Elasticity of Taxable Income and Adjustment Costs: High-Income Taxpayers' Bunching Behavior*

Arezou Zaresani† Miguel Olivo-Villabrille‡ Robert Breunig§

February 13, 2025

Abstract

Increasing income inequality has prompted discussion on taxing high-income individuals. We examine how high-income taxpayers respond to decreases in marginal tax rates on personal income, focusing on the Elasticity of Taxable Income (ETI) and adjustment costs. Our analysis incorporates both fixed and marginal adjustment costs into bunching models that allow for partial income adjustments and bunching from below. High-income individuals exhibit strong sensitivity and responsiveness to tax policies and engage in strategic behaviors, including bunching at tax kinks and chanelling income through other structures such as trust or business income. We observe only very small labor supply responses. Accounting for both fixed and marginal adjustment costs doubles the ETI compared to our estimates from models that ignore adjustment costs or rely solely on fixed adjustment costs. We estimate a marginal cost-to-tax-savings ratio of 0.39. These findings highlight the necessity of including adjustment costs and acknowledging strategic taxpayer behavior when designing tax policies, providing valuable insights for the policy debate on higher tax rates for high-income individuals.

JEL classification: H21; H24; H26; D31.

Keywords: income inequality; taxation and incentives; progressive income tax; high-income taxpayers; elasticity of taxable Income (ETI); bunching; kink; adjustment costs

*We appreciate the valuable insights and suggestions provided by Ashley Craig, Xiaodong Fan, Brendan Fugate, Christian Gillitzer, Nicolas Marceau, Dylan Moore, Mazhar Waseem, and anonymous referees which have significantly improved this paper. We also acknowledge the contributions of seminar participants at various conferences, including Asia and Australasian Society of Labour Economics (AASLE 2022), Australian Workshop on Public Finance (AWPF 2023), Labour Econometrics Workshop (LEW 2023), Canadian Public Economics Group (CPEG 2023), University of British Colombia, Committee for Development of Australia (CEDA), Australian Department of Social Services (DSS), Canadian Economic Association (CES 2024), Australian Public Economics Exchange (APEX 2024), Australian Economics Conference (AEC 2024), and International Institute for Public Finance (IIPF 2024). We thank Trevor Rose for his excellent research assistance, and to Andrew Carter, Justin Holland, Son Nguyen, and Kim Cvetanovska from the Australian Taxation Office and the Sax Institute for their assistance with data access. This research received support from the Canadian Social Sciences and Humanities Research Council's Insight Development Grant (SSHRC-IDG). All views expressed in this paper are those of the authors and do not necessarily represent the views of the Australian or Canadian Governments or their agencies.

†Corresponding author: University of Sydney, Email: arezou.zaresani@sydney.edu.au.

‡Australian National University.

§Australian National University.

1 Introduction

Over the past four decades, global income and wealth inequalities have soared, thereby strengthening the political clout of high earners (Chancel et al., 2022; Saez and Zucman, 2020).[1] With greater financial resources, high-income individuals can influence policy and media, complicating efforts to promote more equitable economic systems and posing a challenge in addressing income inequality without undermining broader economic objectives. Progressive income tax systems, in which marginal tax rates rise with income, have long been a primary policy tool for redistributing wealth from high- to low-income individuals and mitigating income inequality. A growing literature examines the impact of tax policies on high-income earners (Kleven, 2025; Axelson et al., 2024), as they contribute a disproportionately large share of overall tax revenue and therefore play a central role in shaping public finances. Moreover, high-income individuals can often adjust their taxable income more easily to target specific income levels to minimize their tax liabilities—such as by channelling income through trusts and business income—making their reported income highly elastic relative to those with fewer adjustment options. The efficiency cost of tax policies, which is vital for optimal policy design, hinges on two key parameters: (i) the responsiveness of taxable income to tax rates, quantified by the Elasticity of Taxable Income (ETI), and (ii) the adjustment costs that taxpayers incur when modifying their taxable income. Although there is an extensive body of work estimating the ETI (see Saez et al., 2012a for a review), empirical studies providing estimates of adjustment costs for high-income individuals remain less widespread.

In this paper, we provide empirical estimates of the ETI and adjustment costs for high-income taxpayers, utilizing a policy change in the Australian personal income tax schedule during the 2008-2009 financial year which decreased marginal tax rates for higher income levels. This policy increased the top tax threshold from AUD 150,000 to AUD 180,000 (see Figure 1).[2] As the marginal tax rates of 40 and 45 per cent below and above the

[1] For instance, in the United States, deregulation, privatizations, reductions in tax progressivity, and a decline in union coverage have contributed to an increase in the top 10 percent income share from about 34 per cent in 1980 to 45 per cent in 2022. In Australia, these figures rose from 25 per cent to 34 per cent over the same period (Chancel et al., 2022).

[2] The financial year in Australia runs from July 1 to June 30. In 2008, AUD 150,000 was equivalent

threshold remained unchanged, the policy change incentivized taxpayers to adjust their taxable incomes to just below the new threshold, a behavior known as *"bunching"*. While most individuals adjusted their taxable income to bunch at the new kink, some continued to bunch at the old threshold, indicating the presence of adjustment costs. We analyze bunching at the old and new thresholds before and after the policy change to estimate adjustment costs and the ETI with respect to net-of-tax rates. We employ a static model to assess immediate responses and a dynamic model to explore the transition in bunching from the old to the new kink and estimate the cumulative probability of incurring non-zero adjustment costs in addition to the ETI and adjustment costs. We then investigate the channels through which high income individuals adjust their taxable income.

Our contribution to the existing literature is threefold. First, we build on the existing bunching framework by developing a model that accommodates partial income adjustments and allows for bunching to emerge from below the kink —"bunching from below model"— as observed in our data (see Figure 3 and Figure A.1). Second, we provide the first empirical estimates of marginal adjustment costs, alongside fixed costs.[3] Third, we demonstrate that trust income and business income are important channels that high income tax-payers use in response to tax policy changes.

Our choice of the Australian tax system for this study offers several advantages. Notably, the system is comprehensive and individual-centric, managed solely by the federal government. It operates on a single tax base principle, covering all sources of worldwide income, including wages, self-employment, trust and business income, dividends, interest, capital gains, rental income, and various benefits.[4] Additionally, the system allows for

to USD 127,500, and AUD 180,000 to USD 153,000.

[3] Gelber et al. (2020b) incorporate adjustment costs in the Saez (2010a) bunching model —model bunching emerging from above the kink— without allowing for partial income adjustments, and focus only on estimating fixed costs. Mavrokonstantis and Seibold (2022) similarly estimates a bunching from below model with fixed adjustment costs. However, neither model accounts for partial adjustments nor estimates marginal adjustment costs. It is worth mentioning that Gelber et al. (2020b) and Kleven (2016) briefly suggest a model incorporating both fixed and marginal costs, without providing a model or estimates.

[4] A single tax base reduces the incentive for taxpayers to shift among different types of income to lower their tax liabilities. In systems with multiple tax bases and varying tax rates, the ETI may not adequately reflect welfare impacts. See Kleven and Schultz (2014) for an analysis of Denmark's multi-base tax system. In practice a variety of exemptions and concessions including reduced tax rates on retirement contributions and savings returns, the 50 per cent capital gains tax discount and the 100 per cent exemption of owner-occupied housing from capital gains tax undermine full comprehensiveness.

strategic income distribution among family members through trusts and a broad range of deductions.[5] This flexibility helps taxpayers strategically manage their taxable income to optimize personal outcomes in the face of the applicable tax rates.

We use administrative personal income tax return data provided by the Australian Taxation Office (ATO). Our analysis uses a ten percent sample of all individual taxpayers who filed returns from the 2006-2007 to the 2009-2010 financial years, covering two years before and two years after the policy change.[6] These data include comprehensive details on each taxpayer's total and taxable incomes, wages, salaries, trust income, business income, total taxes withheld, net taxes, and deductions. Additionally, they provide basic demographic information such as sex, age, occupation, residence location, and family-related details.

Our analysis yields several key findings. First, high-income taxpayers exhibit strong behavioural responses to changes in the tax system, characterized by large and sharp bunching at the top tax kink (see Figure 2 and Figure 3). The responses are even stronger from self employed individuals and those with trust and business income whom we call flexible bunchers. We find bunching, although much smaller, for wage and salary earners. These are unique findings since most previous studies, in other countries, document bunching only at lower kinks, or at top kinks only in the presence of much larger differentials in marginal tax rates below and above the threshold. Also, most studies do not find bunching for wage and salary earners.[7]

Secondly, our results strongly suggest that high income individuals' responses to the tax policy change are predominantly driven by reporting mechanisms rather than labor

[5]Examples of allowed tax deductions include work-related expenses (uniforms, work-related travel, and professional development costs), home office expenses, charitable donations, investment expenses (including financial advice fees, brokerage fees, and interest on investment loans), self-education expenses (related to courses, seminars, and workshops relevant to current employment or skill improvement), vehicle expenses (such as fuel, maintenance, and depreciation of a vehicle used for work-related purposes), income protection insurance, union and professional association fees, and depreciation of assets.

[6]Our data spans 1999-2000 to 2019-2020. We use the longer panel for further investigating bunching behaviours. We limit our sample to a shorter panel for estimating our models since the top kink was raised to AUD 150,000 in 2006-2007 and the residual bunching at AUD 150,000 diminishes by 2009-2010.

[7]Saez (2010a) and Mortenson and Whitten (2020) document bunching at the lower kinks in the US. Alinaghi et al. (2020) is an exception, who document bunching at the top kink in New Zealand. Mavrokonstantis and Seibold (2022) document bunching at the lower kinks, and for self-employed individuals in Cyprus.

supply responses: (i) individuals who bunch at the top kink frequently adjust their taxable incomes with each increase in the kink threshold, a pattern indicative of chronic bunching, which is challenging to achieve solely through changes in labor supply (see Figure A.1);[8] (ii) those with the most flexibility to adjust their taxable income, such as self-employed individuals and those with trust income, are the primary bunchers (see Figures A.3 and A.4). Our findings further suggests that high-income individuals may avoid higher taxes through strategies like channeling income through trusts, potentially to family members in lower tax brackets.

Third, the ETI estimates from our static and dynamic models—which account for both fixed and marginal adjustment costs, allow for partial income adjustments, and model bunching from below the kink—significantly exceed those from models that do not incorporate these features. Specifically, our static model yields an ETI of 0.18—double the figure from Saez (2010a)'s model excluding adjustment costs (0.09), and Gelber et al. (2020b)'s model with only fixed adjustment costs (0.10). Our dynamic model estimates an ETI of 0.35—nearly twice as high as our static model's estimate, suggesting that adjustment costs attenuate responses even for high income individuals. These findings underscore the importance of accounting for adjustment costs and the capability for partial adjustment in modelling tax responsiveness, taking into account that even high-income individuals require some time, albeit brief, to adapt to tax changes.

Fourth, the estimated marginal adjustment costs are consistent across both our static and dynamic models, at a rate of 1.4 cents per dollar of taxable income for mitigating a five per cent increase in the marginal tax rate from 40 percent below the kink to 45 percent above the kink—this translates to a cost-to-saving ratio of 0.39. However, the fixed costs are substantially higher in the dynamic model (AUD 23) compared to the static model (AUD 10). For instance, according to the static model, a marginal buncher would incur a total adjustment cost of about AUD 17 to increase her taxable income by AUD 520 to bunch at the new kink. In contrast, in the dynamic model, the marginal

[8]The increase in the taxable income by AUD 30,000 to move from the old kink at AUD 150,000 to the new kink at AUD 180,000 is substantial given that the average taxable income in Australia during our study period is less than AUD 50,000. See Table B.1 in Appendix B.

buncher incurs an adjustment cost of AUD 115 to increase her taxable income by AUD 6,600 to bunch at the new kink.

Fifth, the estimated probability of incurring adjustment costs from our dynamic model decreases over time, consistent with the gradual shift in bunching from the old to the new threshold. These probabilities can be interpreted as the portion of residual bunchers at the old kink. Specifically, our estimates indicate an initial 14 per cent of taxpayers continued to bunch at the old threshold after the policy change, which decreases to 7 per cent in the subsequent year.

Lastly, our analysis demonstrates significant variation in ETI based on demographic and economic factors. In the static model, ETI ranges from 0.04 for wage and salary earners to 0.50 for self-employed taxpayers with trust income. In contrast, the dynamic model shows ETI estimates extending from 0.07 for wage earners to 0.95 for self-employed individuals with trust income. The estimated marginal costs exhibit more consistency across demographic groups in the dynamic than in the static model. Conversely, the estimated fixed costs show considerable variation across different groups in both models. For instance, fixed costs in the static model range from AUD 1 for self-employed individuals to AUD 10 for professionals and managers, while in the dynamic model, these costs vary from AUD 15 for males and main earners to AUD 67 for self-employed individuals with trust income.

Income taxes, whether low or high, modify relative prices, influence decisions, and create inefficiencies. This impacts the optimal progressiveness of income taxes aimed at redistributing income from high to low-income individuals and impacts the efficiency cost of tax policies. The efficiency cost of progressive income taxes depends on whether the income sensitivity is driven by changes in economic activity, such as labor supply responses, or reporting responses such as using tax avoidance strategies through deductions and legal loopholes (Slemrod, 1992, 1995; Saez et al., 2012b).[9] If the marginal cost and benefit of income adjustment are equal to the marginal tax rate, then the source of inefficiency should not matter (Feldstein, 1999; Saez, 2004; Slemrod and Yitzhaki, 2002).

[9]This study utilizes administrative tax return data, capturing only legal tax minimization activities and not illegal tax evasion.

In this case, the estimated ETI is a sufficient statistic for the efficiency costs of taxation (Feldstein, 1995, 1999). An optimizing agent balances the marginal benefit of adjusting one dollar of income from tax against the marginal cost of adjusting taxable income by the same amount. Consequently, the underlying cause of the taxable income response is not critical for calculations of inefficiency. This rationale has guided much of the subsequent research, with many studies focusing on the ETI as a sufficient statistic for evaluating tax policy impacts (see Saez et al., 2012a for a critical review of recent literature).

However, Chetty (2009) presents two arguments challenging the adequacy of ETI as a sufficient statistic for analyzing the efficiency costs of taxes.[10] First, some adjustment costs are not genuine economic costs but rather represent transfers within the economy. For example, individuals who make charitable donations or establish trusts to reduce their tax liabilities might not fully realize the benefits of these actions, thereby incurring what can be seen as transfer costs. Second, individuals often overestimate adjustment costs, such as the perceived risk and penalties associated with tax evasion (Andreoni et al., 1998). These miscalculations introduce a disparity between the actual marginal costs and the tax rate, affecting the validity of ETI as a comprehensive measure of tax efficiency. Further, they necessitate accounting for adjustment costs in ETI estimates. There is ample evidence from tax return data indicating that taxpayers incur costs when adjusting their income in response to tax changes (Chetty, 2009; Chetty et al., 2011; Kleven and Waseem, 2013; Chetty, 2012; Alinaghi et al., 2020; Adam et al., 2020) and adjustment costs can affect the estimated elasticity (Chetty, 2009; Chetty et al., 2011; Kleven and Waseem, 2013; Chetty, 2012; Kleven and Waseem, 2013; Alinaghi et al., 2020; Adam et al., 2020; Gelber et al., 2020b; Zaresani, 2020; Mavrokonstantis and Seibold, 2022). This may explain why ETI estimates for high-income individuals are lower than expected despite this group having more margins of income adjustment. While previous studies primarily focused on estimating fixed adjustment costs, estimates of marginal adjustment costs remain rare. Our research addresses this gap by providing estimates for both fixed and marginal adjustment costs, thereby enriching our understanding of high

[10] Doerrenberg et al. (2017) demonstrates that the ETI is not a sufficient statistic for welfare analysis when deductions create externalities and are responsive to tax-rate changes.

income taxpayers' responses to tax policy changes.

Gelber et al. (2020b) build on Saez (2010a) to develop a novel framework that jointly estimates fixed adjustment costs and earnings elasticity by analyzing bunching at a kink.[11] They explore the impact of a policy change in the Social Security Annual Earnings Test in the US, which lowered the marginal tax rate above a kink, employing pre- and post-policy change bunching data to estimate both the earnings elasticity and fixed adjustment costs. Zaresani (2020) adapts this model to analyze a disability insurance program, focusing on a policy that raised the kink threshold without modifying the marginal tax rates—a scenario similar to ours. Mavrokonstantis and Seibold (2022) similarly uses a fixed adjustment cost model where bunchers are initially positioned below the kink, to examine a policy change in Cyprus that shifted the kink's location, akin to Zaresani (2020). Gelber et al. (2020b) and Kleven (2016) briefly suggest a model with both fixed and marginal costs, but do not provide a model or estimation. None of these models allow for partial income adjustment, nor estimate marginal adjustment costs. Our paper advances this body of work by introducing a model that allows for partial adjustments of taxable income and includes both fixed and marginal adjustment costs, and allows for bunching at a kink to emerge from below the kink, thus capturing more nuanced taxpayer responses.

A number of recent studies examine taxable income responses to tax policy changes in the US (Feldstein, 1995; Auten and Carroll, 1999; Goolsbee, 2000; Gruber and Saez, 2002; Kopczuk, 2005; Giertz, 2007), UK (Brewer et al., 2010), Canada (Sillamaa and Veall, 2001; Saez and Veall, 2005), Norway (Aarbu and Thoresen, 2001), Sweden (Hansson, 2007; Blomquist and Selin, 2010; Gelber, 2014), Denmark (Kleven and Schultz, 2014), Poland (Kopczuk, 2012), Australia (Johnson et al., 2023), and South Africa (Axelson et al., 2024). Kleven (2025) shows that the relationship between top earnings and the distribution of earnings capacities in the population could include both positive (such as innovation) and negative externalities (such as rent-extraction). Brülhart et al. (2022) investigate responses to wealth taxes in Switzerland. Findings suggest that high-income individuals are sensitive to tax policies and adjust their behaviour accordingly. We contribute to this

[11] See Kleven (2016) for a review of the recent bunching literature.

literature by providing evidence from Australia, while also accounting for adjustment costs.[12]

For the remainder of the paper, we proceed as follows. We describe the institutional background of the Australian income tax system and the data we use for our analysis in Section 2. We use the data to describe bunching, labor supply and adjustment cost behavior in Section 3. We present our bunching model for estimating the adjustment costs and ETI and our findings in Section 4. We conclude in Section 5.

2 Institutional background and data

2.1 Personal income taxes in Australia

Personal income taxes constitute the primary form of taxation in Australia and are administered by the federal government through the Australian Taxation Office (ATO).[13] Its progressive scale results in higher income individuals being subject to higher tax rates. Figure 1 shows the income tax brackets and corresponding tax rates.[14]

Taxable income is determined by calculating the difference between assessable income and allowable deductions. For individual taxpayers, assessable income falls into three primary categories: personal earnings, business income, and capital gains.[15] The tax base encompasses all sources of income, including wage and salary earnings, self-employment income, trust income, transfer payments, dividends, interest income, capital gains, rental income, and in-kind income.[16] The tax system also offers a range of tax deductions,

[12] Johnson et al. (2023) explore several policy changes in Australia, and estimates ETI using Saez (2010a) bunching model without accounting for the adjustment costs.

[13] In addition to personal income taxes, Australia also imposes a corporate tax on corporate profits, a national goods and services tax and payroll taxes at the state and territory level.

[14] The majority of Australian residents are also required to pay the Medicare Levy, which contributes to funding the country's public healthcare system, known as Medicare. Typically, the Medicare Levy is set at two percent of taxable income. However, individuals whose income exceeds a certain threshold and who do not purchase private health insurance are subject to an additional levy known as the Medicare Levy Surcharge (MLS), which ranges from one to 1.5 percent of their total income.

[15] Capital gains are subject to taxation at the time the gain is realized, and receive a 50 percent reduction if the asset was held for more than one year.

[16] Partnerships and trust income are not directly taxed but are instead taxed upon distribution to beneficiaries. Some types of in-kind income are non-reportable and, as a result, are effectively exempt from taxation. Typically, these benefits correspond to expenses that would otherwise be deductible.

offsets, and rebates designed to support lower-income individuals and families.[17]

Taxpayers are obligated to file an income tax return with the ATO at the conclusion of each financial year, which for most individuals is June 30. This return reports all sources of income, deductions, and other relevant financial details. To facilitate the fulfilment of tax obligations throughout the year, the vast majority of Australian employers withhold income tax from their employees' paychecks through a system known as Pay As You Go (PAYG) withholding.

2.2 Policy changes in personal income taxes

The first panel of Figure 1 plots the personal income tax schedule and the corresponding marginal tax rates in Australia between 2000-2001 and 2020-2021. It shows four income brackets with marginal tax rates ranging between zero and 47 percent, and it has become more progressive over the last two decades.

Our focus is on the top income bracket of the tax schedule. It has gradually increased from AUD 60,000 in 2000-2001 financial year to AUD 180,000 in 2008-2009. The marginal tax rate above the top kink was 47 percent in 2000-2001 and has been 45 per cent since 2007-2008. The marginal tax rate below the top kink in 2000-2001 was 42 percent and it has been 40 percent since 2007-2008. These changes produced two major changes to the kink at the top threshold. First, the top kink was shifted to AUD 150,000 (marginal tax rates of 40 percent and 45 percent respectively below and above the kink) from AUD 95,000 (47 and 42 percent marginal tax rates) in 2006-2007. Second, the top kink was shifted to AUD 180,000 (40 and 45 percent marginal tax rates) from AUD 150,000 (40 and 45 percent marginal tax rates respectively below and above the kink) in 2008-2009. The second panel of Figure 1 demonstrates the marginal tax rates and income brackets in 2007-2008 and 2008-2009. These kinks create incentives for individuals to locate their taxable income below the threshold and bunch at the kink to avoid the higher marginal tax rate above the threshold. In this paper, we focus on the second major change, which decreased the marginal tax rate on higher incomes by increasing the top kink threshold.

[17] Examples of these include the Low and Middle Income Tax Offset (LMITO) and the Family Tax Benefit.

The features of the Australian personal income tax system combined with the changes in the top kink threshold provide an excellent opportunity to empirically estimate adjustment costs. First, income taxes are exclusively levied by the federal government, in contrast to the US, which imposes separate federal, state, and municipal taxes. Second, personal income tax is assessed on individuals, not on household units, as is the case in the US.[18] Third, Australia's tax system boasts a single tax base, including worldwide income, and is comprehensive, unlike the dual tax system in the US. This comprehensiveness covers both labor and capital income, thereby reducing incentives to convert income from one form to another to evade higher marginal tax rates. Fourth, Australia allows for a wide range of deductions to reduce taxable income.[19] Common deductions include work-related expenses, charitable donations, some in-kind income, specific investment-related costs such as interest expenses and capital depreciation, and salary sacrifice for work-related expenses including contributions to retirement savings.[20]

2.3 Data and study sample

We use data from the Administrative Longitudinal Information File (ALife) provided by the Australian Taxation Office (ATO). The ALife data represent a ten percent panel sample of individual annual tax return files.[21] The panel data allow for longitudinal

[18] Although Australia employs an individual-based personal income tax system, a few elements, including the Medicare Levy Surcharge (MLS), are based on household income. Individuals also have the capacity to contribute to the retirement savings of other family members or distribute trust income to other family members.

[19] The Australian taxation system has only limited restrictions on expenses. For example, interest expenses on borrowings can offset labor or other income types, while capital losses resulting from the sale of an asset can be quarantined but used only against capital gains.

[20] Salary sacrificing allows employees to exchange a portion of their pre-tax income for various benefits, such as contributions to retirement savings (Superannuation), health insurance, or even a company car. This approach offers tax advantages, as the income sacrificed is not subject to regular income tax rates. For instance, superannuation contributions made from pre-tax income are taxed at a much lower flat rate of 15 percent, up to an age-specific contribution cap.

[21] A random sample is drawn from the initial client register of tax filers, regularly updated since 1980, including temporary visa holders and people who died prior to 2016. Each client is given a unique permanent random number between zero and one and clients with a number less than 0.1 are included in the sample. This means that the selection of each individual is an independent Bernoulli trial with a ten percent chance of selection. In each release following the initial sample, the sample is updated by a ten percent random sample of people added to the client register since the previous annual release. In years where a tax return was not lodged, the individual's information for that year is missing in ALife. A small number of individuals who face relatively high risk of re-identification (such as those aged 95 or more) are excluded from the sample. For more information see Bond and Wright (2018) and Polidano et al. (2020).

tracking of individual tax records from the financial year 1999-2000 through the financial year 2019-2020. We use data from 2006-2007 through the financial year 2009-2010 (two years of pre- and two years of post policy change) for estimating our dynamic model.[22] This dataset offers comprehensive insights into individuals' total income, taxable income, including wage and salary income, trust income, total tax withhold, net tax, and deductions along with basic demographic data such as sex, gender, age, occupation, location of residence, and some family related information (presence of a spouse and children) and being the main earner.

Our study sample comprises individual taxpayers aged 18 years and older, who are Australian tax residents, and whose taxable income falls within the range of AUD 130,000 to AUD 200,000 (spanning the old and new top kinks) encompassing two years before and two years after the policy change. Our study sample includes about 45,000 and 65,000 individuals before and after the policy change, with a total number of observations of about 170,000 over our study period.

Table 1 presents summary statistics for our study sample.[23] The first block of the table presents economic outcomes. Average total income and taxable income are approximately AUD 165,000 and AUD 156,000, respectively. The average figure for total tax withheld is much lower than the net tax at AUD 36,000 and AUD 45,000, respectively. Average deductions stand at about AUD 9,000. One in three individuals in our sample has trust income. About 45 percent of the sample are self-employed, of whom more than 70 percent have trust income. Occupational information is primarily available for wage and salary earners, with about half the sample comprising managerial and professional occupations. The average wage and salary income in our study sample is about AUD 107,000, which falls below both the former and new top tax thresholds.

The cost of tax affairs is tax-deductible in the Australian tax code and is reported in tax return files. About four in five tax filers within the sample utilized a tax agent for their tax filings. The average tax affair fee (for hiring a tax accountant) is AUD

[22] We limited our sample to the 2006-2007 period, as the top kink was raised to AUD 150,000 at the beginning of that financial year.

[23] Table B.1 in Appendix B presents summary statistics for taxpayers with all levels of taxable income during our study period.

420. Individuals spent on average eleven and eight hours completing their tax returns, respectively, before and after the policy change.

Table 1 also presents demographic summary statistics. The average age within our study sample is 46 years. Three-quarters of the sample consist of males who have partners and at least one child and reside in major cities. Approximately nine out of ten taxpayers are the primary earners in their households, of whom more than 80 percent are male.

3 Adjustment costs

3.1 Documenting the costs

Figure 2 plots the distribution of taxable income over the period spanning 2005-2006 to 2010-2011.[24] In the first panel, which corresponds to the year 2005-2006, the top tax threshold stands at AUD 95,000 (shown in Figure 1). Although not displayed in the figure, there is bunching at the AUD 95,000 kink. However, no bunching is observable in the taxable income range of AUD 130,000 to AUD 200,000 in 2005-06.

Subsequently, the top tax threshold increases to AUD 150,000 in 2006-2007. In the second panel, we observe sharp bunching at this new top kink, with bunching increasing the following year. The top tax threshold was increased to AUD 180,000 in 2008-2009. The fourth panel shows that the bunching shifts to this new top threshold, although some residual bunching persists at the former kink.[25] For a closer examination of the taxable income distribution surrounding the policy change, see Figure 3.[26]

The final two panels of Figure 2 show the gradual increase in bunching at the new threshold, concurrent with a decrease in bunching at the former threshold. This gradual shift of bunching from the former to the new top threshold implies that individuals face

[24]The red line in each figure plots the fitted polynomial. b denotes the normalized estimated bunching and bootstrapped standard errors are presented in parenthesis. All the estimates are statistically significant in conventional levels. More details on bunching estimation procedure are provided in Appendix C.

[25]The residual bunching at the former kink is relatively small–it completely disappears within three years of the policy change, yet it is still statistically significant. We conduct robustness checks using different parameters for the bunching estimates, and our preferred specification yields the smallest residual bunching, which remains statistically significant. Refer to Table B.4 in Appendix B for details.

[26]Figure A.11 to Figure A.18 in Appendix A plot the distribution of taxable income around the top kink for different sub-samples before and after the policy change.

costs when attempting to adjust their taxable income.[27]

Use of an accountant for tax filing is particularly high within our study sample amongst those with higher taxable incomes (see Table 1) and flexible bunchers at the top kinks (see Table 2), with usage rates exceeding eighty percent. These high rates of tax accountant usage implies that tax filers have a strong understanding of the tax system and related policy changes. Therefore, it is unlikely that the residual bunching can be attributed to a lack of information about the policy changes.

3.2 How do high income individuals adjust their taxable income?

We provide a series of figures in Appendix A to examine how high-income individuals adjust their taxable income in response to the policy change. We show that these adjustments are driven predominantly by reporting strategies—particularly channeling income through trusts and businesses—rather than by labor supply changes.[28]

Figure A.1 provides a comprehensive overview of top kink bunchers over three time periods: during, preceding and following our study period. It plots the distribution of taxable income for sharp bunching individuals: those who bunched within a AUD 5,000 window of the new kink at AUD 180,000 during the post-policy change period spanning 2008-2009 to 2010-11. The grey and red lines represent the former and new top kinks over the years. Panel (a) tracks the bunchers before our study period, from 1999-2000 to 2004-2005. Panel (b) illustrates the distribution during our study period, from 2005-2006 to 2010-2011. Notably, it displays significant bunching at the kink due to the sample's structure. Panel (c) tracks the bunching patterns after our study period, spanning from 2011-2012 to 2019-2020.

Figure A.1 shows that individuals who bunched at the AUD 180,000 top kink during

[27]The bunching estimates in the last two columns of Figure 2 are statistically indistinguishable, so we use data from two years after the policy change for estimating our dynamic model.

[28]Reporting strategies also include making use of various tax deductions and shifting income across different tax years. Figure A.19 suggests that deductions are not the primary tool, and our dataset does not permit examining income-shifting behaviors. We do, however, find strong evidence for the use of trust and business income, as discussed in this section.

our study period also bunched at previous top kinks—AUD 50,000, AUD 60,000, AUD 62,500, AUD 70,000, AUD 95,000, and AUD 150,000 (see Figure 1). Notably, these taxpayers continued bunching at the AUD 180,000 kink for the following nine years, extending beyond our study window. This pattern suggests that top kink bunchers chronically adjust their taxable income each time the top kink rises. As a result, the observed responses are more plausibly strategic reporting responses rather than changes in economic activity.

Figure A.2 tracks the bunchers at the top kinks by plotting the distribution of taxable income of individuals who bunch at the former and new top kink respectively in Panel (a) and Panel (b). The first panel plots the distribution of taxable income of individuals whose taxable income was within a AUD 5,000 window around the former top kink (AUD 1455,000 to AUD 155,000) three years before the policy change. The second panel plots the distribution of taxable income of individuals whose taxable income was within a AUD 5,000 window around the new top kink (AUD 175,000 to AUD 185,000) three years after the policy change. The figure suggests that most of the individuals bunching at the former top kink move to the new top kink after the policy change. Also, the individuals bunching at the new top kink also bunched at the former top kink.

Table 2 presents summary statistics for flexible bunchers at both the former top kink (AUD 150,000) and the new top kink (AUD 180,000). The study sample includes about 11,000 individuals whose taxable income fell within a AUD 5,000 window around these kinks in the three years before and after the policy change. While the demographic characteristics of flexible bunchers do not significantly differ from those of our study sample presented in Table 1, there are notable differences in economic outcomes, notably total tax withheld, wage and salary earnings, trust income, and self employed status. Flexible bunchers have about ten percent lower total tax withheld compared to our study sample. The average wage and salary earnings for flexible bunchers at both kinks are more than ten percent lower than those in Table 1, and comprise a smaller share of total and taxable income. More than half of all flexible bunchers are self employed.

The average tax affairs fee (for hiring a tax accountant) for flexible bunchers rose by

approximately 30 percent following the policy change, increasing from AUD 370 to AUD 490.[29] Additionally, the average time required to file taxes quadrupled, rising from six to 24 hours. These findings indicate that flexible bunchers incurred greater financial and time costs to adjust their taxable income after the policy change.

