

Carter, Andrew

## Article

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Andrew Dudley Carter\*

# Does the early release of retirement savings prolong labor market participation for workers approaching retirement? Evidence from Australia's "Transition to Retirement Income Streams" program


## Abstract

Australia's "Transition to Retirement Income Streams" (TRIS) program aims to prolong labor force participation for older workers (aged 55–65 years) by offering early access to a worker's compulsory retirement savings (superannuation). Using a difference-in-differences design, our results suggest a small labor supply response, which increases after the program's initial years. The size of the effects appears to be consistent with the program adoption profile, which was low initially. For this reason, our estimates should be viewed as a lower bound for the true effects. We find that individuals with higher incomes are more likely to adopt TRIS. At least half of the program participants appear to be using strategies to minimize tax, a behavioral response that seems at odds with the program's intent.

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**Corresponding author:** Andrew Dudley Carter  
 andrew.carter@anu.edu.au

Crawford School of Public Policy, Australian National University College of Asia and the Pacific, JG Crawford Building, 132 Lennox Crossing, Canberra, ACT 2601, Australia

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# 1 Introduction

Governments around the world are encouraging older citizens to remain in the labor market for longer to combat the economic and fiscal challenges posed by aging populations. Relatively static retirement ages combined with lengthening life expectancies have resulted in larger shares of the population utilizing publicly funded pensions, health, and aged care services. Governments have typically responded by increasing the qualifying ages for social security benefits and by offering targeted incentives to remain in the workforce.

Increasing the qualifying ages of benefits has been found to be an effective way to increase labor supply rates for older workers,<sup>1</sup> while targeted incentives are often found to have little impact.<sup>2</sup> This paper contributes to the international literature by examining Australia's Transition to Retirement Income Streams (TRIS),<sup>3</sup> a program that offers a novel approach to incentivizing labor supply for older workers.

TRIS was introduced on July 1, 2005, and continues to be available. TRIS intends to combat the concern of workers retiring prematurely just to access their retirement savings. Prior to TRIS, workers had to be aged  $\geq 65$  years to access their retirement savings while remaining in the labor market. TRIS offers limited early access to a worker's compulsory retirement savings (known as superannuation in Australia) for those in the 55- to 65-year age range. Policy makers envisaged that TRIS could be used as an income supplement for those who reduce their working hours as they "transition to retirement". TRIS amounts are taxed at the individual's marginal income tax rate minus a 15% tax offset. From July 1, 2007, superannuation withdrawals, including TRIS, became tax free for workers aged  $>60$  years. This change further incentivized program participation for this age group. An unintended consequence of the program is the opportunity for individuals to minimize tax without decreasing working hours. "Tax-effective" strategies can be devised by drawing a TRIS while, in the same year, cycling salary-sacrificed (pre-income tax) contributions back into their superannuation fund.<sup>4</sup> The Productivity Commission (2015) indicated that it is difficult to precisely ascertain the purpose for which people are using TRIS and, in particular, the extent to which TRIS incomes are encouraging people to remain in the labor market for longer versus simply as a mechanism to minimize tax. The key question this paper seeks to address is whether TRIS increases labor force participation of older workers. We also present some evidence on behavior that appears to be consistent with tax minimization, a response that seems at odds with the program's intent.

We consider the program in the context of a simple life cycle model that serves as a framework to interpret the empirical results. Specifically, we use this model to understand the effect of the TRIS program on an individual's optimal retirement age. We find that the model has confounding effects, which leads to ambiguous optimal retirement age predictions. Despite this, our intuition suggests that the TRIS program is likely to increase the optimal retirement age.

1 Mastrobuoni (2009), Staubli and Zweimüller (2013), Hanel and Riphahn (2012), Vestad (2013), and Atalay and Barrett (2015) examine these effects in the United States, Austria, Switzerland, Norway, and Australia, respectively.

2 See Disney et al. (2010), Ramnath (2013), Feng (2014), and Laun (2017).

3 Also known as Transition to Retirement (TTR) provisions.

4 See Section A.2 in Appendix for more information on „tax-effective" strategies.

We empirically estimate the labor supply and earnings response using administrative data from the Australian Taxation Office (ATO). We use a difference-in-differences (D-i-D) design to measure an “intention-to-treat” effect by comparing the changes in participation and earnings in the program’s initial years by exploiting the qualifying age threshold (55 years). Similarly, following a policy change from July 1, 2007, which introduced tax-free superannuation withdrawals for people aged >60 years, we repeat this analysis to examine the additional “tax free” effect for this age group. The causal estimates we report are local treatment effects for the “treatment” age groups only.

We find no employment response in the program’s first year, a small positive effect in the program’s second year for males only (1.0%), and larger effects in subsequent years for both males (1.4%) and females (1.1%). The timing and magnitude of the effects appear consistent with program adoption rates, which were low initially. We suspect that the slow adoption of the program is partly explained by a lack of program awareness and other frictions that dampen adoption. Adopting TRIS requires action on the individual’s behalf; including research, possible financial advice, and setting up a TRIS pension account with one’s superannuation fund. Individuals on higher incomes are more likely to use and materially benefit from TRIS.

Modest deviations from the common trends assumption weaken the causal interpretation of our D-i-D estimates. In these years, we provide explanations for other known fiscal, macroeconomic, and demographic changes. However, the consistency between the program adoption rates and the causal estimates provide some confidence that we are detecting the program effects.

We contribute to the international literature on tax system design for older workers approaching retirement. We adapt a life cycle model to consider the effect of the program on retirement age and empirically estimate the labor supply response. In addition, we provide previously unavailable insight into TRIS program adoption.

## 2 Background

### 2.1 Superannuation in Australia

Australia’s universal superannuation scheme was introduced in the early 1990s with the goal to provide income in retirement while reducing the reliance on the publicly funded age pension. For the majority of people, superannuation is held in industry and retail funds, which are regulated by the Australian Prudential Regulation Authority (APRA).

There is, however, an increasing share of people who elect to use self-managed superannuation funds (SMSFs) to allow greater flexibility and control over the management of their retirement income.<sup>5</sup> The rules and governance arrangements are complex and have changed over time. Employers are generally required to make superannuation contributions on an employee’s behalf at the Superannuation Guarantee contribution rate, though some employers voluntarily elect to pay more. The Superannuation Guarantee rate is currently 9.5% of an employee’s ordinary time earnings. In general, employer superannuation

<sup>5</sup> The Australian Taxation Office (ATO) and the Australian Securities and Investment Commission (ASIC) work collaboratively to regulate SMSFs.

contributions, along with superannuation earnings within the fund, are taxed concessionally at a flat rate of 15%.

Currently, superannuation is only partially funding retirement for individuals leaving the labor market. This is because most retirees tend to have lower superannuation account balances due to the fact they have only received compulsory employer contributions for part of their working lives and at comparatively low rates throughout the Superannuation Guarantee's introductory years. This means that many retirees will continue to rely on the age pension for some time until the superannuation system matures.

The concessional tax treatment of superannuation contributions, earnings, and income streams are designed to encourage and bolster retirement savings. These concessions, however, result in a high public cost in forgone tax revenue and the benefits disproportionately go to the wealthy.<sup>6</sup> Official estimates indicate that superannuation concessions on earnings and contributions are the second- and third-largest tax expenditures after the tax-free treatment on sales of owner-occupied housing. The Department of the Treasury (2018) estimates that the tax relief for superannuation earnings and contributions accounts for \$19.3 billion and \$16.9 billion, respectively, in 2016–17 alone. These figures emphasize the need to understand how the superannuation system is performing and its distributive effects. For further detail, the Productivity Commission (2015) published a review of Australia's retirement income system, which highlights design issues and incentives that are embedded in the system.

## 2.2 Transition to Retirement Income Streams (TRIS)

TRIS is an Australian Government program that intends to enhance the labor supply of workers aged between 55 years and 65 years. The program was introduced on July 1, 2005, and continues to be available. TRIS offers limited early release to a worker's compulsory superannuation (retirement) savings. Prior to the introduction of TRIS, a superannuation fund member had to satisfy the "conditions of release" to access their savings. For most, this involved reaching the superannuation preservation age<sup>7</sup> and retiring from the labor market. There was concern among policy makers that these conditions would lead to workers prematurely leaving the labor market just to access their savings. TRIS aims to mitigate this effect by enabling limited "early access" superannuation drawdowns for qualifying workers. Policy makers envisaged that TRIS could be used to supplement the salaries of those who reduce their working hours as they "transition to retirement".

TRIS offers up to 10 years early access to superannuation for a worker who remains in the labor market up to the age of  $\geq 65$  years. This represents a 10-year differential between the superannuation preservation age (55 years) and the age that an individual is free to access their superannuation irrespective of their working status (65 years). A person in the 60- to 65-year age range was required to leave the labor market to access his or her superannuation, while a

<sup>6</sup> Department of the Treasury (2012) analysis shows that the share of superannuation tax concessions disproportionately goes to those on higher incomes. In 2012–13, e.g., the Treasury estimates that the top 5% of contributors received 20.3% of contribution concessions.

<sup>7</sup> Access to superannuation is generally restricted to those who have reached their preservation age. The preservation age is based on an individual's date of birth. It is 55 years of age for individuals born before July 1, 1960, and gradually increases to 60 years in 1-year increments for individuals born after June 30, 1964.

person in the 55- to 60-year age range was additionally required to declare that he or she had no intention of returning to the labor market.

TRIS conditionally relaxed these requirements by offering a capped noncommutable superannuation income stream (i.e., not a lump sum) for those who met the superannuation preservation age requirements and continued to work. The annual TRIS must be no <4% of an individual's account balance at the beginning of the financial year and no >10%. TRIS attracts the equivalent tax treatment as would apply for retired individuals. This includes a 15% tax offset on the annual amount of the income stream, along with tax-free earnings within the superannuation fund.<sup>8</sup> From July 1, 2007, the *Simplified Superannuation* package brought a change that made superannuation drawdowns, including TRIS, tax free for people aged >60 years. This increased the financial incentive to adopt TRIS.

TRIS was designed to supplement the incomes of older workers who decide to reduce their engagement in the labor market. This could include those who move from full- to part-time working arrangements or who otherwise reduce their work responsibilities with a corresponding reduction in remuneration. A potential failing of the TRIS design is that a work test was not implemented. Full-time workers are eligible to use TRIS even if they have no intention of transitioning to retirement. A work test was abandoned in the original design as it was argued that it would place an unreasonable compliance burden on superannuation funds. Hanegbi (2013) suggests that this burden should be shifted onto the taxpayer seeking to use TRIS through self-assessment.

For more detail, Section A.1 in Appendix provides a sense of the program benefits through three simplified use-case examples. Section A.2 in Appendix provides details on the strategies that can be applied to reduce one's tax liability. We define a "tax-effective strategy" as a scenario whereby workers draw a TRIS pension while, within the same year, make salary-sacrificed (pre-income tax) contributions back into their superannuation fund.

### 3 Conceptual Framework

We adapt a simple life cycle framework to consider the effect of the TRIS program on an individual's choice to continue working or retire. Specifically, we seek to understand the effect of the program on an individual's optimal retirement age. Life cycle models have been widely used in the pensions and retirement behavior literature. Relevant examples we draw from are presented by Burbidge and Robb (1980) and, more recently, Atalay and Barrett (2015), who consider the effects of changes to pension plans on the retirement decisions of individuals. The models begin with a person who seeks to determine the optimal time to retire from the labor market. More time in the labor market results in higher savings in retirement. The trade-off of working longer is less leisure.

The life cycle model assumes that an individual maximizes his or her lifetime utility subject to his or her lifetime budget constraint. Utility is defined as a function of consumption and leisure  $U(C_t, L_t)$ , where marginal utility is held constant over the life cycle. For simplicity, we assume there are only two states in the life cycle: (i) the period that an individual works; and (ii) the period that an individual is retired. An individual begins work at time "0", assumes he

<sup>8</sup> Superannuation fund earnings would otherwise attract a 15% tax rate while the fund is in an accumulation phase. This tax-free exemption for earnings on TRIS accounts was later repealed from July 1, 2017.

or she will live to a specific age  $T$ , and will spend time until age  $R$  working in the labor market. By construction,  $T$  minus  $R$  equals the time spent in retirement.

The discounted value of lifetime utility  $V$  over time  $t$  is presented as follows:

$$V = \int_0^R U(C_t, 0)e^{-\delta t} dt + \int_0^R U(C_t, 1)e^{-\delta t} dt, \quad (1)$$

where the time spent working is denoted as “0”, time in retirement is “1”, and  $\delta$  is the discount rate per period of time  $t$ . An individual works full time unless he or she chooses to move to a part-time work arrangement by utilizing the TRIS program. Therefore, leisure can only be varied over the life cycle by retiring or, in this analysis, by participating in the TRIS program. TRIS income is captured in the first integral of Eq. (1) given participation in the program is conditional on working.

