



Article from  
International News  
May 2017  
Issue 71

# Replacing the Replacement Rate: A Better Way to Determine Retirement Income Adequacy

By Dr. Bonnie-Jeanne MacDonald

The final earnings replacement rate—where 70 percent is often advocated as the “right” target—has been a long-standing and widespread measure of retirement income adequacy. Financial planners use this benchmark, as do actuaries and other pension plan advisers, academics, and public policy analysts. It underlies pension systems, drives research that determines whether populations are prepared or not prepared for retirement, and the backbone of retirement planning software.

But does it do the job that it is supposed to do? Will 70 percent of a worker’s final annual employment earnings sustain living standards after retirement?

## THE PROBLEM

After an extensive SOA-funded literature review in 2009, I was unable to locate any empirical demonstration that the earnings replacement rate accomplishes its goal. That is to say, there is no study that shows that for a sufficient sample of real workers who hit the prescribed target of 70 percent, living standards are, in fact, approximately maintained after retirement. We therefore decided to test it ourselves.

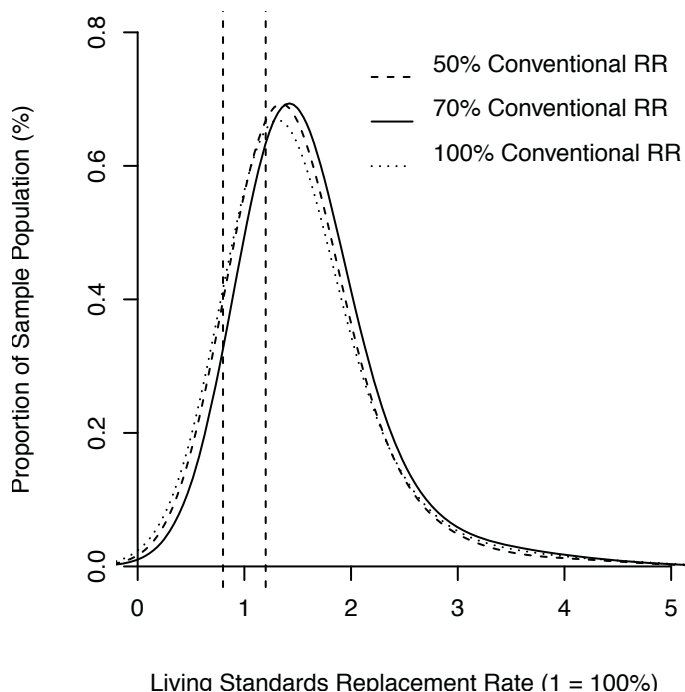
In MacDonald, Osberg and Moore (2016),<sup>1</sup> we tested the conventional earnings replacement rate using one of the world’s largest dynamic micro-simulation models of society—Statistics Canada’s LifePaths dynamic population micro-simulation model. We asked whether those individuals from the 1951–58 Canadian birth cohort who attain roughly a 70 percent final employment earnings replacement rate at retirement actually achieve approximate continuity in their living standards.

We found that the conventional replacement rate is a poor metric of retirement income adequacy. Workers who hit this target were found to experience a wide range of living standards

continuity after retirement, and we were unable to locate a ‘type’ of worker for whom the 70 percent target accurately predicts standard of living continuity.

Regardless of whether we looked at workers who hit a 50 percent earnings replacement rate at retirement, or a 100 percent earnings replacement rate, the distribution of living standards continuity into retirement looked nearly identical (see Figure 1). In fact, we found that the correlation between a worker’s earnings replacement rate and living standards continuity after retirement is only 11 percent, making it an unreliable benchmark for retirement income adequacy.

Figure 1: Living Standards After Retirement



Source: MacDonald, Osberg and Moore (2016)

The issue is not intended to debate whether 70 percent is too high or too low. The earnings replacement rate fails because a **single year’s employment earnings are not a reliable representation of a worker’s living standard**—it relies on an inadequate measurement period (only one year), does not incorporate important components of consumption sources (such as home equity), and ignores household size (particularly children). These omissions are crucial in calculating living standards. These omissions interact, moreover, and the effect of improving one may not emerge without the others. Indeed, it is primarily owing to these significant and interacting omissions in the earnings replacement rate formula that there has been such a wide range of (often conflicting) reports on the retirement preparedness of populations and pension system reform impacts.

