income levels that will experience a decline in their standard of living in retirement.

In McKinsey (2012), in the first quintile, 4 percent of people ages 55 to 64 will experience a decline in their standard of living, but among those

8 Low levels of earnings that are fully replaced in retirement might still leave a person or household with an income that is unacceptably low as judged by an absolute standard.

ages 25 to 34, the portion rises to 15 percent.⁹ In a similar vein, MRL note that, although virtually none of newly retired seniors with low earnings has experienced a decline in living standards, nearly 20 percent are projected to do so by 2050.¹⁰ The studies also conclude that the likelihood that retirement incomes will fall short of target is greater at the highest income level,¹¹ but this reality is deemed not to be important for public policy purposes.

Workplace Pension Plan Participants Are Better Prepared

Another common conclusion in the studies is that participants in workplace pension plans have a greater likelihood of being able to maintain their pre-retirement living standards.¹² This conclusion is presented most clearly in McKinsey (2015), which says that, among mid- to high-income households, 84 percent of those with a workplace pension plan participant are on track to maintain their standard of living in retirement, compared with 63 percent without such a plan. Moreover, 91 percent of members of defined-benefit (DB) plans should maintain their standard of living in retirement.

These conclusions are important in view of the declining participation in such plans, particularly in the private sector. The McKinsey findings also suggest that defined-contribution (DC) plans do not substitute fully for DB plans and that individual

and group Registered Retirement Savings Plans (RRSPs) are also not a full substitute for workplace pension plans.¹³

The Youngest Age Group Is the Least Prepared

All of the studies, other than Horner, include a breakdown by age group, and show that the youngest group is the least prepared for retirement. In both MRL and Wolfson, the increase in the portion of the population falling short of maintaining post-retirement living standards is consistent through time. McKinsey (2012) finds that the youngest age group's rate of failing the retirement readiness test is higher than that of the oldest group in the three bottom quintiles, with margins of difference of at least eight percentage points. In McKinsey (2015), the same holds true in the second through fifth quintiles, but the margin in the second quintile is only two percentage points. Patterns in the middle-age groups are not consistent.

As for the sources of deterioration in retirement income prospects, it is worth noting the conclusions of MRL, Wolfson and McKinsey (2012) that, in the youngest age group at the low-income level, a lack of retirement readiness is associated with the decline in the relative value of OAS. The value of OAS declines because it is price indexed, and its value drops in relation to pre-retirement earnings in the face of an assumed increase in wages and

9 In McKinsey (2012), average household income in the first quintile is \$20,000, an amount that appears to have been established through the 2011 survey that underpins the study.

10 In 2013, the first quintiles of all family types had incomes up to \$21,500; see the appendix and Statistics Canada, CANSIM database, table 206-0031.

11 McKinsey (2015) provides a minor exception to this finding, whereby, in the 55–64 age group, the lowest retirement readiness score is in the fourth, not the fifth, quintile.

12 Workplace pension plans are often referred to as registered pension plans to reflect the fact that they have to be registered with the Canada Revenue Agency to receive favourable tax treatment.

13 Horner also argues that RRSPs fail to substitute fully for workplace pension plans. For the impact on plan members of the shift in participation from DB to DC plans, see Baldwin (2015) and Baldwin and Moore (2015).

salaries net of inflation.¹⁴ The replacement value of OAS also declines with the continuing shift in the retired population from one-earner to two-earner couples.

Wolfson also notes a decline in the replacement role of the C/QPP that is attributable to an increase in the number of years of low or no earnings that cannot be cleared from the calculation of C/QPP retirement benefits.¹⁵ Underlying this growing number of years of low earnings is later entry into the labour force and a steeper age-earnings profile in the early years of working life.

Finally, as noted above, among young people with middle to high incomes, those who do not meet the retirement readiness standard often do not have access to a workplace retirement saving plan.