The most striking difference between flexible bunchers and our study sample concerns trust income. The portion of flexible bunchers with trust income at the new kink is 25 percent higher compared to the former kink (35 versus 44 percent). The average trust income for flexible bunchers at the former and new kinks is AUD 21,500 and AUD 43,000, respectively. In contrast, the corresponding figures for our study sample are orders of magnitude lower, AUD 290 before the policy change and AUD 420 after, more than 70 times lower.

Figures A.3, A.4, and A.5 display the distribution of taxable income before and after the policy change, focusing on flexible bunchers by employment type (self-employed versus wage and salary earners), trust income status (with or without trust income), and self-employed individuals with trust income, respectively. These figures indicate that self employed individuals and those with trust income bunch more and respond more strongly to the policy change. Their flexibility in adjusting taxable income can be attributed to three key factors. First, self employed individuals are not constrained by fixed-hour contracts, allowing them to easily modify their labor supply. Second, a substantial share of their income is not third-party reported, offering more avenues for reporting responses. Third, they can shift a portion of their income to family members (including spouses, children, and elderly relatives) subject to lower marginal tax rates, thus reducing their overall tax liability (Chetty et al., 2011; Kleven et al., 2011).

These findings suggest that responses to the policy change are primarily reporting and not labor supply responses. First, most individuals who bunched at the new kink also bunched at the former kinks. Increasing taxable income by a substantial and precise amount, such as AUD 30,000, in just one year through labor supply adjustments seems unlikely. Second, bunchers are typically those with greater flexibility to adjust their

[29] See Appendix F for an analysis of the policy change's effects on the tax affairs fee.

taxable income, including self-employed individuals and those with trust income.

3.2.1 Trust and business income responses

We provide evidence that high-income individuals use trust income as a strategic reporting response to changes in income taxes. High-income individuals in Australia lower their tax burdens by directing income through trusts, often incorporating businesses within the trusts. This arrangement provides opportunities to distribute income to family members in lower tax brackets, such as spouses, children, or elderly relatives with lower marginal tax rates.[30]

In Figure A.6, we present the distribution of taxable income, gross taxable income, total deductions, and trust income for individuals with trust income.[31] The study sample includes individuals with taxable income ranging from AUD 130,000 to AUD 200,000 who reported trust income. Gross taxable income is calculated by excluding trust income while including total deductions in taxable income.

In Panel (a), we observe sharp bunching at the top income threshold of AUD 150,000 before the policy change. This bunching subsequently shifts to the new threshold of AUD 180,000 after the policy change. Panel (b) illustrates the distribution of gross taxable income, where the bunching has disappeared.

The distribution of deductions in Panel (c) is relatively flat, with two distinct bunching points corresponding to age-based contribution caps on tax-favored retirement savings accounts (known as "superannuation" in Australia). Figure A.7 illustrates the distribution of annual personal superannuation contributions. The grey lines mark the contribution caps over time, and sharp bunching at these caps is evident. As the caps change, the bunching promptly shifts, indicating a direct response to the caps themselves. Notably,

[30] A recent article in the Australian Financial Review (February 1, 2023) notes that, "The AUD 2.2 trillion trust sector is under growing scrutiny from the Australian Taxation Office amid concerns that as trusts become increasingly popular, they are being more blatantly used for tax manipulation by individuals and companies." For more details, see https://www.afr.com/wealth/personal-finance/ato-turns-screws-on-popular-trusts-amid-tax-evasion-claims-20230130-p5cghb. In a related study, Sainsbury and Breunig (2020) discuss various straightforward methods by which trusts can be used to allocate income to individuals with lower marginal tax rates or to defer taxation to future periods.

[31] Figure A.19 in Appendix A provides similar distributions for self employed individuals with trust income.

these changes do not appear influenced by adjustments to the top kinks in the income tax schedule, possibly because the incentives to save within tax-favored retirement accounts are much stronger.[32] Thus, superannuation contributions do not seem to play a significant role for in generating the observed bunching. In contrast, Panel (d) of Figure A.6 shows sharp bunching of trust income at the top income kinks. This pattern suggests that trust income plays a more prominent role in generating he observed bunching than deductions.

While gross taxable income alone cannot provide a comprehensive counter-factual for assessing how individuals' income would appear in the absence of deductions or trusts, these figures collectively suggest that trust income plays a crucial role in tax minimization, contributing to the observed bunching in the distribution of taxable income.

Due to the absence of family link information in our data, we provide suggestive evidence on how high-income individuals use trust income as an instrument for income distribution to family members with lower marginal tax rates including women, younger children and older relatives. To do this, we plot the distribution of trust income by gender, age, and for those who are not the main earners in the household.

Figure A.8 presents trust income distributions for males and females, revealing more bunching at the top tax thresholds for females, in which the bunching shifts from the former top kink to the new one after the policy change. Figure A.9 presents the distribution of trust income among individuals aged below 18, 18-24 years, 24-44 years, 45-59 years, and those over 60 years.[33] The first panel shows substantial trust income for those below 18 years. The other panels suggest that younger individuals exhibit a stronger bunching effect for trust income at the top tax thresholds. Figure A.10 shows the distribution of trust income for individuals who are not the main earners, indicating sharp bunching at the top tax threshold, which shifts to the new threshold after the policy change.

[32]Superannuation accounts have age-based caps on contributions. Contributions up to the cap are taxed at a flat 15 percent, while contributions above the cap face the individual's marginal income tax rate. Since the caps were introduced in 2006-2007 at AUD 100,000 for all ages, they have frequently changed. For example, the cap for individuals under 50 dropped to AUD 50,000 in 2007-2008, and was later reduced to AUD 25,000 for those under 50 and AUD 50,000 for those over 50. Individuals can also contribute to family members' superannuation accounts.

[33]The study sample for the distribution of trust income for those below 18 years includes all levels of taxable income.

These findings suggest that reported trust income originates with higher-income family members.[34]

Figure F.1 presents the distribution of tax affair fees in our study sample, broken down by flexible bunchers and those with trust income. The figure also presents the average fee for each group. Two notable findings emerge. First, the average cost is higher for those with trust income. Second, costs for all, for bunchers, and for those with trust income show an increase in 2008-2009 when the top kink is changed, reflecting re-optimization costs. We estimate Event Study and Difference-in-Differences models to analyse the effects of the policy change on the tax affairs fees in our study samples, and for flexible bunchers. While these estimates might not be causal effects, we find that tax affair fees increased following the policy changes, and increased much more for those with trust income. Details of the analysis appear in Appendix F.

In conclusion, our findings provide compelling evidence that high-income individuals strategically use trust income to minimize their tax liabilities within the bounds of tax regulations. Furthermore, variations in trust income by gender and age suggest potential intergenerational income redistribution strategies within families. This evidence sheds light on the complex tax optimization strategies employed by high-income individuals.

4 Empirical analysis

In this section, we first present our bunching models for estimating adjustment costs and the ETI, then outline the empirical implementation, and finally discuss our estimation results.

Our approach builds on the model by Gelber et al. (2020b), who analyzed a policy change in the U.S. Social Security Annual Earnings Test that lowered the marginal tax rate above a kink. This setting allowed them to estimate fixed adjustment costs and earnings elasticity in a model where bunchers are initially located above the kink. Zaresani (2020) extended this framework to a disability insurance program policy change, where

[34] About 60 percent of taxpayers with taxable income between AUD 130,000-200,000 who are not main earner in their family are females, of which more than 60 percent have trust income.

the kink location shifted (instead of changing tax rates), facilitating the estimation of fixed adjustment costs and earnings elasticity. Mavrokonstantis and Seibold (2022) further adapted the model to a setting in Cyprus, where bunchers were initially located below the kink, enabling estimates of fixed costs and ETI.

We integrate elements from these three models to estimate a bunching model consistent with our empirical setting, where bunching emerges from below (see Figure A.1). Unlike previous models that assume individuals either fully adjust or not at all, our model permits partial income adjustments. Moreover, we study a policy change that shifted the kink location and use the residual bunching at the former kink to identify marginal adjustment costs in addition to fixed adjustment costs and ETI.

4.1 Bunching Model

We present both static and dynamic bunching models. The static model captures immediate responses to the policy change, while the dynamic model examines the gradual transition of bunching from the former to the new threshold. A kink is defined by an income threshold z^*, with marginal tax rates τ_0 below the threshold and τ_1 above it, where $\tau_1 > \tau_0$. The amount of bunching at a kink is proportional to the ETI but inversely related to the magnitude of adjustment costs.

Consider a utility function $u(c, z; \alpha)$, where c is after-tax (consumption) income, z is taxable income, and e denotes the ETI, measuring the responsiveness of taxable income to the tax system. The parameter α represents an individual's time-invariant ability—the only source of heterogeneity in the model. When individuals adjust their taxable income in response to changes in the tax system, they incur adjustment costs, modeled as a utility loss. We assume total adjustment costs comprise two components: a fixed cost ϕ_f incurred by anyone who adjusts their taxable income, and a variable (marginal) cost ϕ_m that scales with the absolute size of the adjustment. Formally, if an individual changes their taxable income from z_0 to z, the adjustment cost is $\Phi(z, z_0) = \phi_f + \phi_m|z - z_0|$. We further assume $\phi_m < \tau_1 - \tau_0$ to ensure incentive compatibility, so that marginal costs of adjustment never exceed the marginal tax savings.

A marginal buncher at a kink is characterized by their ability α, which determines their optimal taxable income under a linear tax rate of τ_0. After a change in the tax schedule, this marginal buncher becomes indifferent between remaining at their current income level or incurring the adjustment costs to move to a new utility-maximizing income level.

In our models, z_0^*, z_1^*, and z_2^* denote the top kink thresholds set at AUD 95,000 (the top kink before our study period), AUD 150,000 (the former top kink during our study period), and AUD 180,000 (the new top kink during our study period), respectively. τ_0 and τ_1 denote the marginal tax rates below and above each kink which are 40 percent and 45 percent, as shown in Figure 1.

4.1.1 Static Model

Panel (a) of Figure 4 illustrates a marginal buncher at z_1^* prior to the policy change, characterized by ability $\alpha^{m_{10}}$ and an initial taxable income $\underline{z}_{10}$ under a linear tax rate τ_0, where $\underline{z}_{10} > z_1^*$. When a kink is introduced at z_0^* (before our study period), the marginal tax rate faced by this individual increases from τ_0 to τ_1, prompting them to reduce their taxable income to $\underline{z}'_{10} < z_1^*$. Once the top kink is shifted to z_1^*, the individual, now facing a lower marginal tax rate τ_0, must choose between remaining at $\underline{z}'_{10}$ or incurring adjustment costs $\Phi(\cdot)$ to move their taxable income up to z_1^* and benefit from the lower marginal tax rate. The *marginal buncher condition* at z_1^* before the policy change is:

$$u((1-\tau_0)z_1^* + R_1, z_1^*; \alpha^{m_{10}}) = u((1-\tau_0)\underline{z}'_{10} + R_1, \underline{z}'_{10}; \alpha^{m_{10}}) + \Phi(z_1^*, \underline{z}'_{10}) \tag{1}$$

where R_1 represents virtual income.

Figure 5 shows the counterfactual distribution of taxable income under a flat tax rate τ_0, denoted as $h_0(\cdot)$. Without adjustment costs and allowing for bunching to emerge from above, individuals initially in the interval $(z_1^*, z_1^* + \Delta z_1^*]$ would bunch at z_1^* following the Saez (2010b) model, covering areas $ii + iii + iv + v$. With adjustment costs, only those whose utility gain exceeds the adjustment costs choose to bunch at the kink, thereby

reducing the bunching range.[35] When we consider adjustment costs and allow for partial income adjustments, individuals with initial taxable income at $z_1^* + \Delta z_1^*$ reduce their income to $\bar{z}_1$ due to the higher marginal tax rate τ_1.[36] In our bunching from below framework, individuals with initial taxable income closer to the kink (unlike those farther away in a bunching from above model by Gelber et al. (2020a)) first move below z_1^* when a kink at $z_0^* < z_1^*$ was introduced, and then they move up to bunch at z_1^*. Consequently, the *bunching range* narrows to $(z_1^*, \underline{z}_{10}]$, covering areas $ii + iii$. The area under $h_0(\cdot)$ approximates bunching at z_1^* before the policy change as:[37]

$$B_{10} = \int_{z_1^*}^{\underline{z}_{10}} h_0(\zeta)\, d\zeta \approx (\underline{z}_{10} - z_1^*) h_0(z_1^*) \tag{2}$$

The policy change increased the top kink threshold to z_2^* from z_1^*. Bunchers at z_1^* will raise their taxable income only if the utility gains outweigh the adjustment costs. Panel (b) of Figure 4 shows a marginal buncher at z_1^* post-policy change with ability $\alpha^{m_{11}}$ and initial taxable income $\underline{z}_{11} \in (z_1^*, \underline{z}_{10}]$. This buncher is indifferent between staying at z_1^* or incurring adjustment costs to relocate to their optimal taxable income with marginal tax rate τ_0 which is $\underline{z}_{11}$. The *marginal buncher condition* at z_1^* post-policy change is:

$$u((1-\tau_0)\underline{z}_{11} + R_2, \underline{z}_{11}; \alpha^{m_{11}}) = u((1-\tau_0)z_1^* + R_2, z_1^*; \alpha^{m_{11}}) + \Phi(\underline{z}_{11}, z_1^*) \tag{3}$$

Here, individuals initially at z_1^* adjust their taxable income twice. First, they reduce it from z_1^* to $\underline{\underline{z}}_1^*$ after z_0^* is introduced and they face a higher marginal tax rate. Second, they raise their taxable income from $\underline{\underline{z}}_1^*$ to $\underline{z}_1^*$ once the top kink increases to z_1^* from z_0^*, where $\underline{\underline{z}}_1^* < \underline{z}_1^* < z_1^*$.[38] Thus, the *residual bunching* range at z_1^* after the policy change is

[35] With adjustment costs and assuming bunching from above, the bunching range would be $(\underline{z}, z_1^* + \Delta z_1^*]$, where $\underline{z} > z_1^*$ is the marginal buncher, as shown in Gelber et al. (2020b).

[36] $\bar{z}_1$ is specified in (E.4) in Appendix E using the utility function specified in (10).

[37] This approximation assumes a uniform income distribution over the integration range, a common assumption in bunching studies (Chetty et al., 2011; Kleven and Waseem, 2013; Kleven, 2016). Gelber et al. (2020b) compare income distributions of groups not facing a kink as a counterfactual. We cannot use that approach since all individuals in our sample face the same income taxes, and changes in the tax schedule over the years complicate using past distributions (see Figure 2).

[38] Since $\phi_m < \tau_1 - \tau_0$, using the utility function in (E.2), we have $\underline{\underline{z}}_1^* = z_1^*(\frac{1-\tau_0-\phi_m}{1-\tau_0})^e$ and $\underline{z}_1^* = z_1^*(\frac{1-\tau_1+\phi_m}{1-\tau_0})^e$.

$(\underline{z}_1^*, \underline{z}_{11}]$, which can be approximated as:

$$B_{11} = \int_{\underline{z}_1^*}^{\underline{z}_{11}} h_0(\zeta)\, d\zeta \simeq (\underline{z}_{11} - \underline{z}_1^*) h_0(z_1^*) \tag{4}$$

Figure 5 shows this residual bunching range, covering areas $i + ii$.

Panel (c) of Figure 4 illustrates a marginal buncher at z_2^* with ability α^{m_2} and initial taxable income $\underline{z}_2 > z_2^*$. After z_1^* is introduced, they face higher marginal tax rate τ_1 and reduce their taxable income to $\underline{z}_2'$. When the kink shifts to z_2^*, they must decide whether to remain at $\underline{z}_2'$ or incur costs $\Phi(\cdot)$ to bunch at z_2^* and benefit from the lower marginal tax rate τ_0. The marginal buncher equation at z_2^* is:

$$u((1-\tau_0)z_2^* + R_2, z_2^*; \alpha^{m_2}) = u((1-\tau_0)\underline{z}_2' + R_2, \underline{z}_2'; \alpha^{m_2}) + \Phi(z_2^*, \underline{z}_2') \tag{5}$$

where R_2 denotes virtual income.

Without adjustment costs, the bunching range would be $(z_2^*, z_2^* + \Delta z_2^*]$, following Saez (2010b) model, covering area $vi + vii + viii$ in Figure 5.[39] When we consider adjustment costs and allow for partial income adjustments, individuals with initial taxable income at $z_2^* + \Delta z_2^*$ reduce their income to $\bar{z}_2$ due to the higher marginal tax rate τ_1.[40] Introducing adjustment costs, allowing for partial adjustment and bunching from below, narrows the bunching range to $(z_2^*, \underline{z}_2]$, where the *bunching range* corresponds to area vi. The *bunching* at z_2^* can be approximated by:

$$B_2 = \int_{z_2^*}^{\underline{z}_2} h_0(\zeta) d(\zeta) \approx (\underline{z}_2 - z_2^*) h_0(z_2^*) \tag{6}$$

Taken together, the marginal buncher and bunching conditions at each kink form a system of equations that we solve numerically to determine the model parameters. Additional information and detailed steps are provided in Appendix E.

[39] The corresponding bunching range from Gelber et al. (2020b) model would be $[\underline{z}, z_2^* + \Delta z_2^*)$ where $\underline{z}$ denotes the marginal buncher at z_2^*.

[40] $\bar{z}_2$ is specified in (E.4) in Appendix E using the utility function specified in (10).

4.1.2 Dynamic Model

A dynamic model takes into account the gradual evolution of bunching over time, as depicted in Figure 2. In our dynamic model, we estimate parameters that indicate the cumulative probability of incurring zero adjustment costs in each period, in addition to the parameters of the adjustment costs and ETI. These parameters are estimated by aligning the bunching behavior at the former and new kinks in each period.

Two crucial aspects of the data are worth highlighting. First is a delayed response to the policy change. Second is a lack of anticipatory responses to the policy change, as there is no bunching at the new kink in the pre-policy change periods (see Figure 2). Following the approach of Gelber et al. (2020b), we assume that the adjustment costs are drawn from a stochastic process where individuals do not anticipate the policy change. This assumption can capture both of these data features effectively.

A discrete distribution models the stochastic arrival of opportunities for income adjustment or information about the policy change. An individual may change their taxable income in a given period only if the utility gain from the income adjustment is sufficiently large to offset the cost drawn in that period. This results in a gradual response to the policy change, manifesting as a gradual decrease in bunching at the former kink and a gradual increase in bunching at the new kink during the post-policy change periods.

At time -1, individuals begin with their initial taxable income, which represents their optimal taxable income under a linear tax rate τ_0. At time 0, a kink is introduced at z_0^*, and at time 1, the kink is increased to z_1^*. This kink remains in place for T periods before subsequently increasing to z_2^*. At each time t, individuals draw a cost from a discrete distribution $\{0, \Phi(\cdot)\}$. Following Gelber et al. (2020b), we assume the probability of drawing a positive cost at time t depends on the time elapsed since the most recent policy change at t^*. We denote this probability as π_{t-t^*}, so the probability of drawing zero cost at time t is $1 - \pi_{t-t^*}$. Individuals will adjust their taxable income only if the utility gain from doing so exceeds the realized cost. The cumulative probability of drawing zero cost by period t is given by $1 - \prod_{j=1}^{t} \pi_j$.

Bunching at z_1^* in the pre-policy change period $t \in [1, T]$ can be expressed as:

$$\begin{aligned} B_{10}^t &= \int_{z_1^*}^{\underline{z}_{10}} h_0(\zeta)\, d\zeta \;+\; (1 - \prod_{j=1}^{t} \pi_j) \int_{\underline{z}_{10}}^{\bar{z}_1} h_0(\zeta)\, d\zeta \\ &= \int_{z_1^*}^{\bar{z}_1} h_0(\zeta)\, d\zeta \;-\; \left(\prod_{j=1}^{t} \pi_j\right) \int_{\underline{z}_{10}}^{\bar{z}_1} h_0(\zeta)\, d\zeta \\ &= B_1^* \;-\; \left(\prod_{j=1}^{t} \pi_j\right) (B_1^* - B_1) \\ &= \left(\prod_{j=1}^{t} \pi_j\right) B_1 \;+\; \left(1 - \prod_{j=1}^{t} \pi_j\right) B_1^* \end{aligned} \tag{7}$$

Here, $\bar{z}_1$ denotes the bunching range at z_1^* allowing for partial adjustment, as defined in (E.4) in Appendix E.[41] B_1 —defined in (2) and covering area ii in Figure 5— denotes the immediate bunching at z_1^* once the kink is introduced. B_1^* —defined in (E.5) in Appendix E and covering areas $ii + iii + iv$ in Figure 5—represents the long-term, full bunching at the kink.

The first line of (7) shows that bunching at z_1^* has two components added together. First, individuals in area ii who immediately bunch once the kink is introduced, mirroring the static model scenario. Second, individuals in area iii who bunch only if they draw zero cost. The probability of drawing zero cost by period t is $1 - \prod_{j=1}^{t} \pi_j$. Therefore, the dynamic bunching at the kink is a weighted average of immediate and full bunching.

Bunching at z_1^* in the post-policy change period $t > T$ can be expressed as:

$$B_{11}^t = \prod_{j=1}^{t-T} \pi_j B_{11} \tag{8}$$

where B_{11} denotes the residual bunching at z_1^* immediately after the policy change, specified in (4). In the post-policy change period t, residual bunchers remain only if they have not yet drawn a zero cost, which would allow them to de-bunch. The probability

[41] Without partial adjustment, the bunching range would be $z_1^* + \Delta z_1^*$ (Saez, 2010a; Gelber et al., 2020b). Allowing for partial adjustment, the bunching range shrinks to $\bar{z}_1$. The reason is that after the introduction of the z_0^* kink, individuals with $z_1^* + \Delta z_1^*$ income would reduce their income to $\bar{z}_1$ in response to higher marginal tax rates. Using the utility function in (10), $\bar{z}_1 = z_1^* \left(\frac{1-\tau_1+\phi_m}{1-\tau_1}\right)^e$ (E.4). The assumption $\phi_m < \tau_1 - \tau_0$ ensures $\bar{z}_1 < z_1^* + \Delta z_1^*$, where $z_1^* + \Delta z_1^* = z_1^* \left(\frac{1-\tau_0}{1-\tau_1}\right)^e$, as defined in (D.4) in Appendix D.

of not drawing a zero cost by period t is $\prod_{j=1}^{t-T} \pi_j$. Thus, as time passes, the probability that bunchers continue to bunch at the old kink without incurring zero costs declines, reflecting the gradual reduction in residual bunching.

Finally, bunching at the new kink z_2^* in period $t > T$ can be expressed as:

$$\begin{aligned} B_2^t &= \int_{z_2^*}^{\bar{z}_2} h_0(\zeta)\, d\zeta + (1 - \prod_{j=1}^{t} \pi_j) \int_{\bar{z}_2}^{\bar{z}_2} h_0(\zeta)\, d\zeta \\ &= \int_{z_2^*}^{\bar{z}_2} h_0(\zeta)\, d\zeta - \left(\prod_{j=1}^{t} \pi_j\right) \int_{\underline{z}_2}^{\bar{z}_2} h_0(\zeta)\, d\zeta \\ &= B_2^* - \left(\prod_{j=1}^{t} \pi_j\right) (B_2^* - B_2) \\ &= \left(\prod_{j=1}^{t} \pi_j\right) B_2 + \left(1 - \prod_{j=1}^{t} \pi_j\right) B_2^* \end{aligned} \tag{9}$$

Here, the parameters mirror those in (7). $\bar{z}_2$ denotes the bunching range at z_2^* allowing for partial adjustment. B_2 —defined in (2) and covering area vi in Figure 5— represents the immediate bunching at z_2^* once the kink is introduced. B_2^* —defined in Appendix E and covering the $vi + vii$ area in Figure 5 —denotes the longer-term full bunching at the kink.

The first line of (9) shows that bunching at z_2^* comprises two components added together. First, individuals in area vi who immediately bunch once the kink at z_2^* is introduced—this mirrors the static model scenario. Second, individuals in area vii who bunch only if they draw zero cost. The probability of such a draw by period t is $1-\prod_{j=1}^{t} \pi_j$.

The static model corresponds to a special case of the dynamic model with a single time period and $\pi = 1$, meaning individuals never draw zero cost. In the limit as $t \to \infty$, B^t converges to B^*, implying that after a sufficiently long time, bunching at a kink returns to the longer term level B^*.

Combining the marginal buncher and bunching equations at each kink and for each time period yields a system of equations we solve numerically to estimate the model parameters, including the cumulative probability of zero adjustment costs at each period, the parameters of adjustment costs, and the ETI. Additional details are provided in Appendix E.

4.2 Empirical Implementation

In this section, we employ a widely-used approach from the bunching literature and parameterize our model using an iso-elastic and quasi-linear utility function (Saez, 2010a; Chetty et al., 2011; Kleven and Waseem, 2013; Bastani and Selin, 2014; Aghion et al., 2017; Gelber et al., 2020b), which is expressed as follows:[42]

$$u(c, z; \alpha) = c - \frac{\alpha}{1 + \frac{1}{e}} \left(\frac{z}{\alpha}\right)^{1+\frac{1}{e}} \tag{10}$$

Here, we define z as taxable income and c as consumption, equivalent to after-tax income $(z - T(z, \tau))$ where τ represents income taxes. The ETI with respect to net-of-tax rate is denoted as e, and α represents an ability parameter.

Each time period corresponds to one financial year. For the estimation of the static model, we use data from one year prior to the policy change (2007-2008) and one year after (2008-2009) (see Figure 3). To estimate the dynamic model, we incorporate data spanning two years of pre- and two years of post-policy change from 2006-2007 to 2009-2010(see Figure 2).

To estimate the amount of bunching at a kink, we follow the procedure outlined by Chetty et al. (2011) and Kleven and Waseem (2013). This involves setting the bin size to $\delta = \text{AUD}\,200$ and fitting a sixth-degree polynomial ($D = 6$) to the observed distribution of taxable income. We exclude six bins on each side of the kink ($l = u = 6$). The measure of bunching at a kink is computed as the difference between the fitted polynomial and the observed distribution of taxable income. A detailed explanation of the bunching estimation procedure appears in Appendix C. We also assess the robustness of our estimates with respect to these parameters in Table B.4 of Appendix B.

The marginal buncher and bunching equations at each kink for each time period collectively define a system of equations that we solve numerically to determine the model parameters. In the static model, we estimate e, ϕ_f, and ϕ_m by solving a system of

[42] Despite the limitations associated with the use of an iso-elastic and quasi-linear utility function, it remains popular in the bunching literature due to its convenience in estimating and expressing findings. A comprehensive review by Kleven (2016) highlights that almost all recent bunching papers adopt this quasi-linear utility function.

equations encompassing (1) to (6). These equations jointly determine these parameters. In the dynamic model, we estimate not only the ETI and adjustment costs parameters but also the cumulative probability of drawing zero adjustment costs in each time period relative to the policy change, π_0 and $\pi_0\pi_1$. Additional details regarding the estimation procedure are provided in Appendix E.

4.2.1 Estimation Assumptions

A fundamental underlying assumption for using the amount of bunching at a kink to estimate structural parameters of a utility function is that the taxable income distribution would be smooth and continuous in the absence of the kink. Based upon observation of the distribution in the pre-policy change period this assumption appears to hold.

Another critical parametric assumption is that the taxable income elasticity remains consistent across all individuals and does not change after the policy change. We assume that an individual's ability, the sole source of heterogeneity in our model, is time-invariant. We also assume that the induced income effects of the policy change are negligible and employ a quasi-linear utility function specified in (10) to parametrize the models.

4.2.2 Inference

To make inferences about the estimated parameters, we employ bootstrapped standard errors, following the procedure described by Chetty et al. (2011). We perform 500 bootstrapped draws with replacement from the estimated error vector ϵ_i in (C.3) in Appendix C to generate new taxable income distributions. For each bootstrapped distribution we estimate the parameters of interest. The standard error for a parameter θ is calculated as the standard deviation of its bootstrapped distribution $S_{\widehat{\theta}}$, which reflects the misspecification of the fitted polynomial to the observed taxable income distribution rather than sampling error.

To test whether an estimated parameter $\widehat{\theta}$ significantly deviates from zero ($H_0 : \theta = 0$), we compute a t-test statistic $T = \frac{\widehat{\theta}}{S_{\widehat{\theta}}}$ for each bootstrapped distribution. The bootstrapped critical values at level β are defined as the lower $\beta/2$ and upper $\beta/2$ quantiles

of the ordered bootstrapped test statistics. We then assess whether an estimate is significantly different from zero within a $100(1-\beta)$ confidence interval if the corresponding t-statistic falls within the critical values at level β.

4.3 Results

4.3.1 Results from the static model

Figure 3 illustrates the distribution of taxable income and the estimated bunching at the top kink before and after the policy change. The bunching is estimated as the difference between the fitted polynomial (depicted by the red line) and the observed distribution of taxable income. Detailed information about the estimation procedure is provided in Appendix C. Bootstrapped standard errors are presented in parentheses.

In Panel (a), the estimated bunching at the top kink before the policy change is 5.6, indicating a concentration of taxable income around the kink threshold that is more than five times higher than the counterfactual distribution depicted by the red line. Panel (b) shows the estimated residual bunching at the former kink of 1.1, representing a 1.1 times higher concentration of taxable income compared to the counterfactual distribution. Additionally, the estimated bunching at the new kink is 7.8, reflecting a concentration more than seven times higher at the new top kink. All these estimated bunchings are statistically significant.[43] We use these estimated bunching measures in our static model estimation.

Table 3 presents the estimates from our static model. The first row provides the estimates for our study sample. The estimated Elasticity of Taxable Income (ETI) is 0.18, which is twice the size of the estimate from the Saez (2010a) model with no costs (0.09) and the Gelber et al. (2020b) model with bunching from above incorporating only fixed costs (0.10), presented in Table B.2 and Table B.3 in Appendix B. Our estimated marginal cost is 1.4 cents for saving one dollar of taxable income from a five percent

[43]The residual bunching at the former kink after the policy change is small but statistically significant. A small residual bunching does not threaten the identification of our model. In Table B.4 in Appendix B, we estimate these bunchings using different specifications, including varying bin sizes, degrees of fitted polynomials, and the number of excluded bins on each side of the kink.

higher marginal tax rate (the difference between the marginal tax rates above and below the top kink), indicating a marginal cost-to-saving ratio of 0.39. The estimated fixed cost is AUD 9.5, which is substantially larger than the estimated fixed cost of less than one dollar from the model of Table B.3. This implies that a marginal buncher at the new kink would incur a total adjustment cost of about AUD 17 to increase their taxable income by AUD 520 to bunch at the new kink, where about half of the total adjustment cost is fixed cost.

Table 3 also presents estimates broken down by gender, age, marital status, having a child, living in a major city, being the main earner in the household, employment type, professional and managerial occupations, individuals who used a tax agent, and those who spent more time filing their taxes.[44] The estimated ETI varies from 0.04 for wage and salary earners to 0.25 for women, all of which are more than twice the size of the estimates from models with only fixed costs or no costs. The estimated marginal cost is quite homogeneous across subgroups, ranging between 1.2 to 1.5 cents, with the largest cost observed for wage and salary earners. In contrast, the estimated fixed costs exhibit more heterogeneity, ranging from AUD 1.7 for wage and salary earners to AUD 10.1 for professionals and managers.

4.3.2 Results from the dynamic model

Figure 2 depicts the evolution of bunching at the top kink, starting with its introduction at AUD 150,000 and subsequently increasing to AUD 180,000. The figure also displays the estimated bunching at each kink, with bootstrapped standard errors shown in parentheses.

Upon introducing the kink at AUD 150,000, the estimated bunching is 5.0, representing a fivefold higher concentration of taxable income around the kink compared to the counterfactual distribution. In the following year, the bunching increases to 5.85. After the policy shift moves the kink to AUD 180,000, the bunching shifts to the new kink. The estimated bunching at the new kink rises to 7.79, indicating a more than sevenfold

[44] The estimates for flexible bunchers are presented in Table 5.

higher concentration of taxable income around the new top kink, while residual bunching at the former kink decreases to 1.14.

Figure 2 further illustrates that, over two years post-policy change, residual bunching at the old kink diminishes to 0.49 and 0.32, two and three years after the policy change, respectively. Bunching at the new kink continues to rise to 10.22, and 10.92 over the second and third year following the policy change. However, the estimated bunching in the third year post-policy change is not statistically different from that in the second year. Therefore, we use data from two years post-policy change for estimating our dynamic model.

