An Empirical Analysis of the Displacement Effect of TFSAs on RRSPs

Leslie Berger, Jonathan Farrar, and Lu Zhang*

PRÉCIS
En instaurant le compte d’épargne libre d’impôt (CELI) en 2009, le gouvernement du Canada souhaitait offrir un autre véhicule d’épargne en plus des régimes enregistrés d’épargne-retraite (REER). Cependant, il existe peu de données empiriques concernant l’effet de l’épargne dans les CELI sur l’épargne dans les REER. Pour étudier cet aspect, nous avons effectué une analyse empirique à l’aide des données de la Banque de données administratives longitudinales de Statistique Canada, qui contient les cotisations annuelles aux CELI et aux REER d’un échantillon de 20 pour cent de tous les déclarants canadiens. Notre analyse nous amène à constater un effet de déplacement : toute augmentation de 1 pour cent d’une cotisation à un CELI réduit approximativement de 0,4 pour cent la cotisation à un REER. Nos résultats ont des répercussions sur la capacité des Canadiens à autofinancer leur retraite, ainsi que sur la capacité du gouvernement canadien de générer des recettes fiscales dans l’avenir.

ABSTRACT
The tax-free savings account (TFSA), introduced in 2009, was intended by the Canadian government to provide an alternative catchment for savings in addition to registered retirement savings plans (RRSPs). However, little empirical evidence exists regarding the impact of saving in TFSAs on saving in RRSPs. To investigate this issue, we conduct empirical analysis, using data from Statistics Canada’s Longitudinal Administrative Databank, which contains annual TFSA and RRSP contributions for a sample of 20 percent of all Canadian taxfilers. We find evidence of a displacement effect of TFSAs on RRSPs: every 1 percent increase in a TFSA contribution reduces an RRSP contribution by approximately 0.4 percent. Our findings have implications for Canadians’ ability to self-fund their retirement, as well as for the Canadian government’s ability to generate future tax revenues.

KEYWORDS: TAX-FREE SAVINGS ACCOUNT ■ REGISTERED RETIREMENT SAVINGS PLAN ■ TFSA ■ RRSP ■ DISPLACEMENT

* Leslie Berger and Jonathan Farrar are of Wilfrid Laurier University, Waterloo, ON (e-mail: lberger@wlu.ca; jfarrar@wlu.ca); Lu Zhang is of Ryerson University, Toronto (e-mail: lu.zhang@ryerson.ca).
INTRODUCTION

The registered retirement savings plan (RRSP) and tax-free savings account (TFSA) are the predominant tax-preferred savings accounts available for Canadians’ personal savings.¹ The RRSP is an example of a tax-deferred savings plan. Contributions to an RRSP are made with pre-tax cash, and, in general, withdrawals are fully taxable.² In contrast, the TFSA is an example of a tax-prepaid savings plan. Contributions to a TFSA are made with after-tax cash, and there are no tax consequences when an amount is contributed or withdrawn. In both plans, income earned in the plan is not taxed (although, in the case of an RRSP, such income is taxed in the year of withdrawal).

The RRSP, introduced in 1957, was intended to provide Canadian workers who lacked access to an employer-funded pension plan a similar opportunity to save for retirement as that available to Canadian workers participating in such plans. The TFSA was introduced in 2009, at a time of declining savings in Canadian households and an impending retirement boom, factors that would add pressure to social security programs (such as old age security) and constrain the ability of future governments to provide publicly funded retirement programs (such as the Canada Pension Plan). The TFSA also provides a saving incentive for Canadians earning low and moderate incomes (for whom contributions to an RRSP might be subject to higher tax rates at the time of withdrawal relative to the time of contribution), and for high income earners who were constrained by RRSP contribution limits.³

The Canadian government’s stated purpose in introducing the TFSA was to “complement existing registered savings plans” and the RRSP in particular.⁴ Such a measure had been under consideration for some time. For example, in 2005, an economist with the federal government commented that a tax-prepaid savings plan

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¹ Others are the deferred profit-sharing plan (DPSP), pooled registered pension plan (PRPP), registered pension plan (RPP), specified pension plan (SPP), registered education savings plan (RESP), and registered disability savings plan (RDSP).

² Exceptions are RRSP withdrawals for the home buyers’ plan (HBP) and lifelong learning plan (LLP).

³ See Jonathan R. Kesselman and Finn Poschmann, “Expanding the Recognition of Personal Savings in the Canadian Tax System” (2001) 49:1 Canadian Tax Journal 40-101.

⁴ Canada, Department of Finance, 2008 Budget, Budget Plan, February 26, 2008, at 277 (https://budget.gc.ca/2008/pdf/plan-eng.pdf).
would “supplement existing federal measures that encourage personal savings” and would be “a measure to supplement retirement income.” The federal government, in its 2003 federal budget, also remarked that a tax-prepaid savings plan “could be a useful and appropriate mechanism to improve the tax treatment of savings and to provide additional savings opportunities for Canadians.” However, the impact of the introduction of the TFSA on RRSP contributions is an empirically underexplored issue. That is, did TFSA contributions represent new savings, or did they displace savings that would otherwise have been held in RRSPs? The purpose of the research reported in this article is to empirically investigate this question.

Using data from Statistics Canada’s Longitudinal Administrative Databank (LAD), a data set that contains the annual TFSA and RRSP contributions for a sample of 20 percent of Canadian taxfilers from 2009 through 2015, we find that a significant displacement effect occurred between the RRSP and the TFSA, such that a 1 percent increase in TFSA contributions reduced RRSP contributions by approximately 0.4 percent. This displacement effect is observed consistently across different demographic groups. In general, Canadians appear to have diverted their savings away from RRSPs and into TFSA since the introduction of the TFSA in 2009.

The displacement between the RRSP and the TFSA is problematic for at least two reasons. First, Canadians may not be accumulating enough long-term savings to allow for a comfortable retirement. A recent report on the retirement savings of Canadians found that only 47 percent of those aged 55 to 64 have accrued pension benefits, and that “[t]he vast majority of these Canadians retiring without an employer pension plan have totally inadequate retirement savings.” Furthermore, “[o]nly a small minority (roughly 15-20 per cent) of middle-income Canadians retiring without an employer pension plan have saved anywhere near enough for retirement.” Unlike the RRSP, the TFSA does not impose restrictions on early withdrawals. If Canadians are diverting savings away from RRSPs in favour of shorter-term savings in TFSA, the deficiency in long-term savings will only increase in severity, especially for middle-income and low-income individuals, who constitute the majority of the Canadian population. Second, the Canadian government relies on deferred RRSP withdrawals as an important source of future tax revenues, especially as workers in the baby boomer generation retire and begin to draw on their RRSPs. To the extent

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5 Marc LeBlanc, *Tax Pre-Paid Savings Plans* (Ottawa: Parliamentary Information and Research Service, Library of Parliament, Economics Division, July 27, 2005), at 1-14. See also Kesselman and Poschmann, supra note 3.

6 Canada, Department of Finance, 2003 Budget, Budget Plan 2003, February 18, 2003, at 140.

7 Richard Shillington, *An Analysis of the Economic Circumstances of Canadian Seniors* (Ottawa: Broadbent Institute, February 2016), at 3.

8 Ibid. See also Bob Baldwin, *Assessing the Retirement Income Prospects of Canada’s Future Elderly: A Review of Five Studies*, C.D. Howe Institute Commentary no. 456 (Toronto: C.D. Howe Institute, September 2016), who concludes that a decline in the standard of living during retirement is “largely a middle- and upper-income earner problem, concentrated among the youngest age group and those not participating in a workplace pension plan” (ibid., at 1).
that Canadians’ RRSP savings are displaced by TFSA savings, the Canadian government faces a looming shortfall of future tax revenues, since TFSA investment income is tax-free and tax revenues from RRSP withdrawals will be less than expected.9

The remainder of the article proceeds as follows. In the next section, we review relevant public finance literature to situate our research, and develop our hypothesis. Then we discuss our methodology and sample description. Next, we present the results of our analysis. The article concludes with a discussion of the implications of our research.