METHODS, DATA AND ASSUMPTIONS

All five studies apply a version of lifetime consumption smoothing in their analysis. According to this theory, rational economic actors will give up enough pre-retirement consumption opportunities through retirement saving/pension contributions in order to generate a retirement income that will allow them to enjoy the same standard of living after retirement as they had before.¹⁶ All five studies

aim to establish the relationship between post- and pre-retirement living standards. They all take account of earnings in the pre-retirement period, and the pre-retirement standard of living also takes account of consumption opportunities forgone thanks to retirement saving/pension contributions, personal income taxes and payroll taxes. In the post-retirement period, all the studies take account of income received from OAS, GIS, C/QPP, workplace pension plans and RRSPs, as well as personal income taxes.¹⁷ Beyond these common points, important differences emerge in the five studies (see Table 3) with respect to their:

- inclusion and exclusion of different types of wealth;
- treatment of families and children;
- definition of the pre-retirement and post-retirement periods that are compared;
- standard for judging consumption continuity; and
- modeling methods, data sources and assumptions.

Wealth Included

Horner, MRL and Wolfson take account of housing wealth in addition to wealth accumulated specifically for retirement through public

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- 14 MRL and Wolfson model OAS and the GIS based on their current legislative provisions, which provide for price indexation. Horner argues that, based on historical experience, it is more reasonable to expect that ad hoc increases in the GIS will maintain the value of the combination of OAS and GIS relative to wages and salaries.
- 15 The CPP bases retirement benefits on earnings on which contributions to the plan were made between age 18 and the date when a valid application for a retirement benefit is made. Actual earnings are upgraded to reflect the growth in the Year's Maximum Pensionable Earnings between the date when contributions are made and the date when an application for a retirement benefit is made. A limited number of years of low earnings can be dropped from the calculation of the retirement benefit; the number was recently increased from seven to eight years for applications made at age 65. There are also special dropouts for child-raising and people working past 65.
- 16 Lifetime consumption theory provides an important perspective on retirement saving and retirement income adequacy. It is important to remember, however, that people's reasons for saving for retirement might also include precautionary and bequest motives.
- 17 Strictly speaking, none of the studies assesses changes in consumption in the pre- and post-retirement periods, as none measures the consumption of consumer durables other than housing through time. What they measure is the changing ability to make new consumption expenditures.

Table 3: Key Differences in Methods and Assumptions, Five Canadian Retirement Income Studies

Method/Assumption	Study				
	Horner	McKinsey 2012	McKinsey 2015	MRL	Wolfson
Relative value of OAS	Stable	Declining	Unknown	Declining	Declining
Participation rate in workplace pension plan	Stable	Stable	Stable	Declining	Declining
Inclusion of non-retirement wealth	Housing	Financial wealth	Financial wealth	Housing	Housing
Definition of pre-retirement periods	Age 64	Peak income year	Peak income year	Best 15 price adjusted age 35-60	Average wage adjusted age 40 to retirement
Modelling method	Deterministic projection of micro data	Deterministic projection of micro data	Deterministic projection of micro data	Stochastic projection of micro data	Stochastic projection of micro data
Discount to make post- and pre-retirement incomes commensurate	Prices	Prices	Prices	Prices	Wages

Source: Author's compilation.

pensions, workplace pension plans and RRSPs, but generally exclude other forms of wealth.¹⁸ In the pre-retirement period, payments of principal on mortgages are deducted from earnings in computing consumption possibilities, and imputed rent on home equity is added to earnings.

In the post-retirement period, the treatment of housing varies somewhat: Horner attributes imputed rent to homeowners, while MRL and Wolfson annuitize half of home equity and attribute imputed rent to the other half.¹⁹ Both of

the latter two studies also provide results based on different treatments of home equity.

In MRL, the base case estimate that 44 percent of the retired population will experience a significant decline in their standard of living in 2050 jumps to about 50 percent if home equity is dealt with only by attributing imputed rent to it. Another jump of almost 10 percentage points stems from ignoring housing wealth altogether. Annuitizing 100 percent of housing wealth reduces the base case estimate by about four percentage points.