The lifetime budget constraint (Eq. (2)) shows that the lifetime discounted value of consumption  $C$  equals the discounted value of income from work  $Y$ , income from TRIS  $TR$ , and the retirement income  $RI$ . A constraint on  $TR$  is provided in Eq (2) given TRIS must be no <4% of a worker’s account balance at the beginning of the financial year and no >10%. To simplify the model, we define retirement income as income drawn from superannuation only.  $TRIS_q$  represents the qualifying age for the TRIS program. The first two integrals in Eq. (2) overlap from the TRIS qualifying age  $TRIS_q$  until the retirement age  $R$ , given participation in the TRIS program is conditional on working.

$$\begin{aligned} \int_0^T C_t e^{-rt} dt = & \int_0^R (1-\alpha)Y_t e^{-rt} dt + \int_{TRIS_q}^R (1-\beta)TR_t e^{-rt} dt \\ & + \int_R^T (1-\theta)RI_t e^{-rt} dt, \text{ s.t. } TR_t = \{RI_t \cdot x \mid 0.04 \leq x \leq 0.10\} \end{aligned} \quad (2)$$

In Eq. (2),  $\alpha$ ,  $\beta$ , and  $\theta$  represent the tax rates on earnings from work, TRIS, and retirement income, respectively. We account for the tax settings to emphasize the tax concessions that TRIS  $TR$  and retirement income  $RI$  attract, relative to income from work  $Y$ . Recall that for TRIS recipients,  $\beta$  will be zero for individuals aged  $\geq 60$  years from 2007–08 and will attract 15% tax offset on this income otherwise. From this point, to simplify the notation, we do not include the tax rate components or the  $TR_t$  constraint in subsequent equations.

The relationship between the income components in Eq. (2) is complicated and depends on several factors. In Eq. (3), we show that retirement income  $RI$  at time  $t$  is a function of the lifetime income from work  $Y$  and the lifetime income from TRIS  $TR$ . The derivative of income from work will be  $>0$  ( $f_Y > 0$ ) given that more time in the labor market will result in more retirement income. The derivative of TRIS income will be  $<0$  ( $f_{TR} < 0$ ) given the program is providing early access to retirement income  $RI$ . The latter, however, assumes that  $TR_t$  is greater than post-tax contributions and earnings within an account for a given year. This may not be the case for all workers, depending on the level of TRIS drawn in a given year, and it is particularly unlikely for those who devise tax-effective strategies.<sup>9</sup>

$$RI_t = f(Y, TR). \quad (3)$$

The optimization problem with respect to  $C$  and  $R$  can be expressed as a Lagrangian function, using Eqs (1) and (2), and solved for any value of  $R$ , where  $R$  is constrained as a value  $>0$

<sup>9</sup> See Sections A.1 and A.2 in Appendix for further information on tax planning with TRIS.



and  $< T$ . The individual seeks to maximize utility subject to the budget constraint with respect to  $C$  and  $R$ . For simplicity, we express  $U(C, 0) = U_C^W$  and  $U(C, 1) = U_C^R$  and let  $\delta$  equal  $r$ .

$$L = \begin{array}{c} \begin{array}{cc} ZR & ZT \\ UCWe - rtdt + & UCR - rtdt \\ 0 & R \end{array} \\ \begin{array}{cccc} (ZT & ZR & ZR & ZT) \\ -\lambda & Cte - rtdt - & Yte - rtdt - & TRte - rtdt - & Rlte - rtdt \\ 0 & 0 & TRIS_q & R \end{array} \end{array} \quad (4)$$

The first-order conditions (excluding the budget constraint) state that the individual's marginal utility of consumption while both working and in retirement are equal. This equals the Lagrange multiplier  $\lambda$  constant (Eq. (5)) which, by definition, represents the marginal utility of wealth.

$$U_C^W = U_C^R = U_C = \lambda; \quad (5)$$

$$U_C^R - U_C^W + \lambda \left\{ Y_t + \int_{TRIS_q}^R \frac{dTR}{dR} e^{-rt} dt - RI_t \right\} = 0. \quad (6)$$

The individual seeks to maximize utility subject to  $C$  and  $R$ . We set Eq. (6) to zero and, using Eq. (5), rearrange Eq. (6) to arrive at Eq. (7).

$$\frac{U_C^R - U_C^W}{U_C} = Y_t + \int_{TRIS_q}^R \frac{dTR}{dR} e^{-rt} dt - RI_t. \quad (7)$$

The left-hand side of Eq. (7) shows the marginal rate of substitution between retirement and consumption. This is the marginal utility gained from an additional year in retirement divided by the marginal utility of an increase in consumption per year.

The comparative statics reveal that TRIS influences an individual's optimal retirement age  $R^*$  in two ways. We first consider the response to an increase in working income resulting from participation in the TRIS program. We define working income  $WI$  as follows:

$$WI = \int_0^R Y_t e^{-rt} dt + \int_{TRIS_q}^R TR_t e^{-rt} dt.$$

Therefore, a positive "income effect" is introduced when  $TR > 0$ , along with a "price effect" given the concessional tax treatment  $\beta$  of this income (recall,  $\beta$  is shown in Eq. (2)). Together, the effects are similar to a wage increase or, equivalently, an increase to an individual's budget constraint. A wage increase has two competing responses in the life cycle model. First, a wage increase reduces the optimal retirement age. This is because income and savings goals can be achieved earlier than they would have otherwise in the absence of the program. Second, there is a substitution effect. A higher wage will, contrarily, increase lifetime consumption. People may, therefore, choose to substitute time in retirement for additional time in the labor market to increase income and savings. The theory on the dominant effect is ambiguous. Our intuition for the TRIS program, however, suggests that the substitution effect will be stronger. This is because the income effect may appear small in the context of total lifetime earnings, noting



that TRIS program benefits are restricted to the latter years of one's working life. A dominant substitution effect will, therefore, increase the optimal retirement age  $R^*$ .

A second response arises due to the TRIS program's interaction with "savings on retirement", defined as retirement income  $RI$  in our model. The effect on the optimal retirement age  $R^*$  will depend on how TRIS usage changes an individual's retirement income. For TRIS program participants, accessing some of their retirement income early may result in less superannuation on retirement than would have otherwise been the case.

Recall,  $RI = \int_R^T RI_t e^{-rt} dt$ ; so, if  $\partial RI < 0$ , then it can be shown that  $\partial R^*/\partial RI < 0$ . In this scenario, the life cycle model predicts that the optimal retirement age will increase in response to a decrease in retirement income, assuming that leisure is a normal good. The opposite is true in a scenario where retirement income increases. Using a tax-effective strategy to boost retirement income is a way in which an increase in savings can happen. It is, however, still possible for retirement savings to increase without using a tax-effective strategy. This can be achieved by drawing a modest TRIS, which is more than offset by ongoing contributions back into superannuation and fund earnings in the working years prior to retirement.

Taken together, the net effects from the life cycle model's theoretical predictions on  $R^*$  are ambiguous.<sup>10</sup> Our intuition, however, suggests that the TRIS program is likely to increase the optimal retirement age. This is based on the following logic. First, the addition of TRIS  $TR$  to lifetime working income  $WI$  will likely increase the optimal retirement age, assuming a dominant substitution effect. Second, the retirement income  $RI$  response may be positive to the degree that workers are using TRIS as policy makers envisaged. That is, as an income supplement to smooth consumption for those who reduce working hours as they "transition to retirement". This will result in a gradual reduction in retirement savings in each year that TRIS clauses are utilized. Ultimately, teasing out the magnitude of the two responses is a matter for empirical research.

## 4 Related Literature

We are not aware whether there are other countries that have piloted approaches such as TRIS to prolong participation. As such, the literature on the effects of similar programs appears scarce. Typically, early access to compulsory retirement savings are only provided in rare and exceptional circumstances, including severe financial hardship, on compassionate grounds, or for people with terminal medical conditions. The literature on retirement decisions in response to policy change usually focuses more on changes to policy parameters, such as increases to the pension or social security-qualifying ages. Examples include the papers by the following authors: Mastrobuoni (2009), Staubli and Zweimüller (2013), Hanel and Riphahn (2012), Vestad (2013), and Atalay and Barrett (2015), who examine these effects in the United States, Austria, Switzerland, Norway, and Australia, respectively. These studies find that increase in the qualifying age is effective at prolonging time in the labor market, with larger responses identified for lower-educated workers. Meanwhile, Hanel (2010) examines a financial incentive that aimed to delay retirement following a pension reform in Germany. The reform introduced a change that was estimated to have reduced pension benefits for early retirees, which delayed retirement

<sup>10</sup> Please see the study by Burbidge and Robb (1980) for further details on the mathematics and graphical analysis behind the comparative statics discussion in this section.

by about 10 months on average. Laun (2017) examines the effect of age-targeted credits on labor force participation of older workers in Sweden. The results show small positive extensive margin effects, which lead the author to conclude that tax incentives for older workers can be a viable tool for delaying retirement.

Ramnath (2013) examines taxpayer responses to the Saver's Credit program in the United States. This is a tax incentive designed to encourage retirement savings among low- and middle-income earners. The author notes that, while the incentives are generous, take-up of the program is low due to its complexity and the nonrefundable nature of the credit; meaning a substantial share of the target group does not realize the benefits. Similarly, Feng (2014) examines the effect of tax incentives on salary-sacrifices (pretax) superannuation contribution participation in Australia. The author finds that participation in the program is relatively low, despite generous tax incentives. Various reasons are put forward to explain these results, including the lack of knowledge of the policy, competing vehicles for long-term saving, and a common belief that compulsory saving through Australia's superannuation guarantee will be "enough" to fund one's retirement. Similarly, Disney et al. (2010) examine the participation of a new private pension arrangement in the United Kingdom, which aimed to incentivize retirement savings. They find little or no impact on savings behavior. The authors also note that there is little agreement in the literature in terms of what policies are most effective at encouraging private savings.

A lack of tax system engagement for some groups is a recurring theme in the literature, and this is thought to limit the effectiveness of targeted programs. Eissa and Liebman (1996) cite evidence from interviews with earned income tax credit (EITC) recipients, which revealed that many individuals had heard of the EITC program in the United States but did not understand how it related to their earnings. Chetty et al. (2009) find that the provision of EITC program information to EITC recipients at the right time can induce material labor supply responses. This study provides evidence to support to the hypothesis that people do not fully optimize behavior in response to government policy due to a lack of engagement; challenging what is often a core assumption in the public finance literature. For retirement savings incentives, Feng (2014) also cited a lack of knowledge as a factor that results in low participation. Worthington (2008) suggests that a policy response to increase knowledge could be to provide subsidized, or compulsory, retirement planning advice for people at particular work-life milestones.

## 5 Data and Variable Construction

We use ATO administrative data and Australian population estimates (Australian Bureau of Statistics, 2020), following the data construction methodology of Carter and Breunig (2019). We augment data from three sources to derive labor supply rates for the age groups of interest within the Australian resident population. This approach is required given that the ATO data alone do not account for the entire population of working and nonworking individuals. Table 1 illustrates how the different data sources are combined to construct labor supply rates.

We use the ATO's income tax return (ITR) data to capture the share of the population that filed a tax return. Using these data, we classify those who worked and those who did not

**Table 1** Data sources

	<b>Worked</b>	<b>Did not work</b>
Filed	Income tax return data	Income tax return data
Did not file	PAYG payment summary data (for salary and wage payments only)	Residual population calculated from ABS estimates

ABS, Australian Bureau of Statistics; PAYG, Pay-As-You-Go.

according to the specific sources of their income (this approach is discussed in Section 5.1). We use the ATO's salary and wage Pay-As-You-Go (PAYG) payment summary data to account for the small share of individuals who appear to have worked but did not file a return. We account for the remaining nonworking population by "topping up" our sample to match aggregate resident population estimates, published by the Australian Bureau of Statistics (2020). We exclude nonresident tax filers to align the data construction method more closely with the ABS definition. We also exclude a very small share of deceased tax filers who passed away before the beginning of a given lodgment year.<sup>11</sup>

We draw on the ATO's superannuation Member Contribution Statement (MCS) and SMSF Annual Return data to observe contributions into superannuation accounts. We include employer contributions to broaden our "working" and "earnings" definitions to capture the small share of individuals who salary sacrifice their entire salary and wage payments into their superannuation account. Workers in this category would not have otherwise been counted by our "working" definitions.