Table 4 presents the estimates from our dynamic model, including ETI, fixed and marginal adjustment costs, and the cumulative probabilities of drawing a positive adjustment cost at each time period relative to the most recent policy change. Here, π_0 denotes the probability in the policy change year, and $\pi_0\pi_1$ represents the probability in the year following the policy change.

The first row provides the estimates for our study sample. Our estimated ETI is 0.35, which is twice the size of the estimate from our static model (0.18) and three times the size of the estimates from Saez (2010b)'s models with no costs (0.09) and Gelber et al. (2020b)'s static model with only fixed cost (0.10). The estimated fixed adjustment cost is AUD 23.0, more than twice the size of the estimate from our static model (AUD 9.5). The estimated marginal cost remains at 1.4 cents, consistent with our static model. The cumulative probabilities of drawing positive adjustment costs decrease from 0.14 at the policy change year to 0.07 the year after. These probabilities represent the portion of bunchers who continue to bunch at the former kink after the policy change. These estimates imply that a marginal buncher at the new kink would incur a total adjustment cost of approximately AUD 155 to increase their taxable income from their initial income by AUD 6,600 to bunch at the new kink, with about 15 percent of the total adjustment cost attributable to fixed costs.

Table 4 also presents estimates for various sub-samples. The estimated ETIs for all sub-samples are approximately twice the size of those from the static model. Specifically,

the ETI ranges from 0.07 for wage and salary earners to 0.62 for females. Consistent with our static model findings, the estimated fixed adjustment costs exhibit greater heterogeneity, ranging from AUD 3.1 for wage and salary earners to AUD 43.4 for females. In contrast, the estimated marginal costs remain relatively homogeneous across sub-samples, ranging from 1.2 to 1.5 cents.

4.3.3 Estimates for flexible bunchers

Table 5 presents the estimates from static and dynamic models for flexible bunchers, including self-employed individuals, those with trust income, and self-employed individuals with trust income.[45] Two main findings emerge.

First, among the flexible bunchers, self-employed individuals with trust income are the most adaptable group. This is evidenced by their higher estimated ETI and the smallest probabilities of incurring positive adjustment costs, which drop to almost zero. The estimated ETI for flexible bunchers is generally larger than those for other sub-samples presented in Table 4, and the estimates from the dynamic model are more than twice those from the static model. Specifically, the ETI estimates range from 0.21 for self-employed individuals (0.61 in the dynamic model) to 0.50 for self-employed individuals with trust income (0.95 in the dynamic model). The estimated marginal cost for self-employed individuals with trust income is similar to that of other groups, although the estimated fixed cost is relatively larger. However, since these individuals adjust a larger taxable income, the fixed cost constitutes a smaller portion of the total cost compared to others.[46]

Second, self-employed individuals, while having the lowest estimated elasticity (0.21 and 0.61 from static and dynamic models, respectively), also have the smallest estimated fixed costs (AUD 1.0 and AUD 41.7 from static and dynamic models, respectively) and adjustment costs (0.0 and 1.4 cents from static and dynamic models, respectively). Additionally, they exhibit the largest probabilities of drawing positive adjustment costs (0.06

[45] See Figure A.3, Figure A.4, and Figure A.5 for the distribution of taxable income for flexible bunchers.

[46] We investigated the effects of the policy change on the tax affairs fee in Appendix F using an Event Study model. The findings suggest that the fee increased after the policy change, and the increase is higher for those with trust income.

and 0.02).

Overall, these results highlight significant heterogeneity in tax responsiveness among flexible bunchers. Self-employed individuals with trust income stand out as the most flexible subgroup, as evidenced by their higher estimated ETI and near-zero probabilities of incurring positive adjustment costs. This group's ability to effectively utilize trusts as a reporting mechanism enables them to maximize tax savings with minimal financial and temporal burdens. In contrast, self-employed individuals without trust income exhibit a lower elasticity and higher probabilities of drawing positive adjustment costs, although they benefit from the smallest fixed and marginal adjustment costs. These findings underscore the crucial role of trust income as a strategic income reporting mechanism among high income individuals. Understanding these distinct behaviors is essential for policy makers aiming to design progressive tax systems that account for varying levels of taxpayer flexibility and adjustment costs, allowing enhancement of both the equity and efficiency of tax policies.

5 Conclusions

In this study, we investigate the behavioral responses of high-income taxpayers to changes in a progressive income tax system, with a particular focus on the Elasticity of Taxable Income (ETI) and the associated adjustment costs. Utilizing comprehensive administrative tax data from the Australian Taxation Office covering 2005 to 2011, we develop both static and dynamic bunching models that incorporate fixed and marginal adjustment costs. Our models allow for partial income adjustments and bunching from below, providing a nuanced understanding of taxpayer behavior in response to tax policy changes.

Our findings reveal that when both fixed and marginal adjustment costs are accounted for, the estimated ETI significantly increases—reaching 0.19 in the static model and 0.35 in the dynamic model. This underscores the critical role that adjustment costs play in shaping tax responsiveness. The estimated marginal cost of saving one dollar of taxable income from an additional five percent higher marginal tax rate is 1.4 cents, resulting in

a marginal cost-to-saving ratio of 0.39.

Further analysis highlights considerable heterogeneity in taxpayer responsiveness. Self-employed individuals with trust income emerge as the most adaptable subgroup, exhibiting the highest ETI (0.50 in the static model and 0.95 in the dynamic model) and the lowest probabilities of incurring positive adjustment costs. In contrast, self-employed individuals without trust income display lower elasticities (0.21 static, 0.61 dynamic) alongside higher probabilities of drawing positive adjustment costs. However, they benefit from the smallest fixed and marginal adjustment costs, These results emphasize the significant impact of trust income as a strategic income reporting mechanism among high-income individuals.

The dynamic model further elucidates the temporal evolution of bunching behavior, demonstrating how taxable income adjustments aid individuals in transitioning from the former to the new tax kink over time. This perspective highlights the persistent nature of strategic reporting and the diminishing residual bunching as adjustment costs accumulate.

The policy change analyzed—raising the top tax threshold from AUD 150,000 to AUD 180,000—resulted in a decrease in government tax revenue of approximately AUD 13.7 million. This decline comprises a AUD 6.5 million increase from behavioral effects and a AUD 20.3 million decrease from mechanical effects, leading to fiscal externalities of approximately 32 cents per dollar lost through mechanical effects. Sub-sample analysis reveals that, except for self-employed individuals with trust income, all other groups generated a negative impact on tax revenue, with some subgroups exhibiting fiscal externalities exceeding one dollar gained per dollar lost. The details of this analysis is provided in Appendix G.

Despite the policy change reducing government tax revenue by approximately AUD 20.3 million annually due to lower marginal tax rates on higher incomes, it resulted in substantial fiscal externalities. For every dollar lost through mechanical effects, about 32 cents were recouped through behavioral responses such as more bunching at the new top kink. This effect is stronger among taxpayers with greater flexibility in adjusting their taxable incomes, such as self-employed individuals with trust income ($1.09), highlighting

the complex interplay between tax policy changes and taxpayer behaviour.

These insights carry important policy implications. Policy makers aiming to design progressive tax systems must consider both fixed and marginal adjustment costs to accurately capture taxpayer responses. Additionally, recognizing and addressing strategic behaviors, such as income reporting through trusts, is essential to enhance the equity and efficiency of tax policies. By accounting for varying levels of taxpayer flexibility and adjustment costs, tax policies can be better tailored to minimize inefficiencies and achieve more effective income redistribution. Future research could expand on these findings by exploring the long-term welfare implications of adjustment behaviors and extending the analysis to other tax contexts to further inform effective tax policy formulation.

While higher taxes on high-income individuals can contribute to greater equity and increased public revenues, the high elasticity and strategic behaviors identified in our study suggest that such measures must be part of a broader, more nuanced tax policy framework. Effective progressive taxation requires not only rate adjustments but also comprehensive strategies to mitigate tax avoidance and address the underlying adjustment costs that influence taxpayer behavior. This could include system simplification. By considering these factors, policy makers can better design tax systems that achieve their intended fiscal and social objectives without unintended negative consequences.

References

Aarbu, Karl O. and Thor O. Thoresen, "Income Responses to Tax Changes—Evidence from the Norwegian Tax Reform," *National Tax Journal*, June 2001, *54* (2), 319–335.

Adam, Stuart, James Browne, David Phillips, and Barra Roantree, "Frictions and taxpayer responses: Evidence from bunching at personal tax thresholds tax thresholds," *International Tax and Public Finance*, 2020.

Aghion, Philippe, Ufuk Akcigit, Matthieu Lequien, and Stefanie Stantcheva, "Tax Simplicity and Heterogeneous Learning," 2017. NBER Working Paper Series.

Alinaghi, Nazila, John Creedy, and Norman Gemmell, "Elasticities of Taxable Income and Adjustment Costs: Bunching Evidence from New Zealand," *Oxford Economic Papers*, 2020, pp. 1–26.

Andreoni, James, Brian Erard, and Jonathan Feinstein, "Tax compliance," *Journal of Economic Literature*, 1998, *36* (2), 818–860.

Auten, Gerald and Robert Carroll, "The Effect of Income Taxes on Household Income," *Review of Economics and Statistics*, November 1999, *81* (4), 681–693.

Axelson, Christopher, Antonia Hohmann, Jukka Pirttilä, Roxanne Raabe, Nadine Riedel, and UNU-WIDER, "Taxing Top Incomes in the Emerging World: Economic Impact under the Microscope," WIDER Working Paper 2024, UNU-WIDER June 2024.

Bastani, Spencer and Håkan Selin, "Bunching and non-bunching at Kink points of the Swedish tax schedule," *Journal of Public Economics*, 2014, *109*, 36–49.

Blomquist, Sören and Håkan Selin, "Hourly Wage Rate and Taxable Labor Income Responsiveness to Changes in Marginal Tax Rates," *Journal of Public Economics*, December 2010, *94* (11-12), 878–889.

Bond, David and Anna Wright, "A Snapshot of the Australian Taxpayer," *Australian Accounting Review*, 2018, *28* (4), 598–615.

Brewer, Mike, Emmanuel Saez, and Andrew Shephard, "Means Testing and Tax Rates on Earnings." In Dimensions of Tax Design," in "In Dimensions of Tax Design: The Mirrlees Review," Oxford University Press, 2010, pp. 90–173.

Brülhart, Marius, Jonathan Gruber, Matthias Krapf, and Kurt Schmidheiny, "Behavioral Responses to Wealth Taxes: Evidence from Switzerland," *American Economic Journal: Economic Policy*, November 2022, *14* (4), 111–150.

Chancel, Lucas, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman, "World Inequality Report," *World Inequality Lab*, 2022.

Chetty, Raj, "Is the taxable income elasticity sufficient to calculate deadweight loss? The implications of evasion and avoidance," *American Economic Journal: Economic Policy*, 2009, *1* (2), 31–52.

_ , "Bounds on Elasticities With Optimization Frictions: A Synthesis of Micro and Macro Evidence on Labor Supply," *Econometrica*, 2012, *80* (3), 969–1018.

_ **, John N. Friedman, Tore Olsen, and Luigi Pistaferri**, "Adjustment costs, firm responses, and micro vs. macro labor supply elasticities: Evidence from Danish tax records," *Quarterly Journal of Economics*, 2011, *126* (2), 749–804.

Doerrenberg, Philipp, Andreas Peichl, and Sebastian Siegloch, "The elasticity of taxable income in the presence of deduction possibilities," *Journal of Public Economics*, 2017, *151*, 41–55.

Feldstein, Martin, "The effect of marginal tax rates on taxable income: A panel study of the 1986 tax reform act," *Journal of Political Economy*, 1995, *103* (3), 551–572.

_ , "Tax avoidance and the deadweight loss of the income tax," *Review of Economics and Statistics*, 1999, *81* (4), 674–680.

Gelber, Alexander, Damon Jones, and Daniel W. Sacks, "Estimating Earnings Adjustment Frictions: Method and Evidence from the Social Security Earnings Test," *American Economics Journal: Applied Economics*, 2020, (January).

_ **,** _ **,** _ **, and Jae Song**, "Using non-linear budget sets to estimate extensive margin responses: Evidence and method from the earnings test," *American Economic Journal: Applied Economics*, 2020.

Gelber, Alexander M, "Taxation and the Earnings of Husbands and Wives: Evidence from Sweden," *The Review of Economics and Statistics*, 2014, *96* (2), 287–305.

Giertz, Seth H., "The Elasticity of Taxable Income over the 1980s and 1990s," *National Tax Journal*, December 2007, *60* (4), 743–768.

Goolsbee, Austan, "What Happens When You Tax the Rich? Evidence from Executive Compensation," *Journal of Political Economy*, April 2000, *108* (2), 352–378.

Gruber, Jon and Emmanuel Saez, "The Elasticity of Taxable Income: Evidence and Implications," *Journal of Public Economics*, 2002.

Hansson, Åsa, "Taxpayers' Responsiveness to Tax Rate Changes and Implications for the Cost of Taxation in Sweden," *International Tax and Public Finance*, August 2007, *14* (5), 563–582.

Johnson, Shane, Robert Breunig, Miguel Olivo-Villabrille, and Arezou Zaresani, "Individuals' Responsiveness to Marginal Tax Rates: Evidence from Bunching in the Australian Personal Income Tax," *Labour Economics*, 2023. doi: https://doi.org/10.1016/j.labeco.2023.102461.

Kleven, Henrik, "Externalites and The Taxation of Top Earners," *NBER Working Paper*, 2025.

Kleven, Henrik J., Martin B. Knudsen, Claus T. Kreiner, Søren Pedersen, and Emmanuel Saez, "Unwilling or Unable to Cheat? Evidence from a Randomized Tax Audit Experiment in Denmark," *Econometrica*, 2011.

Kleven, Henrik Jacobsen, "Bunching," *Annual Review of Economics*, 2016, *8* (1), 435–464.

_ **and Esben Anton Schultz**, "Estimating Taxable Income Responses Using Danish Tax Reforms," *American Economic Journal: Economic Policy*, 2014, *6* (4), 271–301.

_ **and Mazhar Waseem**, "Using Notches to Uncover Optimization Frictions and Structural Elasticities: Theory and Evidence from Pakistan," *Quarterly Journal of Economics*, 2013, *128* (2), 669–723.

Kopczuk, Wojciech, "Tax Bases, Tax Rates and the Elasticity of Reported Income," *Journal of Public Economics*, December 2005, *89* (11-12), 2093–2119.

_ , "The Polish Business Flat Tax and Its Effect on Reported Incomes: A Pareto Improving Tax Reform," *http://www.columbia.edu/˜wk2110/bin/PolishFlatTax.pdf*, 2012.

Mavrokonstantis, Panos and Arthur Seibold, "Bunching and Adjustment Costs: Evidence from Cypriot Tax Reforms," *Journal of Public Economics*, October 2022, *214*, 104727.

Moore, Dylan T., "Evaluating Tax Reforms without Elasticities: What Bunching Can Identify," 2022.

Mortenson, Jacob A. and Andrew Whitten, "Bunching to Maximize Tax Credits: Evidence from Kinks in the US Tax Schedule," *American Economic Journal: Economic Policy*, August 2020, *12* (3), 402–432.

Polidano, Cain, Andrew Carter, Marc Chan, Abraham Chigavazira, Hang To, Justin Holland, Son Nguyen, Ha Vu, and Roger Wilkins, "The ATO Longitudinal Information Files (ALife): A New Resource for Retirement Policy Research," *Australian Economic Review*, 2020, *53* (3), 429–449.

Saez, Emmanuel, "Reported Incomes and Tax Rates , and Evidence," *Tax Policy and the Economy*, 2004, *18* (2004), 117–173.

_ , "Do taxpayers bunch at kink points?," *American Economic Journal: Economic Policy*, 2010, *2* (August), 180–212.

_ , "Do taxpayers bunch at kink points?," *American Economic Journal: Economic Policy*, 2010, *2* (3), 180–212.

_ **and Gabriel Zucman**, "The rise of income and wealth inequality in America: Evidence from distributional macroeconomic accounts," 2020.

_ **and Michael R Veall**, "The Evolution of High Incomes in Northern America: Lessons from Canadian Evidence," *American Economic Review*, May 2005, *95* (3), 831–849.

_ **, Joel Slemrod, and Seth H Giertz**, "The elasticity of taxable income with respect to marginal tax rates: A critical review," *Journal of Economic Literature*, 2012, *50* (1), 3–50.

_ **,** _ **, and Seth H. Giertz**, "The elasticity of taxable income with respect to marginal tax rates: A critical review," *Journal of Economic Literature*, 2012, *50* (1), 3–50.

Sainsbury, Tristram and Robert Breunig, "The Urgent Need for Tax Reform in Australia in the COVID-19 World," *Australian Journal of Labour Economics*, 2020, *23* (2).

Sillamaa, Mary-Anne and Michael R Veall, "The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1988 Tax Flattening in Canada," *Journal of Public Economics*, June 2001, *80* (3), 341–356.

Slemrod, Joel, "Do Taxes Matter? Lessons From the 1980s," *American Economic Review*, 1992, *82* (2), 250–256.

_ , "Income creation or income shifting? Behavioral responses to the tax reform act of 1986," *The American Economic Review*, 1995, *85* (2), 175–180.

_ **and Shlomo Yitzhaki**, "Tax Avoidance, Evasion, and Administration." In . Vol. 3, ed. Alan J. Auerbach and Martin Feldstein," in A.J Auerbach Feldstein and M., eds., *Handbook of Public Economics*, Vol. 3, Elsevier Science B. V., 2002, chapter 22, pp. 1423–1470.

Zaresani, Arezou, "Adjustment cost and incentives to work: Evidence from a disability insurance program," *Journal of Public Economics*, 2020, *188*, 104223.

Tables

Table 1: Summary statistics

	Three years before policy change	Three years after policy change
Economics outcomes		
Total income (,000 AUD)	166.0	164.1
	(38.7)	(30.5)
Taxable income (,000 AUD)	156.1	156.8
	(19.0)	(19.3)
Net tax amount (,000 AUD)	46.0	43.3
	(17.9)	(15.1)
Total deductions (,000 AUD)	9.8	7.2
	(32.6)	(22.0)
Total tax withhold (,000 AUD)	36.4	36.9
	(26.1)	(22.6)
Wage and salary income (,000 AUD)	101.9	113.7
	(69.9)	(65.7)
Trust income (,000 AUD)	0.29	0.42
	(8.2)	(9.1)
Gross taxable income (,000 AUD)	150.1	146.4
	(56.6)	(51.1)
Occupation:		
Managers	0.28	0.28
Professionals	0.29	0.31
Technicians and trade	0.05	0.09
Community and personal services	0.01	0.02
Clerical and administrative	0.05	0.08
Sales	0.03	0.02
Machinery operators and drivers	0.02	0.03
Labourers	0.01	0.02
Self employed	0.48	0.38
	(0.50)	(0.49)
Has trust income	0.31	0.27
Self employed with trust income	0.76	0.73
Used tax agent	0.86	0.81
Tax file preparation time (hours)	11.3	7.9
	(63.5)	(50.2)
Tax affairs fee (,000 AUD)	0.42	0.42
	(2.5)	(2.5)
Demographics		
Age (years)	47.5	46.13
	(12.6)	(11.8)
Male	0.75	0.75
Has spouse	0.74	0.74
Has child	0.67	0.69
Major city	0.74	0.77
Main earner	0.90	0.88
Male main earners	0.82	0.84
Number of individuals	45,137	64,934
Total number of observations	64,670	102,209

Note: This table presents summary statistics for our study sample, including Australian tax-resident filers aged 18 and above with taxable incomes ranging from AUD 130,000 to AUD 200,000 during the financial years from 2005-2006 to 2010-2011. "Before" and "After" the policy change refer to the three years before and after the 2008-2009 policy change, which increased the top kink from AUD 150,000 to AUD 180,000. Dollar values are represented as means in thousands of AUD, with standard deviations shown in parentheses. Other statistics represent proportions. Gross taxable income excludes trust income but includes total deductions in the taxable income. Occupations are categorized based on the Australian Bureau of Statistics (ABS) one-digit Australian and New Zealand Standard Classification of Occupations (ANZSCO). Approximately 30 percent of the sample did not report their occupations. Male main earner presents the portion of main earners who are male. Self employed with trust income statistics denotes the portion of individuals with trust income who are self-employed. For summary statistics for flexible bunchers, and the all tax filers, see Table 1 and Table B.1 in Appendix B.

Table 2: Summary statistics of sharp bunchers at the top kinks

	Three years before policy change	Three years after policy change
Economic outcomes		
Total income (,000 AUD)	159.3	188.6
	(31.8)	(25.8)
Taxable income (,000 AUD)	149.8	179.8
	(2.8)	(2.6)
Net tax amount (,000 AUD)	42.4	46.8
	(17.4)	(19.8)
Total deductions (,000 AUD)	9.5	8.9
	(31.6)	(23.4)
Total tax withhold (,000 AUD)	32.5	33.7
	(24.1)	(28.1)
Wage and salary income (,000 AUD)	92.9	101.8
	(66.3)	(79.6)
Trust income (,000 AUD)	21.5	43.4
	(52.2)	(72.4)
Gross taxable income (,000 AUD)	137.8	145.272.7
	(55.1)	(72.7)
Occupation:		
Managers	0.27	0.27
Professionals	0.27	0.28
Technicians and trade	0.05	0.005
Community and personal services	0.001	0.001
Clerical and administrative	0.005	0.009
Sales	0.003	0.003
Machinery operators and drivers	0.001	0.001
Labourers	0.001	0.001
Self employed	0.52	0.57
Has trust income	0.35	0.44
Self employed with trust income	0.76	0.73
Used tax agent	0.87	0.85
Tax file preparation time (hours)	6.3	24.5
	(25.1)	(34.7)
Tax affairs fee (,000 AUD)	0.37	0.49
	(1.4)	(2.3)
Demographics		
Age (years)	46.9	46.6
	(12.8)	(12.7)
Male	0.7	0.68
Has spouse	0.74	0.75
Has child	0.67	0.71
Major city	0.74	0.80
Main earner	0.86	0.79
Male main earners	0.82	0.84
Number of individuals	11,778	10,865
Total number of observations	12,949	12,478

Note: This table presents summary statistics for flexible bunchers at the top kink before and after the policy change. The study sample comprises individuals whose taxable income fell within a AUD 5,000 range around the former top kink (AUD 145,000 to AUD 155,000) during the three years preceding the policy change (2005-2006 to 2007-2008) and within a AUD 5,000 range around the new top kink (AUD 175,000 to AUD 185,000) during the three years following the policy change (2008-2009 to 2010-2011). See note to Table 1.

Table 3: Estimates from static model

	Elasticity e	Fixed cost ϕ_f	Marginal cost ϕ_m
All sample	0.185	9.456	0.014
	[0.106, 0.263]	[5.158, 13.755]	[0.002, 0.025]
Gender: Male	0.148	8.220	0.014
	[0.103, 0.193]	[6.061, 10.380]	[0.005, 0.024]
Gender: Female	0.250	7.951	0.012
	[0.046, 0.453]	[-3.585, 19.487]	[0.004, 0.020]
Age: 18-44 years	0.180	6.037	0.012
	[0.078, 0.281]	[-0.075, 12.149]	[0.008, 0.016]
Age: 45-59 years	0.154	9.117	0.013
	[0.062, 0.245]	[5.186, 13.048]	[0.002, 0.024]
Has spouse	0.142	5.117	0.012
	[0.070, 0.215]	[1.015, 9.218]	[0.005, 0.019]
Has child	0.198	9.783	0.015
	[0.038, 0.357]	[0.223, 19.343]	[0.013, 0.016]
Live in major city	0.137	3.525	0.012
	[-0.000, 0.273]	[-4.176, 11.226]	[0.008, 0.016]
Main earner	0.154	9.046	0.014
	[0.104, 0.205]	[6.210, 11.883]	[0.008, 0.019]
Employment type:	0.037	1.713	0.015
Wage and salary earners	[0.013, 0.061]	[0.418, 3.008]	[0.006, 0.024]
Occupation:	0.161	10.045	0.014
Professional and managers	[0.085, 0.238]	[6.103, 13.987]	[0.008, 0.021]
Used tax agent	0.191	8.950	0.014
	[0.076, 0.306]	[2.722, 15.179]	[0.005, 0.022]
Spent more than	0.185	9.485	0.014
10 hours filling taxes	[0.106, 0.263]	[5.167, 13.803]	[0.001, 0.026]

Note: This table presents the estimated cost and the Elasticity of taxable income (ETI) from the static model. These estimates capture immediate responses to the policy change using data from one year before and one year after the policy change. The 95 per cent confidence intervals, calculated using bootstrapped standard errors, are presented in brackets. For estimates that consider only fixed costs, refer to Table B.3. For estimates with no costs, using the method by Saez (2010a), please see Table B.2 in Appendix B.

Table 4: Estimates from dynamic model

	Elasticity	Fixed cost	Marginal cost	Cumulative probabilities of positive cost	
	e	ϕ_f	ϕ_m	π_0	$\pi_0\pi_1$
All sample	0.346	22.991	0.014	0.144	0.067
	[0.183, 0.510]	[11.676, 34.306]	[0.014, 0.015]	[0.066, 0.221]	[-0.119, 0.252]
Gender: Male	0.241	15.269	0.014	0.230	0.152
	[0.178, 0.305]	[4.771, 25.766]	[0.012, 0.017]	[0.097, 0.362]	[0.034, 0.270]
Gender: Female	0.623	43.378	0.014	0.063	0.010
	[0.284, 0.962]	[19.842, 66.914]	[0.012, 0.016]	[-0.630, 0.757]	[-0.676, 0.656]
Age: 18-44 years	0.450	29.750	0.014	0.148	0.089
	[0.291, 0.610]	[16.673, 42.827]	[0.011, 0.017]	[-0.018, 0.314]	[-0.037, 0.216]
Has spouse	0.330	21.119	0.014	0.180	0.131
	[0.253, 0.407]	[7.864, 34.375]	[0.013, 0.015]	[0.086, 0.274]	[0.019, 0.243]
Has child	0.351	22.016	0.014	0.249	0.187
	[0.280, 0.422]	[15.197, 28.835]	[0.014, 0.015]	[0.195, 0.303]	[0.086, 0.288]
live in major city	0.404	36.853	0.012	0.169	0.097
	[0.227, 0.582]	[22.744, 50.962]	[0.010, 0.105]	[0.050, 0.289]	[-0.117, 0.310]
Main earner	0.250	15.207	0.015	0.248	0.223
	[0.176, 0.325]	[9.903, 20.511]	[0.014, 0.015]	[0.159, 0.337]	[0.146, 0.301]
Employment type:	0.067	3.140	0.016	1.095	0.528
Wage and salary earners	[-0.017, 0.151]	[-0.719, 6.998]	[-0.001, 0.032]	[0.685, 1.504]	[-0.109, 1.165]
Professional and managers	0.228	14.101	0.014	0.308	0.195
	[0.140, 0.316]	[8.590, 19.612]	[0.014, 0.015]	[0.226, 0.390]	[0.127, 0.263]
Used tax agent	0.447	29.620	0.014	0.076	0.076
	[0.419, 0.476]	[21.153, 38.088]	[0.013, 0.015]	[0.068, 0.084]	[0.064, 0.088]
Spent more than	0.349	23.166	0.014	0.139	0.071
10 hours filling taxes	[0.108, 0.589]	[11.323, 35.010]	[0.005, 0.023]	[-0.065, 0.343]	[-0.394, 0.537]

Note: This table presents the estimated cost and the Elasticity of taxable income (ETI), along with the cumulative probabilities of incurring a positive cost from the dynamic model. The cumulative probabilities are indexed according to the time relative to the policy change. These estimates capture the gradual emergence and dissolution of bunching at the top kink using data from two years before and three years after the policy change. The 95 per cent confidence intervals, calculated using bootstrapped standard errors, are provided in brackets.

Table 5: Estimates from static and dynamic models for flexible bunchers

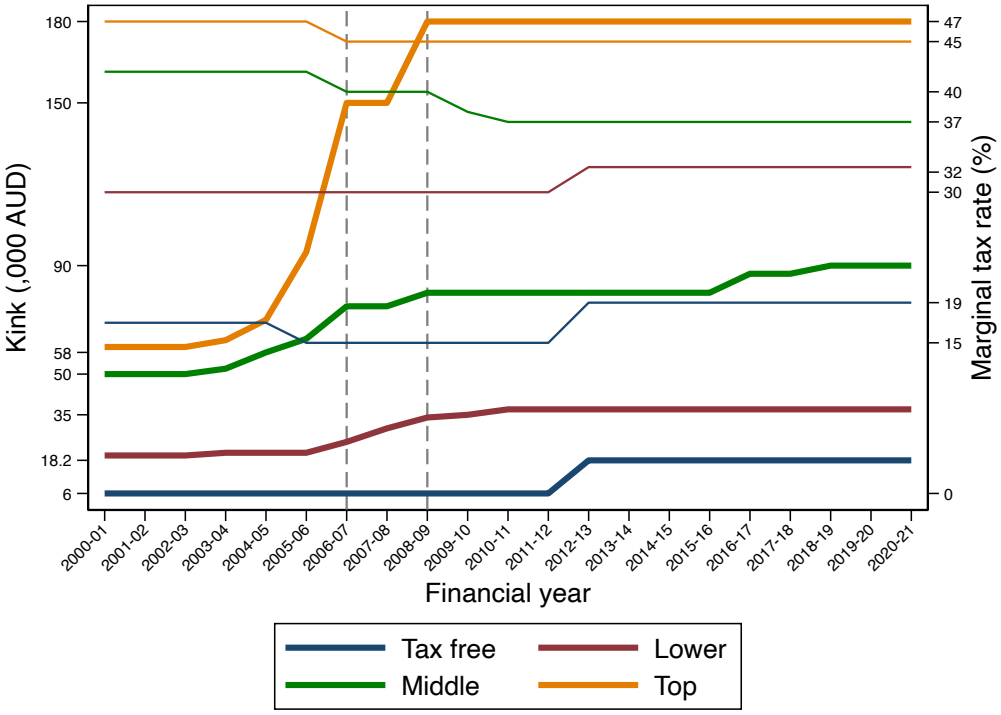
	Elasticity	Fixed cost	Marginal cost	Cumulative probabilities of positive cost	
	e	ϕ_f	ϕ_m	π_0	$\pi_0\pi_1$
Self employed					
Static model	0.213	1.038	0.008		
	[0.035, 0.392]	[-8.267, 10.344]	[0.003, 0.013]		
Dynamic model	0.611	41.695	0.014	0.055	0.023
	[0.376, 0.845]	[25.580, 57.810]	[0.005, 0.023]	[-0.043, 0.152]	[-0.481, 0.526]
Trust income holders					
Static model	0.292	5.432	0.010		
	[0.020, 0.565]	[-8.844, 19.707]	[0.004, 0.015]		
Dynamic model	0.815	56.213	0.014	0.045	0.009
	[0.650, 0.981]	[44.758, 67.667]	[0.003, 0.025]	[-0.277, 0.368]	[-0.593, 0.610]
Self-employed with trust income					
Static model	0.500	26.219	0.013		
	[0.196, 0.805]	[11.611, 40.826]	[0.007, 0.019]		
Dynamic model	0.950	66.758	0.014	0.018	0.010
	[0.745, 1.155]	[52.340, 81.176]	[-0.001, 0.029]	[-0.215, 0.252]	[-0.506, 0.487]

Note: This table presents the estimates from both static and dynamic models for individuals with greater flexibility for bunching, including self-employed individuals, those with trust income, and self-employed individuals with trust income. The 95 per cent confidence intervals, calculated using bootstrapped standard errors, are provided in brackets. Refer to the notes in Table 3 and Table 4 for more details.