18 Horner and Wolfson review available data on non-pension financial wealth, and conclude that its inclusion would make little difference to the results of the analysis for modest and middle-income earners since such financial wealth is not widely held in significant amounts in these income ranges.

19 This approach to modelling is consistent with a “downsizing” approach to housing for older people.

Wolfson illustrates the effects of different treatment of homeownership on the average replacement rate for the 1960–65 birth cohort with different levels of earnings. In the middle-earnings range (\$35,000–\$80,000), different ways of accounting for housing make a notable difference in average replacement rates. At the low end of the middle range, the average replacement rate if all housing wealth is annuitized is about 20 percentage points higher than if it is ignored. At the top end of the middle range, the difference is about half that size. Wolfson's baseline results, in which half of housing wealth is annuitized and the imputed rent is attributed to the other half, are much closer to the results when housing wealth is fully annuitized.

The two McKinsey studies ignore housing wealth in their base case analyses, but include it in their sensitivity testing.²⁰ McKinsey (2015) shows that, if either 30 percent or 100 percent of housing wealth is included in retirement income (assuming the value is annuitized), the percentage of the population not on track to maintain its standard of living in retirement drops from 17 percent to 13 percent and 10 percent, respectively. On the other hand, the two McKinsey studies do take account of financial wealth that is not specifically retirement saving. Accumulated wealth and savings rates are established based on survey results, and these are projected forward with an assumed real rate of return of 3.5 percent per year.²¹ Financial wealth is fully annuitized at retirement age.

Family Context

All five studies take account of family context and children, but do so in different ways. Horner

estimates the adequacy of household savings for different types of households – single individuals, lone-parent households, couples with children and couples without children. For households with children, Horner makes a specific deduction per child from pre-retirement household earnings to establish what is available for the parent(s)' pre-retirement consumption. He also adjusts adult consumption based on family size. MRL and Wolfson adjust family earnings to take account of household size using a standard method of adjustment that is the square root of family size. Horner's adjustment for family size is broadly similar to that of MRL and Wolfson, but gives greater weight to the second adult. The adjusted earnings are attributed to individual family members. The two McKinsey studies use the family/household as the unit of analysis.

Pre- and Post-retirement Periods

There are some significant differences among the studies in terms of how they define the pre- and post-retirement periods.

Horner's results assume that pre-retirement saving will carry on until age 64, and he compares his estimate of pre-retirement consumption with retirement income at age 65. MRL establish pre-retirement consumption based on the highest 15 years of price-adjusted earnings over the age range from 35 to 60. Retirement income at age 70 provides the comparator. Wolfson also takes age 70 as the point when retirement income is measured, but he uses average wage-adjusted earnings from age 40 to retirement age to define the starting point for the calculation of the pre-retirement

20 McKinsey (2012) includes the comment that pre-retirement income is reduced by the amount of mortgage payments, but McKinsey (2015) makes no mention of this.

21 Horner also uses a real-rate-of-return assumption of 3.5 percent per year in his base case. MRL use a somewhat lower rate of return, but their model does not assume a uniform rate for all people, and it is stochastically modelled. MRL also find that changing their rate-of-return assumption by one and a half percentage points changes the portion of the population experiencing a serious decline in its standard of living by four percentage points on a base of 40.

living standard. The two McKinsey studies compare retirement incomes at the time of retirement with pre-retirement consumption based on income in the peak earnings year, although it is not clear how they establish that year. It appears, from a comment in McKinsey (2015), that survey respondents were asked to estimate their year of retirement, and that their responses established the year of retirement.²²

The choice of period used to establish the pre-retirement living standard is conceptually important. It also has an important impact on measured outcomes. Both MRL and Wolfson undertake sensitivity tests of how their results change as the definition of the relevant period changes. In their base case calculations, MRL define the pre-retirement standard of living as the 15 years of highest consumption between ages 35 and 60. They find that, if they use the 25 highest of the last 40 years before retirement, their estimate of the portion of the population in 2050 with retirement consumption possibilities of less than 75 percent of the pre-retirement level drops from 44 percent to about 38 percent.²³ If they use the highest five years of consumption in the final 10 years, retirement readiness drops by about nine percentage points. As they note, periods of rapid wage and salary growth are when the choice of the definition of the pre-retirement standard is most important.