Using this approach, we construct a panel data set for a period that spans 16 financial years, from 2000–01 to 2015–16, for people who are aged 53–62 years by the end of a given financial year. The panel captures the 5 years before the TRIS was introduced, along with the first 11 years in which it was available. There are 40.2 million observations over this period, which, by construction, matches the ABS population estimates. The data were extracted from ATO systems on November 1, 2018.

## 5.1 Measures of labor supply and earnings

The ATO data do not directly record the working status of people. There are, however, various options to derive measures of labor supply from the data. For instance, it seems reasonable to assume that people who report salary and wage payments worked to earn this income. This simple inference can be broadened to include other "earned income" fields from the tax return. To do so, we start with the ATO definition that was used as a work test to administer the now-discontinued Mature Age Worker Tax Offset (MAWTO). This definition, known as "Net income from working" (NIFW), is presented in Table 2. NIFW is the sum of work-related income minus work-related expenses. For our study, we add "total employer superannuation contributions" (Component 12 in Table 2) as mentioned in the Section 5. This addition, however, does not have a material effect on our results.

NIFW was not recorded in ATO databases for workers below the MAWTO's qualifying age and in the years in which the MAWTO was not in force. Further, it cannot be perfectly

<sup>11</sup> Filing can occur beyond death in cases where taxable income continues to accrue until the estate of the deceased is dissolved.

**Table 2** “Net income from working Indicator 2”: adjusted Australian Taxation Office definition

<b>Net income from working</b>		
=	Total gross salary and wage payments	(1)
+	Income from allowances, earnings, tips, director’s fees, etc.	(2)
+	Attributed personal services income	(3)
+	Total reportable fringe benefits (RFB) amounts (if RFB $\geq$ RFB threshold)	(4)
–	Work-related car expenses	(5)
–	Work-related travel expenses	(6)
–	Work-related clothing expenses	(7)
–	Work-related self-education expenses	(8)
–	Other work-related expenses	(9)
–	Low-value pool deduction <sup>a</sup>	(10)
+	Net income from working (Appendix section) <sup>b</sup>	(11)
+	<i>Total employer superannuation contributions</i>	(12)

<sup>a</sup>Low-value pool deductions refer to “low-cost” and “low-value” assets used in the course of generating income. These are assets costing  $< \$1,000$ , which can be depreciated over multiple tax lodgment years.

<sup>b</sup>NIFW (Appendix section) refers to business and partnership income that is derived from working.

recalculated for people with business and partnership income because they were required to complete a supplementary schedule in the years in which the MAWTO was in force. This schedule asked taxpayers to separate their business and partnership income that were derived from work (as opposed to passive income). These earned-income components are shown as Component 11 in Table 2.

Given this issue, we recalculate NIFW using all components from Table 2. The intention is to provide a variable for our analysis that is consistent over time and for all age groups of interest. This approach slightly overstates Component 11 income given that we cannot separate the share that is attributed to work. It does not, however, have a material effect on labor supply rates for people in this group, given that most report work-related earnings from at least one other source.

We examine three labor supply measures to provide insight into the sensitivity of the definitions of employment and corresponding earnings on our results:

1. NIFW Indicator 2: This measure recalculates ATO’s “NIFW indicator” measure by summing the tax return components shown in Table 2.
2. NIFW Indicator 3: This measure removes Component 11 in Table 2 from the definition. This change reduces employment rates by around 12% for males and 7% for females.
3. Salary and wage (SW) indicator: This is a simple measure that further underestimates the true labor supply rates. Salary and wage payments (Component 1) are, by far, the most commonly reported earning component in Table 2. This measure reduces employment rates by 14% for males and 8% for females, relative to NIFW Indicator 2.

The differences in derived labor supply rates are shown graphically in Figure 1 for males and females aged 56 years by the end of a given financial year. For this analysis, we prefer NIFW Indicator 2 given that it captures a broader group of people with business and partnership income who are more likely to materially benefit from the TRIS program.

**Figure 1** Derived employment rates for individuals aged 56 years.

NIFW, net income from working; SW, salary and wage.

In contrast to survey data, the ATO's administrative data are better suited to this study given that we wish to examine the specific effects of TRIS, which is administered through the tax and superannuation systems. The administrative data provide a richer source of relevant income components and flows to and from superannuation accounts, including data on those who receive tax offsets on qualifying superannuation income streams. The administrative data also enable more precise estimates, relative to survey data sets, given the additional statistical power obtained from larger samples.

There are however drawbacks. The administrative data have fewer variables to control for individual characteristics. We also cannot ascertain when an individual worked within a given year, or for how long, given that a measure for hours worked is not available. Thus, we can only analyze extensive margin effects of the program. We do present results on the “earned income” effects, which could be considered an imperfect proxy for intensive margin effects.

Another data limitation is that we are unable to observe spouses. This means that we are not able to gain insight into the joint retirement decisions of couples, or spouses, in response to the program. This would be an interesting question to revisit if the ATO were to make a household-level data product available.

## 5.2 Identifying TRIS recipients

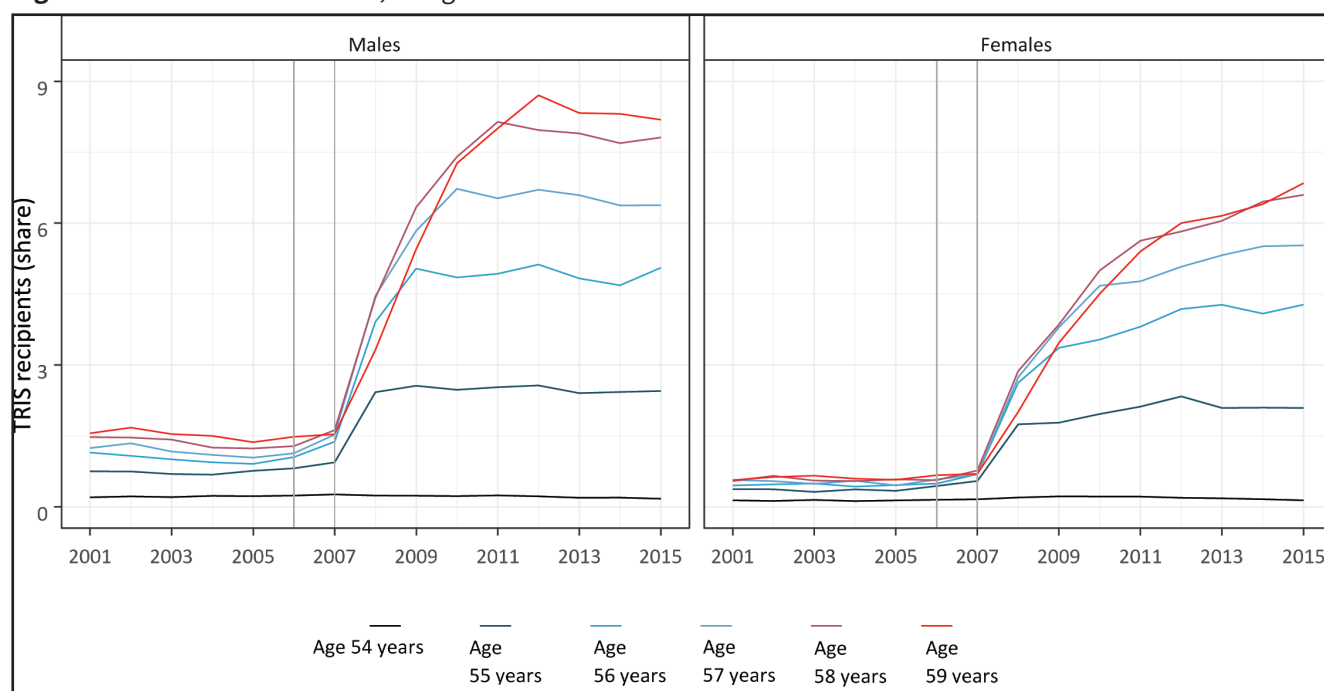
TRIS recipients cannot be directly identified in the ATO data. While TRIS amounts are taxable income for all individuals in the program's initial years, there is no way to distinguish TRIS from other taxable superannuation income streams.<sup>12</sup> Fortunately, identifying TRIS recipients is not critical for the main analysis on the employment and earnings effects. We do, however, attempt to identify people with “TRIS-like-behavior”

<sup>12</sup> This is with the exception of individuals who draw TRIS from SMSFs from 2008–09. From this year, there was a change to the SMSF income tax return form, which required direct identification of TRIS drawdowns.

by deriving rules. These rules identify people as TRIS recipients if they worked (according to our three NIFW definitions) while drawing income from their superannuation in the same year. For taxpayers who meet this rule, we include an additional condition to ensure that recipients are receiving a tax offset of 15% of the superannuation income stream.<sup>13</sup> This additional condition filters out individuals who receive income streams from untaxed superannuation funds (generally government-defined benefits schemes), which attract a 10% offset. Further, given that the data are recorded on an annual basis, we remove individuals who observe “TRIS-like behavior” in a single year only. It is likely that the majority of workers in this category are ordinary retirees. That is, they simply worked part of the year before retiring and drawing a superannuation income stream in the same financial year. In Figure 2, we show the share of the population who exhibit “TRIS-like-behavior”, as identified by the NIFW Indicator 2 measure, for males and females. These charts reveal that the adoption of TRIS appears relatively subdued in the first 2 years in which the program was available, before increasing sharply and plateauing toward the end of the period.

There are three points we wish to emphasize. First, the figures show that there is a relatively stable cohort of individuals who are classified as TRIS recipients before the policy was introduced (pre-2005–06). It is likely that these people are already receiving an annuity stream before TRIS is introduced. Unfortunately, our rule fails to separate this cohort from actual TRIS recipients. Second, there is also a very small and stable share of individuals who are aged 54 years, below the superannuation preservation age, who fit our “TRIS-like-behavior” definition. This cohort could be individuals with rare and exceptional circumstances who are receiving superannuation income streams before reaching the superannuation preservation

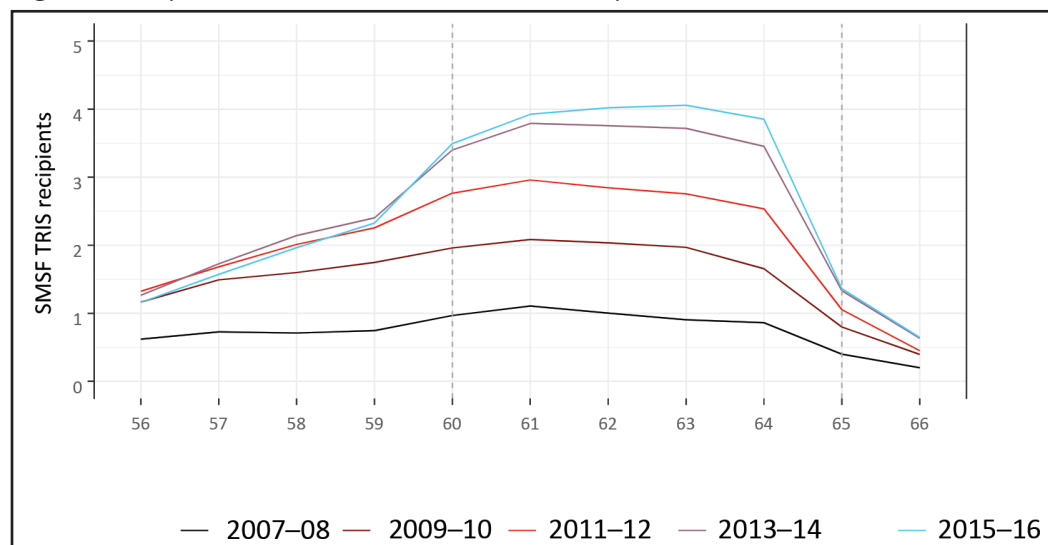
**Figure 2** “TRIS-like-behavior”, using NIFW Indicator 2 TRIS rule.



NIFW, net income from working; TRIS, Transition to Retirement Income Streams.

<sup>13</sup> We actually allow for a tax offset range between 14% and 16% to account for rounding effects, but we find that the results are not sensitive to this allowance.



**Figure 3** Reported SMSF TRIS, males and females pooled.

SMSF, self-managed superannuation funds; TRIS, Transition to Retirement Income Streams.

age. Third, our rule fails to capture recipients aged >60 years from 2007–08. This is because TRIS incomes were no longer reported on the ITR given the tax-free status of this income.