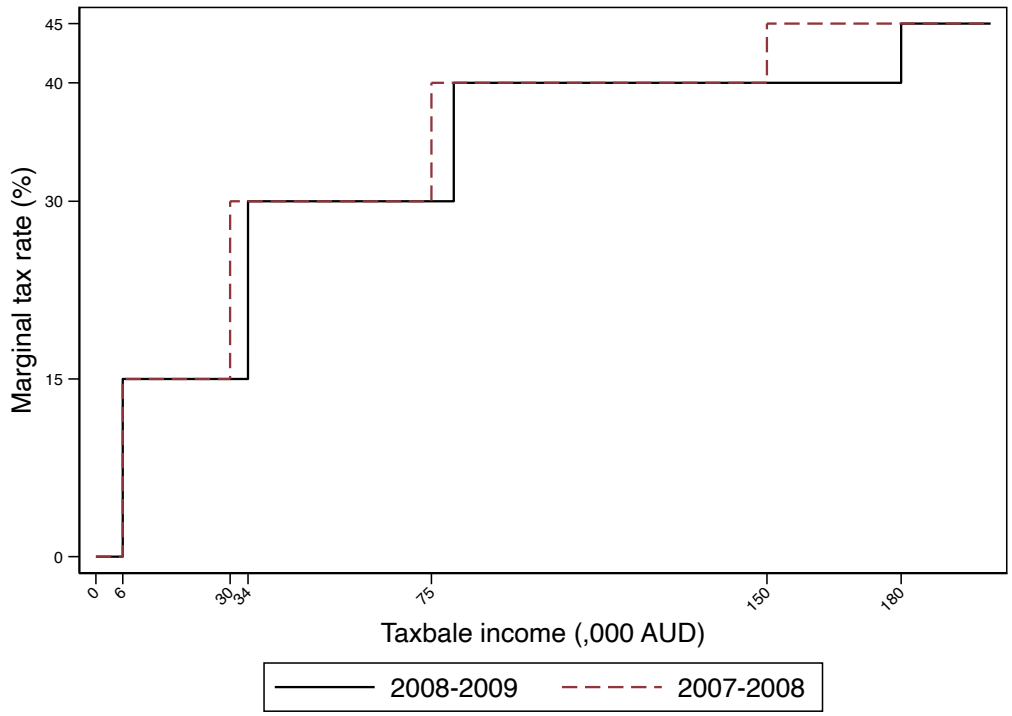
Figures

Figure 1: Australian personal income tax schedule

(a) Changes in the last two decades

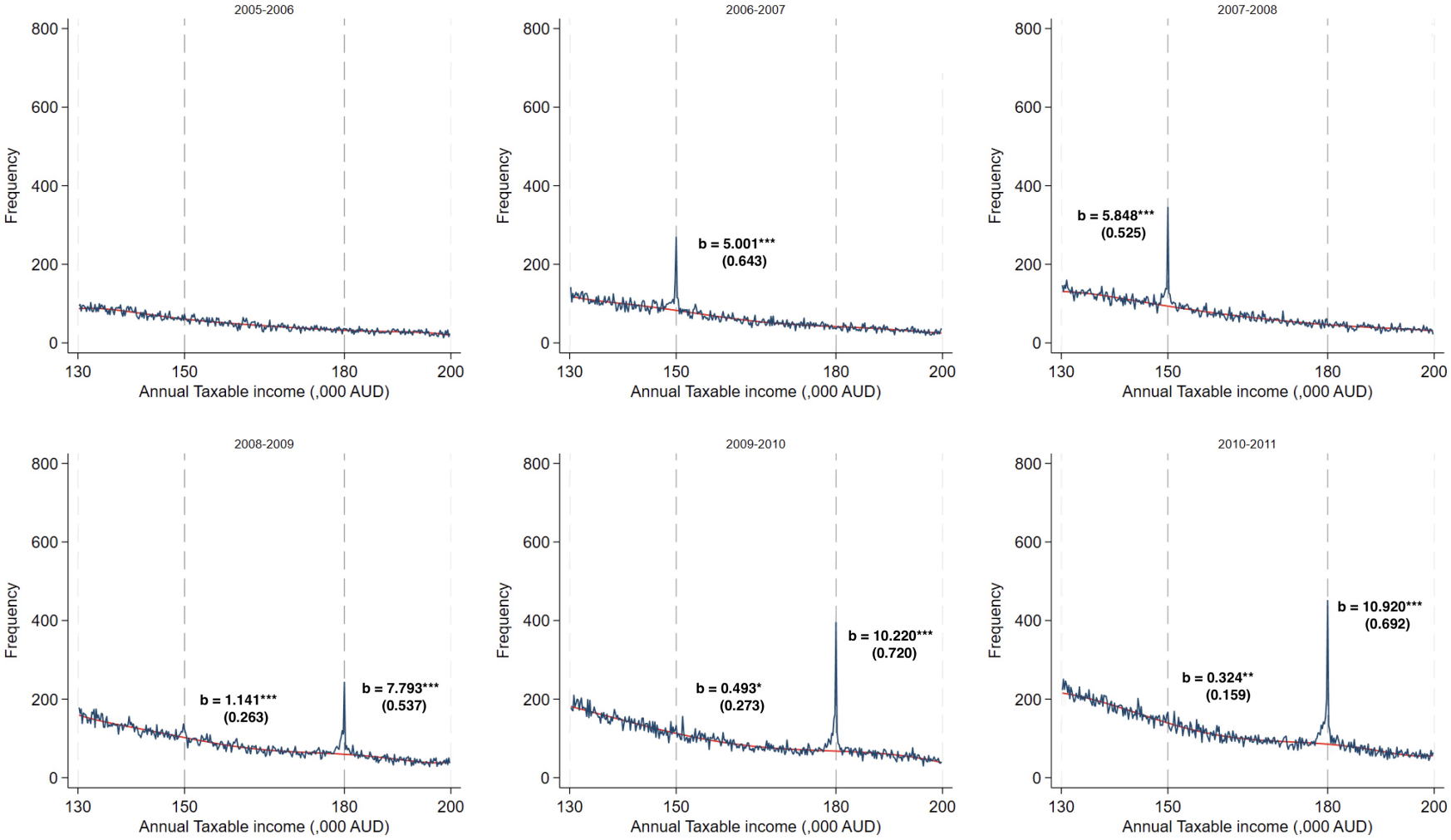


(b) Changes the kinks and marginal tax rates in 2008-2009



Note: This figure depicts the evolution of Australian personal income tax rates for residents over the past two decades. The tax schedule features four brackets: tax-free, lower, middle, and top brackets, each represented in the figure as distinct kinks. The first panel illustrates changes to these kinks and the corresponding marginal tax rates. The thicker line denotes the kinks, while the thinner lines of the same color indicate the marginal tax rates above each kink. The second panel zooms in on the changes during the 2008-09 financial year, which is the focal point of this study. The data is sourced from the Australian Taxation Office website as of March 29, 2024.

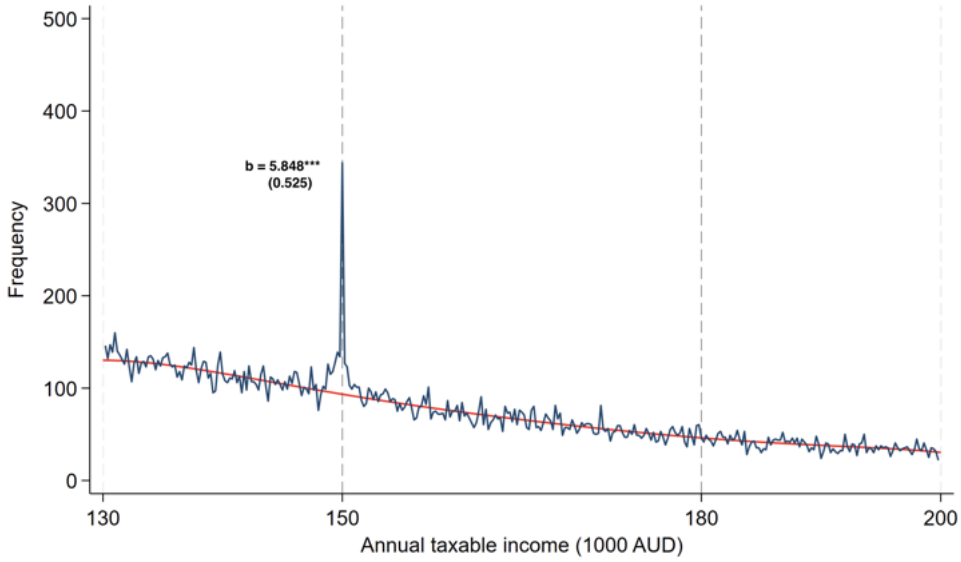
Figure 2: Distribution of annual taxable income at the top kink



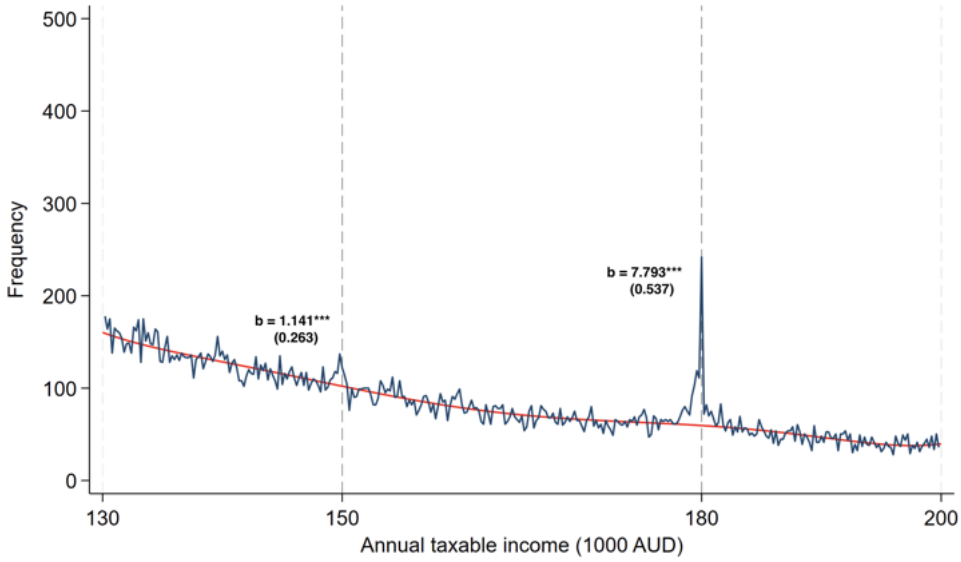
Note: This figure displays the distribution of taxable income around the top kink. The red line represents the fitted degree six polynomial, excluding six bins around the kink with a bin size of AUD 200. The grey lines denote the top kinks. The normalized bunching (b), as specified in (C.5) and estimated using the procedure described in Appendix C. The bootstrapped standard errors are presented in parenthesis.
$*p < 0.10, ** < 0.05, * * *p < 0.01$

Figure 3: Distribution of taxable income around the top kink

(a) Before policy change



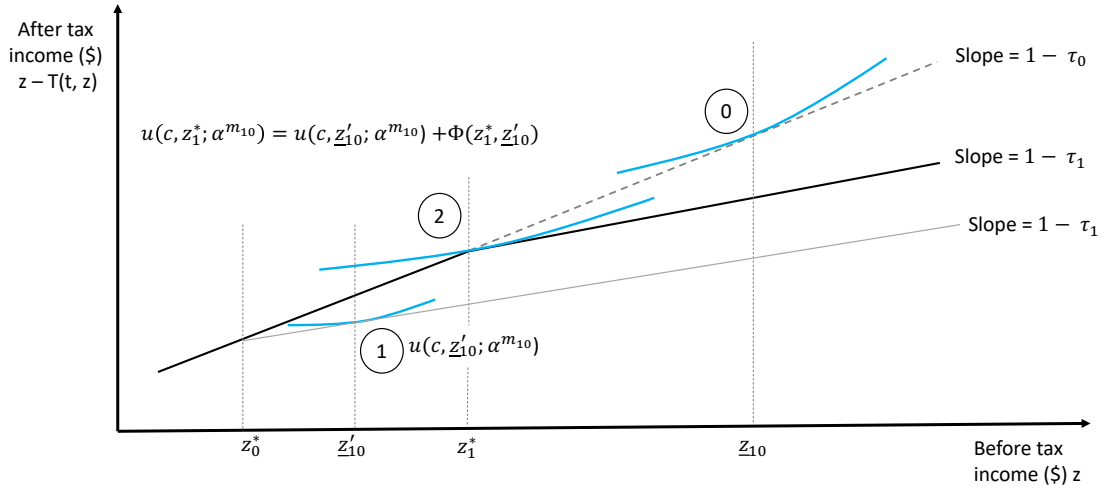
(b) After policy change



Note: This figure illustrates the distribution of taxable income around the top kink before (2007-2008) and after the policy change (2008-2009). The red line represents the fitted degree six polynomial, excluding six bins around the kink with a bin size of AUD 200. In Table B.4 in Appendix B we estimate these bunchings using different specifications, including different bin size, degree of fitted polynomial, and the number of excluded bins at each side of the kink. In all the other specifications, the estimated residual bunching is slightly larger than the ones we use. Individuals who were bunching at the former top kink shift to the new top kink after the policy change, while some continue bunching at the former top kink. The bootstrapped standard errors are presented in parenthesis. For more details, see the notes for Figure 2.

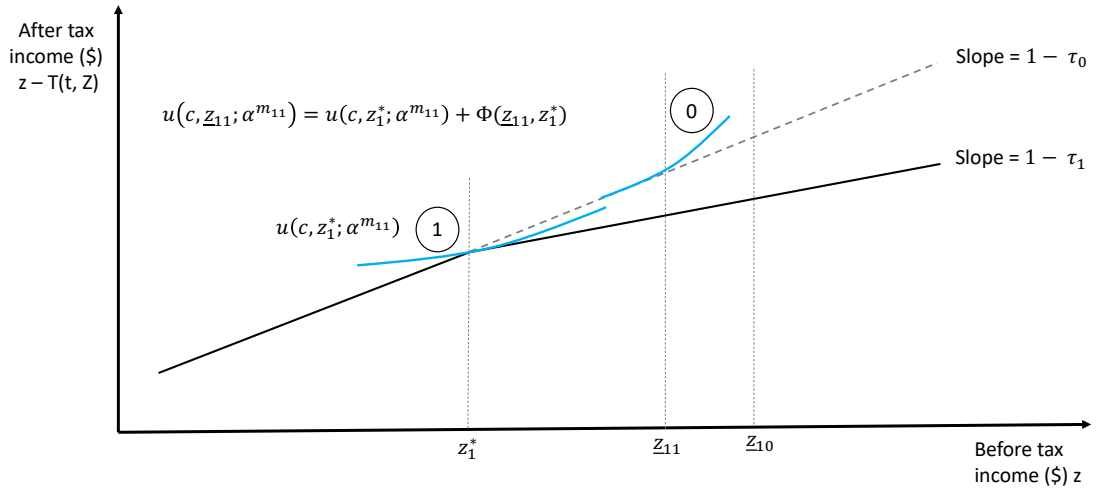
Figure 4: Taxable income responses of marginal buncher

(a) Former kink before policy change



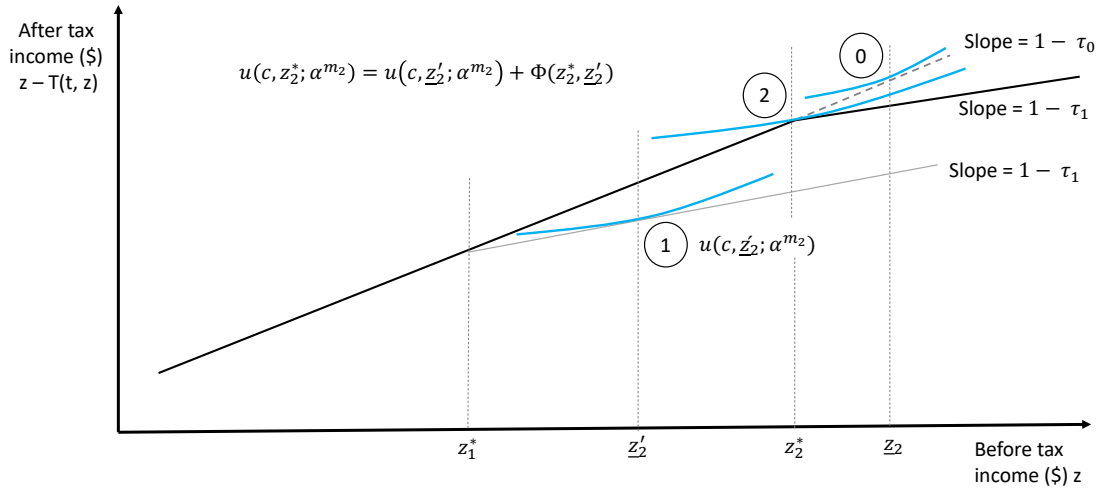
Note: This figure illustrates the change in taxable income for a marginal buncher at the z_1^* kink, characterized by an ability level $\alpha^{m_{10}}$ and initial taxable income $\underline{z}_{10}$ under a linear tax rate of τ_0. This individual initially decreases their taxable income to $\underline{z}'_{10}$, which falls below z_1^* when a kink at z_0^* (the top tax kink prior to z_1^*) is introduced. As the kink shifts to z_1^*, the marginal buncher faces a decision: they may either remain at $\underline{z}_{10}$ or incur an adjustment cost ϕ to increase their taxable income and bunch at z_1^*.

(b) Former kink after policy change



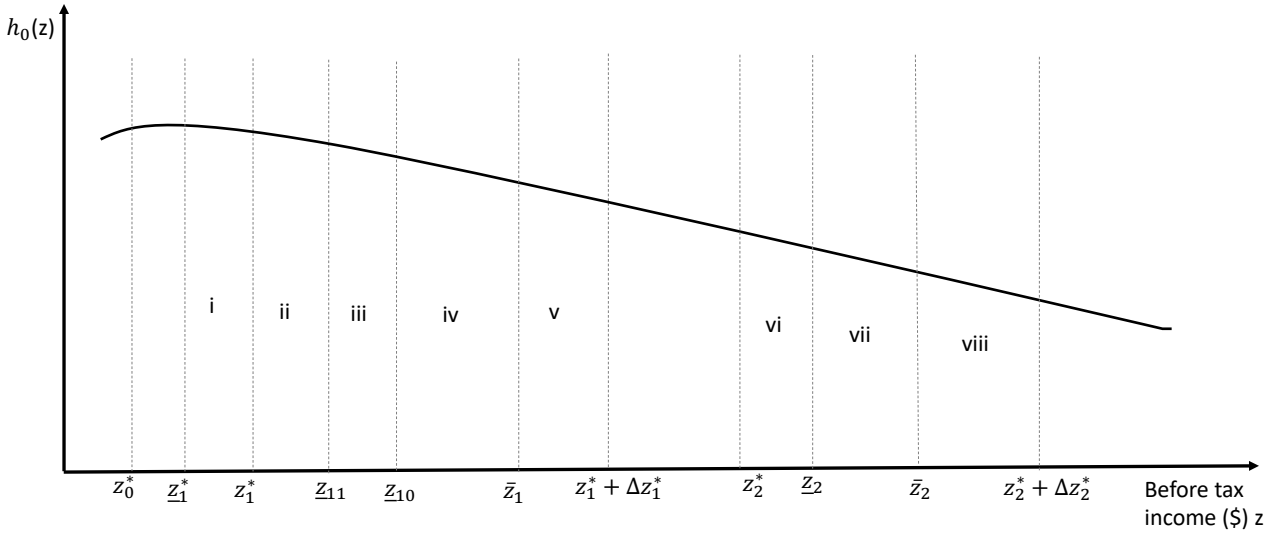
Note: This figure illustrates the change in taxable income for a marginal buncher with ability $\alpha^{m_{11}}$ and initial taxable income $\underline{z}_{11}$ at the previous kink z_1^* following a policy change. Initially, upon the introduction of a kink at z_1^*, the individual chooses to bunch at this kink. Subsequently, as the policy change raises the top kink to z_2^*, they face a decision: either continue bunching at z_1^* or incur an adjustment cost ϕ to increase their taxable income to a new optimal level, represented by $\underline{z}'_{11}$, under the new tax schedule.

(c) New kink



Note: This figure illustrates the change in taxable income for a marginal buncher with ability α^{m_2} and initial taxable income $\underline{z}_2$ at the new kink z_2^*. Initially, with the introduction of a kink at z_1^*, the individual reduces their taxable income to $\underline{z}_2'$. Subsequently, when the kink shifts to z_2^*, they face a decision: either remain at $\underline{z}_2'$ or incur an adjustment cost ϕ to bunch at z_2^*.

Figure 5: Counter-factual distribution of taxable income



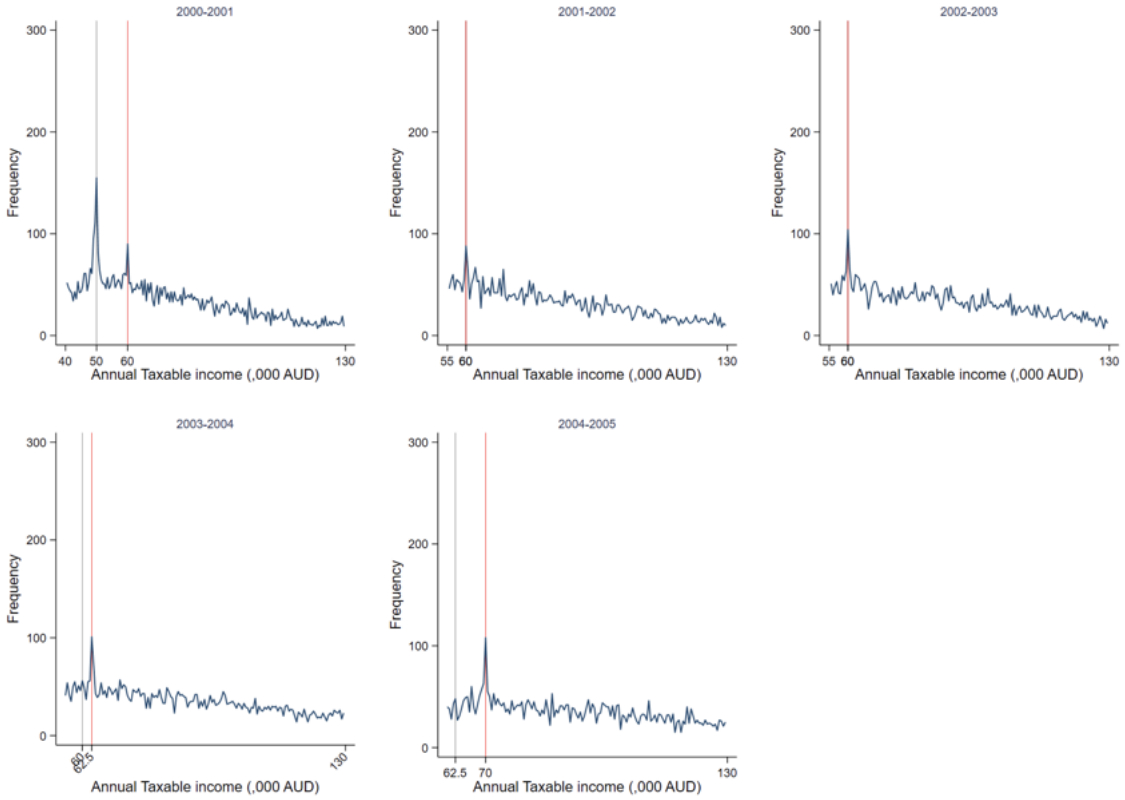
Note: This figure illustrates the counterfactual distribution of taxable income and the bunching ranges at the z_1^* and z_2^* kinks. z_0^* denotes the top kink before our study period. $\bar{z}_1$ and $\bar{z}_2$ denote the adjusted taxable income of individuals who would have located at $z_1^* + \Delta_1^*$ and $z_2^* + \Delta z_2^*$, respectively, and are specified in (E.4) in Appendix E. The bunching ranges without adjustment costs are $ii + iii + iv + v$ at z_1^* and $vi + vii + viii$ at z_2^*. Allowing for partial adjustments, these ranges reduce to $ii + iii + iv$ at z_1^* and $vi + vii$ at z_2^*. When adjustment costs are introduced, the bunching ranges further shrink to $ii + iii$ at z_1^* and vi at z_2^*. The residual bunching at z_1^* is represented by $i + ii$.

Online Appendixes

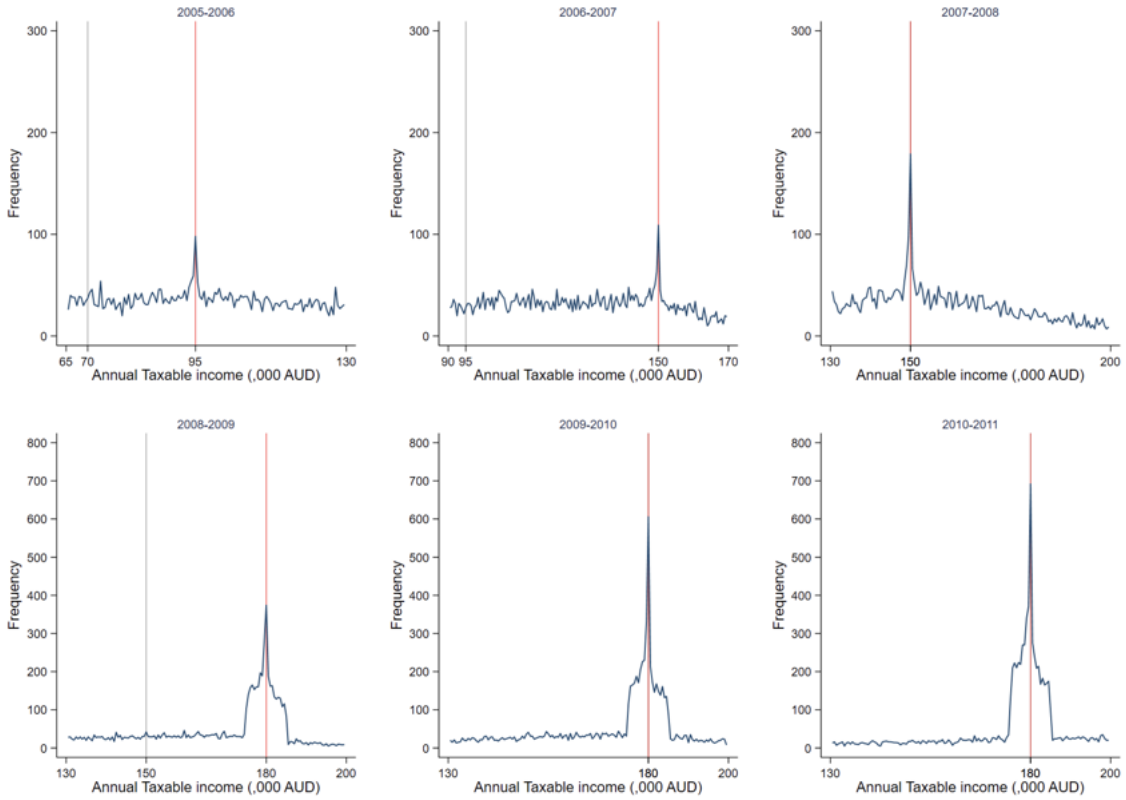
A Appendix: Figures

Figure A.1: Tracking bunchers at new top kink

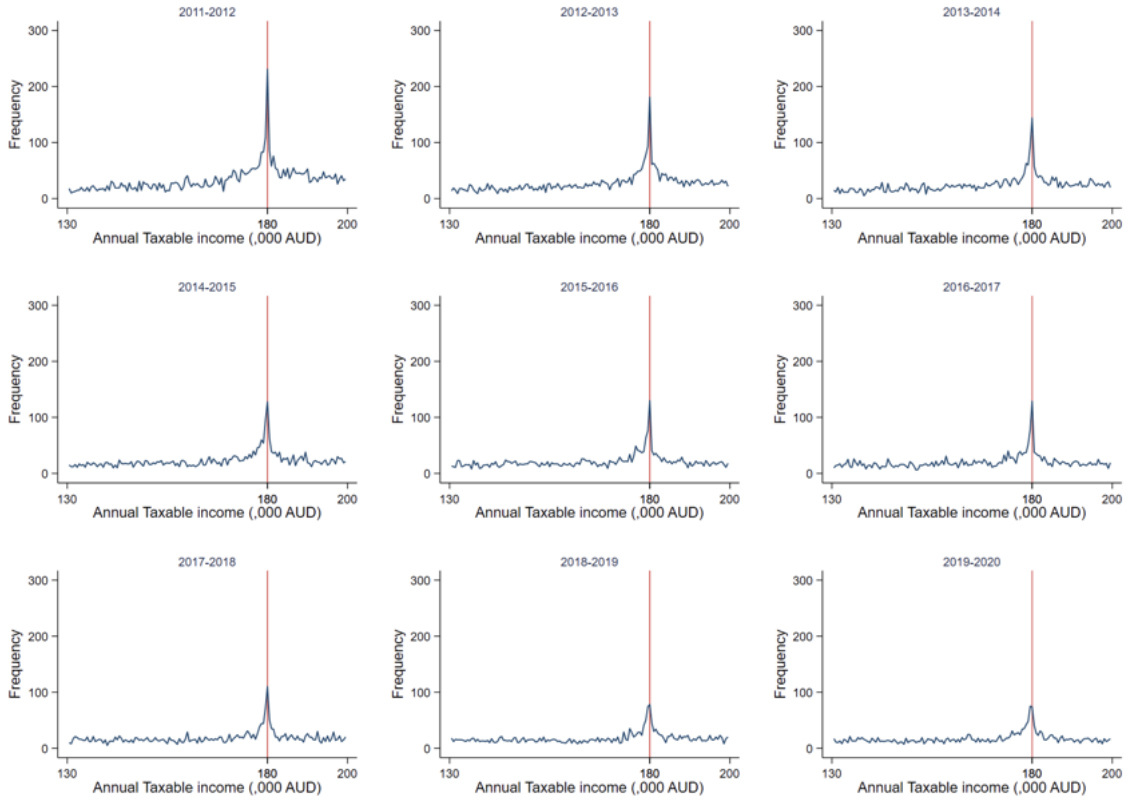
(a) 1999-2000 to 2004-2005 (before our study period)



(b) 2005-2006 to 2010-2011 (during our study period)



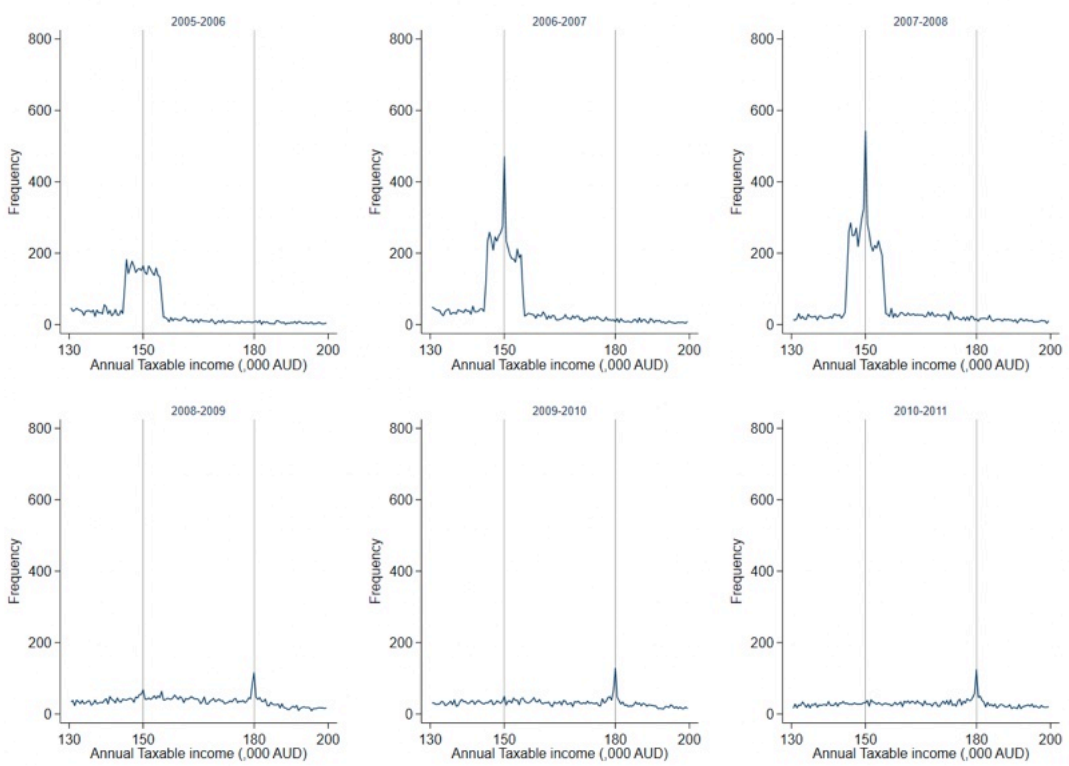
(c) 2011-2012 to 2019-2020 (after our study period)



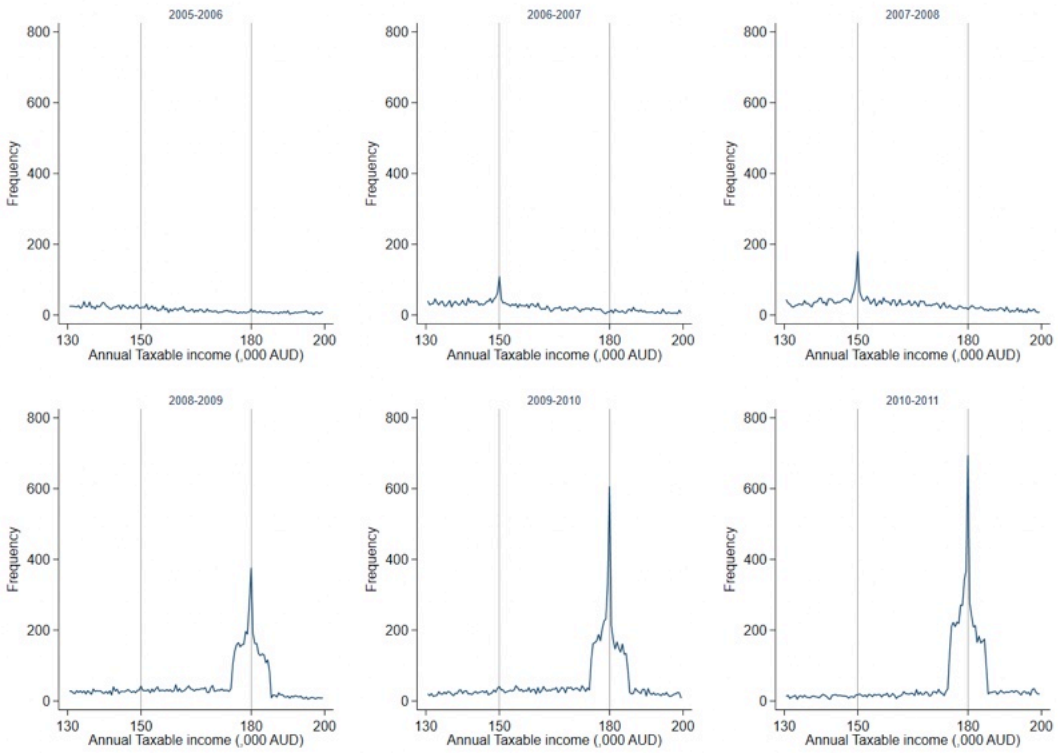
Note: This figure presents the taxable income distribution of individuals who bunched at least once within a AUD 5,000 window of the new kink at AUD 180,000 during the post-policy change period in our study (2008-2009 to 2010-11). The grey and red lines represent the former and new top kinks over the years. Panel (a) tracks the bunchers before our study period from 1999-2000 to 2004-2005. Panel (b) tracks the bunchers during our study period from 2005-2006 to 2010-2011. Panel (c) tracks the bunchers after our study period from 2011-2012 to 2019-2020. The figure suggests that bunchers at the top have a pattern of chronological bunching.