Wolfson's sensitivity tests illustrate changes in average replacement rates that result from changes in the period used to define the pre-retirement standard of living. Not surprisingly, the pattern is the same as in MRL. The average replacement rate is lowest if the best five years are used, and highest if lifetime adjusted earnings are used. In an appendix, Wolfson reminds the reader that

periods encompassing many years of working life will include not only years of lower earnings, but also years when consumption is reduced by child expenses and mortgage payments.

One issue that turns on the choice of pre-retirement period is how to make incomes at later periods commensurate with incomes at earlier periods. This is an issue for both MRL and Wolfson because of the long period that separates the retired consumption possibilities date from the pre-retirement date. MRL use changes in the consumer price index (CPI) for this purpose. Wolfson uses a wage deflator to make incomes commensurate across time; doing so equalizes relative income status as opposed to purchasing power. This method has a significant impact on the results. Wolfson notes that using the CPI instead of a wage deflator would improve the retirement readiness of middle-income earners by about 50 percent, reflecting the relatively long time that separates the pre-retirement period and when retirement income is observed, as well as his assumed rate of real wage growth of 1.3 percent per year. Without passing judgment on whether wage discounting is the right choice, it clearly has a significant effect on the outcome of Wolfson's analysis.

The Standard for Judging Consumption Continuity

The standard chosen for deciding if consumption continuity will be maintained differs somewhat among the studies. In Horner, MRL and Wolfson, pre-retirement incomes are adjusted to establish the level of consumption possibilities in the pre- and post retirement periods. Horner also reduces

22 In explaining differences between the 2012 and 2015 results, McKinsey (2015, p 19) notes the following as one of four points: "A more realistic range of expected retirement age was captured in the 2014 survey, which led to an increase in the average expected retirement age."

23 I use approximate language ("about") here as MRL present their results in the form of a line graph.

pre-retirement consumption possibilities by an amount that reflects work-related expenses – namely, \$300 plus 3 percent of earnings. He then uses the 90 percent and 100 percent thresholds to assess whether pre-retirement savings are sufficient to maintain that standard of living in retirement. MRL and Wolfson take a similar approach to defining adequacy, but use a net replacement income of 75 percent of consumable pre-retirement income as a standard for judging adequacy. Horner focuses on decline, while MRL and Wolfson focus on serious decline. MRL also express a concern that, for methodological reasons, actual consumption possibilities for retirees might be understated.

The two McKinsey studies take a somewhat different approach to making consumption smoothing operational. They note that household consumption spending declines as the age of the oldest person in the household increases from 53 to 65. This, they note, is the age range when most Canadians are transitioning from employment to retirement and, further, that the decline in consumption spending does not appear to be driven by an income constraint.²⁴ Based on their analysis of the decline in consumption spending, the McKinsey studies conclude that incomes in retirement will be adequate for people in the first quintile of the income distribution if net income in the retirement period amounts to 80 percent of net pre-retirement income. In the higher-income quintiles, net retirement income is deemed to be adequate if it amounts to 65 percent of pre-retirement net income.²⁵ In all but one instance (in McKinsey 2012), the McKinsey studies focus on decline versus serious decline.

Modelling, Data and Assumptions

A key difference among the studies relates to their modelling methods, sources of data and assumptions, a complete review of which is beyond the scope of this *Commentary*. A look at some of these differences, however, can help explain variations among the conclusions they reach.