Data are available from 2007–08 for those drawing TRIS from SMSFs following a change to the SMSF annual return, which introduced a field to identify TRIS directly. Previously, TRIS incomes were pooled with other reportable superannuation income streams. The benefit of the SMSF data is that they provide insight into program adoption details for individuals aged  $\geq 60$  years. Taking these data at face value (i.e., not using our “TRIS-like-behavior” rule), we plot the share of the population who reported TRIS by age and income year in Figure 3. In this figure, we have pooled males and females with age on the  $x$ -axis to show the increased uptake for people in the age range of 60–64 years (who benefit from tax-free TRIS). The figure reveals three points of interest. First, we see that program adoption continues to increase with time and age. Second, we observe that the rate of change in uptake for people aged 60 years becomes more acute in the latter years. It therefore appears to imply a “learning effect” as program adoption matures. Third, we can also see the expected drop-off in TRIS participation from the age of 65 years given that this group is free to access their superannuation irrespective of their working status.

In Section A.3 of Appendix, we use APRA data as an independent cross-check for our derived “TRIS-like-behavior” rules. Despite some technical issues between the two data sources, we find that our method produces TRIS recipient numbers that are broadly comparable to the APRA data. The APRA statistics additionally show the strength in TRIS adoption for individuals aged >60 years, which we cannot observe in the ATO data for non-SMSFs. Adoption for the 60–64 year age grouping almost doubles relative to the 55–59 year age grouping for individuals with APRA regulated (non-SMSF) accounts.

## 6 Identification Strategy

We use a difference-in-differences (D-i-D) design to detect the labor supply and corresponding earnings response to the TRIS. This is an “intention-to-treat” effect given the voluntary nature



of program participation. We compare the difference in labor supply rates of 54- (control) and 56-year-olds (treatment) in the TRIS's first year (2005–06) with the same difference in the year before it was introduced (2004–05). We do not focus on the difference in 55-year-olds given that there is a partial-treatment effect for this group. This arises due to the annual frequency of the data, meaning that only around half of the people who are aged 55 years by the end of a given financial year are eligible for TRIS.

The first income year in which the TRIS was available, along with the minimum qualifying age, provides crisp boundaries to assign as “control” and “treatment” groups before and after TRIS's introduction. We compare individuals who are close in age as they are likely to be similar in other ways. We subsequently repeat this analysis for the corresponding measures of earnings. We estimate the effects for males and females separately, given that the labor supply rates differ by sex. Pooled results were estimated but are not presented given that they show a weighted average of the D-i-D coefficients by sex.

Noting that the TRIS adoption profile appeared relatively flat in the first year, we then examine the effect on the D-i-D estimates of skipping the first year in which TRIS options were available. Under this estimation, the control group remains the same; however, 2006–07 is assigned as the treatment year. The intention is to see whether an increased effect is detected in the second year. We then again repeat this approach for the program's third year. These D-i-D estimates are discussed in Section “Empirical results”.

Once we account for the different labor supply rates by age and sex, along with wage inflation between periods, our control and treatment groups appear similar in other ways. The summary statistics are presented in Tables A3 and A4 in Appendix. These tables include statistics on two “treatment” groups that we examine separately (2005–06 and 2006–07).

We repeat this approach to estimate the additional “tax-free effect” for workers aged  $\geq 60$  years from 2007–08 (treatment), by comparing the labor supply rates in 2006–07 (control). In this case, we compare labor supply rates of individuals aged 59 years (control group) and with individuals aged 61 years (treatment group). As with the previous estimates, we skip reporting results for individuals aged 60 years given the partial-treatment effect.

A key identifying assumption of D-i-D is that common trends hold in periods where there is no “treatment”. This assumption is required in order to isolate the treatment effect of TRIS with confidence. We graphically present these trends and discuss the factors that challenge this assumption in Section “Robustness checks”.

The D-i-D design only attempts to detect the local treatment effects for the two “treatment” age groups mentioned above, namely, 56- and 61-year-old individuals. The D-i-D design does not attempt to identify effects for other age groups who could have different responses.

A potential issue for the causal identification of program effects is the degree to which “anticipation effects” exist. For example, it could be the case that an individual intended to retire at 53 years, but who, in response to the program, continues to work until 57 years to utilize the benefits of the TRIS program in the latter 2 years before retirement. Similarly, a non-TRIS participant might have otherwise intended to retire at the age of 58 years, yet, in response to the program, continues working until 62 years of age to draw a tax-free TRIS for the latter 2 years. In these examples, “anticipation effects” are a problem to the degree to which the TRIS program is inducing a labor supply response for those in our “control group”. Unfortunately, not much can be done about this issue. We cannot observe individuals in this group nor pick

up the effect. Intuitively, we think this effect is probably negligible. To the degree that “anticipation effects” exist, they would indicate that our main results should be interpreted as lower-bound estimates on the true program effects.

## 7 Model Specification

We estimate linear probability models to detect the effect of the TRIS on labor supply (see Eq. (9)). A binary dependent variable  $participation_{it}$  takes the value of “1” if an individual is working in a given year. We define working as a “nonzero” amount of earned income according to our definitions (the “earned income” components were previously shown in Table 2). The explanatory variables are also binary. The first takes a value of “1” if the TRIS qualifying age was met ( $D_i = 1$  if aged 56 years). The second indicates whether TRIS was available in a given year ( $T_t = 1$  if TRIS was available). Finally, the D-i-D estimator is the estimate of  $\beta_3$  from the interaction of  $T_t = 1$  and  $D_i = 1$ .

$$participation_{it} = \beta_0 + \beta_1 D_i + \beta_2 T_t + \beta_3 (D_i \cdot T_t) + \epsilon_{it}. \quad (8)$$

No additional controls are available for the labor supply estimation. This is because our data construction approach utilizes official population estimates to account for the assumed nonworking population that is not observed in the administrative data. Hence, no further information is available on this group other than their sex.

To examine the effect on earnings, we substitute the binary dependent variable from Eq. (9) with the corresponding log dollar value of “earned income” (Eq. (10)). This is the sum of some or all of the income components in Table 2, depending on the measure. This estimation is conditional on working, so we exclude the nonworking individuals from the data, as defined by the NIFW measures. Noting that there is a small share of individuals who report negative business income (a loss), we convert their negative income values to \$0.01 and assign an additional dummy variable as a control for this group.

$$\ln(income_{it}) = \beta_0 + \beta_1 D_i + \beta_2 T_t + \beta_3 (D_i \cdot T_t) + \beta_4 negative_{it} + \epsilon_{it}. \quad (9)$$

## 8 Empirical Results

Table 3 presents the average employment rates for the control and treatment groups in the 12-month periods before and after the introduction of the TRIS. The employment rates in Columns 1 and 2 show that a higher share of people aged 54 years (control group) work, compared with people aged 56 years (treatment group). This is consistent with observed labor supply rates, which peak at around age 50 before beginning to trend down as workers gradually retire with age. The difference in employment rates between the two periods is shown in Column 3, and the D-i-D estimate is shown in Column 4. Labor supply rates range from 57.7% for females aged 56 years under the salary and wage measure, to 84.3% for males aged 54 years under the more comprehensive NIFW Indicator 2 measure. The D-i-D estimates for the treatment group (individuals aged 56 years) are presented in Column 4. These estimates imply that TRIS did not have an effect that was significantly different from zero in the first year in which it was available. These results appear consistent with the TRIS adoption profile (shown in Figure 2).

**Table 3** Labor supply rates in periods before and after the introduction of TRIS

	Pre-TRIS 2004–05 (1)	TRIS 2005–06 (2)	Difference (2 – 1) (3)	Difference-in- difference (4)
<i>Males</i>				
<i>A NIFW Indicator 2</i>				
Treatment (age: 56 years)	0.7977	0.8080	0.0102***	
[249,728]	(0.0011)	(0.0011)	(0.0016)	
Control (age: 54 years)	0.8317	0.8432	0.0115***	–0.0013
[256,949]	(0.001)	(0.001)	(0.0015)	(0.0022)
<i>B NIFW Indicator 3</i>				
Treatment (age: 56 years)	0.6729	0.6867	0.0138***	
[249,728]	(0.0013)	(0.0013)	(0.0019)	
Control (age: 54 years)	0.7111	0.7234	0.0124***	0.0014
[256,949]	(0.0013)	(0.0012)	(0.0018)	(0.0026)
<i>C Salary and wage indicator</i>				
Treatment (age: 56 years)	0.6557	0.6711	0.0154***	
[249,728]	(0.0014)	(0.0013)	(0.0019)	
Control (age: 54 years)	0.6962	0.7089	0.0127***	0.0027
[256,949]	(0.0013)	(0.0013)	(0.0018)	(0.0026)
<i>Females</i>				
<i>D NIFW Indicator 2</i>				
Treatment (age: 56 years)	0.6603	0.6778	0.0175***	
[250,487]	(0.0013)	(0.0013)	(0.0019)	
Control (age: 54 years)	0.7168	0.7362	0.0194***	–0.0019
[258,953]	(0.0013)	(0.0012)	(0.0018)	(0.0026)
<i>E NIFW Indicator 3</i>				
Treatment (age: 56 years)	0.5873	0.6060	0.0186***	
[250,487]	(0.0014)	(0.0014)	(0.002)	
Control (age: 54 years)	0.6476	0.6687	0.0212***	–0.0025
[258,953]	(0.0013)	(0.0013)	(0.0019)	(0.0027)
<i>F Salary and wage indicator</i>				
Treatment (age: 56 years)	0.5765	0.5959	0.0194***	
[250,487]	(0.0014)	(0.0014)	(0.002)	
Control (age: 54 years)	0.6387	0.6597	0.0211***	–0.0017
[258,953]	(0.0013)	(0.0013)	(0.0019)	(0.0027)

Notes: Labor supply equals one if the specific NIFW measure has a dollar value that does not equal zero. Sample size is presented in square brackets, and robust standard errors are in parentheses.

\*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

NIFW, net income from working; TRIS, Transition to Retirement Income Streams.

Noting the delayed adoption of the TRIS program, we test the effect of skipping the first year (2005–06) to see whether we pick up a response if 2006–07 is assigned as the treatment year. In Table 4, we present two variations of the D-i-D coefficients. Column 1 shows the D-i-D estimators from the previous table (Table 3) and Column 2 shows the D-i-D estimators that pick up the second year's response. The results for males now become slightly positive and

**Table 4** TRIS effects on “labor supply” and “earnings” (D-i-D coefficients)

	2004–05 vs 2005–06		2004–05 vs 2006–07	
	(1)		(2)	
<b>ITR, PAYG, and ABS estimates</b>	54 years vs 56 years		54 years vs 56 years	
<i>Labor supply</i>	Males			
NIFW 2 D-i-D (TRIS · Age)	–0.0013	[0.0022]	0.0052**	[0.0021]
NIFW 3 D-i-D (TRIS · Age)	0.0014	[0.0026]	0.0102***	[0.0026]
Salary and wage D-i-D (TRIS · Age)	0.0027	[0.0026]	0.0101***	[0.0026]
	Females			
NIFW 2 D-i-D (TRIS · Age)	–0.0019	[0.0026]	–0.0008	[0.0025]
NIFW 3 D-i-D (TRIS · Age)	–0.0025	[0.0027]	0.0001	[0.0027]
Salary and wage D-i-D (TRIS · Age)	–0.0017	[0.0027]	0.0003	[0.0027]
<b>ITR and PAYG data</b>	54 years vs 56 years		54 years vs 56 years	
<i>Earned income</i>	Males			
NIFW 2 D-i-D (TRIS · Age)	0.0173**	[0.0073]	0.0244***	[0.0073]
NIFW 3 D-i-D (TRIS · Age)	0.0018	[0.0079]	0.0161**	[0.0079]
Salary and wage D-i-D (TRIS · Age)	0.0021	[0.0080]	0.0179**	[0.0080]
	Females			
NIFW 2 D-i-D (TRIS · Age)	–0.0080	[0.0083]	0.0012	[0.0082]
NIFW 3 D-i-D (TRIS · Age)	–0.0175**	[0.0084]	–0.0099	[0.0082]
Salary and wage D-i-D (TRIS · Age)	–0.0190**	[0.0084]	–0.0084	[0.0083]
	2006–07 vs 2007–08		2006–07 vs 2008–09	
<b>ITR, PAYG, and ABS estimates</b>	59 years vs 61 years		59 years vs 61 years	
<i>Labor supply</i>	Males			
NIFW 2 D-i-D (TRIS · Age)	0.0247***	[0.0026]	0.0110***	[0.0026]
NIFW 3 D-i-D (TRIS · Age)	0.0253***	[0.0028]	0.0136***	[0.0028]
Salary and wage D-i-D (TRIS · Age)	0.0238***	[0.0028]	0.0115***	[0.0029]
	Females			
NIFW 2 D-i-D (TRIS · Age)	0.0134***	[0.0029]	0.0058**	[0.0029]
NIFW 3 D-i-D (TRIS · Age)	0.0113***	[0.0029]	0.0058**	[0.0029]
Salary and wage D-i-D (TRIS · Age)	0.0113***	[0.0029]	0.0050*	[0.0029]
<b>ITR and PAYG data</b>	59 years vs 61 years		59 years vs 61 years	
<i>Earned income</i>	Males			
NIFW 2 D-i-D (TRIS · Age)	0.0024	[0.0088]	0.0020	[0.0092]
NIFW 3 D-i-D (TRIS · Age)	–0.0149	[0.0093]	–0.0133	[0.0097]
Salary and wage D-i-D (TRIS · Age)	–0.0166	[0.0102]	–0.0110	[0.0099]
	Females			
NIFW 2 D-i-D (TRIS · Age)	0.0074	[0.0112]	0.0137	[0.0111]
NIFW 3 D-i-D (TRIS · Age)	–0.0229**	[0.0113]	–0.0197*	[0.0111]
Salary and wage D-i-D (TRIS · Age)	–0.0263**	[0.0114]	–0.0217*	[0.0111]

Notes: Robust standard errors are presented in brackets.