Figure A.2: Tracking the top kink bunchers

(a) Bunchers at the former top kink



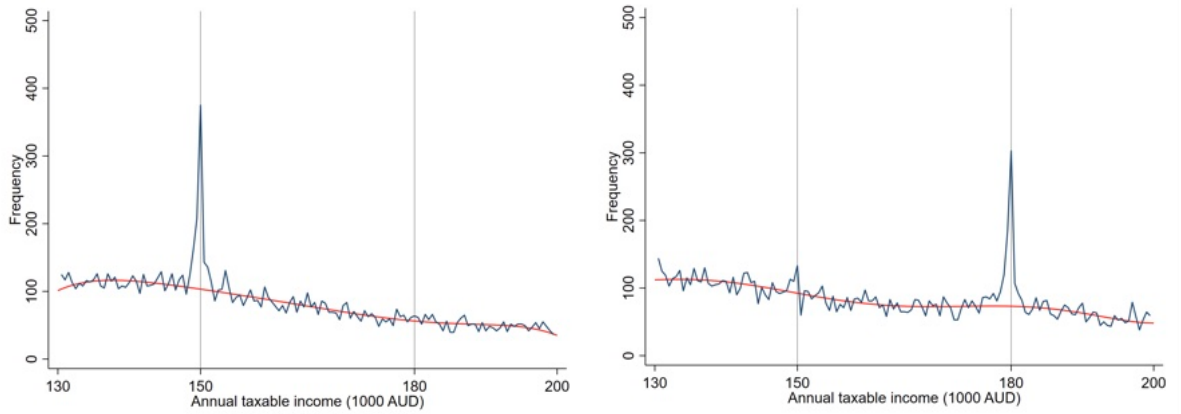
(b) Bunchers at the new top kink



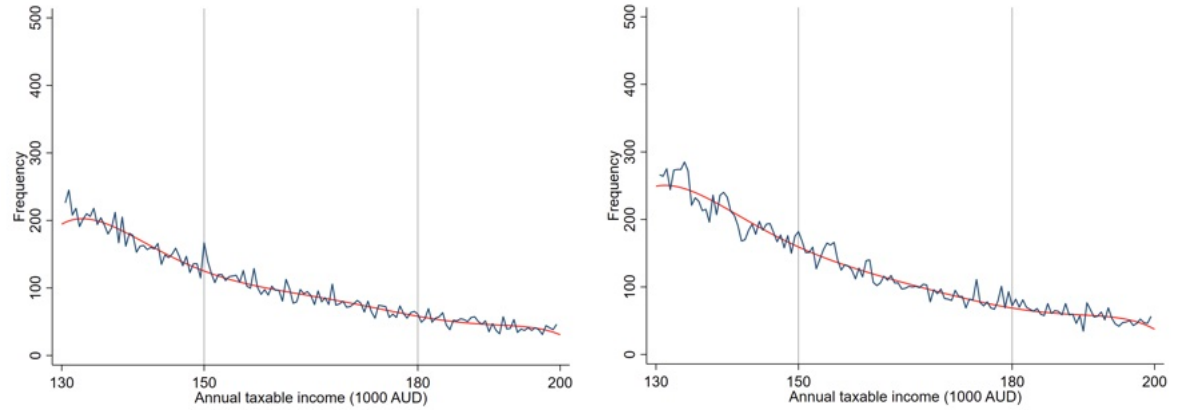
Note: This figure tracks the bunchers at the top kinks by plotting the distribution of taxable income of individuals who bunch at the former and new top kink respectively in Panel (a) and Panel (b). The first panel plots the distribution of taxable income of individuals whose taxable income was within a AUD 5,000 window around the former top kink (AUD 1455,000 to AUD 155,000) three years before the policy change (2005-2006 to 2007-2008). The second panel plots the distribution of taxable income of individuals whose taxable income was within a AUD 5,000 window around the new top kink (AUD 175,000 to AUD 185,000) three years after the policy change (2008-2009 to 2010-2011). The figure suggests that most of the individuals bunching at the former top kink move to the new top kink after the policy change. Also, the individuals bunching at the new top kink also bunched at the former top kink.

Figure A.3: Distribution of taxable income around the top kink by employment type

(a) Self employed (before and after the policy change)



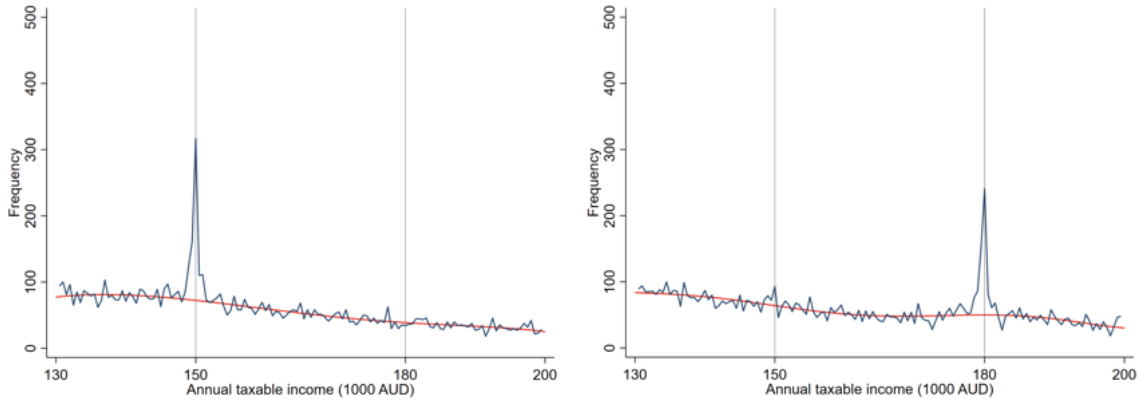
(b) Wage and salary earner (before and after the policy change)



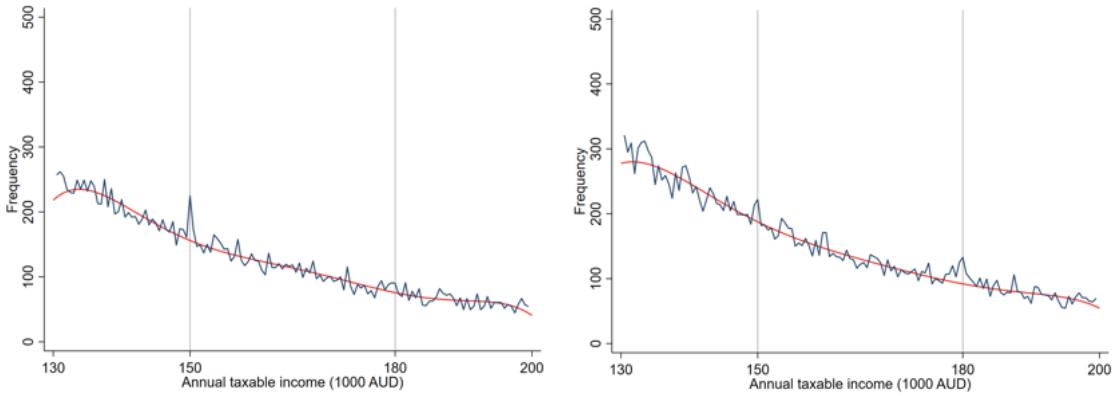
Note: This figure displays the distribution of taxable income within our study sample, categorized by employment type (self-employed versus wage and salary earners) one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.4: Distribution of taxable income around the top tax threshold for individuals by trust income status

(a) With trust income (Before and after the policy change)



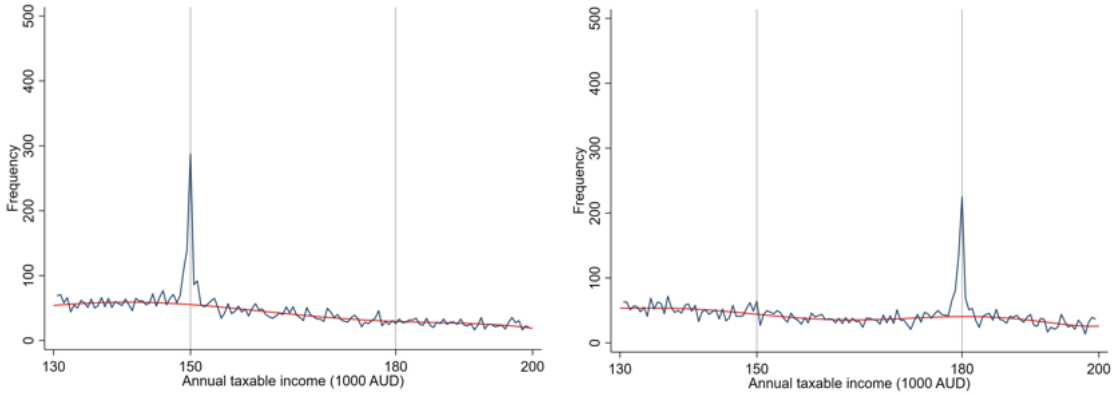
(b) With no trust income (Before and after the policy change)



Note: This figure displays the distribution of taxable income within our study sample by trust income status, one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.5: Distribution of taxable income around the top tax threshold for self-employed individuals with trust income

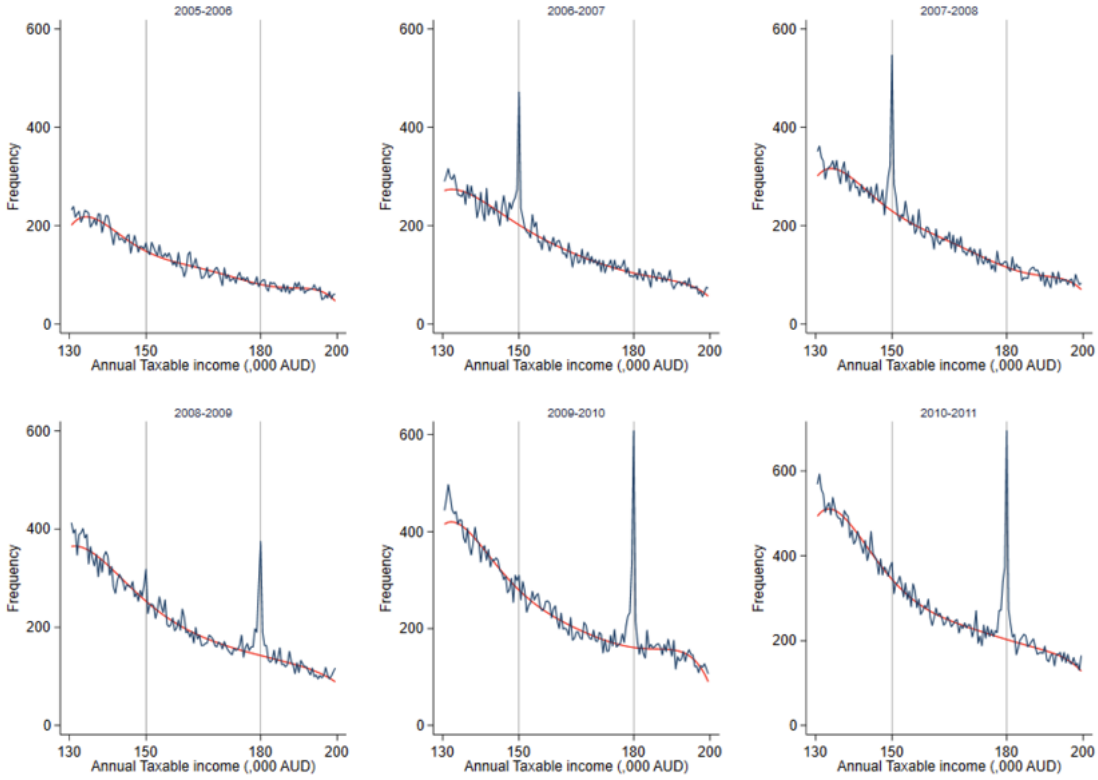
(a) Before and after the policy change



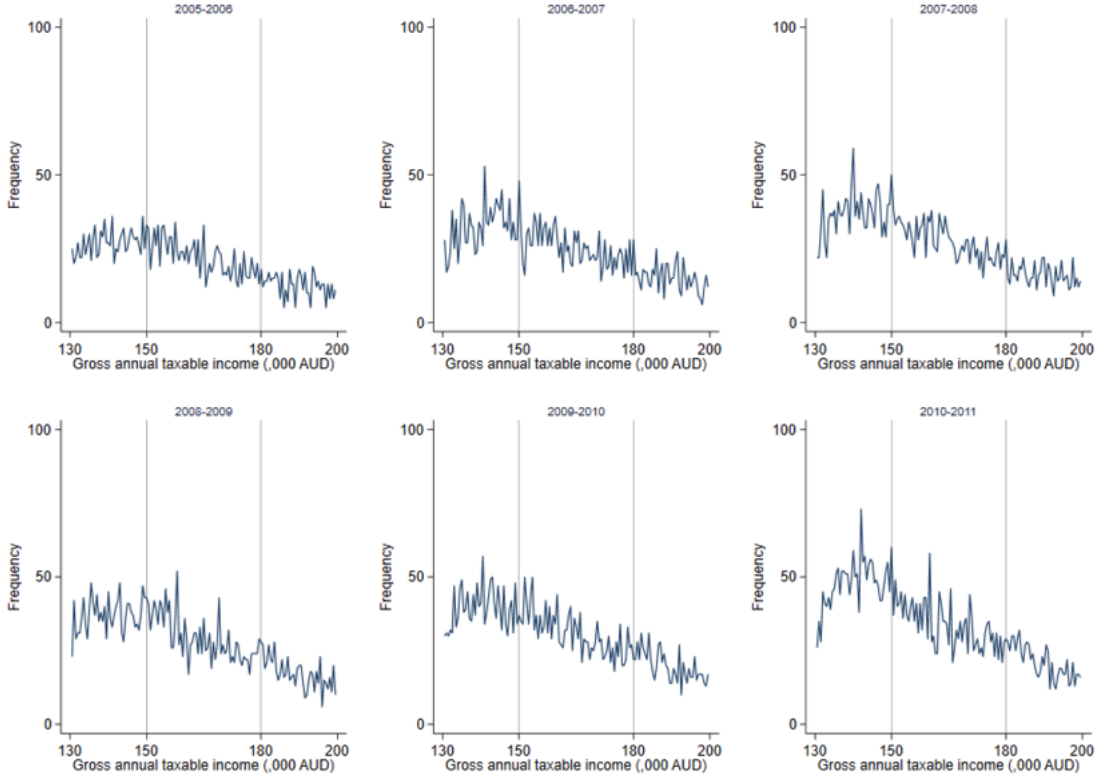
Note: This figure displays the distribution of taxable income for self-employed individuals with trust income in our study sample, one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.6: Distribution of taxable income, gross taxable income, deductions and trust income for individuals with trust income

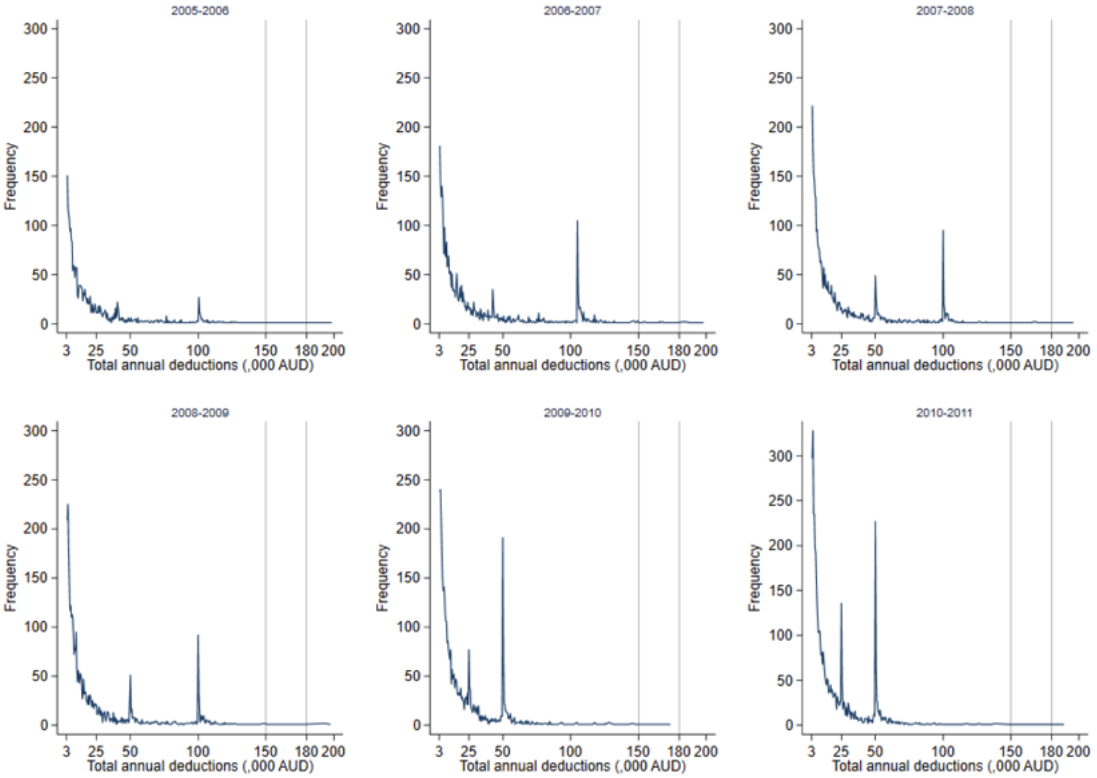
(a) Annual taxable income



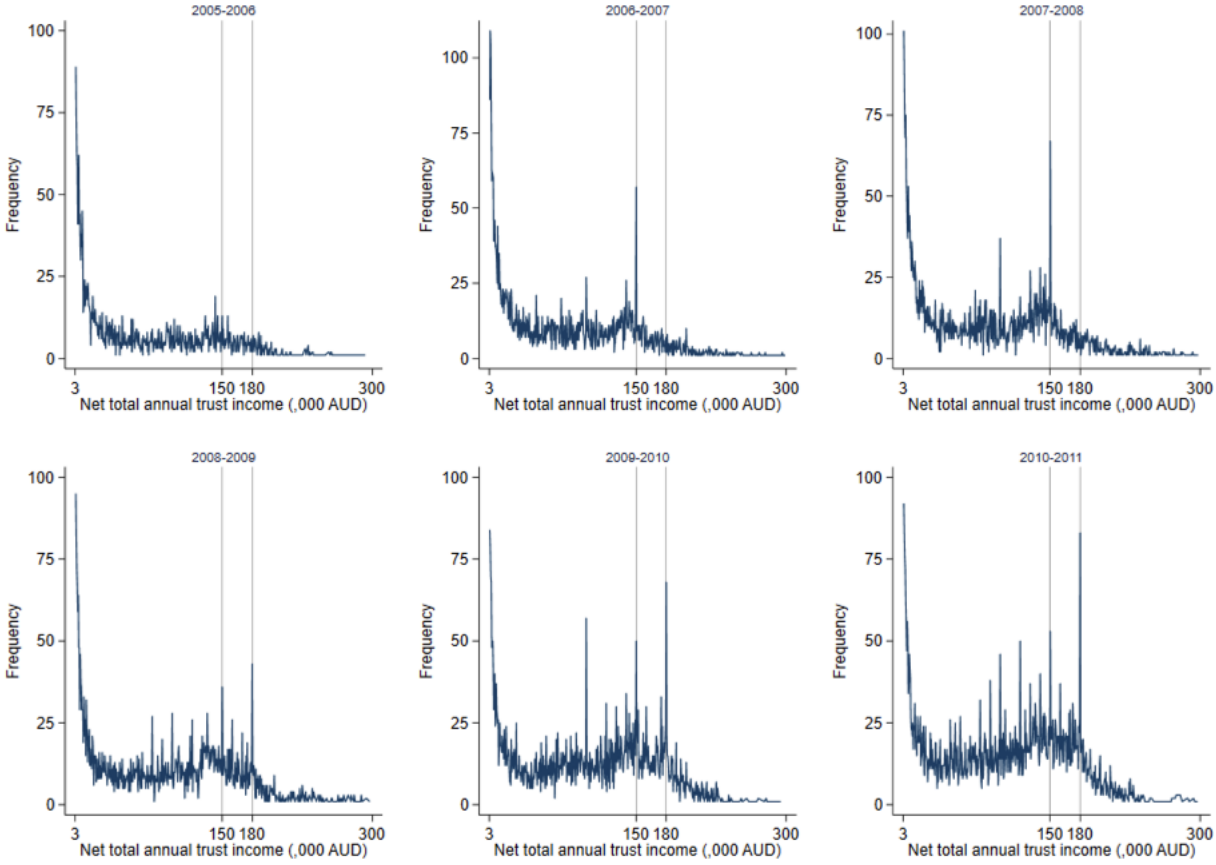
(b) Gross annual taxable income



(c) Total annual deductions

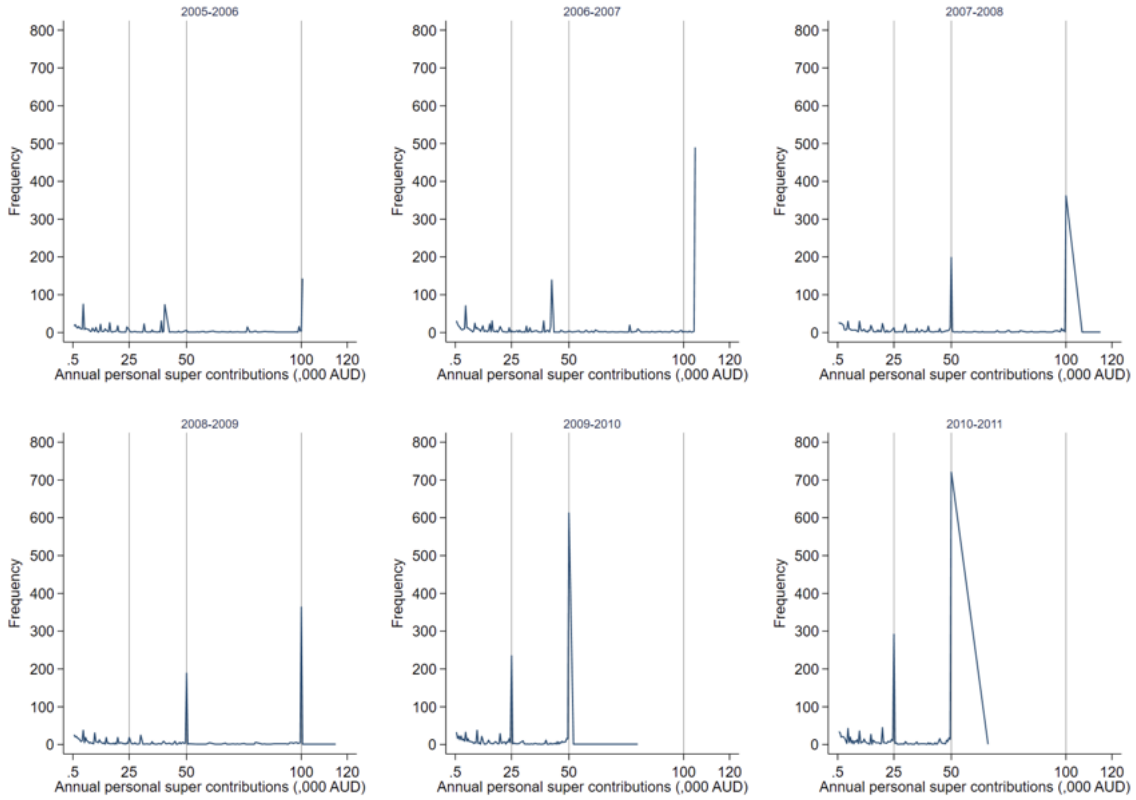


(d) Net total annual trust income



Notes: This figure plots the distribution of annual taxable income, gross annual taxable income, total deductions, and net total annual trust income for those with trust income in our study sample, those whose annual taxable income is within AUD 130,000 and AUD 200,000. The gross taxable income is defined as taxable income net of deductions and trust income. The bin size is AUD 500. Panel (a) and Panel (b) show that while there is quite sharp bunching at the top kinks at the distribution of taxable income, the bunching disappears once the deductions and trust income are netted out in the gross taxable income. Panel (c) and Panel (d) suggest that these individuals use mostly trust income for minimizing their tax liabilities.

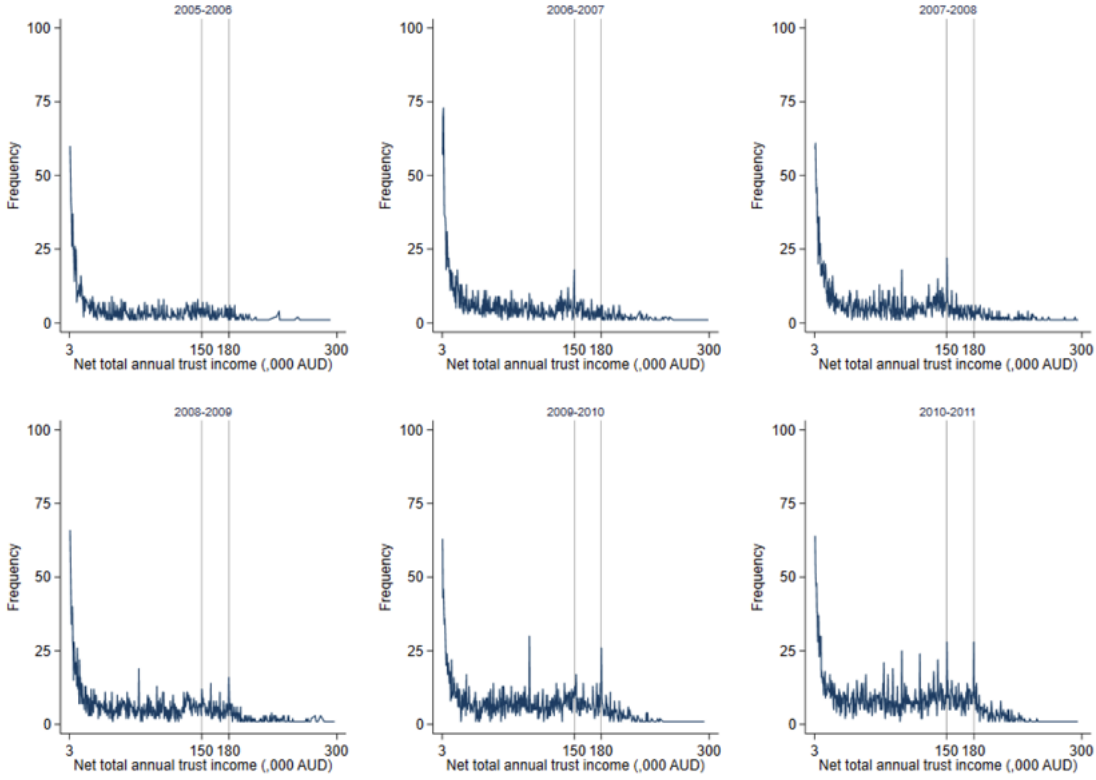
Figure A.7: Distribution of personal contributions to super funds



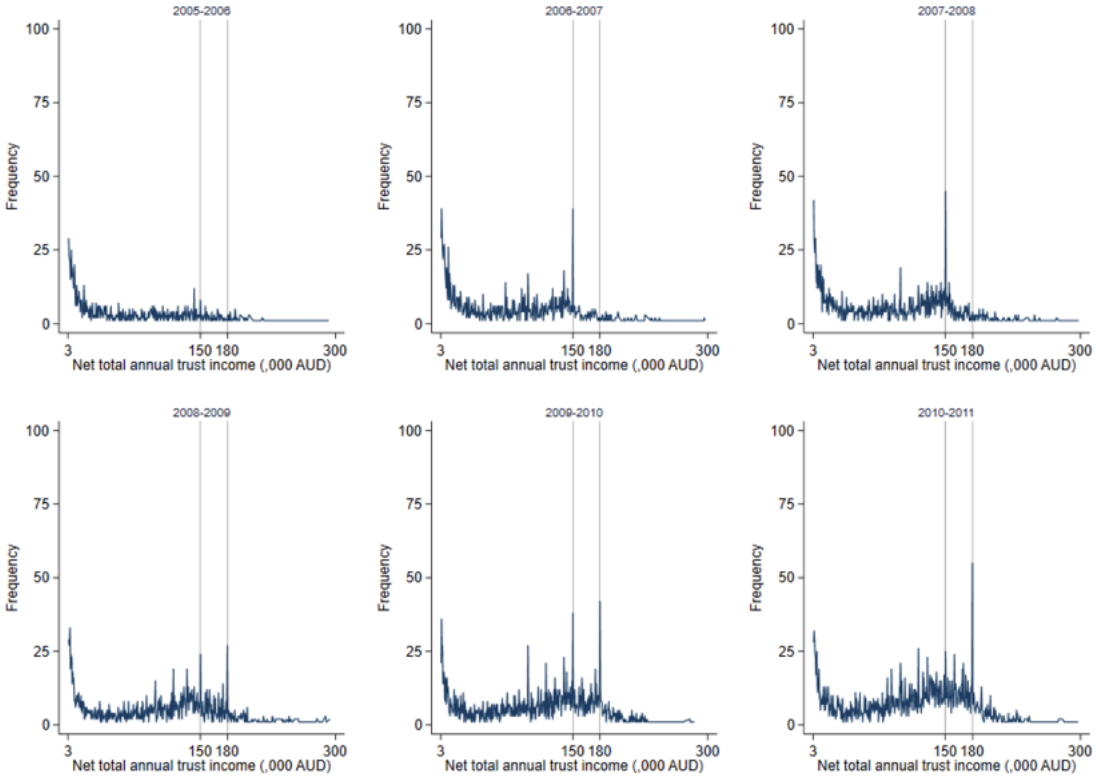
Notes: This figure displays the distribution of annual personal contributions to tax favoured retirement funds, known as "superannuation" funds. Starting from 2007-2008, an age-based cap on contributions was introduced. This cap determined when the marginal tax rate increased from a 15 percent flat rate to an individual's marginal income tax rate. The cap was initially set at AUD 50,000 and AUD 100,000 for those below and over 50 years old, respectively. These caps were later reduced by 50 percent to AUD 25,000 and AUD 50,000 in 2009-2010. The study sample consists of individuals with taxable income between AUD 130,000 and AUD 200,000. Bunching at the contribution caps is observed, and it appears largely unaffected by changes in the top kink of the income tax schedule.