Horner and the two McKinsey studies are similar in their basic approach to modelling. They take micro data on income, earnings and savings rates at particular moments in time, and project these forward by combining them with assumed future rates of return on savings. Horner converts DB accruals into a savings rate based on the pension adjustment for tax purposes, while the two McKinsey studies project future benefit accruals by combining the annual rate of benefit accrual and future projected employment to retirement age at an assumed rate of wage growth. Both Horner and McKinsey treat current status with respect to labour market participation and savings as if they are a permanent steady state.

MRL and Wolfson use Statistics Canada's former longitudinal, microsimulation model, LifePaths, to conduct their analyses. This model generates millions of synthetic individuals and is designed so that the individuals' characteristics reflect important social and economic characteristics of the Canadian population at particular moments and through time. LifePaths is designed to analyze issues where current outcomes depend on previous status and outcomes vary from individual to individual, as is the case with retirement income prospects.

LifePaths models the way in which changes in individual labour market status, workplace pension

24 McKinsey (2015, p 17) includes the following finding from the survey of retired households: "Fourteen percent of households currently retired are spending more in retirement; 53 percent are spending less but do not feel the need to spend more; and 33 percent said they would spend more but feel financially constrained."

25 Lafrance and LaRoche-Côté (2011) suggest that the decline in consumption expenditures unadjusted for changes in household size is consistent with the continuity of per capita income adjusted for household size.

participation and retirement savings rates in the pre-retirement period will show up in retirement incomes. In contrast, the more deterministic analyses by Horner and McKinsey project current states forward at a steady rate. The synthetic individuals in the LifePaths model are constructed from a mix of Statistics Canada surveys, censuses and administrative databases. The dynamic aspects of LifePaths are based on transition probabilities that have been tested to make sure they generate appropriate cross-sectional values and historical patterns. Horner's analysis relies on income tax data and the McKinsey studies are based on surveys of the working age population and retirees conducted by a polling firm. The survey that was used to prepare the 2015 study included 9,000 working households and 3,000 retired households.

Most of the McKinsey survey data are not in the public domain; however, McKinsey (2012) shows average incomes by quintile. These data match Statistics Canada data reasonably closely in the second through fourth quintiles – the most important quintiles for the issue at hand. The McKinsey data do not match as well with Statistics Canada data in the first and fifth quintiles, likely due to the point made in McKinsey (2015) that the households retained for analysis had incomes between \$10,000 and \$250,000, which would raise the average income in the first quintile and lower it in the fifth (see the appendix).

In two areas, differences in assumptions among the studies are worth noting, as they are clear and potentially material to outcomes.

The first relates to real wage growth and its interaction with the price-indexed OAS program. Based on assumptions used by the Office of the Chief Actuary in valuing the CPP, both MRL and

Wolfson assume that real wages will grow at a rate of 1.3 percent per year net of inflation (OCA 2010) and that OAS benefits will grow at the rate of inflation. The implication is that the value of OAS benefits relative to wages and salaries will fall at the rate of real wage growth. Horner assumes that all key values in his analysis increase at the rate of wage growth in the pre-retirement period and with prices thereafter. Proceeding in this way assumes that OAS effectively keeps pace with wage and salary growth and there is no decline in its relative value.

In McKinsey (2012), there is a distinct pattern in quintiles one and two of a declining portion of the retired population maintaining its standard of living in retirement as one moves from the oldest portion of the pre-retired population to the youngest. These are the quintiles where OAS income is most important. McKinsey (2012) notes that the relative value of OAS declines as a result of a positive real wage growth assumption interacting with a price-indexed OAS benefit.

In McKinsey 2015, there is basically no change in the portion of the population in the first quintile that is on target to maintain its standard of living in retirement as one moves from the oldest to youngest age group, and there is almost no change in the second quintile.²⁶

The other assumption that differs among the studies and that might have had a material impact on their outcomes relates to participation in workplace pension plans.