## THE SOLUTION

After concluding that the conventional earnings replacement rate is not fit for purpose, I was committed to come up with an alternative, more accurate way of measuring retirement income adequacy that practitioners and analysts could adopt. I developed the Livings Standards Replacement Rate (LSRR).

Drawing from best academic practices, the LSRR determines how well a worker's living standards will be maintained after retirement by **comparing how much money a worker has available to support their personal consumption of goods and services before and after retirement.**

$$\text{LSRR} = \frac{\text{Money available to spend on personal consumption in retirement}}{\text{Money available to spend on personal consumption while working}}$$

The target then becomes 100 percent. At an individual level, some people will want to target a better standard of living after retirement (perhaps more travel), or will anticipate higher expenses after retirement (notably medical)—in this case, the target would be higher than 100 percent. On the other hand, many workers will decide to reduce spending after retirement (such as by shopping with greater efficiency and eating more at home), in which case they would target less than 100 percent. For general assessments of retirement income adequacy at a population level, however, the general goal is to ensure living standards continuity (that is, an LSRR = 100 percent).

The LSRR framework (outlined in our paper) is intended to provide a guide for academics, financial planners, employer pension plan advisers and policy makers to follow when analysing questions of retirement income adequacy for individuals or populations. Analysts invest time and effort in the study of retirement income adequacy, but an unreliable benchmark for “adequacy” not only effectively invalidates that effort, but it can lead to misleading conclusions. The LSRR offers a real alternative to the conventional replacement rate, and is bridging the gap between good science and industry need.

The LSRR calculation considers the entire family, includes consumption components comprehensively and covers a representative number of years. Having this framework available for analysts to reference will enable a more consistent measure of retirement income adequacy, so as to facilitate the interpretation, comparison and integration of findings across different analysis (between authors, over time and across nations). This would help the study of retirement income adequacy to move forward.

The LSRR provides an accurate, understandable, and consistent measure of retirement income adequacy, and this concept has

Population ageing has led to widespread concern regarding retirement income adequacy, and now is time to adopt a better measure.

proved extremely useful to practitioners in serving their clients. In Canada, the LSRR is already being used in the financial industry—for example, Eckler Ltd. has employed the LSRR to evaluate plan designs and financial outcomes for over 100,000 Canadians (for an example of the LSRR being implemented in industry, see <https://www.eckler.ca/subpage-3-lsrr>).

This work has been recognized for its academic merit, having won the 30th International Congress of Actuaries' Pension, Benefits and Social Security Scientific Committee Award Prize for Best Paper in 2014. It has also been published in a significant peer-reviewed academic journal, which can be downloaded without fee: <http://dx.doi.org/10.1017/asb.2016.20>.

The academic paper goes into much more depth and will interest readers wishing to know more about the LSRR and retirement income adequacy in general.

Population ageing has led to widespread concern regarding retirement income adequacy, and now is time to adopt a better measure. The LSRR has penetrated the Canadian financial industry, and has gained considerable traction internationally. If the LSRR can create the necessary paradigm-shift within the pension industry and study of retirement income adequacy, the benefit to the public is incalculable. ■



Dr. Bonnie-Jeanne MacDonald, Ph.D., FSA, is an academic researcher at Dalhousie University in Halifax, based in Canada. She can be reached at [bonniejeanne\\_macdonald@hotmail.com](mailto:bonniejeanne_macdonald@hotmail.com).

## ENDNOTES

- 1 Bonnie-Jeanne MacDonald, Lars Osberg and Kevin Moore. (2016). “How Accurately does 70% Final Earnings Replacement Measure Retirement Income (In)Adequacy? Introducing the Living Standards Replacement Rate (LSRR).” *ASTIN Bulletin - The Journal of the International Actuarial Association*, 46(3), pp 627–676, DOI: 10.1017/asb.2016.20. This paper is ‘open access’ meaning that there are no fees to access.