BACKGROUND LITERATURE AND HYPOTHESIS DEVELOPMENT

Several recent studies compare RRSP and TFSA usage in the Canadian context. Kesselman10 compares the features of the TFSA and the RRSP, and conducts a comparative analysis of TFSA usage by income and age. He finds a steep decline of TFSA maximization rates from 2009 to 2014, especially among modest- to low-income individuals and young individuals, and suggests that TFSA contributions are likely to be savings diverted from other sources such as taxable savings and RRSPs. Messacar11 investigates aggregate RRSP contributions among taxfilers aged 25 to 54 around the time that the TFSA was introduced and finds that RRSP contributions declined from $30.6 billion in 2009 to $22.5 billion in 2013. In contrast, TFSA contributions during this time period increased from $9 billion to $15.9 billion.

Lavecchia12 and Zaman13 investigate TFSA usage, using data from the Survey of Financial Security (SFS). Both studies find that TFSA Ss are more popular among older, highly educated, and higher net worth families. Using a subsample of families with children, Lavecchia further finds that higher TFSA balances displace taxable savings in fixed-income assets but do not significantly affect RRSP balances.

It is noteworthy that the above studies use different data sources. Kesselman uses TFSA statistics published by the Canada Revenue Agency. The SFS data used in

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9 Kevin Milligan, “Policy Forum: The Tax-Free Savings Account—Introduction and Simulations of Potential Revenue Costs” (2012) 60:2 Canadian Tax Journal 355-60.
10 Jonathan Kesselman, “Tax-Free Savings Accounts: Expanding, Restricting, or Refining?” (2015) 63:4 Canadian Tax Journal 905-45.
11 Derek Messacar, “Trends in RRSP Contributions and Pre-Retirement Withdrawals, 2000 to 2013,” Economic Insights, February 13, 2017, 1-9 (also published as Statistics Canada catalogue no. 11-626-X, no. 064, February 13, 2017) (www150.statcan.gc.ca/n1/pub/11-626-x/11-626-x2016064-eng.pdf).
12 Adam M. Lavecchia, Tax-Free Savings Accounts: Who Uses Them and How? Working Paper no. 1802E (Ottawa: University of Ottawa, Department of Economics, January 2018) (https://socialsciences.uottawa.ca/economics/sites/socialsciences.uottawa.ca.economics/files/1802e_1.pdf).
13 Ashraf Al Zaman, “The Distributional Impacts of Canada’s Tax-Free Savings Accounts” (2017) 43:4 Canadian Public Policy 331-49.
Lavecchia’s and Zaman’s studies are derived from self-reported responses to a Statistics Canada survey. The LAD data used in Messacar’s report are collected from the federal personal income tax forms of 20 percent of Canadian taxfilers. Unlike the SFS, which contains the year-end balances of RRSPs and TFSAs for selected years at the household level, the LAD data used by Messacar and in our study provide the amounts of RRSP and TFSA contributions by individual taxfilers for every year of the study period (in our study, 2009-2015). The large sample size and accurate contribution data provided by the LAD are suitable for examining the displacement between TFSA and RRSP contributions.

Outside Canada, the preponderance of public finance literature pertaining to potential displacement effects between savings accounts is within the US context. The United States has a pair of tax-favoured savings plans akin to Canada’s RRSP and TFSA, namely, the individual retirement account (IRA) and the Roth IRA, respectively. Some US researchers have examined the extent to which taxpayers have converted a traditional IRA to a Roth IRA; others have suggested strategies for taxpayers to use in choosing between traditional IRAs and Roth IRAs based on factors such as current and future income tax rates and the investment time horizon. Several studies have

14 See, for example, the US studies cited in notes 15 through 18, infra. In the UK context, see Maureen Donnelly and Allister Young, “Policy Forum: Tax-Free Savings Accounts—A Cautionary Tale from the UK Experience” (2012) 60:2 Canadian Tax Journal 361-74; and United Kingdom, HM Revenue and Customs, Individual Attitudes to Saving: Effect of ISAs on People’s Saving Behaviour: Research into Attitudes and Motivations for Saving in ISAs (London: HM Revenue and Customs, 2007) (https://webarchive.nationalarchives.gov.uk/20140207061343/http://www.hmrc.gov.uk/research/working-paper-isa.pdf). In the Denmark context, see Raj Chetty, John N. Friedman, Søren Leth-Petersen, Torben Heien Nielsen, and Tore Olsen, “Active vs. Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence from Denmark” (2014) 129:3 Quarterly Journal of Economics 1141-1219 (https://doi.org/10.1093/qje/qju013).

15 The major difference between the Canadian and US tax-favoured savings plans is that any contributions to a TFSA do not reduce the amount of available contributions to an RRSP, whereas any contributions to a Roth IRA reduce the amount of available contributions to an IRA.

16 See, for example, Sarah Holden and Steven Bass, The IRA Investor Profile: Traditional IRA Investors’ Activity, 2007-2014, ICI Research Report (Washington, DC: Investment Company Institute, August 2016) (www.ici.org/pdf/rpt_16_ira_traditional.pdf).

17 See, for example, Leonard E. Burman, William G. Gale, and David Weiner, “The Taxation of Retirement Saving: Choosing Between Front-Loaded and Back-Loaded Options” (2001) 54:3 National Tax Journal 689-702 (dx.doi.org/10.17310/ntj.2001.3.17); Julia M. Camp, David S. Hulse, and Cynthia Vines, “The Effect of the Form of Tax Incentives on Individuals’ Savings Decisions” (2008) 18:1 Journal of Business and Behavioral Sciences 123-47; Warren B. Hrung, “Determinants of the Choice Between Roth and Deductible IRAs” (2007) 29:1 Journal of the American Taxation Association 27-42 (https://doi.org/10.2308/jata.2007.29.1.27); and Andrew D. Cuccia, Marcus M. Doxey, and Shane R. Stinson, The Relative Effects of Economic and Non-Economic Factors on Taxpayers’ Preferences Between Front-Loaded and Back-Loaded Retirement Savings Plans, CRR WP 2017-7 (Chestnut Hill, MA: Boston College, Center for Retirement Research, July 2017).
examined whether employees who contribute to an employer-sponsored retirement savings plan (a 401(k)) are likely to additionally save in individual plans (such as IRAs and Roth IRAs); however, this stream of research has produced inconclusive results. Moreover, these studies have not examined how taxpayers’ net IRA contributions were affected, if at all, when the Roth IRA was introduced in 1998.

As the above literature shows, there is limited empirical evidence on whether or the extent to which tax-prepaid savings increase or displace tax-deferred savings, and any such evidence that does exist is inconclusive. Our study aims to fill this gap by conducting a comprehensive study of the displacement effect of TFSAs on RRSPs using a comprehensive data set of Canadians taxfilers.

Life-cycle consumption theory models of saving decisions hypothesize that individuals will maximize the utility of savings over their lifetime. That is, individuals will save early in their lives so that they can accumulate assets for consumption in their retirement period. The tax incentive provided by RRSPs encourages Canadians to save for future consumption. When an additional type of tax-preferred savings plan (such as the TFSA) is introduced, individuals have to first decide whether they will contribute to this new savings plan. If they decide that they will, they then must decide whether the contribution will be funded by reducing their consumption or by reallocating pre-existing savings from other savings plans (such as the RRSP). On the one hand, by contributing to the new savings plan, individuals could save more tax (and thereby secure greater future consumption), making consumption today a less attractive option. In this case, individuals would reduce their consumption and contribute to TFSAs without affecting their contributions to RRSPs. On the other hand, if individuals would like to maintain the same level of total tax-preferred savings to achieve their optimal consumption, and if they are indifferent about the tax implications of RRSPs versus TFSAs, those individuals who chose to contribute to TFSAs would divert their savings away from RRSPs and into TFSAs.

Moreover, if both possibilities apply simultaneously, we would expect a partial displacement effect of TFSAs on RRSPs to occur. That is, in general, individuals will neither reduce their consumption to be able to contribute the maximum allowable amount to their TFSAs, nor apportion all of their savings away from RRSPs and

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18 See John Beshears, James J. Choi, David Laibson, and Brigitte C. Madrian, “Does Front-Loading Taxation Increase Savings? Evidence from Roth 401(k) Introductions” (2017) 151:1 Journal of Public Economics 84-95. See also B. Douglas Bernheim, “Taxation and Saving,” in Alan J. Auerbach and Martin Feldstein, eds., Handbook of Public Economics, vol. 3 (Amsterdam: Elsevier Science, 2002), 1173-1249; and John N. Friedman, “Tax Policy for Retirement Savings,” in Alan J. Auerbach and Kent Smetters, eds., The Economics of Tax Policy (Oxford: Oxford University Press, 2017), chapter 10, for a review of this literature.