\*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

ABS, Australian Bureau of Statistics; D-i-D, difference-in-differences; ITR, income tax return; NIFW, net income from working; PAYG, Pay-As-You-Go; TRIS, Transition to Retirement Income Streams.

significant. The response ranges from half a percentage point for NIFW Indicator 2, to 1.0 percentage point for NIFW Indicator 3 and the SW indicator. The employment response for females remains statistically insignificant.

We also examine the effect of skipping the second year by assigning 2007–08 as the treatment year given that TRIS adoption appeared to increase substantially from this year. These results now show stronger labor supply responses of up to 1.4 percentage points for males and up to 1.1 percentage points for females. As with the previous estimates, the response appears consistent with the observed trends in TRIS adoption. We note, however, that the identification is weakened under this estimation given that the reassigned treatment year coincides with the “Simplified Superannuation” reforms package, which may have influenced the employment rates for our control and treatment groups differently, in addition to moving further away from our control year (2004–05). Nevertheless, the larger response in 2007–08 seems consistent with the TRIS adoption profile.

The lower half of Table 4 shows the responses for individuals aged >60 years from 2006–07. We find statistically significant results for both men and women under both scenarios irrespective of whether we skip the first year in which TRIS amounts became a tax-free income (2007–08). The response for men is as high as 2.5 percentage points in 2007–08 and up to 1.4 percentage points in 2008–09 when this year is assigned as the treatment year. The response for women is around half the response for men under all measures.

Table 4 also reports the results for the corresponding “earned income” (conditional on working) measures. These results are mixed, which probably reflects the balancing effect of the different TRIS strategies that workers can use. The D-i-D estimators for people aged 56 years range from “not significantly different from zero” to 2.4% for NIFW Indicator 2 when 2006–07 is assigned as the treatment year. The inverse is true for females, wherein we find that the results range from insignificant to negative 1.9% when 2005–06 is assigned as the treatment year. Taken at face value, this may imply that males are more likely to use TRIS to boost income in the current year (e.g., continue working full time while drawing TRIS), while females reduced their attachment to the labor market; however, TRIS is not quite topping up their incomes to prior levels. Unfortunately, it is not possible to disentangle these effects, given that a measure for time spent working is not available in the data.

The lower half of Table 4 shows the earned income D-i-D estimates for individuals aged 61 years in 2007–08 and 2008–09 (skipping the first year). Here, we find no effect for males and, consistent with the previous estimates, slightly negative results for females. Column 1 shows that the earnings effect for women is not statistically different from zero for NIFW Indicator 2, while both NIFW Indicator 3 and the salary and wage indicator are negative and statistically significant. The estimates are similar but slightly stronger when 2008–09 is assigned as the treatment year.

## 8.1 TRIS adoption – descriptive analysis

We regress the binary variable “TRIS-like-behavior” against a series of explanatory variables to gain insight into TRIS adoption over time. The intention is to undertake some descriptive analysis to provide context for the main results. The underlying population for this analysis includes all tax filers in the 54–59 year age range for the financial years 2004–05 to 2015–16.

Unfortunately, individuals aged  $\geq 60$  years are excluded given that our “TRIS-like-behavior” rule fails for this age group. The following linear probability model is estimated separately for males and females:

$$tris_{it} = \beta_0 + \beta_1 D2006_t + \beta_2 D2007_t + \beta_3 D2008_t + \dots + \beta_{11} D2016_t + \epsilon_{it}. \quad (10)$$

In Eq. (11),  $tris_{it}$  is an indicator if the individual was drawing a TRIS in a given financial year. This variable is equivalent to the series plotted in Figure 2. The right-hand side includes financial year dummies to reveal how the adoption of TRIS has changed over time. Robust standard errors in this estimation are clustered at the individual. The coefficients show the TRIS adoption rates relative to the year before the policy was introduced (2004–05), the benchmark year where no dummy was assigned. We then extend this basic model to include controls for age as at June 30 in a given year, before further extending the estimation a third time for additional controls that are available. These controls include the log of taxable income,<sup>14</sup> and the following binary controls: self-prepared tax return (as opposed to using a tax agent); whether the individual reported a partner; indicators of geographical remoteness; and taxpayers who report any income in the following categories: Personal Services Income (PSI); business and partnership income; dividend income; and rental income. The remoteness indicators were created by mapping Australian residential postcodes to the Australian Statistical Geographic Standard (Australian Bureau of Statistics, 2011). The regression outputs for the three specifications are presented in Tables A5 and A6 in Appendix for males and females, respectively.

The results show that the year and age coefficients (in Columns (1), (2), and (3)) remain stable and, as expected, confirm that adoption of TRIS was slow in the initial years before picking up noticeably from 2007–08. Adoption rates continue to increase over the course of the remaining years. A similar trend is observed with the age variable in Column (2), whereby program adoption increases as individuals age. We note that the “partial-treatment” effect, previously mentioned, is captured for 55 year olds given the lower response.

The regression coefficients show that males and females exhibit relatively similar adoption patterns across time. A difference, however, is that a higher share of males appear to use TRIS relative to females. Perhaps unsurprisingly, adoption of TRIS is positively correlated with income and for those with diverse sources of income (e.g., business, dividend, and rental income). Having professional services income (PSI) has a slightly negative effect for males and is not significant for females. The effect of a reported partner is slightly positive for males. The effect for those who self-prepare tax returns is not statistically significant for males and is slightly negative for females. TRIS use is less likely for individuals who live in more remote areas of Australia.

## 9 Discussion and Robustness Checks

We examine the sensitivity of the results by extending the control and treatment age groupings to 2 years either side of the introduction of TRIS. Table A7 in Appendix shows that the effects are stronger for both males and females relative to the single-year age group estimates. Here, we

<sup>14</sup> Negative taxable income (a loss) is possible for a small share of individuals with business income. In this case, we convert negative taxable income to 0.01 and include a dummy variable to control for individuals with negative taxable income.



compare groups aged 53–54 years (control group) with individuals aged 56–57 years (treatment group). The labor supply D-i-D estimators are all statistically significant, with effects ranging from around 0.6% for females in 2005–06 (TRIS's first year) to almost 1.9% for the salary and wage indicator in 2006–07 (TRIS's second year) for males. It appears that the double-age groupings, in this instance – the addition of people aged 57 years, are picking up the effect that older individuals are more likely to use TRIS. This effect is also observed in the TRIS adoption profiles (Figure 2) and the supplementary regression results (Tables A5 and A6 in Appendix). Given that program adoption is still maturing in this period, it supports our argument that the main results should be considered lower-bound estimates.

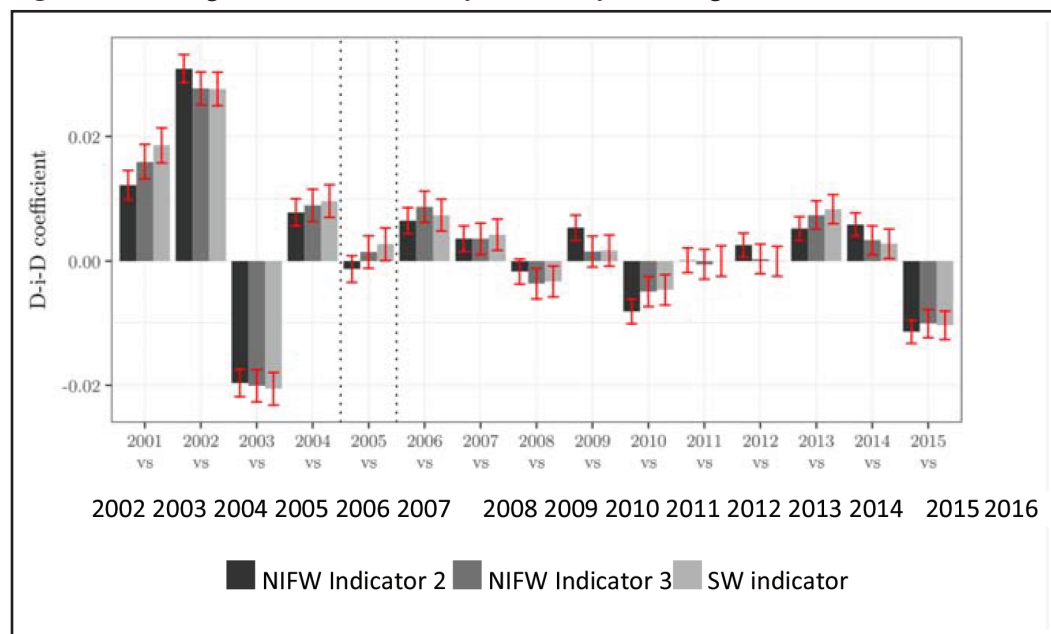
Similarly, we examine the effects of the extended age grouping for the group aged >60 years. With this check, we compare the groups aged 58–59 years (control group) with individuals aged 61–62 years (treatment group). The D-i-D estimators in 2007–08, shown in Table A7 in Appendix, are still positive and statistically significant for males but are much weaker compared with the single-year age estimates. The D-i-D estimates for females are also weaker. They move from being positive and statistically significant in the single-year specification to being not significantly different from zero under the extended-age grouping specification. Under the second specification that skips the first tax-free year (now assigning 2007–08 as the control), the estimates remain similar to the single-year age groupings; however, the effects are slightly stronger for both males and females.

It is common practice for studies that use D-i-D approaches to undertake placebo tests in periods where there is no treatment. These tests aim to demonstrate that the D-i-D coefficients return effects that are not statistically different from zero in periods where there was no treatment. For this check, we reassign the control and treatment periods for each of the neighboring 2 years in our panel. For example, we compare 2001 (assigned as control) with 2002 (assigned as treatment), then separately for 2002 (assigned as control) with 2003 (assigned as treatment), and repeat this analysis for all subsequent years.

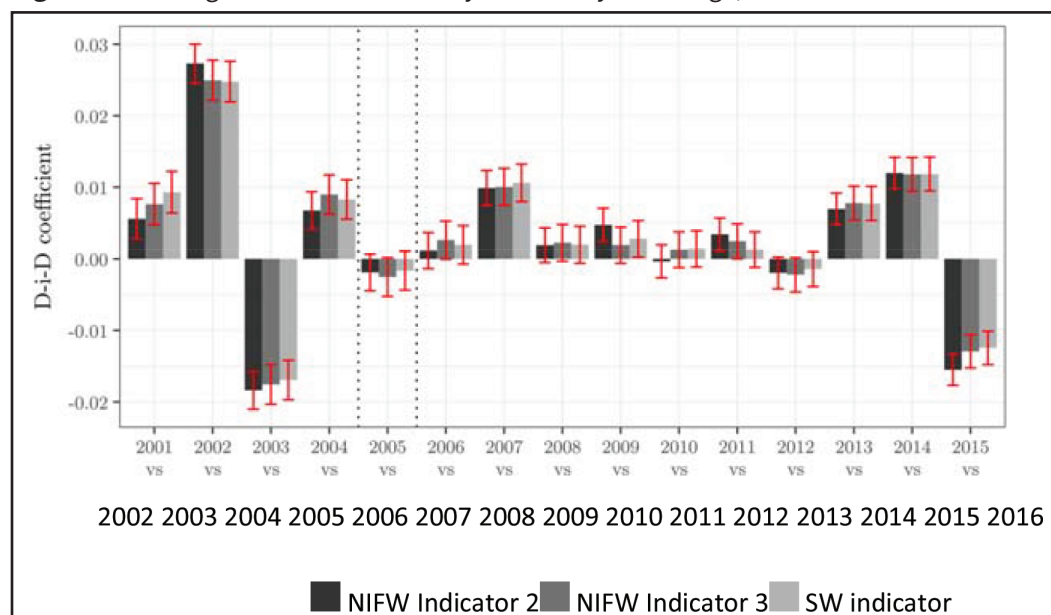
We estimate these placebo checks for males and females separately. The coefficients are presented graphically in Figures 4 and 5. The figures confirm that there are modest nonzero movements in other years. As Carter and Breunig (2019) found when they examined the responses to Australia's MAWTO, there are other known factors influencing labor supply rates in other years. These checks are therefore not true placebo tests given other fiscal, macroeconomic, and demographic changes. The large apparent "treatment" effects detected in 2002–03 and 2003–04 show the unusual effects of demographic patterns that are well documented. The instability in the early period up to 2003–04 are accounted for by individuals who were born in 1947, which was the peak year of the post-World War II baby boom, as documented by the Australian Bureau of Statistics (2004). This period, with its unusual demographic patterns, highlights a key problem with using D-i-D when common trends fail to hold. Fortunately, TRIS was implemented after this period at a time where the trends appear to have reverted to a more parallel state.