Figure A.8: Distribution of trust income by gender

(a) Males



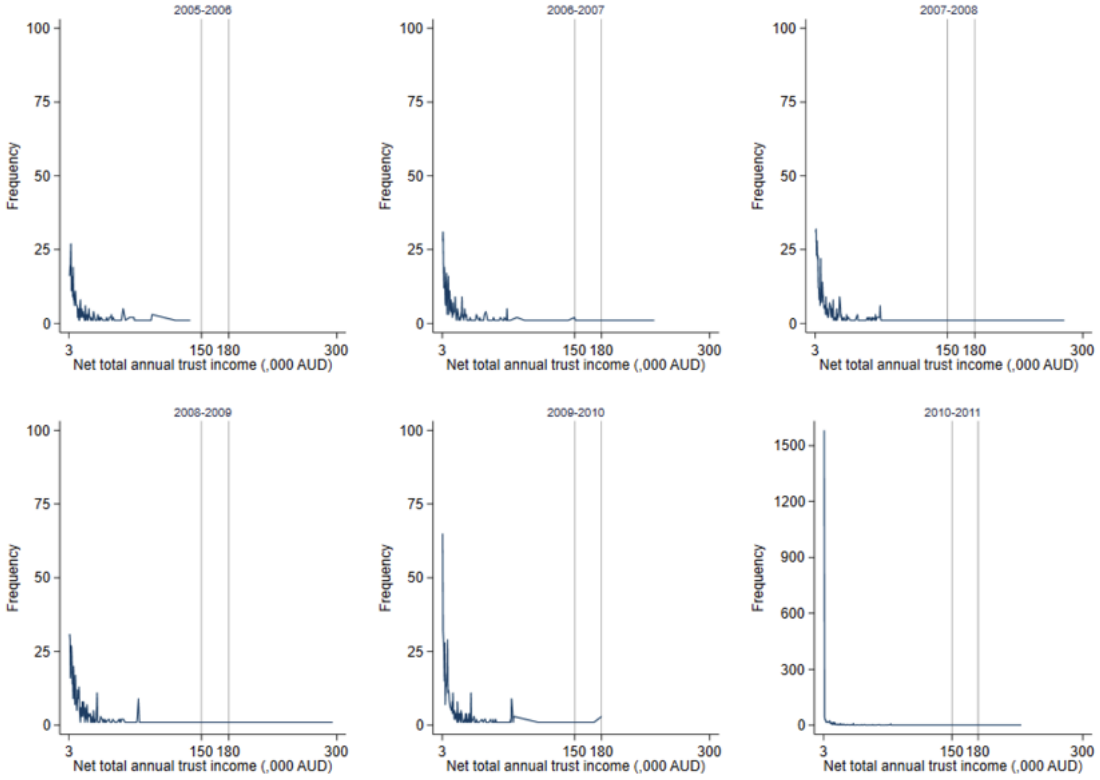
(b) Females



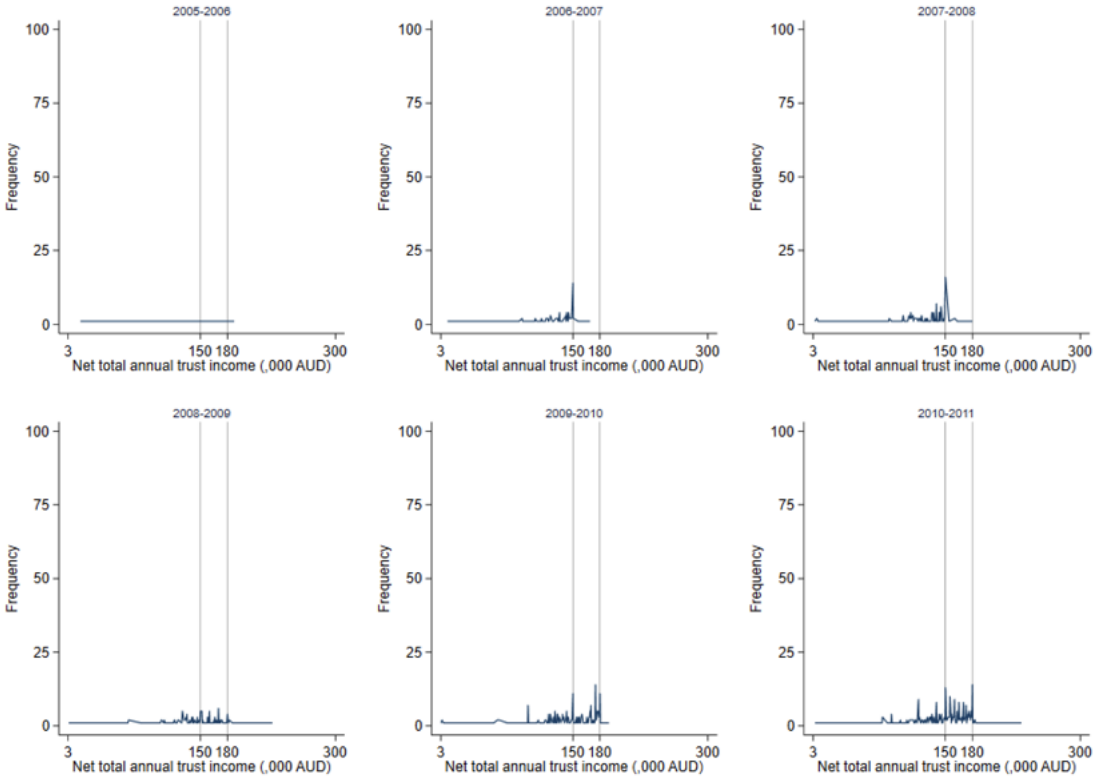
Notes: This figure displays the distribution of trust income in our study sample, categorized by gender. The study sample includes individuals with taxable income between AUD 130,000 and AUD 200,000 who had trust income. For additional details, refer to the notes for Figure A.6.

Figure A.9: Distribution of trust income by age

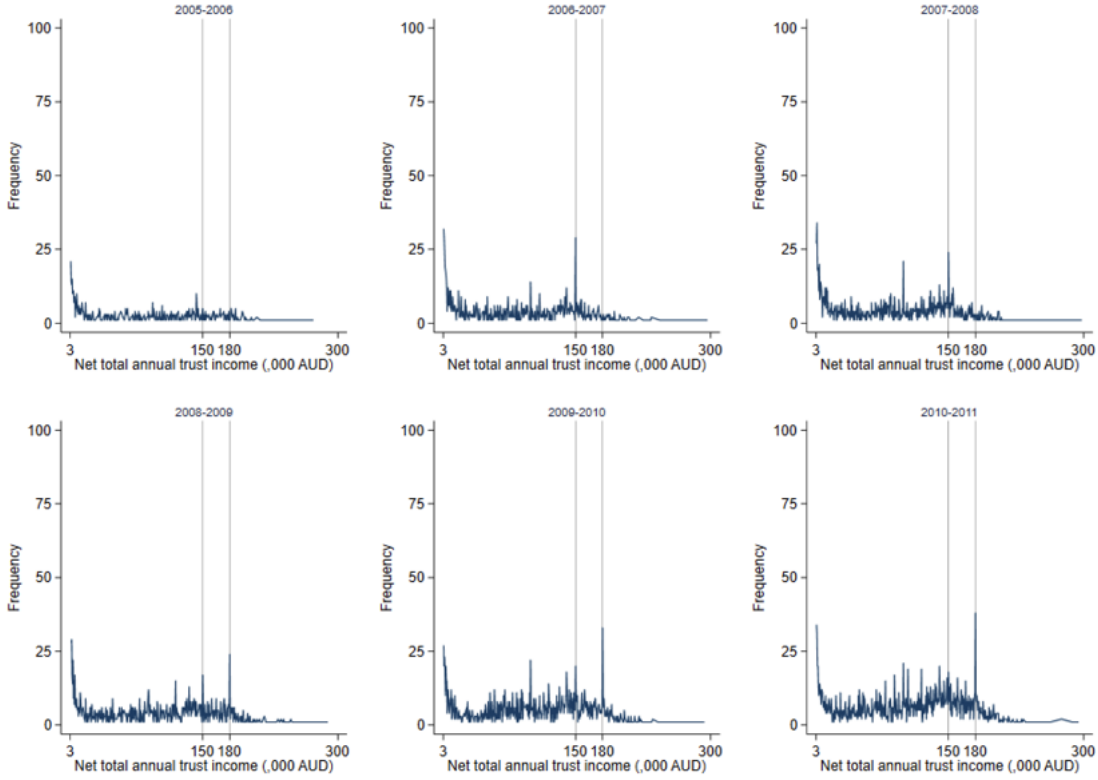
(a) Below 17 years



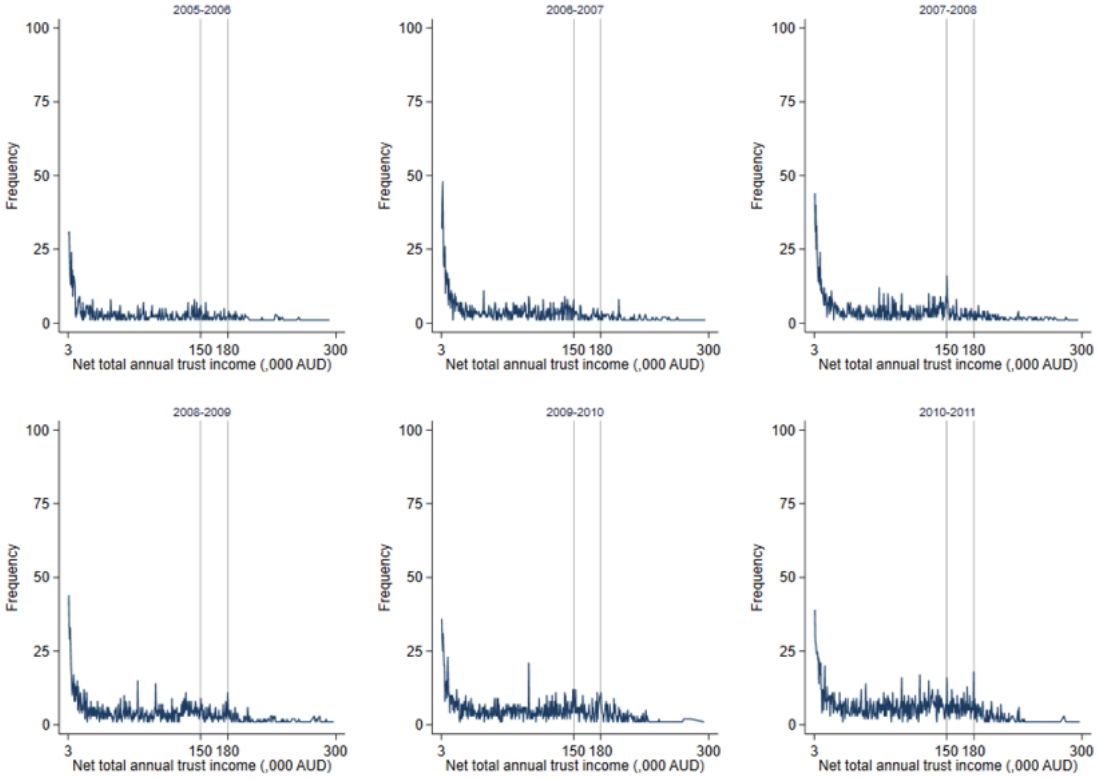
(b) 18-24 years



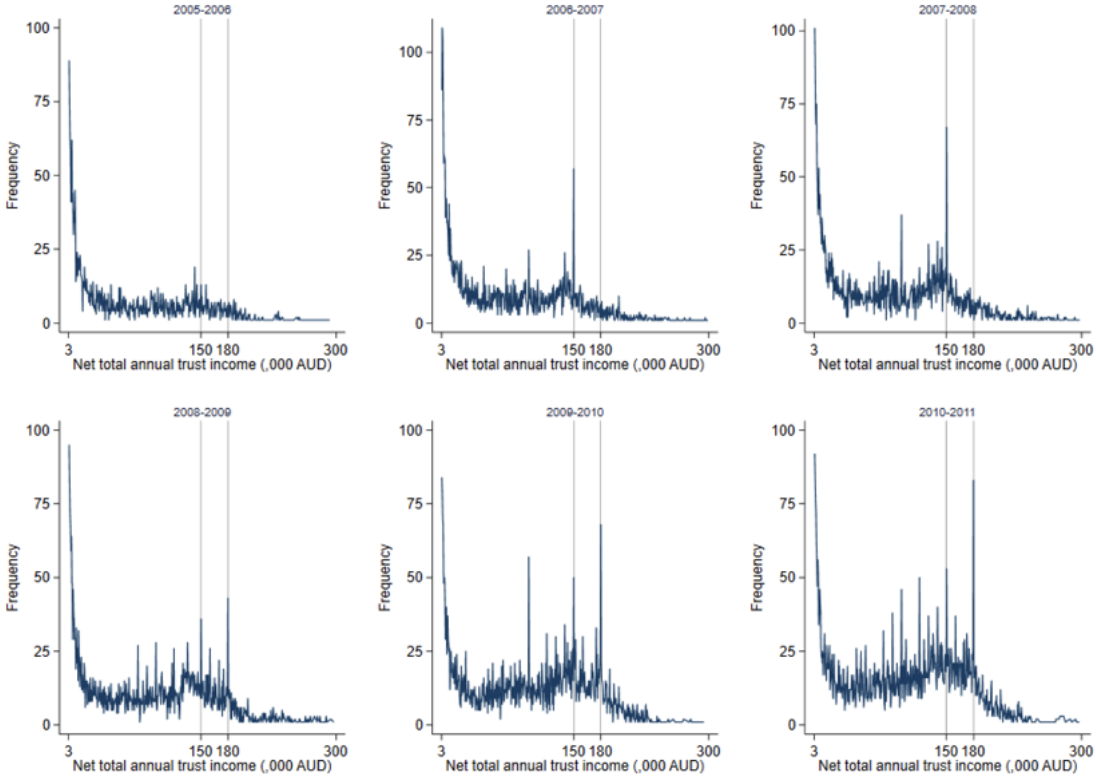
(c) 25-44 years



(d) 45-59 years

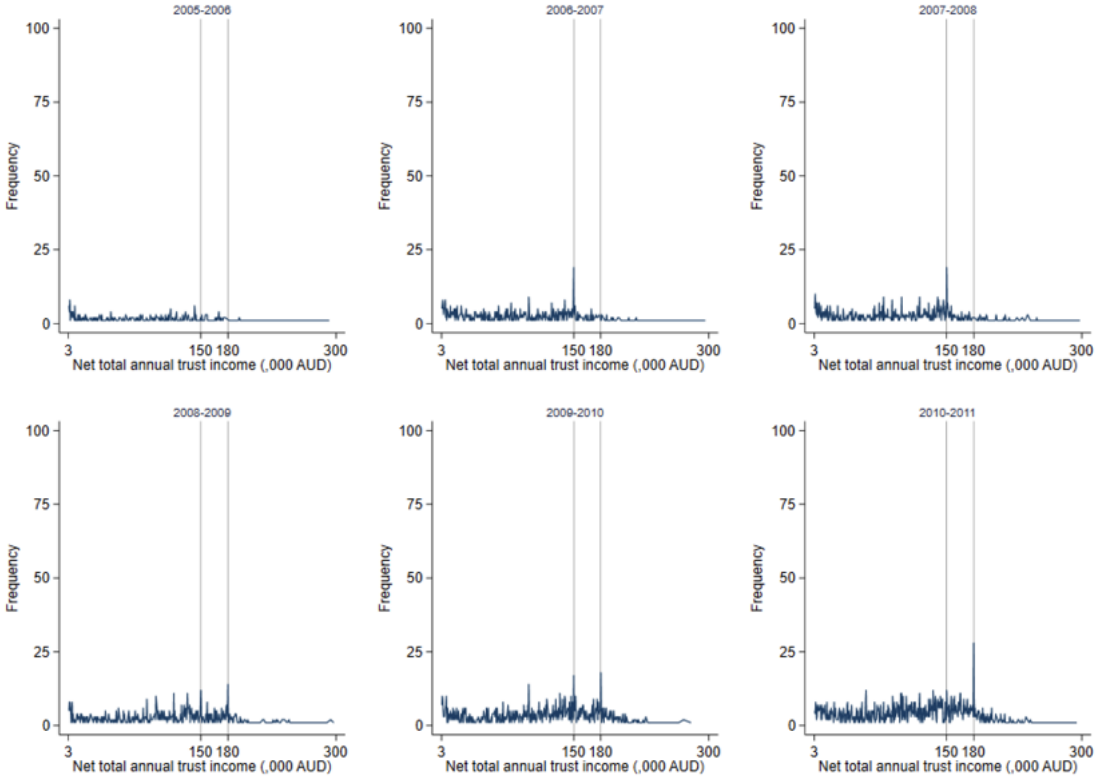


(e) 60 years and above



Notes: This figure plots the distribution of trust income, categorized by age groups (below 17, 18-24, 25-44, 45-59, and 60 years and above). The study sample for the first panel includes individuals aged 17 years and younger who have trust income at any level of taxable income. The following panels focus on individuals within the study sample with trust income whose taxable incomes ranging from AUD 130,000 to AUD 200,000. For additional details, refer to the notes for Figure A.6.

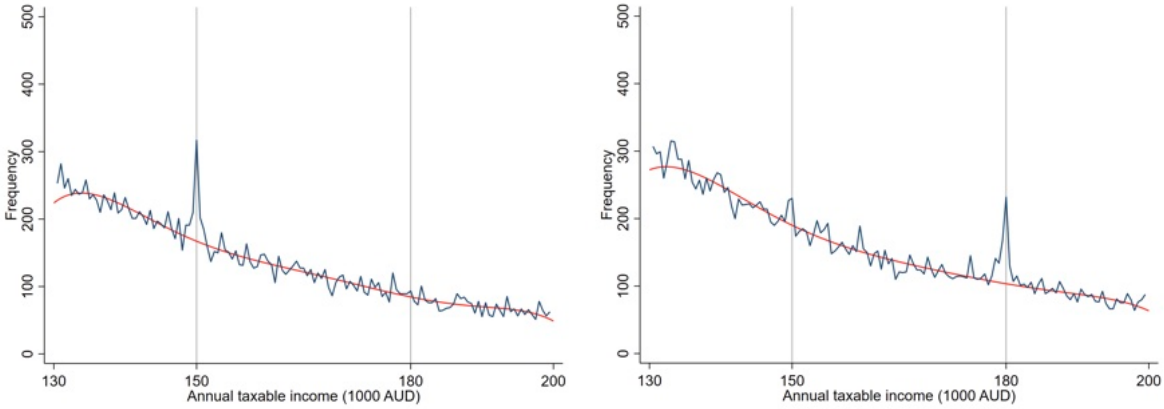
Figure A.10: Distribution of trust income for those who are not the main earners



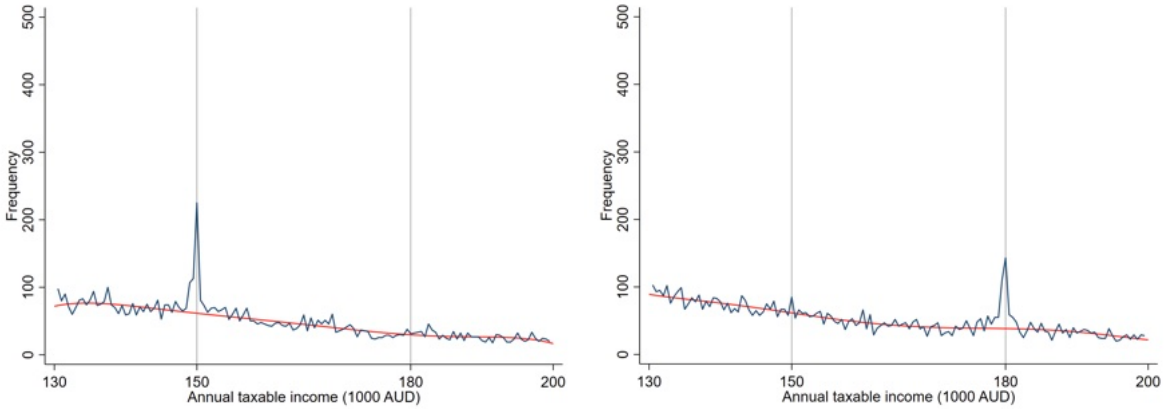
Note: This figure plots the distribution of trust income of those who are not the main earners in their family. The study sample includes individuals with taxable income between AUD 130,000 and AUD 200,000. See notes to Figure A.6.

Figure A.11: Distribution of taxable income around the top kink by gender

(a) Male (before and after the policy change)



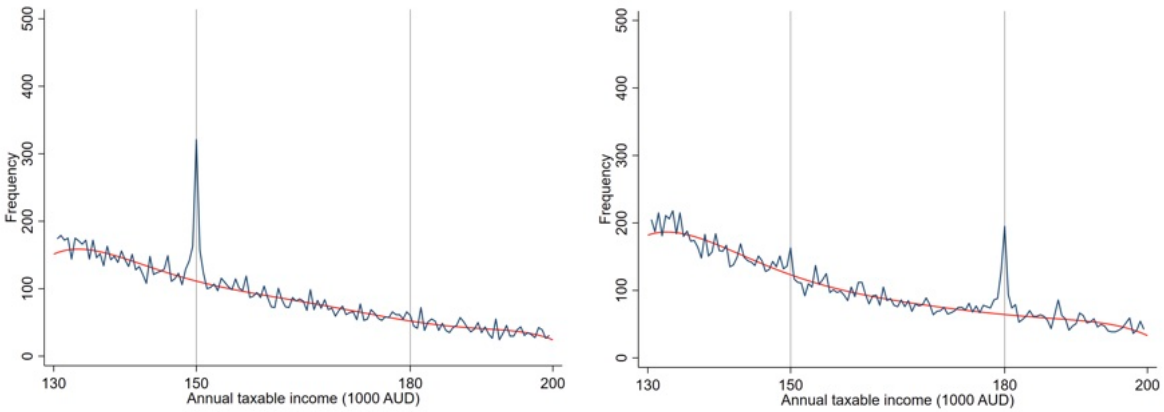
(b) Female (before and after the policy change)



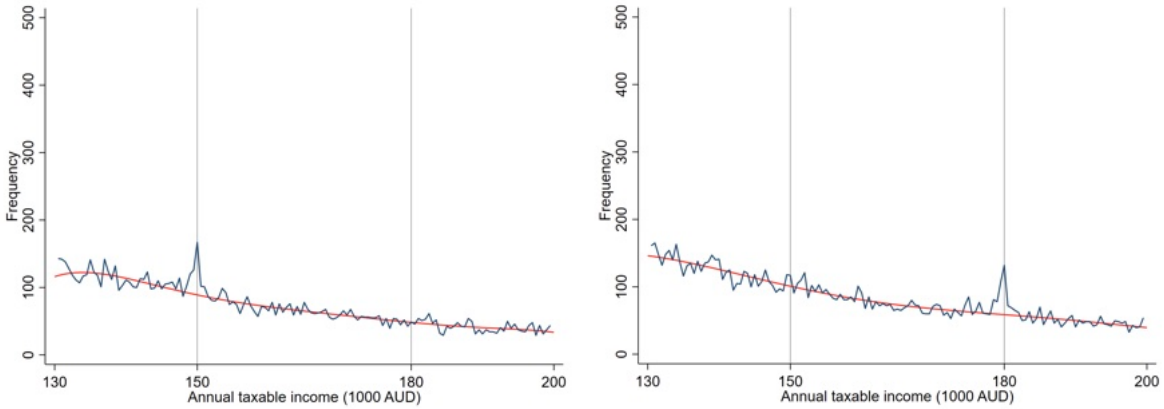
Note: This figure displays the distribution of taxable income within our study sample, categorized by gender one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.12: Distribution of taxable income around the top kink by age

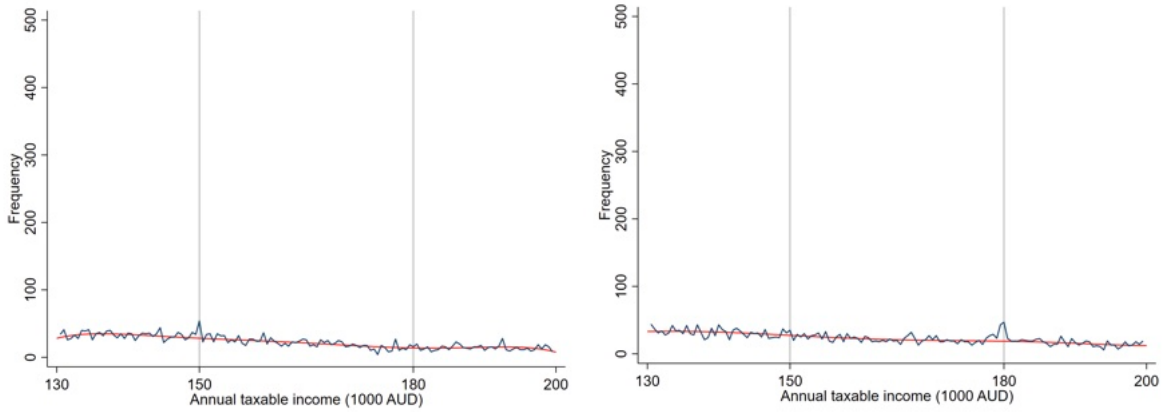
(a) 18-44 years (before and after policy change)



(b) 45-59 years (before and after the policy change)



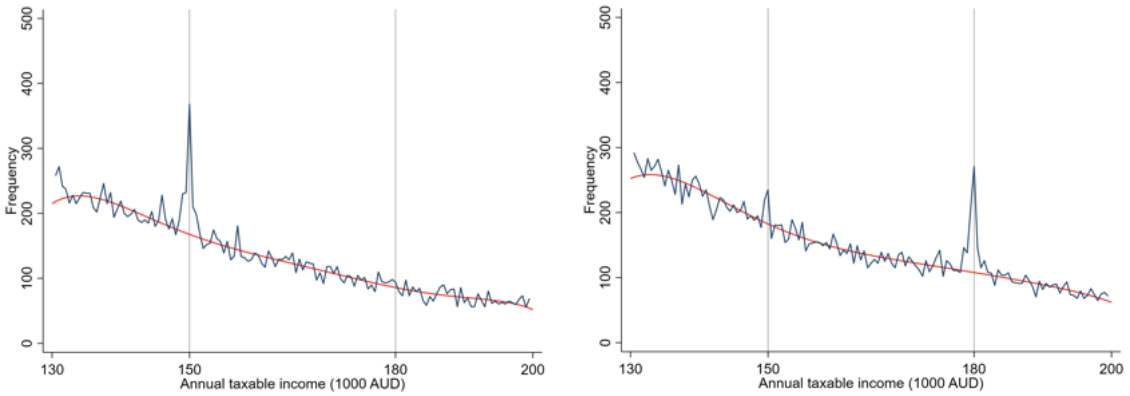
(c) 60 years and above (before and after the policy change)



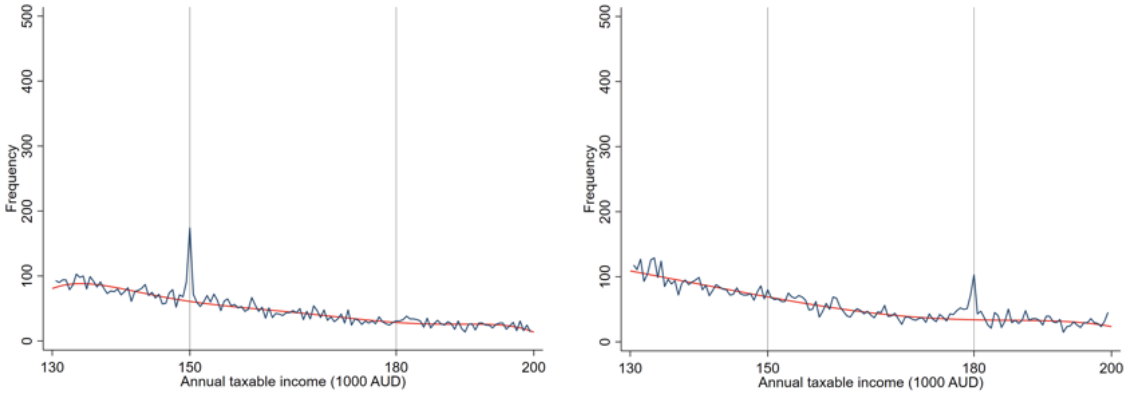
Note: This figure displays the distribution of taxable income within our study sample, categorized by age (18-44, 45-59 and 60 years and over) one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.13: Distribution of taxable income around the top kink by marital status

(a) Has spouse (before and after policy change)



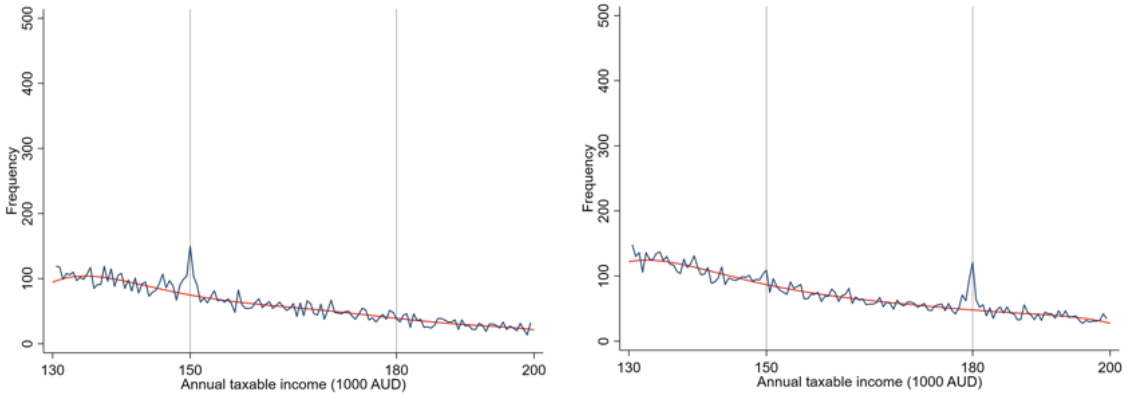
(b) Single (before and after the policy change)



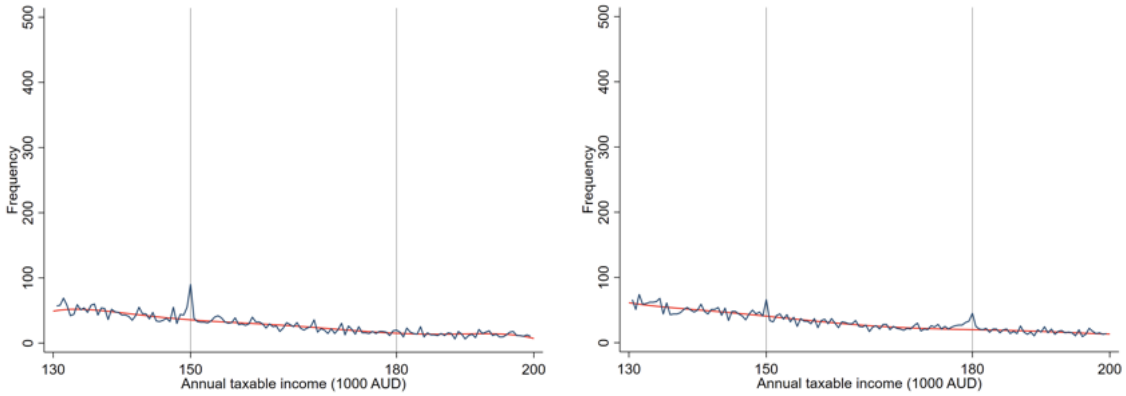
Note: This figure displays the distribution of taxable income within our study sample, categorized by marital status (having a spouse versus not having spouse) one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.14: Distribution of taxable income around the top kink by the number of children