19 See Franco Modigliani, “The Life-Cycle Hypothesis of Saving Twenty Years Later,” in M. Parkin and A.R. Nobay, eds., Contemporary Issues in Economics (Manchester: Manchester University Press, 1975), 2-35.

20 Martin Feldstein, “Social Security and Saving: The Extended Life Cycle Theory” (1976) 66:2 American Economic Review 77-86, discusses why both effects should occur simultaneously.
into TFSAs. Thus, we would predict that savings in TFSAs displace savings in RRSPs, but not completely. As a result, total savings in TFSAs and RRSPs combined would be greater than total savings in RRSPs alone, but year-over-year total savings in RRSPs would decline. Our hypothesis is as follows:

Hypothesis: Savings in TFSAs partially displace savings in RRSPs.

**METHODODOLOGY AND SAMPLE DESCRIPTION**

We obtained a panel of individual taxfilers’ data from the Statistics Canada’s LAD. This data set provides annual RRSP and TFSA contributions and withdrawals, along with annual taxable incomes and demographic characteristics such as age, gender, family size, and province of residence, of 20 percent of all Canadians who filed a federal tax return each year. Our sample period starts in 2009 and ends in 2015; 2009 is the year when the TFSA was introduced, and 2015 is the most recent year with available LAD data.

Table 1, panel A, lists the annual participation rates—that is, the percentage of taxfilers in the LAD who made contributions to an RRSP and/or a TFSA—in each year from 2009 to 2015. The accompanying graph (figure 1) shows a steady decline in the percentage of taxfilers who made net RRSP contributions, from 26 percent in 2009 to 22 percent in 2015. As well, the graph shows a steady increase in the percentage of taxfilers who made net TFSA contributions, from 16 percent in 2009 to 27 percent in 2015, surpassing the RRSP participation rate in 2013. Despite the growing popularity of the TFSA, 60 percent of the taxfilers in the data set did not contribute to either an RRSP or a TFSA by 2015.

Panel B of table 1 reports the average participation rates of the RRSP and TFSA by income. The sample taxfilers are divided into four income quartiles based on their taxable income in each year, where Q1 denotes the lowest income quartile and Q4 denotes the highest income quartile. The TFSA appears to be more popular than the RRSP among individuals in the bottom income quartile: the participation rate is 11 percent for the TFSA and only 3 percent for the RRSP in this income group. This finding is in line with the Canadian government’s intention for the TFSA to provide a saving incentive for low- to moderate-income Canadians. Participation rates in both accounts increase with income. The RRSP participation rate rises from 3 percent in the bottom income quartile (Q1) to 44 percent in the top income quartile (Q4). The average TFSA participation rate exhibits less of an increase, from 11 percent (Q1) to 23 percent (Q4). Eighty percent of individuals in the bottom income quartile

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21 See Derek Messacar, “Crowd-Out, Education, and Employer Contributions to Workplace Pensions: Evidence from Canadian Tax Records” (2018) 100:4 Review of Economics and Statistics 648-63, who finds a displacement effect of RPP contributions on other forms of savings, including RRSPs.

22 We used data set #4107. Approval was received to access this data from Statistics Canada’s Research Data Centre (RDC). All data reported in this article have been approved for release by the RDC. The data set contains no identifying information of any Canadian taxfiler.
### TABLE 1  Participation Rates for RRSPs and TFSAs, 2009-2015 (Percent)

| Panel A | Participation rates by year |
|---------|-----------------------------|
| Year    | RRSP | TFSA | Both | Neither |
| 2009    | 26   | 16   | 7    | 64      |
| 2010    | 26   | 18   | 7    | 64      |
| 2011    | 25   | 20   | 8    | 63      |
| 2012    | 24   | 22   | 8    | 62      |
| 2013    | 23   | 24   | 8    | 62      |
| 2014    | 23   | 25   | 9    | 61      |
| 2015    | 22   | 27   | 9    | 60      |
| Average | 27   | 22   | 8    | 62      |

| Panel B | Participation rates by income group |
|---------|-------------------------------------|
| Income quartile | RRSP | TFSA | Both | Neither |
| Q1       | 3     | 11   | 1    | 80      |
| Q2       | 14    | 17   | 4    | 64      |
| Q3       | 29    | 20   | 8    | 47      |
| Q4       | 44    | 23   | 13   | 35      |

| Panel C | Participation rates by age group |
|---------|----------------------------------|
| Age group | RRSP | TFSA | Both | Neither |
| Under 25    | 7     | 14   | 2    | 77      |
| 25-29       | 21    | 17   | 6    | 61      |
| 30-34       | 27    | 15   | 7    | 56      |
| 35-39       | 28    | 14   | 6    | 53      |
| 40-44       | 27    | 13   | 6    | 53      |
| 45-49       | 28    | 14   | 7    | 53      |
| 50-54       | 30    | 17   | 8    | 52      |
| 55-59       | 29    | 20   | 9    | 50      |
| 60-64       | 22    | 24   | 8    | 51      |
| 65-70       | 10    | 26   | 4    | 56      |

RRSP = registered retirement savings plan; TFSA = tax-free savings account.

Note: This table lists the percentage of individuals in the Longitudinal Administrative Databank sample contributing to either an RRSP or a TFSA, both an RRSP and a TFSA, and neither, by year.

do not contribute to either an RRSP or a TFSA. This number drops to 35 percent in the top income quartile. These findings suggest that the top earners claim the most tax benefits from the TFSA and the RRSP.

Panel C of table 1 reports the average participation rates by age. Participation in the RRSP exhibits an inverted U-shape across the 10 age groups: it increases from 7 percent in the under 25 age group, peaks at 30 percent in the 50-54 age group, and declines to 10 percent in the 65-70 age group. In contrast, participation in the
TFSA increases with age, from 14 percent in the under 25 group to 26 percent in the 65-70 age group. Individuals in both the youngest and the oldest age groups used the TFSA more than the RRSP, suggesting that the TFSA better caters to young people with more distant retirement saving needs and to seniors approaching ineligibility to make RRSP contributions.

Table 2 reports the percentages of taxfilers in the sample who maximized their contributions to RRSPs and TFSA. We allow a $500 cushion; therefore, the maximization rates reflect taxfilers whose ending RRSP and TFSA contribution room in a given year is less than $500. Panel A shows that the percentage of taxfilers who maximized their contributions to RRSPs declined slightly, from 3 percent in 2009 to 2 percent in 2015. In contrast, the percentage of taxfilers who maximized their TFSA contributions declined more markedly, from 10 percent in 2009 to 2 percent in 2015. The growing unused TFSA contribution room suggests insufficient justification to further raise the TFSA contribution limit. Panels B and C of Table 2 compare the maximization rates across the income quartiles and age groups, respectively. A higher proportion of individuals maximized the contribution limits of the RRSP and TFSA in the higher income and older age groups. These findings support Kesselman’s argument that the TFSA most benefits individuals with financial assets and the means to shift savings from taxable accounts to tax-free accounts, and that the ability for the TFSA to create new savings for the average Canadian is limited.²³

FIGURE 1 RRSP and TFSA Participation Rates, 2009-2015

| Year | RRSP | TFSA | Both | Neither |
|------|------|------|------|---------|
| 2009 | 3    | 10   | 1     | 70      |
| 2010 | 2    | 9    | 1     | 70      |
| 2011 | 2    | 8    | 1     | 70      |
| 2012 | 2    | 7    | 1     | 70      |
| 2013 | 2    | 6    | 1     | 70      |
| 2014 | 2    | 5    | 1     | 70      |
| 2015 | 2    | 4    | 1     | 70      |

RRSP = registered retirement savings plan; TFSA = tax-free savings account.