Both Horner and the two McKinsey studies project forward the level of participation in such plans at the time of their observation – that is, participation rates are assumed to be stable from the age when people are observed to retirement. Given the deterministic nature of the analyses of these

26 McKinsey offers a general explanation of the reasons for differences in the results in their 2012 and 2015 studies. But the items it identifies are unlikely to change the pattern of results for the first and second quintiles in the manner observed. McKinsey 2015 attributes the major differences in results between 2012 and 2015 to clearer questions about workplace pension plan participation; the taking account of workplace pension plan benefits due from previous employment; more reasonable estimates of the age of retirement; and tax calculations that take more accurate account of provincial tax regimes.

studies, it is not clear that there is an alternative to this approach. Both MRL and Wolfson assume, in contrast, that the recent trend of declining levels of participation in workplace pension plans will continue. That said, it is not clear what levels of participation would emerge over time in the two studies, as neither identifies the numerical value of the trend or the beginning or end rates. This is an important omission, as the decline in workplace pension plan participation has not occurred at a uniform rate through time.

Table 3 summarizes some of the key differences in methods and assumptions likely to have had an impact on the conclusions the five studies reach.

CONCLUDING REMARKS

The five studies of the retirement income prospects of the future elderly differ in important respects in terms of their methodology, data and assumptions. But it would be unfair to suggest that any of them made all decisions with respect to methods, data and assumptions so as to maximize or minimize the conclusion reached with regard to the portion of the future elderly population that is likely to experience a significant decline in their standard of living. That said, it is likely that the compounding effect of the capture by MRL and Wolfson of the declining relative value of OAS and changing workplace pension plan participation rates goes a long way toward explaining the differences in all their conclusions – not just the headline conclusions. Moreover, Wolfson's use of a wage deflator in making pre- and post-retirement incomes commensurate is clearly important in explaining differences between his results and the others' – especially those of MRL.

Several issues arise in the five studies themselves and in a review of them that warrant a final comment.

First, given the dynamic and individual nature of the influences on retirement outcomes, in my opinion longitudinal micro-simulation models like LifePaths have some potential advantages over more deterministic models that rely on representative agents. While LifePaths as it stood when Statistics Canada withdrew financial support from it represented progress, it still had its limitations. For example, it did not model retirement decisions in a manner that reflected what is known in the literature about retirement decision-making.²⁷ Much of what MRL and Wolfson identify as retirement on low incomes will likely show up in later retirement thanks to behavioural change that is not captured in LifePaths.²⁸ Nor did LifePaths capture the way in which DB pension plans interact with a changing financial environment – a limitation noted in MRL. It is important to underline that these limitations of LifePaths are not comparative disadvantages in relation to the other methods.

If Life Paths is revived or a successor model developed, its governance should be changed to make it more transparent to potential users of reports based on the model. In particular, LifePaths would need improved documentation, broadened access to the model, clear conventions on acceptable presentation of results, a broader peer review of assumptions and other technical aspects, and adequate resources.

Second, the studies differ in the age range over which they define pre- and post-retirement living standards. Wolfson allows readers to see that the choice of pre-retirement age range makes a big

27 MacDonal and Cairns (2007) provide an example of modelling that allows the age of retirement to vary in response to prospective pension benefit levels.

28 Hamilton (2015) is quite categorical in his criticism of LifePaths for not taking account of behavioural change.

difference in the results. With respect to the pre-retirement age range, there is little we can add except that it is hard to be dogmatic about which of the main choices is preferable: earnings over an entire working career upgraded by a wage or price index, as in the CPP; earnings just prior to retirement as in many workplace pension plans; or something in the middle, as in the modelling done by MRL and Wolfson. But all five studies might be challenged for the way they choose an age at which to assess the post-retirement living standard. Despite the increasing length of the retirement period and the fact that it often involves a transition from being a member of a couple to being a lone survivor, all five studies focus on an age that is likely to be close to when retirement begins and when couples who enter retirement as couples are still couples.