The MAWTO, an EITC for people older than the age of 55 years, was introduced in 2004–05 and was found to have small positive labor supply effects. TRIS was introduced in the following year, which is a period highlighted by the dotted lines in the figures, along with the subsequent effects that are in line with the increase in the TRIS adoption profile. Problems isolating specific effects arise from 2007–08 given that this period coincided with the "Simplified



**Figure 4** Rolling D-i-D estimates – 54 years vs 56 years of age, males.

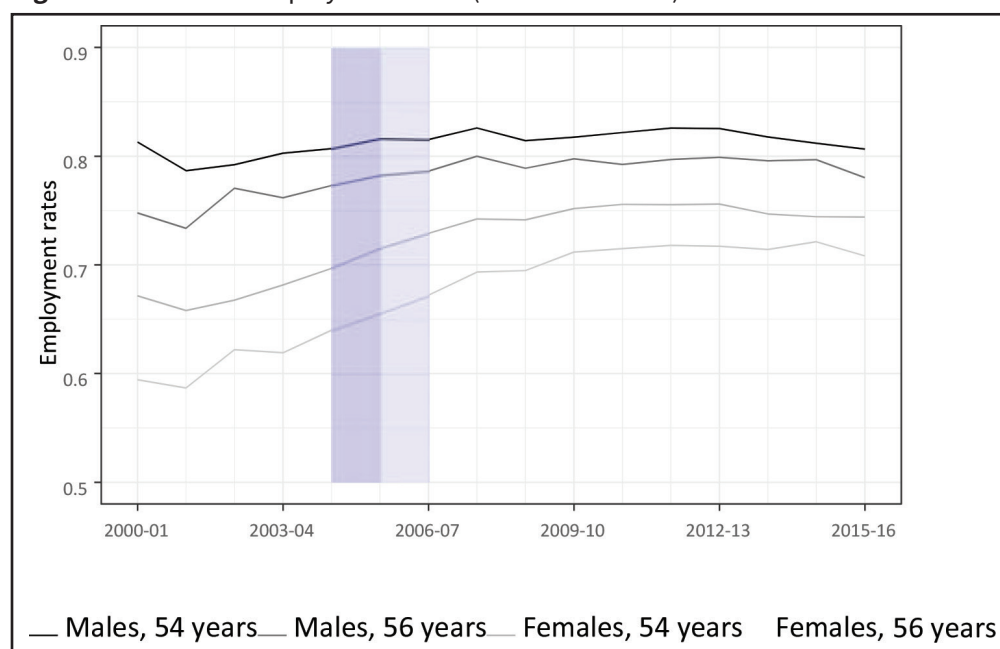
D-i-D, difference-in-differences; NIFW, net income from working; SW, salary and wage.

**Figure 5** Rolling D-i-D estimates – 54 years vs 56 years of age, females.

D-i-D, difference-in-differences; NIFW, net income from working; SW, salary and wage.

Superannuation” reforms and the subsequent onset of the global financial crisis. The global financial crisis, in particular, may have delayed retirement decisions given the value of retirement investment holdings were significantly reduced.

The trends in employment rates for individuals aged 54 years (control group) and individuals aged 56 years (treatment group) are shown in Figure 6. This provides an alternative way to view the rolling D-i-D estimates presented in Figures 4 and 5. Figure 6 shows the obvious labor supply spikes in 2000–01 and 2002–03, which are explained by unusual demographic patterns. The two highlighted areas in the figure show the key TRIS periods of interest for this paper.

**Figure 6** Trends in employment rates (NIFW Indicator 2).

NIFW, net income from working.

These checks provide important context for the main results. Above all, care should be taken in interpreting the D-i-D estimates as we cannot demonstrate null effects in periods where there is no TRIS treatment. Further, our placebo-like tests lend support to the hypothesis that the TRIS program may have had more of an effect on employment rates in subsequent years as program adoption rates increased.

It appears that <10% of workers in the 56–59 years age grouping are using TRIS by 2014–15 (according to our NIFW Indicator 2 measure). This seems low relative to the share of eligible workers who would likely benefit from the program. There are several reasons that could explain low adoption rates. First, low adoption in the initial years could be due to a “learning effect”. It may have taken time for knowledge of the program to spread and for workers to understand the benefits. Second, it is a voluntary program, which means that workers need to set up TRIS pension with their superannuation fund. Third, it is likely that a proportion of workers remain unaware of the provisions. Fourth, individuals on lower incomes and/or with lower superannuation account balances have less to gain from TRIS. This is because the maximum 10% annual account balance drawdown may be too low to make entering into the arrangement worthwhile. In addition, workers with lower income may have little, or perhaps nothing, to gain from a tax savings perspective if their income is already subject to lower marginal income tax rates.

For those individuals who meet the “TRIS-like-behavior” rule, we attempt to identify the subset that appears to be using a tax-effective strategy. Recall that we define a tax-effective strategy as a worker who draws a TRIS pension while, within the same year, makes voluntary salary-sacrificed contributions back into their superannuation fund.<sup>15</sup> From 2009–10 to 2014–15, the final year in which we can derive our “TRIS-like-behavior” rule in our data, it appears

<sup>15</sup> We use the “reportable superannuation contributions” field from the individual’s income tax return form, which isolates salary-sacrificed superannuation contributions from employer Superannuation Guarantee contributions. Separating out reportable superannuation contributions prior to 2009–10 is not possible as the amounts are pooled into a single field in the data.

that at least half of the workers in the 56–59 year age grouping are using tax-effective strategies. Unfortunately, we cannot say anything for individuals >60 years of age.

The introduction of concessional contributions caps (see Figure A2 in Appendix) lessened opportunities for higher income earners to use TRIS to minimize tax if their concessional contributions were already at, or above, the cap. For those with “TRIS-like-behavior” in 2014–15, it appears that around 1% had already exhausted their concessional contributions limit and were therefore not able to use a tax-effective strategy. To provide some context, in 2014–15, the cap was \$35,000, which implies, for workers receiving the Superannuation Guarantee at 9.5%, a corresponding annual salary of around \$370,000 or more.<sup>16</sup> This cap was further reduced to \$25,000 from 2017–18.

## 10 Conclusion

The TRIS program is a novel approach to incentivize the labor supply of older workers. The program allows early access to their concessionally taxed retirement savings. This paper considers the effect of the program in the context of a life cycle model and empirically examines the effects on labor supply and earnings. Consistent with the literature, and despite generous financial incentives, program adoption is low and is concentrated toward higher earners for whom the tax benefits are larger. TRIS had no detectable effect on labor supply in its first year, small positive effects of around 1.0% for males only in its second year, and larger effects in the program’s third year of up to 1.4% for both males and females. For people aged >60 years, we find stronger responses of up to 2.5% from 2007–08, the period when superannuation income streams became tax free for this group.

The program’s effects on earnings are ambiguous. This is because individuals can adopt different TRIS strategies depending on their income and savings goals. Despite this, we report that the TRIS had nil or very small positive earnings effects for males, and nil or slightly negative effects for females. Taken at face value, these small average effects might imply that males are more likely to use TRIS as a way to boost incomes while continuing to work full time, and females are more likely to use the policy as it is intended to support their transition to retirement. This is, however, difficult to ascertain given the lack in the data of a measure for time spent working.

We highlight that the delayed program adoption weakens the clean identification of program effects, along with modest deviations to the common trends assumption. It appears that it took time for knowledge of the program to spread and, hence, for program adoption to mature. This delay is consistent with the magnitude and timing of the estimated labor supply effects, which are nil or slightly positive in the initial years and increase in subsequent years. A related issue is that our ability to accurately detect the program effects becomes less reliable the further we move away from the program’s initial year. This means that we cannot estimate the causal effects for all age groups as program adoption matured. For this reason, we argue that our results should be viewed as a lower bound on the true program effects.

<sup>16</sup> We note that it is common for certain occupations to receive more than the Superannuation Guarantee rate. For example, Australian public servants usually receive 15.4% of ordinary time earnings and academia is known to offer even higher rates.

Higher earners have more to gain from TRIS, and our analysis confirms that this group is more likely to participate in the program. The lack of a work test has provided the opportunity to use TRIS as a tool to minimize tax. It appears that at least half of the TRIS recipients are using tax-effective strategies. Hanegbi (2013) suggests that the program could be better targeted by requiring taxpayer self-assessment against specific criteria to ensure that the program is used as intended. The situation of workers entering into TRIS arrangements with no intention of reducing hours or workplace responsibilities seems at odds with the policy's intent – and particularly for those employing tax-effective strategies.

## **Declarations**

### **Availability of data and materials**

The Australian Taxation Office Longitudinal Information Files (ALife) were used as the source of evidence to support this research. For further detail on ALife please see <https://alife-research.app/> and Polidano et al. (2020).

### **Competing interests**

The author declares no competing interests.

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### **Authors' contributions**

Andrew Carter is the sole author.

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## A Appendix

### A.1 Simplified use-case examples

TRIS intends to encourage labor supply by offering (i) financial flexibility to workers through the early release of superannuation, (ii) tax concessions via a tax offset on TRIS income (which became tax free income for those >60 years of age from July 1, 2007), along with tax-free earnings within TRIS pension accounts, and (iii) tax planning opportunities. Three simplified examples of TRIS use cases are presented in this section based on the 200506 tax settings.<sup>17</sup> The intention of this section is to provide a sense of the program's benefits.

#### A.1.1 Intended use – reducing work

John recently turned 55 and wishes to reduce his working hours without reducing his take-home pay. John earns a full-time annual salary of \$80,000 and transfers \$200,000 of his superannuation account balance to a transition to retirement pension account. John decides to work 3.5 days per week, now earning \$60,000 annually. In order to maintain his previous posttax income, John draws a TRIS of \$19,068. As a result, John saves \$4,932 in income tax due to the TRIS tax offset while maintaining the same posttax income.

#### A.1.2 Moderate use – boosting income

Sally is 55 and is looking to boost her income in the current year so she can make higher mortgage repayments. Sally earns \$100,000 annually and transfers \$250,000 of her superannuation into a transition to retirement pension account. Sally continues to work full time while drawing a TRIS of \$25,000. Sally's posttax income is increased by \$16,550. The tax offset on the TRIS provides a tax saving of \$3,750.

#### A.1.3 Aggressive use – tax planning

Emily is 55 and is looking for opportunities to minimize tax. Emily earns \$140,000 and transfers \$350,000 of her superannuation into a transition to retirement pension account. Emily asks her employer to salary sacrifice her entire wage payments into her superannuation. Emily now only pays a flat 15% superannuation contributions tax on this income, avoiding her marginal tax rate of 47%. Within the same year, Emily also draws a TRIS of \$35,000. Emily's posttax income drops from \$90,650 to \$33,890 but Emily does not mind because she has other savings to draw upon for current year consumption, and she is saving \$27,240 in tax.

Each of the above examples became more attractive for individuals aged  $\geq 60$  years when TRIS became tax-free income from 2007–08. From this year, however, the opportunity to use TRIS to minimize tax was lessened due to the introduction of limits on concessional superannuation contributions (see Section A.2 in Appendix for more detail).

<sup>17</sup> Please see Table A2 in Section A.4 for the calculations that underpin these examples.

## A.2 Tax planning with TRIS

TRIS “tax planning” opportunities are commonly advertised by financial planners as a strategy that all eligible working individuals should consider.<sup>18</sup> Strategies can be tailored depending on individual circumstances and retirement income goals. For example, strategies can be designed to top up incomes for those wanting to reduce hours; boost posttax income and/or superannuation contributions, or to reduce an individual’s tax liability.