²³ Supra note 10.
### TABLE 2  RRSP and TFSA Maximization Rates, 2009-2015 (Percent)

#### Panel A  Maximization rates for the full sample

| Year | RRSP | TFSA |
|------|------|------|
| 2009 | 3    | 10   |
| 2010 | 3    | 8    |
| 2011 | 3    | 6    |
| 2012 | 2    | 5    |
| 2013 | 2    | 4    |
| 2014 | 2    | 4    |
| 2015 | 2    | 2    |
| Average | 2 | 6 |

#### Panel B  Maximization rates by income group

| Income quartile | RRSP | TFSA |
|-----------------|------|------|
| Q1               | 0    | 3    |
| Q2               | 1    | 5    |
| Q3               | 2    | 7    |
| Q4               | 5    | 8    |

#### Panel C  Maximization rates by age group

| Age group | RRSP | TFSA |
|-----------|------|------|
| Under 25  | 1    | 1    |
| 25-29     | 1    | 3    |
| 30-34     | 1    | 2    |
| 35-39     | 1    | 3    |
| 40-44     | 2    | 3    |
| 45-49     | 2    | 4    |
| 50-54     | 2    | 4    |
| 55-59     | 4    | 8    |
| 60-64     | 4    | 11   |
| 65-70     | 3    | 14   |

RRSP = registered retirement savings plan; TFSA = tax-free savings account.

Note: This table lists the maximization rates of RRSPs and TFSAs in each year from 2009 to 2015. RRSP (TFSA) maximization is defined as the contribution room of RRSP (TFSA) in a year that is less than $500. In each year, the contributors are taxfilers in the Longitudinal Administrative Databank who are between ages 18 and 70, within the 1% to 99% income percentile, and who have made a net RRSP and/or TFSA contribution in that year.

To examine the relationship in savings between the RRSP and the TFSA at the individual level, we focus our subsequent analysis on taxfilers who were “contributors” in 2009 through 2015. That is, for each year, we restrict our sample to taxfilers who made a positive net contribution to an RRSP and/or a TFSA in that year, since our goal is to investigate taxpayers’ saving patterns using the two tax-preferred savings accounts. Thus, taxfilers who used neither an RRSP nor a TFSA in a given year from
2009 to 2015 are excluded from further analysis, as are taxfilers who made a net withdrawal from either an RRSP or a TFSA.\textsuperscript{24} The net contribution of a taxfiler in each year is defined as the difference between the amount contributed and the amount withdrawn (if any) in that year. We further restrict our sample to taxfilers in the age group of 18 to 70 because an individual must be 18 years old to own a TFSA and an individual can no longer make an RRSP contribution after age 71. We exclude individuals in the top and bottom 1 percent brackets of total income to avoid biased results from individuals in these extreme income groups.\textsuperscript{25}

Table 3 reports average net RRSP and TFSA contributions as well as the number of contributors in each year from 2009 to 2015. The number of taxfilers exceeds 1 million in each year, and the overall sample contains over 2.3 million unique taxfilers. The average net RRSP contribution declines every year from $2,100 in 2009 to $1,600 in 2015, whereas the average net TFSA contribution increases every year from $1,700 in 2009 to $3,600 in 2015. The average net TFSA contribution surpasses the average net RRSP contribution in 2011. The parallel graph (figure 2) illustrates these patterns. The decline in average RRSP contributions and the increase in average TFSA contributions year over year are consistent with Messacar’s findings about the aggregate RRSP and TFSA contributions.\textsuperscript{26}

Table 4 describes other characteristics of our sample. An average taxfiler in our sample made net RRSP contributions of $2,100 per year and net TFSA contributions of $2,600 per year. The average sample income of $43,100 is comparable with the $42,500 average income from Statistics Canada’s Canadian Income Survey over the same time period.\textsuperscript{27} The median income of $43,200 is higher than the $31,400 median from the Canadian Income Survey, suggesting a larger number of high-income individuals among the RRSP/TFSA contributors than in the Canadian population. The contributors had a median age of 47 years (a mean age of 45.9 years), were 56 percent female and 52 percent married individuals, and had an average family size of 2.64 persons. Compared with the 2011 census, where the Canadian population had a median age of 41 years, were 51 percent female and

\textsuperscript{24} It is possible for a taxfiler to be in a net savings position if he or she withdraws funds from an RRSP (TFSA) but contributes more than the amount of the withdrawal to a TFSA (RRSP) in a given year. In untabulated results, we find that including these individuals in the sample (using inverse hyperbolic sine transformation of the dollar variables) does not change our inference about the results.

\textsuperscript{25} The term “sample” in this article refers to taxfilers aged 18 to 70 who made net contributions to a TFSA and/or an RRSP, and who were not within the top or bottom 1 percent of income earners.

\textsuperscript{26} Messacar, in his descriptive analysis, supra note 11, uses taxfilers aged 25 to 54.

\textsuperscript{27} Statistics Canada table 11-10-0238-01, “Distribution of Market, Total and After-Tax Income of Individuals, Canada, Provinces and Selected Census Metropolitan Areas” (www150.statcan.gc.ca/t1/tbih/en/cv.action?pid=1110023801). The average and median are calculated with the total income of all Canadians in the period 2009-2015.
| Year | RRSP contribution ($) | TFSA contribution ($) | No. of contributors |
|------|-----------------------|-----------------------|---------------------|
| 2009 | 2,100                 | 1,700                 | 1,069,205           |
| 2010 | 2,100                 | 2,100                 | 1,067,780           |
| 2011 | 1,900                 | 2,300                 | 1,078,705           |
| 2012 | 1,900                 | 2,300                 | 1,071,735           |
| 2013 | 1,800                 | 2,600                 | 1,080,035           |
| 2014 | 1,700                 | 2,800                 | 1,086,655           |
| 2015 | 1,600                 | 3,600                 | 1,118,340           |

RRSP = registered retirement savings plan; TFSA = tax-free savings account.

Note: This table lists the average RRSP and TFSA net contribution by year and the number of contributors from 2009 to 2015. In each year, the contributors are taxfilers in the Longitudinal Administrative Databank who are between ages 18 and 70, within the 1% to 99% income percentile, and who have made a net RRSP and/or TFSA contribution in that year.

FIGURE 2  Mean RRSP and TFSA Contributions Among Contributors, 2009-2015

RRSP = registered retirement savings plan; TFSA = tax-free savings account.
TABLE 4  Descriptive Statistics

|                          | Mean  | Std. dev. | P25   | P50   | P75   |
|--------------------------|-------|-----------|-------|-------|-------|
| RRSP variables ($)       |       |           |       |       |       |
| Net contribution         | 2,100 | 2,844     | 0     | 1,000 | 3,000 |
| Contribution limit       | 35,800| 31,982    | 10,400| 27,300| 52,400|
| TFSA variables ($)       |       |           |       |       |       |
| Net contribution         | 2,600 | 4,527     | 0     | 70    | 5,000 |
| Contribution limit       | 17,900| 11,471    | 7,400 | 15,000| 25,500|
| Contribution limit       | 750   | 1,569     | 0     | 0     | 370   |
| Total income ($)         | 43,100| 18,119    | 29,000| 43,200| 57,400|
| Age                      | 45.9  | 13.79     | 34    | 47    | 57    |
| Female                   | 0.56  | 0.5       | 0     | 1     | 1     |
| Married                  | 0.52  | 0.5       | 0     | 1     | 1     |
| Family size              | 2.64  | 1.23      | 2     | 2     | 4     |

RPP = registered pension plan; RRSP = registered retirement savings plan; TFSA = tax-free savings account.

Note: This table describes the key variables used for the subsequent regression analysis. The sample include taxfilers in the Longitudinal Administrative Databank (LAD) who are between ages 18 and 70, within the 1st and 99th income percentile, and who made RRSP and/or TFSA contributions in a given year from 2009 to 2015. All the dollar variables are rounded and weighted using the population weighting variable provided by the LAD. “P25,” “P50,” and “P75” denote the 25th, 50th, and 75th percentiles, respectively, of the variables.

46 percent married individuals, and had an average family size of 2.5, our sample has a slightly higher proportion of females, a comparable family size, and a slightly higher average age.  

To determine empirically whether there is a significant displacement effect of TFSA on RRSP savings, we use the following regression equation as our main specification:

\[
RRSP_{Net,i,t} = \alpha + \beta TFSA_{Net,i,t} + \gamma Controls_{i,t} + Year_t + Province_t + \epsilon_{i,t}.
\]  

(1)

In this equation, \( RRSP_{Net,i,t} \) denotes the net amount of the RRSP contribution of individual \( i \) in year \( t \). \( TFSA_{Net,i,t} \) is the net amount of the TFSA contribution made by the same individual \( i \) in year \( t \). The partial displacement hypothesis will be supported if the \( \beta \) coefficient on \( TFSA_{Net,i,t} \) is significant and negative, and more than \(-1\) but less than \(0\).  

28 Statistics Canada, Census Profile, 2011 Census, (Code 01), Statistics Canada catalogue no. 98-316-XWE, released October 24, 2012 (www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/index.cfm?Lang=E).