(a) Has at least one child (before and after policy change)



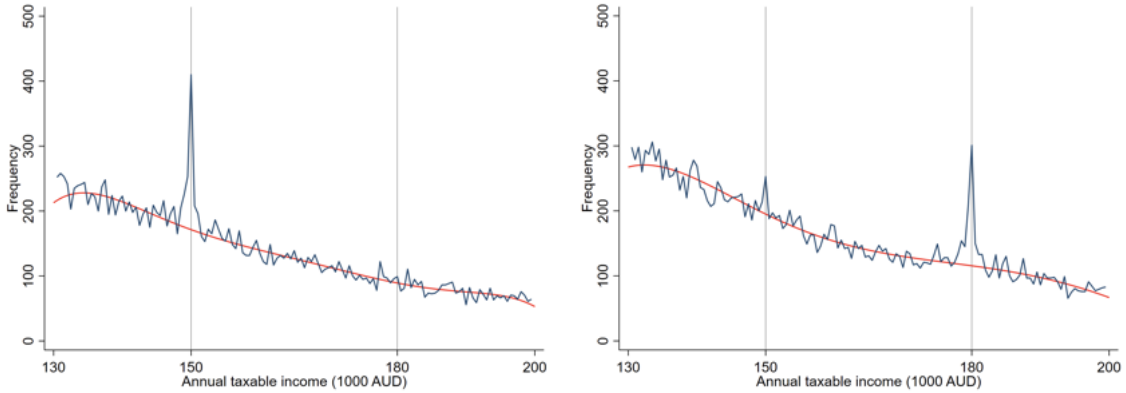
(b) No child (before and after the policy change)



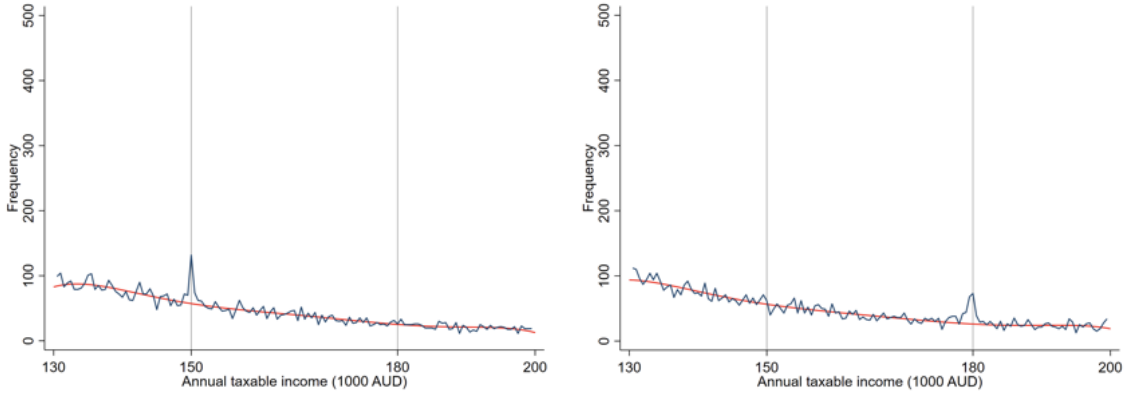
Note: This figure displays the distribution of taxable income within our study sample, categorized by the number of children (having at least one child versus no child) one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.15: Distribution of taxable income around the top kink by location of residence

(a) Major city (before and after policy change)



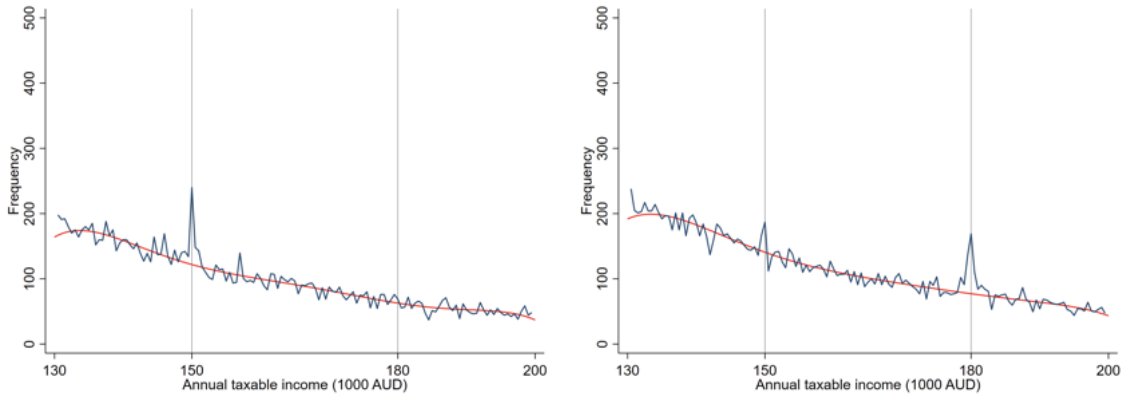
(b) No major city (before and after the policy change)



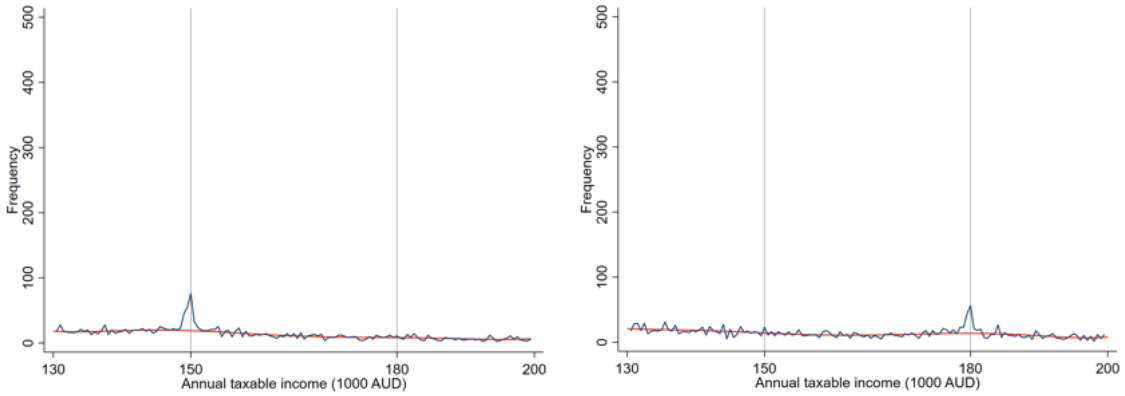
Note: This figure displays the distribution of taxable income within our study sample, categorized by the location of residence (residing in a major city versus no major city) one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.16: Distribution of taxable income around the top kink by family status

(a) Main earner (before and after policy change)



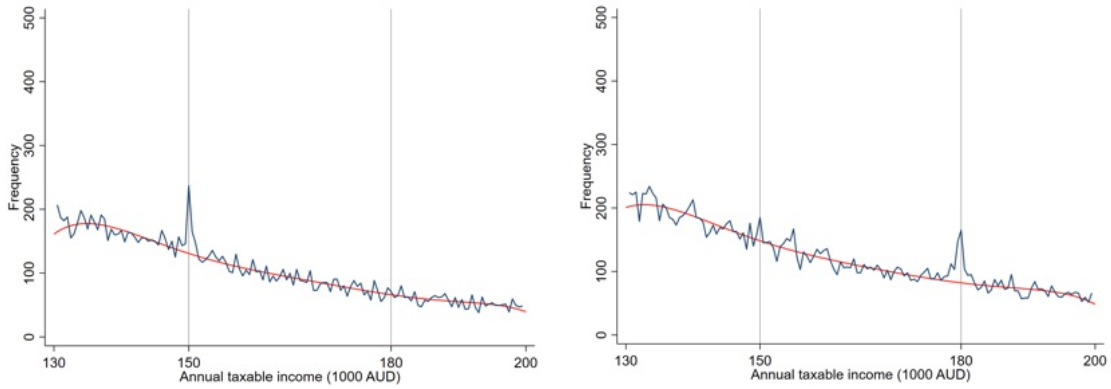
(b) Not main earner (before and after the policy change)



Note: This figure displays the distribution of taxable income within our study sample, categorized by main earning status (being main earner versus not being main earner) one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.17: Distribution of taxable income around the top kink for individuals with managerial and professional occupations

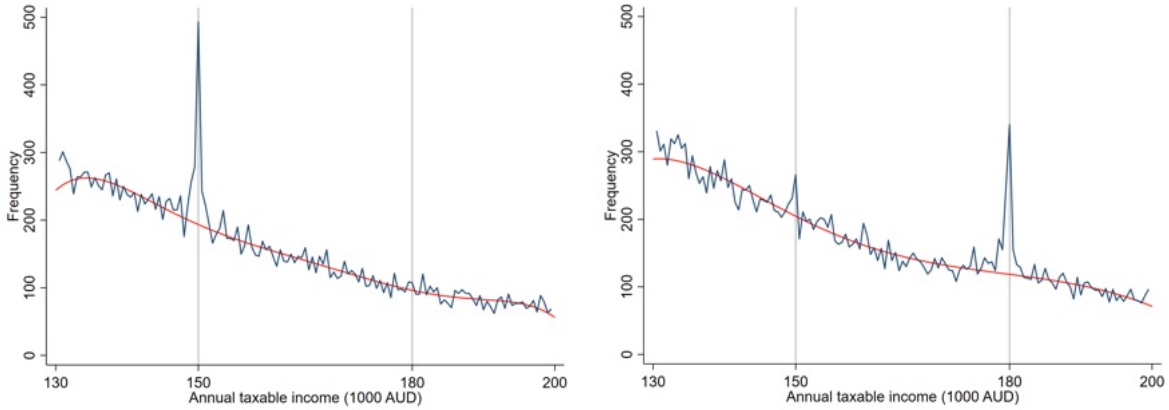
(a) Before and after the policy change



Note: This figure displays the distribution of taxable income within our study sample, who are in managerial and profession occupations, one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.18: Distribution of taxable income around the top tax threshold for individuals used a tax agent's help for filing their taxes

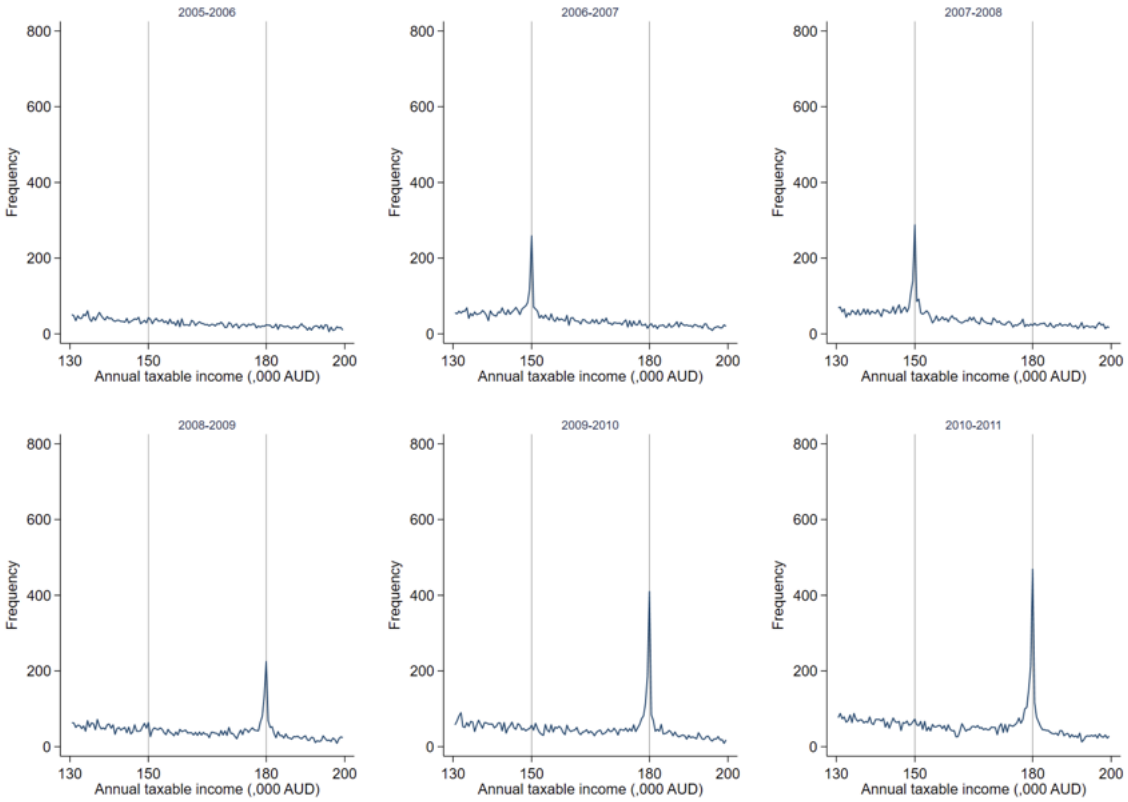
(a) Before and after the policy change



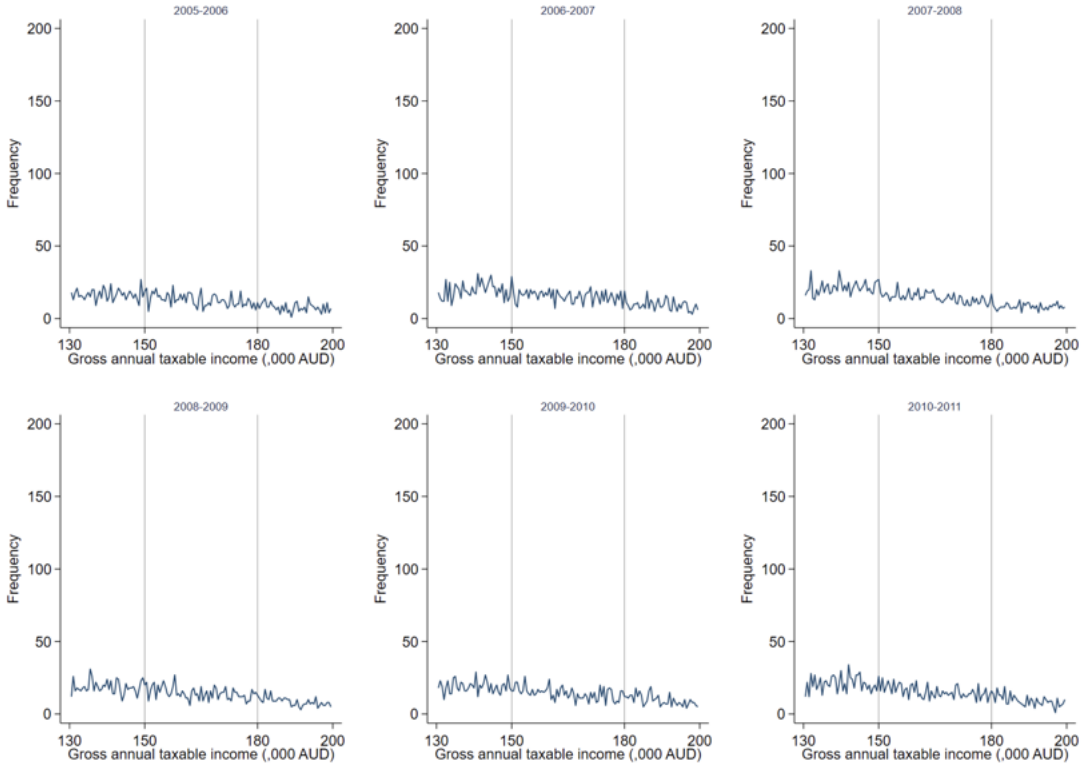
Note: This figure displays the distribution of taxable income within our study sample who used a tax agent for filing their taxes, one year before and one year after the policy change. For further information, refer to the notes to Figure 2.

Figure A.19: Distribution of taxable income, gross taxable income, deductions and trust income for self-employed individuals with trust income

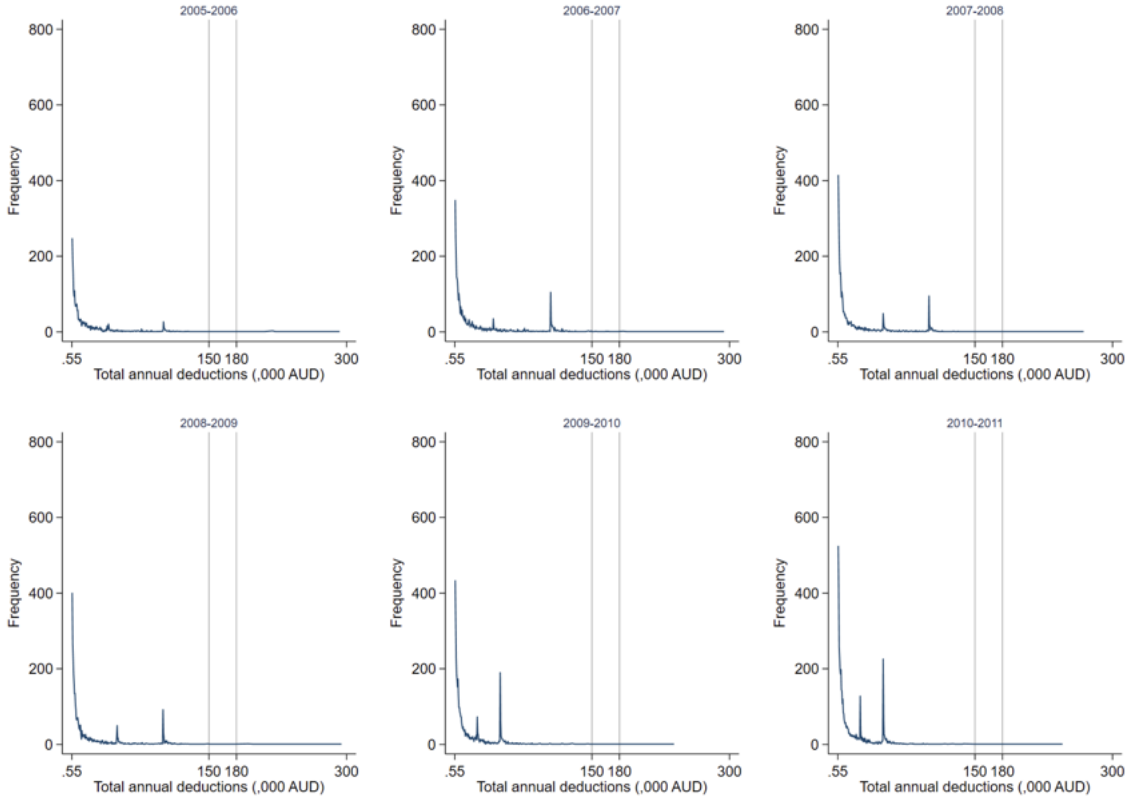
(a) Annual taxable income



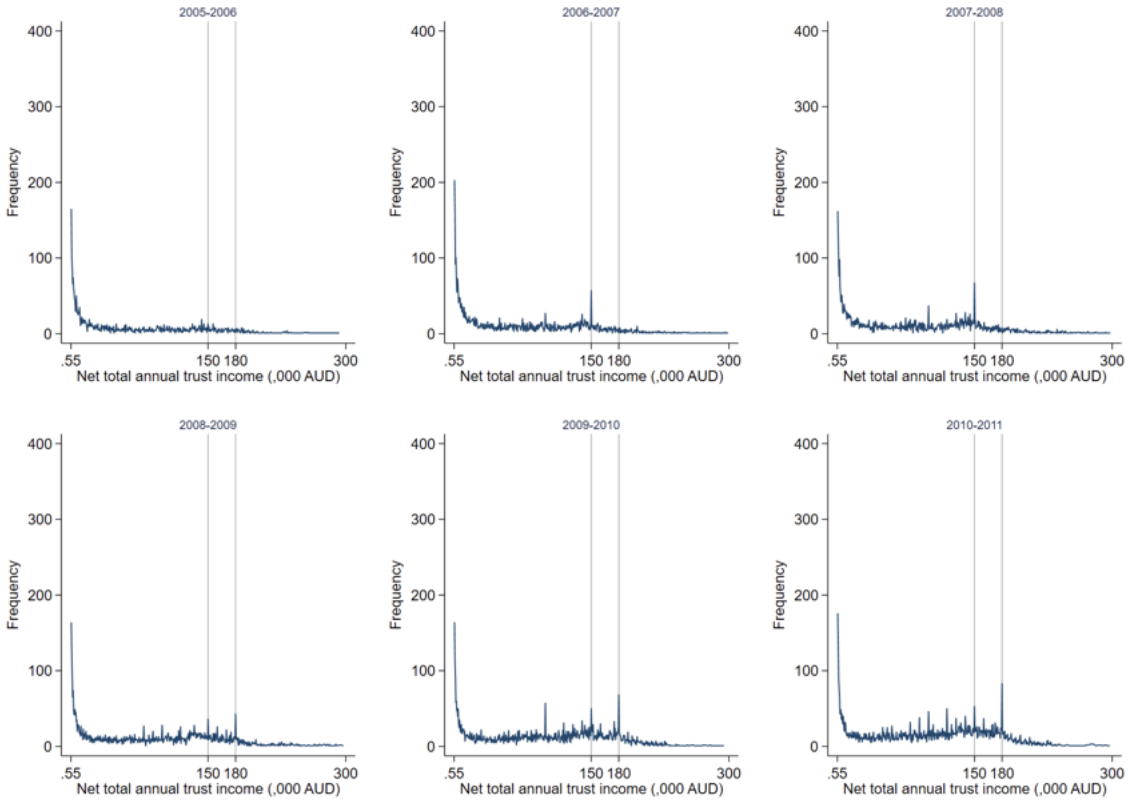
(b) Gross annual taxable income



(c) Total annual deductions



(d) Net total annual trust income



Notes: This figure plots the distribution of annual taxable income, gross annual taxable income, total deductions, and net total annual trust income for self-employed individuals with trust income in our study sample, those whose annual taxable income is within AUD 130,000 and AUD 200,000. The gross taxable income is defined as taxable income net of deductions and trust income. The bin size is AUD 500. For more information, see noted to Figure A.6.

B Appendix: Tables

Table B.1: Summary statistics of all tax filing individuals

	Three years before policy change	Three years after policy change
Economics outcomes		
Total income (,000 AUD)	45.6	50.4
	(154.2)	(241.6)
Taxable income (,000 AUD)	42.8	47.5
	(150.2)	(139.1)
Net tax amount (,000 AUD)	9.0	9.1
	(65.1)	(38.7)
Total deductions (,000 AUD)	2.7	2.7
	(18.0)	(295.5)
Total tax withhold (,000 AUD)	8.5	9.1
	(17.9)	(20.6)
Wage and salary income (,000 AUD)	8.5	9.7
	(17.9)	(20.6)
Trust income (,000 AUD)	0.006	0.008
	(4.4)	(3.8)
Gross taxable income (,000 AUD)	42.5	46.9
	(148.6)	(231.4)
Occupation:		
Managers	0.09	0.09
Professionals	0.15	0.16
Technicians and trade	0.09	0.10
Community and personal services	0.07	0.08
Clerical and administrative	0.11	0.14
Sales	0.07	0.06
Machinery operators and drivers	0.04	0.05
Labourers	0.09	0.08
Self employed	0.36	0.35
Has trust income	0.16	0.14
Self employed with trust income	0.76	0.75
Used tax agent	0.73	0.71
Tax file preparation time (hours)	8.4	7.5
	(50.1)	(44.8)
Tax affairs fee (,000 AUD)	0.13	0.34
	(3.5)	(292.3)
Demographics		
Age (years)	42.5	42.7
	(15.5)	(15.6)
Male	0.52	0.52
Has spouse	0.57	0.57
Has child	0.57	0.50
Major city	0.61	0.69
Main earner	0.62	0.58
Male main earners	0.67	0.70
Number of individuals	1,363,727	1,438,569
Total number of observations	3,690,608	3,909,038

Note: This table presents the summary statistics of all tax filers. The sample includes all Australian resident individual tax filers above 18 years old from 2005-2006 to 2010-2011. For additional information, refer to the notes for Table 1.

Table B.2: Estimates of elasticity of taxable income using Saez (2010a) model

	Elasticity e
Base model	0.089 [0.074, 0.105]
Gender: Male	0.060 [0.050, 0.070]
Gender: Female	0.165 [0.135, 0.195]
Age: 18-44 years	0.114 [0.093, 0.136]
Age: 45-59 years	0.070 [0.059, 0.081]
Above 60 years	0.051 [0.039, 0.063]
Has spouse	0.089 [0.075, 0.102]
Has child	0.084 [0.069, 0.100]
live in major city	0.090 [0.071, 0.110]
Main earner	0.064 [0.055, 0.072]
Employment type: Wage and salary earners	0.014 [0.011, 0.017]
Employment type: Self employed	0.178 [0.145, 0.212]
Trust income holders	0.227 [0.185, 0.269]
Self employed with trust income	0.274 [0.225, 0.323]
Occupation: Professional and managers	0.051 [0.045, 0.057]
Used tax agent	0.100 [0.083, 0.117]
Spent more than 10 hours filling taxes	0.090 [0.074, 0.106]

Note: This table presents the estimated Elasticity of Taxable Income (ETI) using the Saez (2010a) model. The estimates capture immediate responses to the policy change using the data from the policy change year. The 95 per cent confidence intervals using bootstrapped standard errors are in the brackets.

Table B.3: Estimates of fixed adjustment costs and elasticity of taxable income

	Elasticity e	Fixed cost ϕ_f
Base model	0.099	0.801
	[0.092, 0.106]	[0.071, 1.531]
Gender: Male	0.056	0.329
	[0.049, 0.061]	[-0.885, 1.543]
Gender: Female	0.218	2.663
	[0.1476, 0.288]	[-3.467, 8.794]
Age: 18-44 years	0.116	1.061
	[0.103, 0.128]	[0.026, 2.095]
Age: 45-59 years	0.084	1.547
	[0.079, 0.089]	[0.253, 2.841]
Has spouse	0.092	0.698
	[0.085, 0.098]	[-0.107, 1.504]
Has child	0.100	4.754
	[0.092, 0.108]	[3.645, 5.862]
live in major city	0.110	1.054
	[0.102, 0.117]	[0.626, 1.483]
Main earner	0.057	0.437
	[0.051, 0.063]	[0.121, 0.725]
Employment type:	0.017	9.906
Wage and salary earner	[0.013, 0.020]	[-0.663, 2.474]
Employment type:	0.205	2.445
Self employed	[0.166, 0.243]	[-1.115, 6.006]
Professional and managers	0.056	0.033
	[0.037, 0.074]	[-4.571, 4.636]
Used tax agent	0.110	1.217
	[0.103, 0.117]	[0.229, 2.206]
Spent more than	0.099	0.714
10 hours filling taxes	[0.093, 0.106]	[0.032, 1.397]

Note: This table presents the estimated fixed adjustment costs and the Elasticity of Taxable Income (ETI) using the static Gelber et al. (2020b) model. The 95 per cent confidence intervals, computed using bootstrapped standard errors, are shown in brackets.

Table B.4: Robustness of estimates of bunching to the selected parameters

Bin size ($)	Degree of fitted polynomial	Number of excluded bins at each side	Normalized bunching at AUD 150,000 kink before policy change	Normalized bunching at AUD 150,000 kink after policy change	Normalized bunching at AUD 180,000 kink after policy change
δ	D	$l = u$	b_{10}	b_{11}	b_2
			Panel A: Base estimate		
200	6	6	5.848	1.141	7.793
			Panel B: Robustness to bin size		
250	6	12	4.661	0.455	6.258
500	6	3	2.479	0.467	3.758
			Panel C: Robustness to degree of fitted polynomial		
200	5	6	5.743	1.162	8.401
200	7	6	5.854	0.7338	7.731
			Panel D: Robustness to the number of excluded bins		
200	6	7	5.989	0.648	8.185
200	6	4	5.309	0.837	7.467

Note: This table presents the estimated normalized bunching at the kinks, as defined in (C.5), with respect to the selected parameters. The estimation procedure is explained in detail in Appendix C. The selected parameters include the bin size, degree of the fitted polynomial, and the number of excluded bins around a kink. Note that changing the bin size also adjusts the number of excluded bins accordingly.

C Estimating Bunching at a Kink

We follow the approach of Chetty et al. (2011) and Kleven and Waseem (2013) to construct a counterfactual taxable income distribution denoted as $h_0(.)$. This is achieved by fitting a polynomial to the observed empirical income distribution $h(.)$, while excluding a visually selected range around the kink. To start, we divide the observed annual taxable income into bins of width δ, where f_i represents the frequency of taxable income within the range $[z_i - \delta/2, z_i + \delta/2]$. We then fit a flexible polynomial of degree D to the observed income distribution within a neighborhood $Q = [Q^l, Q^u]$ of the kink z^*. This is done by estimating the following regression equation:

$$f_i = \sum_{d=0}^{D} \beta_d (z_i - z^*)^d + \sum_{j=-l}^{l} \gamma_j \mathbb{1}\{z_i - z^* = \delta j\} + \epsilon_i \tag{C.1}$$

Here, $\mathbb{1}(.)$ denotes as an indicator function representing dummies for the bunching bins around the kink within the range $[z^* - \delta l, z^* + \delta u]$. These dummies help isolate the effects of the bunching bins on the estimated counterfactual income distribution, denoted as $\widehat{f}_i$. This counterfactual distribution is calculated as $\widehat{f}_i = \sum_{d=0}^{D} \beta_d (z_i - z^*)^d$. The initial estimate of bunching at z^* is given by:

$$B = \delta \sum_{j=l}^{u} (f_j - \widehat{f_j}) = \delta \sum_{j=l}^{u} \gamma_j \tag{C.2}$$

However, (C.2) overestimates the true amount of bunching at a kink because it does not account for the fact that individuals who bunch at a kink might have chosen to locate to the right of the threshold if a flat tax rate τ_0 had been imposed. Furthermore, when a kink is shifted forward, those who bunch at the new kink have moved from points to the left of the threshold. This leads to the observed income distribution not matching the counterfactual distribution under the integration constraint (as referred to by Chetty et al. (2011)). To address this, we employ a technique introduced by Chetty et al. (2011). We iteratively shift the estimated counterfactual income distribution around the former kink at z_1^* to the right and around the new kink at z_2^* to the left.

The iteration process involves estimating the following equations, with n denoting the iteration number:

$$\begin{aligned}
f_i \cdot \left(1 + \mathbb{1}\{i > u_1\} \frac{\widehat{B_1}^{n-1}}{\sum_{q>u_1} f_q}\right) &= \sum_{d=0}^{D} \beta_d^n (z_i - z_1^*)^d + \sum_{j=l_1}^{u_1} \gamma_j^n \mathbb{1}\{z_i - z_1^* = \delta j\} + \epsilon_i \\
f_i \cdot \left(1 + \mathbb{1}\{i < l_2\} \frac{\widehat{B_2}^{n-1}}{\sum_{q<l_2} f_q}\right) &= \sum_{d=0}^{D} \beta_d^n (z_i - z_2^*)^d + \sum_{j=l_2}^{u_2} \gamma_j^n \mathbb{1}\{z_i - z_2^* = \delta j\} + \epsilon_i
\end{aligned} \tag{C.3}$$

The iteration continues until the area under the estimated counterfactual distribution

equals that under the empirical one, given by $\sum_{i \in Q} f_i = \sum_{i \in Q} \widehat{f}_i$. The estimated bunching at z^* at iteration n is $B^n = \delta \sum_{j=l}^{u} (f_j - \widehat{f}_j) = \delta \sum_{j=l}^{u} \gamma_j^n$. The estimated counterfactual income distribution at z^*, obtained using (C.3), is denoted as $h_0(z)$:

$$\begin{aligned} h_0(z) &= \sum_{d=0}^{D} \beta_d (z - z^*)^d \\ h_0(z^*) &= \beta_0 \end{aligned} \tag{C.4}$$

To make the estimated bunching comparable across kinks, we normalize it by dividing it by the counterfactual mass at z^*, as shown in:

$$\widehat{b} = \frac{B}{h_0(z^*)} = \frac{B}{\beta_0} \tag{C.5}$$

We conduct a series of robustness checks to assess the sensitivity of our results to various parameters of bunching estimation. These checks include variations in the bunching range, alternative specifications of the tax function, and different sample periods. The estimates are provided in Table B.4.