Third, all five studies anchor their concept of an adequate retirement income in a variant on lifetime consumption theory. One beneficial thing about the theory is that it makes us mindful of the possibilities of both under- and over-saving for retirement (depressing pre-retirement living standards below post-retirement levels). The possibility of over-saving is a particular concern in mandatory pension plans. Yet, it is impossible to establish a DB benefit rate that balances pre-retirement sacrifice and post-retirement income correctly for all members of a plan. Indeed, a basic dilemma in the pension world is the tension between the idiosyncratic nature of retirement income needs and aspirations and the relatively greater effectiveness of group bases for delivering pension income.

Fourth and finally, most discourse on retirement income adequacy and most modelling related to it take the maintenance of living standards to refer to measures of purchasing power. To meet this

objective throughout the retirement period requires the price indexation of benefits. However, Wolfson's choice to make post-retirement consumption possibilities commensurate with pre-retirement possibilities through the use of a wage index raises a more general question: whether maintenance of living standards should be thought of in terms of the post-retirement purchasing power of the elderly continuing to go up or down in step with that of the working population, or in terms of its being maintained at a level established upon retirement. In periods of relatively slow economic growth, the practical effect of choosing a purchasing power measure versus a relative measure will not be great. But in a period of very rapid economic growth, the purchasing power of the elderly will fall below that of the working population in a price-indexed pension regime. Moreover, in a period of economic contraction, the opposite will occur in a price-indexed pension regime. The scope for divergence between the outcomes of a price-adjusted regime and a relative-income regime will increase with increases in life expectancies at later ages.

To conclude, each of the five studies reviewed in this *Commentary* has a "headline conclusion" for which it is widely associated. The five studies thus give very different impressions of the extent to which the future elderly are likely to experience a decline in their standard of living in retirement. If attention is focused on the young middle earners, however, the differences diminish significantly. In addition, the studies support a number of common qualitative conclusions: the risk of a declining standard of living is largely a middle- and upper-income-earner problem, concentrated among the youngest age group and those not participating in a workplace pension plan.

APPENDIX: INCOME MEASURES

Appendix Table A-1 presents a number of income measures relevant to the discussion in the text. It starts with Statistics Canada data on incomes by quintile for 2013, the latest year for which data are available. The table also includes some data from McKinsey (2012) on average incomes in quintiles

drawn from its 2011 survey, and benchmark income measures used in Horner and Wolfson. Data from the various studies are presented initially as they appear in the studies. The numbers in parentheses update the data to 2013 based on increases in the CPI.

Table A-1: Income by Quintile, Five Retirement Income Studies

Quintile	Income	All Types	Unattached Individuals	Economic Families	McKinsey 2011 Survey
First	Upper Limit Average	\$27,400	\$15,300	\$45,000	NA
		\$15,800	\$7,800	\$30,500	\$20,000 (\$20,400)
Second	Upper Limit Average	\$48,500	\$24,300	\$68,900	NA
		\$37,900	\$19,850	\$56,450	\$40,000 (\$40,800)
Third	Upper Limit Average	\$72,500	\$38,400	\$97,800	NA
		\$60,850	\$30,050	\$72,950	\$60,000 (\$61,200)
Fourth	Upper Limit Average	\$118,000	\$59,100	\$141,400	NA
		\$94,400	\$47,600	\$117,350	\$90,000 (\$91,800)
Fifth	Upper Limit Average	NA	\$NA	NA	NA
		\$187,400	\$93,700	\$214,950	\$140,000 (\$142,800)

Horner's Modest- and Middle-Earnings Ranges (based on 2006 data)

Modest	Singles and one-parent families	\$25,000 – \$60,000	(\$28,000 – \$67,200)
	Couples and two-parent families	\$40,000 – \$100,000	(\$44,800 – \$112,000)
Middle	Singles and one-parent families	\$60,000 – \$100,000	(\$67,200 – \$112,000)
	Couples and two-parent families	\$100,000 – \$166,700	(\$112,000 – \$186,700)

Wolfson's Middle-Earnings Range (original data in 2010 dollars)

Middle	\$35,000 – \$80,000	(\$36,400 – \$83,200)
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Source: Author's compilation.

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