29 The coefficient on the TFSA variable should be interpreted as a correlation between TFSA and RRSPs. Our results do not provide any inference regarding the direction of causality between TFSA and RRSPs. In other words, we do not test whether TFSA cause the reduction in contributions to RRSPs or RRSPs cause the reduction in contributions to TFSA.
Controls, denotes the vector of the control variables, which includes demographic characteristics that have been found to be related to people’s saving behaviour, namely, income, age, gender, and marital status.\textsuperscript{30} Income Q4 (Q1) denotes the highest (lowest) income quartile based on the total taxable income of individual taxfilers in each year. Income Q1 is dropped in the regressions to avoid multicollinearity. We divide the sample taxfilers into 10 age groups of under 25, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, and 65-70. The age group indicators are included to control for the potential non-linear effect of age on retirement savings. Female is a dummy variable that equals 1 for female and 0 for male. Married is a dummy variable that equals 1 if an individual is married and 0 otherwise.

We also control for registered pension plan (RPP) contributions (RPP CTR), indicative of pre-existing pension savings through an employer pension, since empirical research suggests that the presence of employer-provided pensions affects saving behaviour.\textsuperscript{31} The annual RRSP contribution limit (RRSP LMT) and the cumulative TFSA contribution limit (TFSA LMT) are included in the regressions since individuals who contribute close to the maximum amount in one of the two accounts may divert funds into the other.\textsuperscript{32} Year, province, and family-size fixed effects are included in the regression to control for unobservable fixed effects over time, across provinces, and across different family sizes. We apply a log transformation for all the dollar variables to reduce the skewness in the raw variables.

\textsuperscript{30} See, for instance, Esther Duflo, William Gale, Jeffrey Liebman, Peter Orszag, and Emmanuel Saez, “Saving Incentives for Low- and Middle-Income Families: Evidence from a Field Experiment with H&R Block” (2006) 121:4 Quarterly Journal of Economics 1311-46; Nicole Votolato Montgomery, Lisa R. Szykman, and Julie Agnew, Temporal Distance to Retirement and Communication Framing: Enhancing Retirement Financial Decision Making, Financial Security Project at Boston College FSP 2011-4 (Chestnut Hill, MA: Boston College, November 2011); Annamaria Lusardi and Olivia S. Mitchell, Financial Literacy and Planning: Implications for Retirement Wellbeing, NBER Working Paper no. 17078 (Cambridge, MA: National Bureau of Economic Research, May 2011); Beshears et al., supra note 18; Rob Alessie, Stefan Hochguertel, and Arthur van Soest, “Non-Take-Up of Tax-Favored Savings Plans: Evidence from Dutch Employees” (2006) 27:4 Journal of Economic Psychology 483-501; and David Card and Michael Ransom, “Pension Plan Characteristics and Framing Effects in Employee Savings Behavior” (2011) 93:1 Review of Economics and Statistics 228-43.

\textsuperscript{31} See Mariacristina Rossi, “Examining the Interaction Between Saving and Contributions to Personal Pension Plans: Evidence from the BHPS” (2009) 71:2 Oxford Bulletin of Economics and Statistics 253-71; and Card and Ransom, supra note 30. An individual’s RRSP contribution room is reduced by his or her pension adjustment, so it is important to control for RPP contributions, since individuals with RPP contributions may have less ability to contribute to RRSPs than individuals without RPP contributions.

\textsuperscript{32} Annual RRSP contribution limits are included in the LAD. We use the following equation to calculate the cumulative TFSA contribution limit:

\[
TFSA \text{ contribution limit}_{i,t} = \text{cumulative legal TFSA contribution limit}_{t} - \text{cumulative TFSA contributions from 2009 to year } t - 1_{i,t} + \text{cumulative TFSA withdrawals from 2009 to year } t - 1_{i,t},
\]

where \(i\) denotes individual in the sample and \(t\) denotes the year. The legal TFSA contribution limit was $5,000 in 2009-2012, $5,500 in 2013-2014, and $10,000 in 2015.
RESULTS

Table 5 presents the pooled OLS regression baseline results examining the displacement effect between RRSPs and TFSA.s. In column 1, where the regression controls for year, province, and family-size fixed effects only, TFSA NET exhibits a negative and significant coefficient. Column 2 further controls for income, age, RPP contributions, and RRSP and TFSA contribution limits, and shows a consistent negative and significant coefficient for TFSA NET.

On the basis of the estimated coefficient in column 2 of table 5, a 1 percent increase in net TFSA contributions would reduce the net RRSP contributions by 0.402 percent. In dollar terms, using the average net TFSA contribution of $2,600 and average net RRSP contribution of $2,100, a $26 increase (1 percent) in TFSA contributions would reduce RRSP contributions by $8.44. Thus, our baseline results suggest a partial displacement effect between the TFSA and the RRSP.

We next investigate whether the baseline results are driven by the unobservable heterogeneous saving preferences among different subsamples of individuals. To give an extreme example, if a significant number of the sample individuals with a strong preference for the TFSA or the RRSP contribute to their preferred account only and the remainder of the sample individuals are indifferent as between the TFSA and the RRSP, the observed negative coefficient of the TFSA variable may only reflect the contrasting saving patterns among the subsample individuals with strong preferences for the TFSA or the RRSP. We conduct multiple robustness checks to address this concern.

First, we add individual fixed effects in the regressions to control for time-invariant individual saving preferences. The coefficient of TFSA NET in the individual fixed-effect model now estimates the association between TFSA contributions and RRSP contributions over time among individuals. Columns 3 and 4 of table 5 nevertheless show a significant and negative coefficient for TFSA NET. The displacement effect remains statistically and economically significant: the regression in column 4 suggests that a 1 percent increase in the contribution to a TFSA crowds out the contribution to an RRSP by 0.191 percent for the same individual. The time-invariant variables such as age group and gender are omitted in the individual fixed-effect regressions.

Second, we use our sample taxfilers’ RRSP saving pattern in the pre-TFSA years (2003-2008) as a proxy for their retirement saving preferences, and test whether the baseline results are driven by the prior preference toward or against RRSPs among the sample taxfilers. Specifically, we classify our sample into four categories: those

[33] For early discussions about individuals with “a taste for savings,” see Philip Cagan, The Effect of Pension Plans on Aggregate Savings: Evidence from a Sample Survey, Occasional Paper no. 95 (New York: National Bureau of Economic Research, 1965); and George Katona, Private Pensions and Individual Saving (Ann Arbor, MI: University of Michigan, Institute for Social Research, Survey Research Center, 1965). The authors argue that their finding of higher saving rates among individuals with employer pensions could be explained by people with a “taste for saving” choosing to work for employers that offer pension plans.
### TABLE 5  Displacement Between RRSP and TFSA, Baseline Regression Results

| Independent variables | (1)     | (2)     | (3)     | (4)     |
|-----------------------|---------|---------|---------|---------|
| **TFSA NET**          | −0.487*** | −0.402*** | −0.204*** | −0.191*** |
| **RPP CTR**           | −0.026*** |         |         | 0.030***  |
| **RRSP LMT**          | 0.169*** |         |         | 0.490***  |
| **TFSA LMT**          | −0.465*** |         |         | 0.178***  |
| **Income Q2**         | 1.290*** |         |         | 0.811***  |
| **Income Q3**         | 2.360*** |         |         | 1.602***  |
| **Income Q4**         | 3.311*** |         |         | 2.354***  |
| **Age 25-29**         | 0.530*** |         |         |         |
| **Age 30-34**         | 0.684*** |         |         |         |
| **Age 35-39**         | 0.745*** |         |         |         |
| **Age 40-44**         | 0.861*** |         |         |         |
| **Age 45-49**         | 1.016*** |         |         |         |
| **Age 50-54**         | 1.215*** |         |         |         |
| **Age 55-59**         | 1.287*** |         |         |         |
| **Age 60-64**         | 0.771*** |         |         |         |
| **Age 65-70**         | −0.432*** |         |         |         |
| **Female**            |         | 0.151*** |         |         |
| **Married**           |         |         | 0.012** | 0.072***  |
| Fixed effects \(^{a}\) | \(Y, P, F\) | \(Y, P, F\) | \(Y, P, F, I\) | \(Y, P, F, I\) |
| N                     | 6,913,485 | 6,913,485 | 6,913,485 | 6,913,485 |
| Adjusted \(R^2\)     | 0.308    | 0.440    | 0.069    | 0.167    |

Notes: The dependent variable is **RRSP NET** in all regressions. Regressions (1) and (2) use pooled OLS regressions with province, year, and family-size fixed effects. Regressions (3) and (4) also include individual fixed effects, where rank-type variables including gender and age-group dummies are excluded. In all regressions, standard errors are clustered by individual. *, **, and *** denote significant at the 10%, 5%, and 1% level, respectively.