A tax-effective strategy is to use TRIS in conjunction with concessional salary-sacrificed contribution provisions that are commonly available to workers. Using this approach, the employee draws down on their superannuation while, concurrently, deposits salary-sacrificed voluntary contributions (in addition to compulsory employer Superannuation Guarantee contributions) back into their superannuation fund. This opportunity allows people to take advantage of the difference between the 15% tax on contributions paid within the fund and a taxpayer’s marginal rate. This strategy became more attractive for people aged >60 years when superannuation income streams became tax free from July 1, 2007. Figure A1 in Appendix depicts the income streams flowing to and from an individual’s superannuation to lower his or her tax liability. Higher income earners have more to gain as they avoid relatively higher marginal tax rates that their wages would have otherwise attracted. Further, they are more likely to have larger superannuation account balances to draw TRIS and will typically have increased capacity to make larger salary-sacrificed contributions back into their superannuation fund.

A limit on the amount of concessional (pretax) salary contributions was introduced in the 2007–08 financial year, 2 years after the introduction of TRIS. Caps were introduced as an integrity measure to lessen opportunities to channel excessively large amounts of pretax income into superannuation. Throughout the introductory years, caps were generous, which meant effective tax minimization strategies could still be implemented. Figure A2 in Appendix shows how the concessional contribution caps have gradually reduced since their introduction.

## A.3 Benchmarking our “TRIS-like-behavior” rules

Very little published information exists on TRIS usage. This is with the exception of a “one-off” Australian Prudential Regulation Authority (APRA) (2015) publication that provides some summary statistics for the 2014–15 income year only. We use the APRA data as independent cross-check for our derived “TRIS-like-behavior” rules in this year.<sup>19</sup> Table A1 in the Appendix shows the three derived TRIS measures (rows A–D; and rows H–K) for the 55–59 year age range.

This is not a perfect comparison. The unit reporting between the APRA statistics and our derived rules are different. The APRA statistics are on a superannuation account basis, compared to the derived measures, which are on an individual basis. Using the ATO data, we cannot identify people who may be drawing a TRIS from multiple accounts. Despite these issues, this benchmarking exercise provides some validation that our method is capturing a

<sup>18</sup> The Australian Securities and Investments Commission’s “Money Smart” website also advertises strategies to minimise tax: <https://www.moneysmart.gov.au/superannuation-and-retirement/income-sources-in-retirement/income-from-super/transition-to-retirement> (accessed May 7, 2022).

<sup>19</sup> The author wrote to APRA to ask whether these summary statistics by gender and age could be made available in other years. APRA indicated that they only have collected data from 2015 given changes to reporting requirements that took effect around this time.



comparable number of TRIS recipients, particularly once we adjust for the apparent overcounting of people who fit our “TRIS-like-behavior” rule in the years prior to the introduction of the program (pre-2005-06).

The APRA statistics additionally show the strength in TRIS adoption for individuals aged >60 years, which we cannot observe in the ATO data. Adoption for the 60–64 year age range almost doubles relative to the 55–59 year age grouping. A limitation of the APRA data is that we do not observe adoption for those with SMSFs. The ATO “TRIS-like behavior” aggregates show that SMSF TRIS recipients accounted for around 16% of the total, while receiving around 25% of TRIS payments in 2014–15.

#### A.4 Additional tables and figures

**Table A1** TRIS measures versus APRA statistics, 55–59 year age range, 2014–15<sup>1</sup>

		APRA-regulated funds			SMSFs		
		Female	Male	Total	Female	Male	Total
Count of TRIS recipients ('000s)							
A	NIFW Indicator 2	30	35	65	7	7	14
B	NIFW Indicator 3	27	31	58	6	5	11
C	SW indicator	26	30	56	5	5	10
D	APRA 55–59	21	26	47	na	na	na
E	APRA 60–64	40	52	92	na	na	na
F	APRA 65–69	3	4	7	na	na	na
Total TRIS payments (\$ million)							
G	NIFW Indicator 2	342	498	840	125	182	307
H	NIFW Indicator 3	298	432	730	98	140	237
I	SW indicator	282	408	690	87	122	208
J	APRA 55–59	204	325	529	na	na	na
K	APRA 60–64	438	801	1,239	na	na	na
L	APRA 65–69	38	72	110	na	na	na

<sup>1</sup>There is a difference in the reported unit between the APRA and derived TRIS estimates. The APRA statistics are on an account basis, whereas the derived TRIS estimates are on an individual basis.

APRA, Australian Prudential Regulation Authority; NIFW, net income from working; SMSF, self-managed superannuation funds; SW, salary and wage; TRIS, Transition to Retirement Income Streams.

**Table A2** Hypothetical TRIS use cases in 2005–06

		<b>Intended use: reducing labor (\$ 000s)</b>	<b>Moderate use: bolstering income (\$ 000s)</b>	<b>Aggressive use: tax planning (\$ 000s)</b>	<b>Notes</b>
<i>Benchmark</i>					
A	Earnings from work	80.0	100.0	140.0	
B	Income tax on earnings	21.9	30.6	49.4	2004–05 schedule
C	Posttax earnings	58.1	69.5	90.7	=A – B
D	Employer contributions	7.2	9.0	12.6	=A*0.09 <sup>a</sup>
E	Salary-sacrificed contributions	0.0	0.0	0.0	
F	Tax on contributions	1.1	1.4	1.9	=(D+E)*0.15
<i>Using TRIS</i>					
H	Earnings from work	56.0	100.0	0.0	
I	TRIS	19.1	25.0	35.0	=R*0.1 <sup>b</sup>
J	Assessable income	75.1	125.0	35.0	=H+I
K	Tax on earnings	19.8	42.8	6.4	2004–05 schedule
L	TRIS tax offset	2.9	3.8	5.3	=H*0.15
M	Tax minus TRIS offset	17.0	39.0	1.1	=K+L
N	Posttax earnings	58.1	86.0	33.9	=J – M
O	Employer contributions	5.0	9.0	12.6	=H*.09 <sup>a</sup>
P	Salary-sacrificed contributions	0.0	0.0	140.0	
Q	Tax on contributions	0.8	1.4	22.9	=O+P*0.15
R	Superannuation balance	200.0	250.0	350.0	A*2.5 <sup>c</sup>
<i>Difference</i>					
S	After-tax earnings	0.0	16.6	–56.8	=N – C
T	Tax on income	–4.9	8.5	–48.2	=M – B
U	Super contributions	–2.2	0.0	140.0	=O+P – D
V	Tax on contributions	–0.3	0.0	21.0	=Q – F
W	Tax paid	–5.3	8.5	–27.2	=U+W

<sup>a</sup>Assumed to be at the superannuation guarantee rate of 9.0% in 2005–06.

<sup>b</sup>TRIS amounts are assumed to be at the maximum rates of 10%.

<sup>c</sup>Superannuation balance is assumed to be 2.5 times the earnings from work.

TRIS, Transition to Retirement Income Streams.

**Table A3** Summary statistics before and after the introduction of TRIS, males

	Control period		Treatment 1		Treatment 2	
	2004–05		2005–06		2006–07	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
<b>ITR, PAYG, plus ABS estimates</b>						
Income year	2004–05	0.00	2005–06	0.00	2006–07	0.00
Age at June 30	54.98	1.00	54.99	1.00	54.98	1.00
<i>Employment rates</i>						
NIFW Indicator 2	0.82	0.39	0.83	0.38	0.83	0.38
NIFW Indicator 3	0.69	0.46	0.71	0.46	0.71	0.45
SW indicator	0.68	0.47	0.69	0.46	0.70	0.46
<i>Earned income</i>						
NIFW Indicator 2 (\$)	56,419	74,440	60,311	92,301	64,771	93,301
NIFW Indicator 3 (\$)	57,697	63,970	61,602	87,307	65,952	83,799
SW indicator (\$)	57,908	60,298	61,928	82,835	66,350	81,510
Observations (number)	251,666	na	255,011	na	258,715	na
<b>ITR observations only</b>						
Income year	2004–05	0.00	2005–06	0.00	2006–07	0.00
Age at June 30	54.98	1.00	54.98	1.00	54.97	1.00
<i>Employment rates</i>						
NIFW Indicator 2	0.93	0.25	0.94	0.25	0.94	0.24
NIFW Indicator 3	0.79	0.41	0.80	0.40	0.80	0.40
SW indicator	0.77	0.42	0.78	0.42	0.79	0.41
<i>Earned income</i>						
NIFW Indicator 2 (\$)	57,099	75,080	61,023	93,193	65,536	94,171
NIFW Indicator 3 (\$)	58,539	64,496	62,477	88,249	66,881	84,624
SW indicator (\$)	58,777	60,751	62,832	83,706	67,311	82,302
<i>Controls</i>						
Reported spouse	0.59	0.49	0.62	0.48	0.62	0.48
Self-prepared tax return	0.20	0.40	0.20	0.40	0.20	0.40
Business and PSI income	0.11	0.32	0.11	0.32	0.12	0.33
Partnership and trust income	0.21	0.41	0.20	0.40	0.20	0.40
Dividend income	0.39	0.49	0.37	0.48	0.37	0.48
Rental income	0.21	0.41	0.21	0.41	0.22	0.41
<i>Remoteness</i>						
Major cities	0.68	0.47	0.68	0.47	0.67	0.47
Inner regional	0.20	0.40	0.21	0.40	0.21	0.41
Outer regional	0.09	0.29	0.09	0.29	0.09	0.29
Remote and very remote	0.02	0.13	0.02	0.13	0.02	0.13
Not available	0.01	0.09	0.01	0.10	0.01	0.11
Observations (number)	214,771	na	219,504	na	222,946	na

*Note:* The *Earned income* measures show the mean and std. dev. for working individuals only. The number of individuals who have *Earned income* in a given year can be calculated by multiplying the relevant "Participation measure" by the number of observations.

ABS, Australian Bureau of Statistics; ITR, income tax return; na, not available; NIFW, net income from working; PAYG, Pay-As-You-Go; PSI, personal services income; Std. dev., standard deviation; SW, salary and wage; TRIS, Transition to Retirement Income Streams.

**Table A4** Summary statistics before and after the introduction of TRIS, females

	Control period		Treatment 1		Treatment 2	
	2004–05		2005–06		2006–07	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
<b>ITR, PAYG, plus ABS estimates</b>						
Income year	2004–05	0.00	2005–06	0.00	2006–07	0.00
Age at June 30	54.98	1.00	54.99	1.00	54.98	1.00
<i>Employment rates</i>						
NIFW Indicator 2	0.69	0.46	0.71	0.46	0.72	0.45
NIFW Indicator 3	0.62	0.49	0.64	0.48	0.66	0.47
SW indicator	0.61	0.49	0.63	0.48	0.65	0.48
<i>Earned income</i>						
NIFW Indicator 2 (\$)	35,971	29,205	38,557	32,599	41,412	36,773
NIFW Indicator 3 (\$)	36,616	27,720	39,237	30,703	41,915	33,900
SW indicator (\$)	36,251	26,713	38,861	29,807	41,385	32,733
Observations (number)	252,876	na	256,564	na	261,864	na
<b>ITR observations only</b>						
Income year	2004–05	0.00	2005–06	0.00	2006–07	0.00
Age at June 30	54.96	1.00	54.97	1.00	54.96	1.00
<i>Employment rates</i>						
NIFW Indicator 2	0.88	0.32	0.89	0.31	0.90	0.30
NIFW Indicator 3	0.79	0.41	0.80	0.40	0.82	0.39
SW indicator	0.78	0.42	0.79	0.41	0.80	0.40
<i>Earned income</i>						
NIFW Indicator 2 (\$)	36,353	29,213	35,699	31,473	41,818	36,853
NIFW Indicator 3 (\$)	37,060	27,679	39,696	30,705	42,380	33,909
SW indicator (\$)	36,692	26,649	39,317	29,790	41,838	32,729
<i>Controls</i>						
Reported spouse	0.51	0.50	0.56	0.50	0.56	0.50
Self-prepared tax return	0.23	0.42	0.23	0.42	0.24	0.43
Business and PSI income	0.05	0.22	0.05	0.22	0.06	0.24
Partnership and trust income	0.26	0.44	0.25	0.43	0.24	0.42
Dividend income	0.40	0.49	0.38	0.49	0.37	0.48
Rental income	0.20	0.40	0.20	0.40	0.21	0.40
<i>Remoteness</i>						
Major cities	0.69	0.46	0.69	0.46	0.69	0.46
Inner regional	0.20	0.40	0.20	0.40	0.20	0.40
Outer regional	0.08	0.28	0.08	0.28	0.08	0.28
Remote and very remote	0.01	0.12	0.01	0.12	0.01	0.12
Not available	0.01	0.08	0.01	0.09	0.01	0.10
Observations (number)	192,587	na	199,174	na	206,331	na

*Note:* The *Earned income* measures show the mean and std. dev. for working individuals only. The number of individuals that have *Earned income* in a given year can be calculated by multiplying the relevant “Participation measure” by the number of observations.