Definition of variables:

- **RRSP NET** is the natural log of (net RRSP contributions + 1).
- **TFSA NET** is the natural log of (net TFSA contributions + 1).
- **RPP CTR** is the natural log of (RPP contributions + 1).
- **RRSP LMT** is the natural log of (RRSP contributions + 1).
- **TFSA LMT** is the natural log of (TFSA contribution limit + 1), where the TFSA contribution limit equals the cumulative annual contribution limit since 2009 plus cumulative TFSA contributions of the individual since 2009 minus cumulative TFSA withdrawals of the individual since 2009.
- **Income Q2, Q3, and Q4** are indicator variables that equal 1 if an individual’s total income is ranked in the 2nd, 3rd, and 4th quartiles in a given year, respectively, and equal 0 otherwise. Total income is the amount reported on line 150 of the T1 tax form.
- **Age group variables** are indicator variables that equal 1 if an individual’s age is in a given age group and equal 0 otherwise.
- **Female** is an indicator variable that equals 1 if an individual is female and equals 0 otherwise.
- **Married** is an indicator variable that equals 1 if an individual is married and equals 0 otherwise.

\(^{a}\) \(Y = \) year; \(P = \) province; \(F = \) family size; \(I = \) individual.
who made a net RRSP contribution in all six years from 2003 through 2008 (“continuous” contributors); those who made a net RRSP contribution in three, four, or five of the six years (“frequent” contributors); those who made a net RRSP contribution in one or two of the six years (“occasional” contributors); and those who did not make a net RRSP contribution in any of the six years (“non”-contributors). If our baseline results were driven by the difference in preferences for RRSPs across the groups, the within-group variation in the displacement between RRSP and TFSA would be insignificant. However, the results in table 6 do not support this possibility. We find a significant displacement effect in all four groups based on individuals’ prior RRSP contribution patterns. Interestingly, the magnitude of the displacement effect varies across the four groups. The effect is strongest among the “non”-contributors, suggesting that the TFSA reflects most closely their saving preference relative to the RRSP. A 1 percent increase in TFSA contributions on average crowds out 0.566 percent of RRSP contributions among the “non”-contributors. On the other end of the savings spectrum, the “continuous” contributors experience only a modest displacement effect after the introduction of the TFSA: a 1 percent increase in TFSA contributions on average diverts 0.11 percent of RRSP savings. Individuals who already have a habit of saving appear to benefit more from the TFSA than those who do not.

Third, we investigate the displacement effect among individuals with different income levels and in different age groups, respectively. Column 1 of table 7 adds the interaction terms between the income quartile variables and TFSA NET in the regression. We find a significant displacement effect across all four income groups, suggesting that the baseline results are not driven by the cross-group difference in the preference for the RRSP or the TFSA. The displacement is strongest in the bottom income quartile (Q1). A 1 percent increase in TFSA contributions on average reduces RRSP contributions by 0.525 percent. In contrast, the reduction in RRSP contribution is only 0.305 percent (0.525 percent − 0.220 percent) in the top income quartile (Q4). This finding is consistent with low-income individuals substituting more savings toward TFSA, since they benefit less from RRSP tax deductions than do high-income individuals. This finding is also consistent with Kesselman’s finding that TFSA benefit high-income individuals by sheltering more tax-preferred savings, part of which could be reallocated from their taxable savings.34

Column 2 of table 7 adds interaction terms between the age groups and TFSA NET in the baseline regression. Again, the displacement effect remains significant across all age groups. We further observe a non-linear association between age and the displacement effect: individuals in the age groups of under 25, 60-64, and 65-70 exhibit the strongest displacement effect, and the effect is modest among the individuals between age 25 and 59. The TFSA appeals to the younger age demographic, who tend to earn relatively modest incomes. The tax benefits of saving in the RRSP is thus limited for this age and income demographic. The TFSA is also

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34 Supra note 10.
attractive for seniors because unlike the RRSP, which excludes contributions from individuals over age 71, the TFSA has no upper age limit for making contributions or mandatory withdrawals.

Last, we evaluate the impact of TFSA contribution limit increases on the displacement between RRSPs and TFSA. The annual TFSA contribution limit increased from $5,000 to $5,500 in 2013 and increased again to $10,000 in 2015. If increases in the TFSA contribution limit allowed individuals to transfer more planned RRSP contributions to their TFSA, the displacement effect would become more pronounced over time. On the other hand, if increases in limits encouraged people to save more or shelter more taxable savings, the displacement effect would remain stable or

### TABLE 6  Displacement Between RRSP and TFSA, by Pre-2009 RRSP Contribution Patterns

| Independent variables\(^b\) | Continuous | Frequent | Occasional | Non |
|--------------------------------|------------|----------|------------|-----|
| TFSA NET                      | -0.110***  | -0.258***| -0.394***  | -0.566*** |
| RPP CTR                       | -0.039***  | -0.031***| -0.037***  | -0.037*** |
| RRSP LMT                      | 0.175***   | 0.225*** | 0.175***   | 0.077*** |
| TFSA LMT                      | -0.106***  | -0.067***| -0.125***  | -0.347*** |
| Income Q2                     | 1.409***   | 1.205*** | 1.071***   | 0.808*** |
| Income Q3                     | 2.160***   | 1.835*** | 1.732***   | 1.713*** |
| Income Q4                     | 2.873***   | 2.651*** | 2.554***   | 2.609*** |
| Age 25-29                     | -0.344     | -0.287***| -0.144***  | 0.311*** |
| Age 30-34                     | -0.319     | -0.455***| -0.432***  | 0.099*** |
| Age 35-39                     | -0.248     | -0.549***| -0.618***  | -0.102*** |
| Age 40-44                     | -0.134     | -0.463***| -0.558***  | -0.123*** |
| Age 45-49                     | 0.041      | -0.309***| -0.513***  | -0.125*** |
| Age 50-54                     | 0.226      | -0.156***| -0.479***  | -0.087*** |
| Age 55-59                     | 0.261      | -0.187***| -0.548***  | -0.087*** |
| Age 60-64                     | -0.171     | -0.800***| -1.205***  | -0.396*** |
| Age 65-70                     | -1.166***  | -1.963***| -2.292***  | -0.968*** |
| Female                        | 0.084***   | 0.085*** | 0.083***   | 0.150*** |
| Married                       | -0.021**   | -0.002   | -0.002     | 0.049*** |
| Fixed effects\(^c\)           | Y, P, F    | Y, P, F  | Y, P, F    | Y, P, F |
| N                             | 1,388,355  | 1,654,920| 1,246,820  | 1,936,690 |
| Adjusted \(R^2\)              | 0.206      | 0.314    | 0.405      | 0.487    |

Notes:
The dependent variable is RRSP NET in all regressions.* *, **, and *** denote significant at the 10%, 5%, and 1% level, respectively.

a Continuous: taxfilers contributed to an RRSP in all six years (2003-2008). Frequent: taxfilers contributed to an RRSP in three, four, or five of the years 2003 through 2008. Occasional: taxfilers contributed to an RRSP in one or two of the years 2003 through 2008. Non: taxfilers did not contribute to an RRSP in any of years 2003 through 2008.

b Variable definitions are listed in table 5, “Notes.”