ABS, Australian Bureau of Statistics; ITR, income tax return; na, not available; NIFW, net income from working; PAYG, Pay-As-You-Go; PSI, personal services income; Std. dev., standard deviation; SW, salary and wage; TRIS, Transition to Retirement Income Streams.

**Table A5** TRIS adoption – descriptive analysis, males

	Without controls		Plus age		Additional controls	
	(1)		(2)		(3)	
Income tax return data only						
Intercept	0.0096***	[0.0001]	−0.0255***	[0.0001]	−0.0854***	[0.0005]
D2006	0.0008***	[0.0001]	0.0003***	[0.0001]	−0.0000	[0.0001]
D2007	0.0027***	[0.0001]	0.0025***	[0.0001]	0.0021***	[0.0001]
D2008	0.0212***	[0.0002]	0.0211***	[0.0002]	0.0208***	[0.0002]
D2009	0.0320***	[0.0002]	0.0320***	[0.0002]	0.0322***	[0.0002]
D2010	0.0376***	[0.0003]	0.0378***	[0.0003]	0.0363***	[0.0003]
D2011	0.0398***	[0.0003]	0.0400***	[0.0003]	0.0382***	[0.0003]
D2012	0.0412***	[0.0003]	0.0415***	[0.0003]	0.0396***	[0.0003]
D2013	0.0397***	[0.0003]	0.0401***	[0.0003]	0.0373***	[0.0003]
D2014	0.0388***	[0.0003]	0.0392***	[0.0003]	0.0365***	[0.0003]
D2015	0.0395***	[0.0003]	0.0398***	[0.0003]	0.0380***	[0.0003]
Age at June 30						
Age 54 years	−	−	0.0005***	[0.0000]	0.0003***	[0.0000]
Age 55 years	−	−	0.0219***	[0.0001]	0.0215***	[0.0001]
Age 56 years	−	−	0.0433***	[0.0002]	0.0427***	[0.0002]
Age 57 years	−	−	0.0563***	[0.0002]	0.0557***	[0.0002]
Age 58 years	−	−	0.0660***	[0.0002]	0.0654***	[0.0002]
Age 59 years	−	−	0.0672***	[0.0002]	0.0666***	[0.0002]
Additional controls						
Log(Taxable income)	−	−	−	−	0.0046***	[0.0000]
Negative taxable income	−	−	−	−	0.0463***	[0.0006]
Self-prepared return	−	−	−	−	−0.0012***	[0.0003]
Reported partner	−	−	−	−	−0.0083***	[0.0002]
PSI income	−	−	−	−	−0.0022***	[0.0003]
Business and partnership income	−	−	−	−	0.0046***	[0.0003]
Dividend income	−	−	−	−	0.0168***	[0.0002]
Rental income	−	−	−	−	0.0062***	[0.0003]
Remoteness						
Inner regional	−	−	−	−	0.0022***	[0.0003]
Outer regional	−	−	−	−	−0.0078***	[0.0004]
Remote and very remote	−	−	−	−	−0.0189***	[0.0006]
Not available	−	−	−	−	−0.0133***	[0.0005]
Observations	8,809,835		8,809,835		8,809,835	
R-squared	0.0074		0.0280		0.0346	

Notes: Robust standard errors clustered at the individual level are presented in brackets.

\*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

PSI, personal services income; TRIS, Transition to Retirement Income Streams.

**Table A6** TRIS adoption – descriptive analysis, females

	Without controls		Plus age		Additional controls	
	(1)		(2)		(3)	
Income tax return data only						
Intercept	0.0051***	[0.0001]	−0.0228***	[0.0001]	−0.0728***	[0.0004]
D2006	0.0006***	[0.0001]	0.0003***	[0.0001]	0.0005***	[0.0001]
D2007	0.0017***	[0.0002]	0.0015***	[0.0001]	0.0017***	[0.0001]
D2008	0.0170***	[0.0002]	0.0169***	[0.0002]	0.0172***	[0.0002]
D2009	0.0244***	[0.0002]	0.0243***	[0.0002]	0.0257***	[0.0002]
D2010	0.0302***	[0.0002]	0.0301***	[0.0002]	0.0299***	[0.0002]
D2011	0.0335***	[0.0002]	0.0334***	[0.0002]	0.0330***	[0.0002]
D2012	0.0366***	[0.0002]	0.0365***	[0.0002]	0.0356***	[0.0002]
D2013	0.0377***	[0.0002]	0.0376***	[0.0002]	0.0369***	[0.0002]
D2014	0.0388***	[0.0002]	0.0386***	[0.0002]	0.0379***	[0.0002]
D2015	0.0401***	[0.0002]	0.0399***	[0.0002]	0.0400***	[0.0003]
Age at June 30						
Age 54 years	−	−	0.0003***	[0.0000]	0.0002***	[0.0000]
Age 55 years	−	−	0.0186***	[0.0001]	0.0181***	[0.0001]
Age 56 years	−	−	0.0361***	[0.0002]	0.0355***	[0.0002]
Age 57 years	−	−	0.0459***	[0.0002]	0.0454***	[0.0002]
Age 58 years	−	−	0.0531***	[0.0002]	0.0525***	[0.0002]
Age 59 years	−	−	0.0529***	[0.0003]	0.0524***	[0.0002]
Additional controls						
Log(Taxable income)	−	−	−	−	0.0046***	[0.0000]
Negative taxable income	−	−	−	−	0.0480***	[0.0006]
Self-prepared return	−	−	−	−	−0.0067***	[0.0002]
Reported partner	−	−	−	−	−0.0045***	[0.0002]
PSI income	−	−	−	−	0.0017***	[0.0004]
Business and partnership income	−	−	−	−	0.0107***	[0.0003]
Dividend income	−	−	−	−	0.0135***	[0.0002]
Rental income	−	−	−	−	0.0053***	[0.0003]
Remoteness						
Inner regional	−	−	−	−	0.0008**	[0.0003]
Outer regional	−	−	−	−	−0.0063***	[0.0004]
Remote and very remote	−	−	−	−	−0.0156***	[0.0006]
Not available	−	−	−	−	−0.0095***	[0.0004]
Observations	8,182,689		8,182,689		8,182,689	
R-squared	0.0079		0.0242		0.0311	

Notes: Robust standard errors clustered at the individual level are presented in brackets.

\*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

PSI, personal services income; TRIS, Transition to Retirement Income Streams.

**Table A7** TRIS effects on “labor supply” and “earnings” (double age grouping D-i-D coefficients)

	2004–05 vs 2005–06		2004–05 vs 2006–07	
	(1)		(2)	
<b>ITR, PAYG, and ABS estimates</b>	53–54 vs 56–57		53–54 vs 56–57	
<i>Labor supply</i>	Males			
NIFW Indicator 2 D-i-D (TRIS · Age)	0.0100***	[0.0015]	0.0144***	[0.0015]
NIFW Indicator 3 D-i-D (TRIS · Age)	0.0116***	[0.0018]	0.0178***	[0.0018]
SW indicator D-i-D (TRIS · Age)	0.0125***	[0.0018]	0.0185***	[0.0018]
	Females			
NIFW Indicator 2 D-i-D (TRIS · Age)	0.0062***	[0.0018]	0.0099***	[0.0018]
NIFW Indicator 3 D-i-D (TRIS · Age)	0.0057***	[0.0019]	0.0103***	[0.0019]
SW indicator D-i-D (TRIS · Age)	0.0063***	[0.0019]	0.0105***	[0.0019]
<b>ITR and PAYG data</b>	53–54 vs 56–57		53–54 vs 56–57	
<i>Earned income</i>	Males			
NIFW Indicator 2 D-i-D (TRIS · Age)	0.0153***	[0.0052]	0.0264***	[0.0052]
NIFW Indicator 3 D-i-D (TRIS · Age)	0.0045	[0.0056]	0.0132**	[0.0056]
SW indicator D-i-D (TRIS · Age)	0.0037	[0.0057]	0.0110*	[0.0057]
	Females			
NIFW Indicator 2 D-i-D (TRIS · Age)	–0.0037	[0.0059]	0.0048	[0.0058]
NIFW Indicator 3 D-i-D (TRIS · Age)	–0.0037	[0.0059]	–0.0019	[0.0059]
SW indicator D-i-D (TRIS · Age)	–0.0069	[0.0059]	–0.0026	[0.0059]
	2006–07 vs 2007–08		2006–07 vs 2008–09	
<b>ITR, PAYG, and ABS estimates</b>	58–59 vs 61–62		58–59 vs 61–62	
<i>Labor supply</i>	Males			
NIFW Indicator 2 D-i-D (TRIS · Age)	0.0059***	[0.0019]	0.0133***	[0.0018]
NIFW Indicator 3 D-i-D (TRIS · Age)	0.0094***	[0.0020]	0.0146***	[0.0020]
SW indicator D-i-D (TRIS · Age)	0.0092***	[0.0020]	0.0137***	[0.0020]
	Females			
NIFW Indicator 2 D-i-D (TRIS · Age)	0.0022	[0.0020]	0.0072***	[0.0020]
NIFW Indicator 3 D-i-D (TRIS · Age)	0.0022	[0.0020]	0.0078***	[0.0020]
SW indicator D-i-D (TRIS · Age)	0.0022	[0.0020]	0.0073***	[0.0020]
<b>ITR and PAYG data</b>	58–59 vs 61–62		58–59 vs 61–62	
<i>Earned income</i>	Males			
NIFW Indicator 2 D-i-D (TRIS · Age)	0.0026	[0.0067]	0.0065	[0.0066]
NIFW Indicator 3 D-i-D (TRIS · Age)	–0.0141*	[0.0072]	–0.0046	[0.0070]
SW indicator D-i-D (TRIS · Age)	–0.0191***	[0.0074]	–0.0064	[0.0071]
	Females			
NIFW Indicator 2 D-i-D (TRIS · Age)	0.0048	[0.0081]	0.0183**	[0.0079]
NIFW Indicator 3 D-i-D (TRIS · Age)	–0.0180**	[0.0082]	–0.0126	[0.0079]
SW indicator D-i-D (TRIS · Age)	–0.2060**	[0.0083]	–0.0142*	[0.0079]

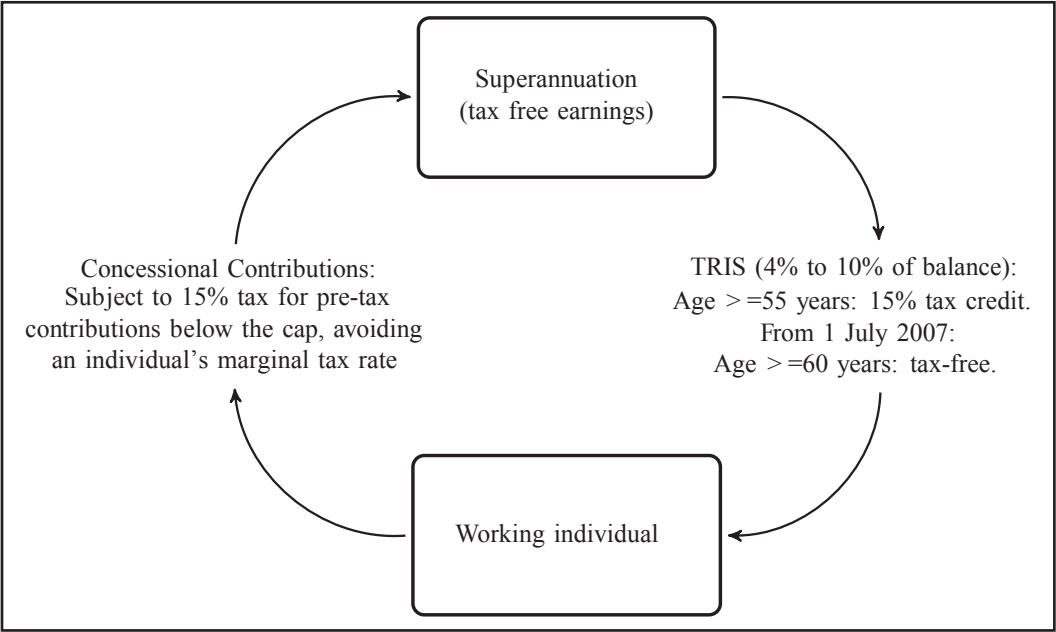
Notes: Robust standard errors are presented in brackets.

\*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

ABS, Australian Bureau of Statistics; D-i-D, difference-in-differences; ITR, income tax return; NIFW, net income from working; PAYG, Pay-As-You-Go; PSI, personal services income; SW, salary and wage; TRIS, Transition to Retirement Income Streams.



**Figure A1** A tax-effective strategy.



**Figure A2** Historical concessional contributions caps.