c Y = year; P = province; F = family size.
### TABLE 7 Displacement Between RRSP and TFSA, Income and Age Effect

| Independent variables | Income effect (1) | Age effect (2) |
|-----------------------|-------------------|----------------|
| TFSA NET              | -0.525***         | -0.491***      |
| TFSA NET*Income Q2    | -0.001            |                |
| TFSA NET*Income Q3    | 0.100***          |                |
| TFSA NET*Income Q4    | 0.220***          |                |
| TFSA NET*Age 25-29   |                   | 0.068***       |
| TFSA NET*Age 30-34   |                   | 0.123***       |
| TFSA NET*Age 35-39   |                   | 0.142***       |
| TFSA NET*Age 40-44   |                   | 0.146***       |
| TFSA NET*Age 45-49   |                   | 0.149***       |
| TFSA NET*Age 50-54   |                   | 0.151***       |
| TFSA NET*Age 55-59   |                   | 0.117***       |
| TFSA NET*Age 60-64   |                   | -0.006***      |
| TFSA NET*Age 65-70   |                   | -0.130***      |
| RPP CTR               | -0.025***         | -0.029***      |
| RRSP LMT              | 0.172***          | 0.156***       |
| TFSA LMT              | -0.453***         | -0.499***      |
| Income Q2             | 1.123***          | 1.281***       |
| Income Q3             | 1.690***          | 2.362***       |
| Income Q4             | 2.220***          | 3.315***       |
| Age 25-29             | 0.470***          | 0.150***       |
| Age 30-34             | 0.632***          | 0.110***       |
| Age 35-39             | 0.710***          | 0.126***       |
| Age 40-44             | 0.834***          | 0.231***       |
| Age 45-49             | 0.988***          | 0.368***       |
| Age 50-54             | 1.181***          | 0.536***       |
| Age 55-59             | 1.250***          | 0.706***       |
| Age 60-64             | 0.742***          | 0.787***       |
| Age 65-70             | -0.403***         | 0.569***       |
| Female                | 0.135***          | 0.155***       |
| Married               | 0.023***          | 0.009**        |
| Fixed effects         |                   | Y, P, F        |
| N                     | 6,913,485         | 6,913,485      |
| Adjusted $R^2$        | 0.449             | 0.447          |

Notes:

The dependent variable is RRSP NET in the regressions.

*, **, and *** denote significant at the 10%, 5%, and 1% level, respectively.

a The control variables reported in table 4 are included in the regressions. Variable definitions are listed in table 5, “Notes.”

b The coefficients for TFSA NET*Income Q3 and TFSA NET*Income Q4 are positive, but nonetheless support a crowd-out effect. These positive coefficients suggest that the displacement effect in Income Q3 and Q4 are less negative than Q1 (the base group).

The net effect of TFSA contributions on RRSP contributions in Income Q3 is calculated as $-0.525 + 0.1 = -0.425$, and for Income Q4, $-0.525 + 0.220 = -0.305$.

c Y = year; P = province; F = family size.
decrease over time. Table 8 reports the regression results by year. The coefficient of $TFSA\, NET$ is significant and negative for each year from 2009 to 2015. Furthermore, the magnitude of the coefficient increases every year, suggesting that TFSA increasingly crowd out savings in RRSP over time. The displacement effect is the most pronounced in 2015, suggesting that the one-time spike to the TFSA contribution limit in 2015 had little impact on creating new tax-preferred savings.

**ROBUSTNESS TESTS**

We next examine whether our main finding is robust in relation to the definitions of the key dependent and independent variables, alternative control variables, demographic groups, and an alternative regression method.

First, we test whether our finding is robust in relation to alternative definitions of the RRSP and TFSA variables. Because the log transformation requires the net contributions to be non-negative, individuals with negative RRSP or TFSA contributions but with positive total contributions (that is, net savers) are excluded from the above analysis. We provide three alternative definitions of the RRSP and TFSA variables to also include net savers with negative contributions in an RRSP or a TFSA. First, we define $TFSA\, (RRSP)\, dummy$, which is set to 1 if the TFSA (RRSP) net contribution is positive and is set to 0 otherwise. Negative contributions are coded as 0 on the basis of this definition. Second, $Sinh^{-1}(TFSA)$ and $Sinh^{-1}(RRSP)$ are defined as the inverse hyperbolic sine transformation of the TFSA and RRSP net contributions, respectively. The inverse hyperbolic sine transformed variables are highly correlated with the log transformed ones but do not restrict non-negative values. Third, we define $TFSA/Income$ and $RRSP/Income$ as the percentages of TFSA and RRSP contributions in an individual’s total income, respectively. Negative contributions are coded as 0. Table 9 reports the regression results using the three alternative variable definitions. We find consistent negative coefficients of the TFSA variable across all specifications. Accordingly, our inferences about the displacement between RRSP and TFSA contributions are not subject to the log transformation of the RRSP and TFSA variables.

Second, we control for the presence of investment income as the proxy for individuals’ taxable investments. Because the introduction of the TFSA allows individuals to shelter more of their investments from taxes, “new” saving in TFSA may be redirected at taxable investments rather than RRSP contributions. We therefore expect less of a displacement effect among individuals with investment income. We define investment income as the sum of taxable dividends, capital gains, rental income, and interest.

35 In order to run the logit regression on the binary RRSP variable, individuals with net total withdrawals are also included in this specification.

36 The inverse hyperbolic sine transformation is defined as $Sinh^{-1}(X) = \ln(X + (X^2 + 1)^{1/2})$. 
TABLE 8  Displacement Between RRSP and TFSA, Regressions by Year

| Independent variables a | 2009     | 2010     | 2011     | 2012     | 2013     | 2014     | 2015     |
|-------------------------|----------|----------|----------|----------|----------|----------|----------|
| TFSA NET                | -0.352***| -0.375***| -0.393***| -0.414***| -0.424***| -0.428***| -0.429***|
| RPP CTR                 | -0.029***| -0.025***| -0.022***| -0.025***| -0.025***| -0.026***| -0.030***|
| RRSP LMT                | 0.187***  | 0.183***  | 0.176***  | 0.172***  | 0.161***  | 0.157***  | 0.148***  |
| TFSA LMT                | -0.526***| -0.435***| -0.443***| -0.524***| -0.459***| -0.590***|          |
| Income Q2               | 1.434***  | 1.398***  | 1.351***  | 1.281***  | 1.190***  | 1.135***  |          |
| Income Q3               | 2.391***  | 2.380***  | 2.382***  | 2.369***  | 2.376***  | 2.335***  | 2.287***  |
| Income Q4               | 3.234***  | 3.268***  | 3.305***  | 3.309***  | 3.358***  | 3.360***  | 3.343***  |
| Age 25-29               | 0.584***  | 0.621***  | 0.628***  | 0.555***  | 0.512***  | 0.458***  | 0.358***  |
| Age 30-34               | 0.634***  | 0.736***  | 0.752***  | 0.713***  | 0.690***  | 0.649***  | 0.590***  |
| Age 35-39               | 0.668***  | 0.761***  | 0.809***  | 0.760***  | 0.735***  | 0.720***  | 0.701***  |
| Age 40-44               | 0.755***  | 0.897***  | 0.913***  | 0.875***  | 0.866***  | 0.840***  | 0.812***  |
| Age 45-49               | 0.913***  | 1.044***  | 1.086***  | 1.023***  | 1.027***  | 0.985***  | 0.961***  |
| Age 50-54               | 1.089***  | 1.231***  | 1.277***  | 1.238***  | 1.233***  | 1.204***  | 1.148***  |
| Age 55-59               | 1.130***  | 1.294***  | 1.338***  | 1.299***  | 1.307***  | 1.284***  | 1.250***  |
| Age 60-64               | 0.509***  | 0.696***  | 0.784***  | 0.800***  | 0.814***  | 0.828***  | 0.828***  |
| Age 65-70               | -0.709*** | -0.505*** | -0.408*** | -0.384*** | -0.411*** | -0.381*** | -0.393*** |
| Female                  | 0.128***  | 0.132***  | 0.146***  | 0.167***  | 0.156***  | 0.152***  | 0.153***  |
| Married                 | 0.001     | 0.012     | 0.018     | 0.024***  | 0.010     | 0.014     | 0.002     |
| Fixed effects b         | Y, P, F   | Y, P, F   | Y, P, F   | Y, P, F   | Y, P, F   | Y, P, F   | Y, P, F   |
| N                       | 1,031,670 | 996,125   | 988,125   | 970,355   | 968,785   | 966,170   | 992,255   |
| Adjusted R²             | 0.425     | 0.431     | 0.436     | 0.443     | 0.438     | 0.433     | 0.425     |

Notes:
The dependent variable is RRSP NET in all regressions.

*, **, and *** denote significant at the 10%, 5%, and 1% level, respectively.

a Variable definitions are listed in table 5, “Notes.”

b Y = year; P = province; F = family size.
Column 1 of table 10 includes a positive investment income dummy variable as well as its interaction with TFSA NET in the regression. The displacement effect remains significant after controlling for investment income \( (\text{InvestIncome} > 0) \). The positive coefficient of the interaction term suggests less displacement among individuals with positive investment income. Column 2 of table 10 repeats the same exercise using the positive change in investment income as a proxy for the “unexpected” investment income. The rationale is that people may not frequently change their saving plans but would be motivated to do so when their investment income and the associated taxes were higher than expected. We find a consistent displacement effect.
An empirical analysis of the displacement effect of TFSA on RRSPs

### Table 10: Controlling for Investment Income

| Independent variables\(^b\) | Positive investment income indicator (1) | Positive change indicator (2) |
|------------------------------|------------------------------------------|-------------------------------|
| **TFSA NET**                 | −0.435\(^{***}\)                         | −0.420\(^{***}\)             |
| **TFSA NET** \(\times\) InvestIncome > 0 | 0.041\(^{***}\)                         |                               |
| InvestIncome > 0             | 0.463\(^{***}\)                         |                               |
| **TFSA NET** \(\times\) \(\Delta\) InvestIncome > 0 |                               | 0.016\(^{***}\)             |
| \(\Delta\) InvestIncome > 0 |                                           | 0.340\(^{***}\)             |
| RPP CTR.                     | −0.023\(^{***}\)                         | −0.026\(^{***}\)            |
| RRSP LMT.                    | 0.182\(^{***}\)                         | 0.159\(^{***}\)             |
| TFSA LMT.                    | −0.308\(^{***}\)                         | −0.433\(^{***}\)            |
| Income Q2                    | 1.261\(^{***}\)                         | 1.270\(^{***}\)             |
| Income Q3                    | 2.301\(^{***}\)                         | 2.319\(^{***}\)             |
| Income Q4                    | 3.210\(^{***}\)                         | 3.236\(^{***}\)             |
| Age 25-29                    | 0.488\(^{***}\)                         | 0.560\(^{***}\)             |
| Age 30-34                    | 0.616\(^{***}\)                         | 0.705\(^{***}\)             |
| Age 35-39                    | 0.661\(^{***}\)                         | 0.755\(^{***}\)             |
| Age 40-44                    | 0.757\(^{***}\)                         | 0.867\(^{***}\)             |
| Age 45-49                    | 0.888\(^{***}\)                         | 1.012\(^{***}\)             |
| Age 50-54                    | 1.056\(^{***}\)                         | 1.198\(^{***}\)             |
| Age 55-59                    | 1.096\(^{***}\)                         | 1.259\(^{***}\)             |
| Age 60-64                    | 0.552\(^{***}\)                         | 0.712\(^{***}\)             |
| Age 65-70                    | −0.669\(^{***}\)                         | −0.542\(^{***}\)            |
| Female                       | 0.137\(^{***}\)                         | 0.145\(^{***}\)             |
| Married                      | 0.005                                    | 0.004                        |
| Fixed effects\(^c\)          | Y, P, F                                  | Y, P, F                      |
| N                            | 6,913,485                                | 5,366,510                    |
| Adjusted R\(^2\).            | 0.446                                    | 0.427                        |

Notes:
The dependent variable is RRSP NET in the regressions.

\(^a\) InvestIncome > 0 is an indicator variable that equals 1 if an individual reports positive investment income in a year and equals 0 otherwise. \(\Delta\) InvestIncome > 0 is an indicator variable that equals 1 if an individual reports positive change in investment income in a given year compared with the prior year and equals 0 otherwise. InvestIncome is the sum of taxable dividends (line 120 of the T1 tax form), taxable capital gains (line 127), net rental income (line 160), and interest and other investment income (line 121).

\(^b\) Variable definitions are listed in table 5, “Notes.”

\(^c\) Y = year; P = province; F = family size.
among individuals with or without positive changes in investment income, although the effect is weaker in the former group.\footnote{In untabulated results, we replace the investment income dummy variables with the continuous variables and find robust results. These findings further suggest that TFSAs are used by individuals with taxable investment income to shelter more tax-preferred savings.}

Third, we test whether the displacement effect holds for gender, marital status, different family sizes, self-employment status, enrolment in an RPP, and geographic location.\footnote{In the LAD, a self-employed taxfiler is identified by the flag SEISWI. A “self-employed” taxfiler in the sample would have a non-zero amount (income or loss) from farming, from professional activities, from commissions as a salesperson, or from business activities. A “self-employed” taxpayer could also have employment income. The Northwest Territories, Yukon Territory, and Nunavut were grouped together for the purposes of this analysis.} The results are robust across all of the demographic groups. Excluding individuals who maximize their contributions to RRSPs and/or TFSAs also does not change our inference, suggesting that the explanation for the results is not that individuals who reach the contribution limit of one account use the other as an alternative.\footnote{We define maximum contributors to RRSPs (TFSAs) as individuals with less than $500 of contribution room left after making the RRSP (TFSA) contribution in each year. Using $100 or $1,000 as the alternative threshold does not change the results.} Finally, we repeat the above analysis using individual fixed-effect regressions and find consistent results.

**IMPLICATIONS AND CONCLUSIONS**

In this study, we set out to determine empirically whether TFSAs displaced savings in RRSPs. Utilizing Statistics Canada’s LAD, we investigate this issue using a large sample of Canadian taxfilers who made a net contribution to an RRSP and/or a TFSA from 2009 to 2015. We find strong evidence of a partial displacement effect. Once the TFSA was introduced, taxpayers had the opportunity to contribute to a TFSA as well as an RRSP. They chose to contribute to TFSAs without simultaneously maintaining or increasing their RRSP contributions. Our baseline results indicate that every 1 percent increase in a TFSA contribution reduces an RRSP contribution by approximately 0.4 percent.

Our displacement effect results are robust regardless of the following factors: RRSP contribution behaviour prior to 2009, income, age, gender, marital status, family size, province or territory of residence, self-employment status, whether taxfilers contributed to an employer pension or maximized their contributions to RRSPs and/or TFSAs, and whether taxfilers had passive (investment) income. Collectively, our results do not appear to be attributable to savings preferences of particular groups of taxfilers. Furthermore, the magnitude of the substitution effect increases every year over the sample period, during which the TFSA contribution limit was raised twice (in 2013 and 2015). We find that increases in TFSA limits had a limited effect on creating new savings. As unused TFSA contribution room...
accumulated over time, the percentage of taxfilers who maximized their TFSA contributions declined from 10 percent in 2009 to 2 percent in 2015.

Our results do not indicate complete displacement, since the magnitude of an increase in TFSA contributions is not matched by a corresponding decrease in RRSP contributions. Nevertheless, if the TFSA also replaces savings in taxable accounts or other forms of wealth accumulation, at least partially, the government may not achieve its goal of increasing total savings by offering the TFSA as a tax-preferred savings vehicle.\(^{40}\)

The stronger displacement effect that we find among young Canadians and the increasing displacement effect over time is concerning from a future tax revenue perspective: because the net annual amounts being contributed to RRSPs are declining, tax revenues will be lower than expected when funds held in RRSPs are withdrawn. This trend may suggest that Canadians are saving less for retirement, even if they are increasing their savings in TFSAs relative to RRSPs. Two factors may contribute to this saving behaviour: the TFSA can be used for short-term and intermediate saving needs, and it is not tax-prohibitive to make a TFSA withdrawal, since withdrawals are not taxable income.

Our research supports the aggregate findings of Messacar, who documented a Canada-wide declining trend of RRSP contributions against an upward trend in TFSA contributions.\(^{41}\) Our research also contributes to the wider tax and economics literature on tax-favoured savings plans, and specifically the interplay between tax-deferred savings plans and tax-prepaid savings plans, by documenting a partial displacement or crowd-out effect in the Canadian context. We encourage further research, perhaps using a behavioural economics focus, to better understand why this displacement could have occurred and to suggest policy changes that would better integrate the existing tax-preferred saving plans.\(^{42}\)

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\(^{40}\) Kesselman, supra note 10, finds that the use of TFSAs is motivated by tax minimization because taxable assets have been shifted into TFSAs with a minimal increase in savings.

\(^{41}\) Supra note 11.

\(^{42}\) See, for instance, Card and Ransom, supra note 30, discussing framing effects, and Richard H. Thaler, “Anomalies: Saving, Fungibility, and Mental Accounts” (1990) 4:1 Journal of Economic Perspectives 193-205, for a discussion of mental accounting (https://doi.org/10.1257/jep.4.1.193).