D Standard static model with no adjustment costs

The model used to estimate the Elasticity of Taxable Income (ETI) without considering costs, as introduced by Saez (2010a), serves as the foundation for the model that incorporates costs. Saez (2010a) model explores the assumed proportional relationship between Elasticity of Taxable Income (ETI) and bunching at a kink. A kink is characterized with income threshold z^* and marginal tax rates below and above the threshold, denoted as τ_0 and τ_1, respectively where $\tau_0 < \tau_1$.

Individuals choose their taxable income z to maximize their quasi-linear utility function, specified as:

$$u(c, z; \alpha) = c - \frac{\alpha}{1 + \frac{1}{e}} \left(\frac{z}{\alpha}\right)^{1+\frac{1}{e}} \tag{D.1}$$

where z and c represent respectively taxable income and consumption defined as after-tax income $z - T(z, \tau)$, where τ denotes the marginal income tax rate. e denotes the ETI. Individuals differ only in their ability, denoted by α, which is assumed to have a smooth distribution, implying a smooth distribution of taxable income with linear taxes. The utility maximizer's level of income for an individual with ability α under a linear marginal tax rate τ is given by:

$$z_\alpha = \alpha(1 - \tau)^e \tag{D.2}$$

$$\Rightarrow \alpha = \frac{z_\alpha}{(1 - \tau)^e}$$

Suppose there is a kink at z^* where the marginal taxes below and above the kink are τ_0 and τ_1, respectively, with $\tau_0 < \tau_1$. The smooth distribution of ability implies that individuals with ability $\alpha \in \left[\frac{z^*}{(1-\tau_0)^e}, \frac{z^*}{(1-\tau_1)^e}\right]$ who would have been located in the bunching range $(z^*, z^* + \Delta z^*]$ in the absence of the kink now bunch in a neighborhood of z^*. Δz^* is the income response range at z^* and is defined as:

$$\Delta z^* = z^* \left(\left(\frac{1 - \tau_0}{1 - \tau_1}\right)^e - 1\right) \tag{D.3}$$

$$\Rightarrow z^* + \Delta z^* = z^* \left(\frac{1 - \tau_0}{1 - \tau_1}\right)^e \tag{D.4}$$

Suppose $h_0(\cdot)$ denotes the counterfactual distribution of taxable income in the absence of the kink. Bunching at the z^* kink is the area under the counterfactual distribution in the bunching range. Assuming that $h_0(\cdot)$ in the bunching range is uniform, the full bunching at z^* kink with no adjustment costs is defined as:

$$B^{**} = \int_{z^*}^{z^*+\Delta z^*} h_0(\zeta) d\zeta \approx \Delta z^* h_0(z^*) \tag{D.5}$$

Δz^* and B^{**} together define the ETI as:

$$e = \frac{\Delta z^*/z^*}{(\tau_1 - \tau_0)/(1 - \tau_0)} \tag{D.6}$$

We describe the method for estimating the counterfactual distribution and bunching at a kink in Appendix C. We use the distribution of taxable income from the the policy change year at 2008-2009 to estimate the ETI with no cost. We fit a sixth-degree polynomial ($D = 6$) to the binned distribution of taxable income ($\delta =$ AUD 200) around the former kink, excluding six bins on each side of the kink ($l = u = 6$), using the regression specified in (C.3) in Appendix C. The red line in Panel (a) of Figure 3 presents the fitted polynomial. We then estimate the bunching at the kink from (C.2). We back out Δz_1^* from (D.5) by using the estimated B^{**} and $h_0(z^*)$. Substituting Δz^* into (D.6) results in the ETI with respect to net-of-tax rates, defined as:

$$e = \frac{\ln\left(1 + \frac{\delta b}{z_1^*}\right)}{\ln\left(\frac{1-\tau_0}{1-\tau_1}\right)} \tag{D.7}$$

We estimate the standard errors using the method explained in Section 4.2.2 to make inferences about the estimations. The estimates are presented in Table B.2 in the Appendix B.

E Empirical implementation of bunching from below models with partial adjustment

E.1 Static model

In this section, we detail our static model incorporating adjustment costs. Our model assumes that bunchers move to the kink from below and allows for partial adjustments. Building on the bunching model without adjustment costs, where bunching emerges from above the kink (Saez, 2010a), Gelber et al. (2020b) developed a model that incorporates adjustment costs. Further expanding this framework, Mavrokonstantis and Seibold (2022) introduced a model allowing for bunching from below. However, these models do not permit partial adjustments and only estimate fixed adjustment costs. Supported by patterns observed in our data (see Figure A.1), we integrate these approaches to develop a model that allows for partial income adjustments, with bunchers moving to the kink from below. In this context, a buncher with initial income above a kink under a linear tax schedule first moves below the kink in response to the introduction of a previous kink at a lower threshold, and then moves up to bunch at the new kink.

In our model, we assume that the cost of adjusting taxable income from an initial level z_0 to z is given by:

$$\Phi(z, z_0) = \phi_f + \phi_m |z - z_0| \tag{E.1}$$

where ϕ_f and ϕ_m represent the fixed and marginal costs of adjusting taxable income, respectively. These costs manifest as utility losses for individuals. By incorporating both fixed and marginal costs, our model allows individuals to partially adjust their taxable income in response to changes in the tax schedule. We also assume that $\phi_m < \tau_1 - \tau_0$, ensuring incentive compatibility by guaranteeing that the cost does not exceed the benefits of adjustment.

We employ the utility function specified in (D.1) to estimate three parameters: e, ϕ_f, and ϕ_m. Intuitively, the marginal buncher and bunching equations at the former kink before and after the policy change, as well as at the new kink after the policy change (Equations (E.10) to (E.16)), collectively form a system of three equations that determine these parameters. Detailed explanations are provided below.

In a model without adjustment costs, the bunching range at the z^* kink is Δz^*, as specified in (D.3). Consequently, individuals with taxable income $z^* + \Delta z^* = z^* \left(\frac{1-\tau_0}{1-\tau_1}\right)^e$ and ability $\alpha = \frac{z^*}{(1-\tau_1)^e}$ bunch at the z^* kink. Allowing for partial adjustments, individuals with initial taxable income $z^* + \Delta z^*$ will decrease their taxable income when a kink at $z_0^* < z^*$ is introduced, resulting in an increased marginal tax rate from τ_0 to τ_1. These individuals choose the new income level $\bar{z}$ to maximize their utility as follows:

$$\max_{\bar{z}} u(c, \bar{z}; \alpha) - \Phi(\bar{z}, z^* + \Delta z^*) \tag{E.2}$$

$$\Rightarrow \max_{\bar{z}}(1-\tau_0)z^* + (1-\tau_1)(\bar{z}-z^*) + \frac{\alpha}{1+\frac{1}{e}}\left(\frac{\bar{z}}{\alpha}\right)^{\left(1+\frac{1}{e}\right)} - \{\phi_f + \phi_m|\bar{z} - (z^* + \Delta z^*)|\}$$

$$\overset{FOC}{\Rightarrow} 1 - \tau_1 + \phi_m = \left(\frac{\bar{z}}{\alpha}\right)^e \tag{E.3}$$

Substituting the ability of the bunchers, $\alpha = \frac{z^*}{(1-\tau_1)^e}$, into the First Order Condition (FOC) above, we obtain the bunching range at the z^* kink allowing for partial adjustment:

$$\bar{z} = z^*\left(\frac{1-\tau_1+\phi_m}{1-\tau_1}\right)^e \tag{E.4}$$

Note that since we assume $\phi_m < \tau_1 - \tau_0$, the bunching range allowing for partial adjustment falls below the range without adjustment costs: $\bar{z} < z^* + \Delta z^*$, where $z^* + \Delta z^* = z^*\left(\frac{1-\tau_0}{1-\tau_1}\right)^e$ as specified in (D.4).

The full bunching at the z^* kink, allowing for partial adjustment, is given by:

$$B^* = \int_{z^*}^{\bar{z}} h_0(\zeta)\, d\zeta \approx (\bar{z} - z^*)h_0(z^*) \tag{E.5}$$

An individual with initial taxable income z^* and ability $\alpha = \frac{z^*}{(1-\tau_0)^e}$ will decrease their taxable income to $\underline{z}$ once a kink at $z_0^* < z^*$ is introduced, in response to the higher marginal tax rate. These individuals maximize their utility, specified as $u(c, \underline{z}; \alpha) - \Phi(\underline{z}, z^*)$. Using a similar FOC as in (E.3), we obtain:

$$\underline{z} = z^*\left(\frac{1-\tau_1+\phi_m}{1-\tau_0}\right)^e \tag{E.6}$$

Note that $\underline{z} < z^*$ since $\phi_m < \tau_1 - \tau_0$.

E.1.1 Bunching at z_1^* before policy change

We examine the marginal bunchers at each kink, beginning with the marginal buncher at the z_1^* kink before the policy change. Assume that the initial taxable income of the marginal buncher is $\underline{z}_{10}$. Using (D.2), the ability of this marginal buncher is characterized as:

$$\alpha^{m_{10}} = \frac{\underline{z}_{10}}{(1-\tau_0)^e} \tag{E.7}$$

The initial income of a marginal buncher at the z_1^* kink, $\underline{z}_{10}$, is determined using (2), where B_{10} and $h_0(z_1^*)$ denote the estimated bunching at z_1^* and the intercept of the estimated counterfactual income distribution, respectively, as described in Appendix C:

$$\underline{z}_{10} = z_1^* + \frac{B_{10}}{h_0(z_1^*)} \tag{E.8}$$

Once a prior kink at $z_0^* < z_1^*$ is introduced, the marginal tax rate faced by the marginal

buncher increases from τ_0 to τ_1. Consequently, the marginal buncher adjusts their taxable income to their optimal level under the new tax schedule. Using a FOC similar to (E.3), the marginal buncher decreases their taxable income to $\underline{z}'_{10}$, which lies below z_1^*:

$$\underline{z}'_{10} = \underline{z}_{10}\left(\frac{1-\tau_1+\phi_m}{1-\tau_0}\right)^e \tag{E.9}$$

The marginal buncher equation presented in (1) is expressed as follows:

$$(1-\tau_0-\phi_m)(z_1^*-\underline{z}'_{10}) + \frac{\alpha^{m_{10}}}{1+\frac{1}{e}}\left(\left(\frac{\underline{z}'_{10}}{\alpha^{m_{10}}}\right)^{1+\frac{1}{e}} - \left(\frac{z_1^*}{\alpha^{m_{10}}}\right)^{1+\frac{1}{e}}\right) - \phi_f = 0 \tag{E.10}$$

Together, Equations (E.7), (E.8), (E.9), and (E.10) form an equations involving e, ϕ_f, and ϕ_m.

E.1.2 Residual bunching at z_1^* after policy change

We use the residual bunching at the z_1^* kink after the policy change to construct an additional equation. Let $\underline{z}_{11}$ denote the initial income of a residual marginal buncher at z_1^*, characterized by ability $\alpha^{m_{11}}$, using (D.2) as follows:

$$\alpha^{m_{11}} = \frac{\underline{z}_{11}}{(1-\tau_0)^e} \tag{E.11}$$

Individuals with initial taxable income z_1^* and ability $\alpha = \frac{z_1^*}{(1-\tau_0)^e}$ adjust their taxable income twice. First, they decrease their taxable income from z_1^* to $\underline{\underline{z}}_1^*$ (specified in (E.3)) in response to the higher marginal tax rate introduced by the z_0^* kink. Second, they increase their taxable income from $\underline{\underline{z}}_1^*$ to $\underline{z}_1^*$ to take advantage of the lower marginal tax rates once the kink is raised to z_1^*, where $\underline{\underline{z}}_1^* < \underline{z}_1^* < z_1^*$. To achieve this, these individuals solve the following utility maximization problem:

$$\max_{\underline{z}_1^*}\left[u(c,\underline{z}_1^*;\alpha) - \Phi(\underline{z}_1^*,\underline{\underline{z}}_1^*)\right] \tag{E.12}$$

$$\Rightarrow \max_{\underline{z}_1^*}\left[(1-\tau_0)\underline{z}_1^* + \frac{\alpha}{1+\frac{1}{e}}\left(\frac{\underline{z}_1^*}{\alpha}\right)^{1+\frac{1}{e}} - \left\{\phi_f + \phi_m|\underline{z}_1^* - \underline{\underline{z}}_1^*|\right\}\right]$$

$$\overset{FOC}{\Rightarrow} 1-\tau_0-\phi_m = \left(\frac{\underline{z}_1^*}{\alpha}\right)^e$$

$$\overset{\alpha=\frac{z_1^*}{(1-\tau_0)^e}}{\Rightarrow} \underline{z}_1^* = z_1^*\left(\frac{1-\tau_0-\phi_m}{1-\tau_0}\right)^e$$

Feeding $\underline{z}_1^*$ obtained from (E.12) into the residual bunching equation specified in (4)

results in:

$$\underline{z}_{11} = z_1^* \left(\frac{1 - \tau_0 - \phi_m}{1 - \tau_0} \right)^e + \frac{B_{11}}{h_0(z_1^*)} \tag{E.13}$$

The marginal buncher equation defined in (3) using the utility function specified in (D.1) is given by:

$$(1 - \tau_0 - \phi_m)(\underline{z}_{11} - z_1^*) + \frac{\alpha^{m_{11}}}{1 + \frac{1}{e}} \left(\left(\frac{z_1^*}{\alpha^{m_{11}}} \right)^{1+\frac{1}{e}} - \left(\frac{\underline{z}_{11}}{\alpha^{m_{11}}} \right)^{1+\frac{1}{e}} \right) - \phi_f = 0 \tag{E.14}$$

Together, (E.11), (E.13), and (E.14) form the second equation involving e, ϕ_f, and ϕ_m.

E.1.3 Bunching at z_2^*

We apply a similar procedure to analyze the bunching at the new kink at z_2^*. The following equations collectively describe the third equation:

$$\alpha^{m_2} = \frac{\underline{z}_2}{(1 - \tau_0)^e} \tag{E.15}$$

$$\underline{z}_2 = z_2^* + \frac{B_2}{h_0(z_2^*)} \tag{E.16}$$

$$\underline{z}_2' = \underline{z}_2 \left(\frac{1 - \tau_1 + \phi_m}{1 - \tau_0} \right)^e \tag{E.17}$$

$$(1 - \tau_0 - \phi_m)(z_1^* - \underline{z}_2') + \frac{\alpha^{m_2}}{1 + \frac{1}{e}} \left(\left(\frac{\underline{z}_2'}{\alpha^{m_2}} \right)^{1+\frac{1}{e}} - \left(\frac{z_1^*}{\alpha^{m_2}} \right)^{1+\frac{1}{e}} \right) - \phi_f = 0 \tag{E.18}$$

Here, α^{m_2} and $\underline{z}_2$ denote the ability and initial utility-maximizing taxable income of the marginal buncher at the z_2^* kink, respectively. $\underline{z}_2'$ represents the adjusted income after the introduction of the prior kink z_1^*.

We use the distribution of taxable income from both before (2008-2009) and after the policy change (2009-2010), as depicted in Figure 3, for our estimations. We estimated the bunching at z_1^* = AUD 150,000 before (B_{10}) and after the policy change (B_{11}), and the bunching at z_2^* = AUD 180,000 (B_2) using the procedure outlined in Appendix C. The parameters were set as follows: $\delta = 200$ (bin size), $D = 6$ (degree of the fitted polynomial), and $l = u = 6$ (number of excluded bins below and above a kink). The red line in Figure 3 represents the fitted polynomial.

The marginal tax rates below and above the kinks are $\tau_0 = 0.40$ and $\tau_1 = 0.45$, respectively. Equations (E.10), (E.14) and (E.18) collectively form a system of three equations that we solve numerically to determine the parameters e, ϕ_f, and ϕ_m. We employ the method described in Section 4.2.2 to estimate standard errors and make

inferences about the estimated parameters. The estimates are presented in Table 3.

E.2 Dynamic model

The dynamic model explores the evolution of bunching from the the z_1^* kink to the new z_2^* kink, with marginal tax rates of τ_0 and τ_1 below and above the kink thresholds, respectively, where $\tau_0 < \tau_1$. We use the estimated bunching at z_1^* from two years prior to the policy change, as well as residual bunching at z_1^* and bunching at z_2^* from two years following the policy change. The time periods referenced below are relative to the policy change under investigation in this paper.

$\underline{t = -2}$

Bunching at z_1^*

$$(1-\tau_0-\phi_m)(z_1^* - \underline{z}_{10}^{\prime,t=-2}) + \frac{\alpha^{m_{10},t=-2}}{1+\frac{1}{e}}\left((\frac{\underline{z}_{10}^{\prime,t=-2}}{\alpha^{m_{10},t=-2}})^{1+\frac{1}{e}} - (\frac{z_1^*}{\alpha^{m_{10},t=-2}})^{1+\frac{1}{e}}\right) - \phi_f = 0 \quad \text{(from (E.10))}$$

$$\underline{z}_{10}^{\prime,t=-2} = \underline{z}_{10}^{t=-2}\left(\frac{1-\tau_1+\phi_m}{1-\tau_0}\right)^e \quad \text{(from (E.9))}$$

$$\underline{z}_{10}^{t=-2} = z_1^* + \frac{B_{10}^{t=-2}}{h_0(z_1^*)^{t=-2}} \quad \text{(from (E.8))}$$

$$\alpha^{m_{10},t=-2} = \frac{\underline{z}_{10}^{t=-2}}{(1-\tau_0)^e} \quad \text{(from (E.7))}$$

$\underline{t = -1}$

Bunching at z_1^*

$$(1-\tau_0-\phi_m)(z_1^* - \underline{z}_{10}^{\prime,t=-1}) + \frac{\alpha^{m_{10},t=-1}}{1+\frac{1}{e}}\left((\frac{\underline{z}_{10}^{\prime,t=-1}}{\alpha^{m_{10},t=-2}})^{1+\frac{1}{e}} - (\frac{z_1^*}{\alpha^{m_{10},t=-1}})^{1+\frac{1}{e}}\right) - \phi_f = 0 \quad \text{(from (E.10))}$$

$$\underline{z}_{10}^{\prime,t=-1} = \underline{z}_{10}^{t=-1}\left(\frac{1-\tau_1+\phi_m}{1-\tau_0}\right)^e \quad \text{(from (E.9))}$$

$$\underline{z}_{10}^{t=-1} = z_1^* + \frac{B_{10}^{t=-1}}{h_0(z_1^*)^{t=-1}} \quad \text{(from (E.8))}$$

$$\alpha^{m_{10},t=-1} = \frac{\underline{z}_{10}^{t=-1}}{(1-\tau_0)^e} \quad \text{(from (E.7))}$$

$$B_{10}^{t=-1} = \pi_0\pi_1 B_1 + (1-\pi_0\pi_1)B_1^* \quad \text{(from (7))}$$

Here, B_1 denotes the immediate bunching at the z_1^* kink at $t = -2$, corresponding to the introduction of the kink at z_1^*, and is estimated using the method described in Appendix C. B_1^* represents the longer-term bunching at the z_1^* kink, as specified in (E.5).

Additionally, π_0 and π_1 denote the probabilities of drawing a positive adjustment cost at the time of the policy change and one period after the introduction of the kink at z_1^*, respectively.

$\underline{t=0}$

Residual bunching at z_1^*

$$(1-\tau_0-\phi_m)(\underline{z}_{11}^{t=0}-z_1^*)+\frac{\alpha^{m_{11},t=0}}{1+\frac{1}{e}}\left((\frac{z_1^*}{\alpha^{m_{11},t=0}})^{(1+\frac{1}{e})}-(\frac{\underline{z}_{11}^{t=0}}{\alpha^{m_{11}^{t=0}}})^{(1+\frac{1}{e})}\right)-\phi_f=0 \quad \text{(from (E.14))}$$

$$\underline{z}_{11}^{t=0}=z_1^*\left(\frac{1-\tau_0-\phi_m}{1-\tau_0}\right)^e+\frac{B_{11}^{t=0}}{h_0(z_1^*)^{t=0}} \quad \text{(from (E.13))}$$

$$\alpha^{m_{11}^{t=0}}=\frac{\underline{z}_{11}^{t=0}}{(1-\tau_0)^e} \quad \text{(from (E.11))}$$

$$B_{11}^{t=0}=\pi_0 B_{11}^{t=-1} \quad \text{(from (8))}$$

Bunching at z_2^*

$$(1-\tau_0-\phi_m)(z_2^*-\underline{z}_2^{\prime,t=0})+\frac{\alpha^{m_2,t=0}}{1+\frac{1}{e}}\left((\frac{\underline{z}_2^{\prime,t=0}}{\alpha^{m_2,t=0}})^{1+\frac{1}{e}}-(\frac{z_2^*}{\alpha^{m_2,t=0}})^{1+\frac{1}{e}}\right)-\phi_f=0 \quad \text{(from (E.18))}$$

$$\underline{z}_2^{\prime,t=0}=\underline{z}_2^{t=0}\left(\frac{1-\tau_1+\phi_m}{1-\tau_0}\right)^e \quad \text{(from (E.17))}$$

$$\underline{z}_2^{t=0}=z_2^*+\frac{B_2^{t=0}}{h_0(z_2^*)^{t=0}} \quad \text{(from (E.16))}$$

$$\alpha^{m_2,t=0}=\frac{\underline{z}_2^{t=0}}{(1-\tau_0)^e} \quad \text{(from (E.15))}$$

$\underline{t=1}$

Residual bunching at z_1^*

$$(1-\tau_0-\phi_m)(\underline{z}_{11}^{t=1}-z_1^*)+\frac{\alpha^{m_{11},t=1}}{1+\frac{1}{e}}\left((\frac{z_1^*}{\alpha^{m_{11},t=1}})^{(1+\frac{1}{e})}-(\frac{\underline{z}_{11}^{t=1}}{\alpha^{m_{11}^{t=1}}})^{(1+\frac{1}{e})}\right)-\phi_f=0 \quad \text{(from (E.14))}$$

$$\underline{z}_{11}^{t=1}=z_1^*\left(\frac{1-\tau_0-\phi_m}{1-\tau_0}\right)^e+\frac{B_{11}^{t=1}}{h_0(z_1^*)^{t=1}} \quad \text{(from (E.13))}$$

$$\alpha^{m_{11}^{t=1}}=\frac{\underline{z}_{11}^{t=1}}{(1-\tau_0)^e} \quad \text{(from (E.11))}$$

$$B_{11}^{t=1}=\pi_0\pi_1 B_{11}^{t=-1} \quad \text{(from (8))}$$

Bunching at z_2^*

$$(1-\tau_0-\phi_m)(z_2^*-\underline{z}_2^{\prime,t=1})+\frac{\alpha^{m_2,t=1}}{1+\frac{1}{e}}\left((\frac{\underline{z}_2^{\prime,t=1}}{\alpha^{m_2,t=1}})^{1+\frac{1}{e}}-(\frac{z_2^*}{\alpha^{m_2,t=1}})^{1+\frac{1}{e}}\right)-\phi_f=0 \quad \text{(from (E.18))}$$

$$\underline{z}_2^{\prime,t=1}=\underline{z}_2^{t=1}\left(\frac{1-\tau_1+\phi_m}{1-\tau_0}\right)^e \quad \text{(from (E.17))}$$

$$\underline{z}_2^{t=0}=z_2^*+\frac{B_2^{t=1}}{h_0(z_2^*)^{t=1}} \quad \text{(from (E.16))}$$

$$\alpha^{m_2,t=1}=\frac{\underline{z}_2^{t=1}}{(1-\tau_0)^e} \quad \text{(from (E.15))}$$

$$B_2^{t=1}=(\pi_0\pi_1)B_2+(1-\pi_0\pi_1)B_2^* \quad \text{(from (8))}$$

We use data spanning two years before and two years after the policy change, specifically from 2006-2007 to 2009-2010, to estimate the dynamic model. The method for estimating bunching at each kink is detailed in Appendix C. We numerically solve the above specified equations to estimate the parameters e, ϕ_f, and ϕ_m, as well as the cumulative probabilities of drawing a positive adjustment cost, π_0 and $\pi_0\pi_1$. The estimates are presented in Table 4.

F Effects of the policy change on tax affairs fees

We first estimate an Event Study (ES) model to investigate the effects of the policy change on tax affairs fees within our study sample. The model is specified as follows:

$$\begin{aligned} TaxAffairsFees_{it} = \beta_0 + \beta_1 TaxableIncome_{it} + \beta_2 TrustIncome_{it} \\ + \beta_3 X_{it} + \alpha Post_t + \lambda_i + \tau_t + \epsilon_{it} \end{aligned} \tag{F.1}$$

where i and t denote individuals and years, respectively. $Post_t$ is a dummy variable that equals one for years after the policy change. X_{it} includes time-varying controls such as annual taxable income and trust income. λ_i and τ_t represent individual and time fixed effects, respectively. ϵ_{it} is the error term. The coefficient of interest is α, which measures the average change in tax affairs fees after the policy change compared to before.

Subsequently, we estimate a Difference-in-Differences (DD) model to analyze the heterogeneous effects of the policy change on tax affairs fees for individuals with more flexible taxable income, specifically flexible bunchers and those with trust income. Sharp bunchers are defined as individuals with taxable income within a AUD 5,000 window around the top kinks before and after the policy change. Individuals with trust income are defined as those with a net positive trust income in their taxable income. The DD model is specified as follows:

$$\begin{aligned} TaxAffairsFees_{it} = \beta_0 + \beta_1 TaxableIncome_{it} + \beta_2 TrustIncome_{it} + \beta_3 X_{it} \\ + \beta_4 Post_t + \beta_5 Treated_i + \alpha Treated_i \times Post_t + \lambda_i + \tau_t + \epsilon_{it} \end{aligned} \tag{F.2}$$

where $Treated_i$ is a dummy variable that equals one for treated units, which are flexible bunchers and those with trust income. This model compares the effects of the policy change on flexible bunchers (those with trust income) with those on non-flexible bunchers (those without trust income). The coefficient of interest is α, which captures the differential effect of the policy change on the treated group compared to the control group.

To further investigate the effects of the policy change over time, we generalize the DD model by replacing $\alpha Treated_i \times Post_t$ with a full set of treatment and yearly time interaction terms. This allows us to estimate an event study regression of the form:

$$\begin{aligned} TaxAffairsFees_{it} = \beta_0 + \beta_1 TaxableIncome_{it} + \beta_2 TrustIncome_{it} + \beta_3 Post_t \\ + \beta_4 Treated_i + \sum_{j=-3}^{j=2} \alpha_j (Treated_i \times Year_t) + \lambda_i + \tau_t + \epsilon_{it} \end{aligned} \tag{F.3}$$

In this specification, the coefficients of interest are the α_j terms. Small or insignificant estimates for the pre-policy change periods provide suggestive evidence supporting the common trend assumption required for the DD model's identification. It is important to note that these estimates may not represent causal effects; rather, they indicate the correlation between tax affairs fees and changes in the tax system.

The study sample comprises Australian tax-resident filers aged 18 and above, with taxable incomes ranging from AUD 130,000 to AUD 200,000 during the financial years from 2005-2006 to 2010-2011. Table F.1 presents the estimated effects. The first column of Table F.1 shows the effects of the policy change for our entire study sample based on the ES model specified in (F.1). The results suggest an average increase of AUD 275.2 (a 52.5 percent increase) in the cost of tax affairs in the years following the policy change compared to the years before. This increase could be attributed to more complicated tax affairs following the policy change, necessitating tax sheltering of a larger amount of taxable income.

The last two columns of Table F.1 display the estimated effects from the DD model specified in (F.2) for flexible bunchers and individuals with trust income. In these estimates, we compare the effects on flexible bunchers (those with trust income) to those on non-flexible bunchers (those without trust income). The estimated effects are an increase of AUD 46.7 (8.0 percent) and AUD 100.1 (18.6 percent) in the cost of tax affairs, respectively. However, these estimated effects are not statistically significant for flexible bunchers.

Figure F.2 plots the estimated effects from the DD model over time (α_j). The first panel presents the estimates for flexible bunchers, while the second panel illustrates the estimates for individuals with trust income. The figure reveals several key insights. Firstly, the estimated effects in the pre-policy change periods are small, supporting the plausibility of the common trend assumption underlying our DD model. Secondly, both panels demonstrate an increase in the cost of tax affairs in the years following the policy change. Additionally, the increasing trend for individuals with trust income is substantially larger and statistically significant, indicating more complex tax affairs for this group post-policy change. Lastly, the sharp increase during the policy change years suggests the presence of re-optimization costs.

Tables

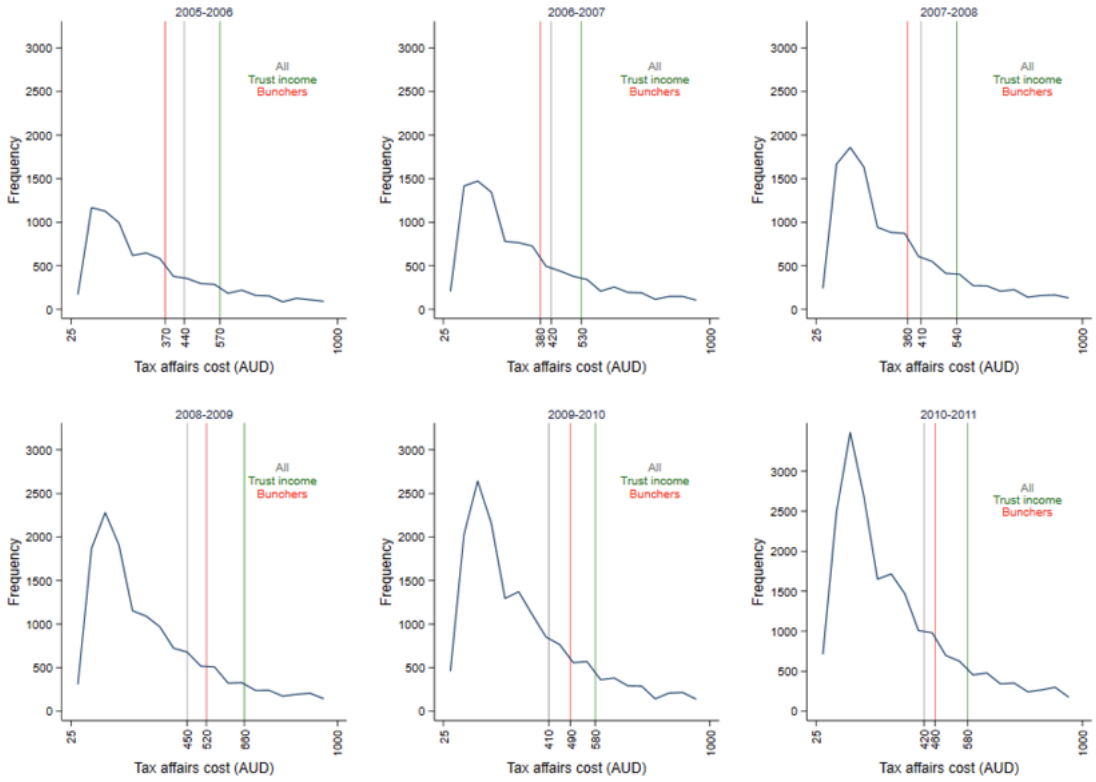
Table F.1: Estimated effects of the policy change on tax affairs fees

	(1) All	(2) Sharp bunchers	(3) Trust income
Post × Sharp buncher		46.72	
		(28.97)	
Post × Trust			100.12***
			(21.81)
Post	275.19***	275.02***	246.26***
	(18.32)	(18.73)	(19.38)
Taxable income (,000 AUD)	-2.03***	-2.42***	-2.00***
	(0.37)	(0.40)	(0.37)
Trust income (,000 AUD)	0.67**	0.63**	0.63**
	(0.28)	(0.28)	(0.29)
Sharp buncher		14.94	
		(17.14)	
Has trust income			-65.50**
			(25.70)
Constant	523.69***	577.76***	538.41***
	(55.32)	(59.97)	(55.64)
Year fixed effects	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes
Number of observations	141,819	141,819	141,819

Note: This table presents the estimated effects of the policy change on tax affairs fees from (F.1) and (F.2). The study sample consists of Australian tax-resident filers aged 18 and above, with taxable incomes ranging from AUD 130,000 to AUD 200,000 during the financial years from 2005-2006 to 2010-2011. Sharp bunchers are defined as individuals with taxable income within an AUD 5,000 window around the top kinks before and after the policy change. Those with trust income are defined as those with a net positive trust income in their taxable income. Standard errors are presented in parentheses.
$*p < 0.10, **p < 0.05, ***p < 0.01$

Figures

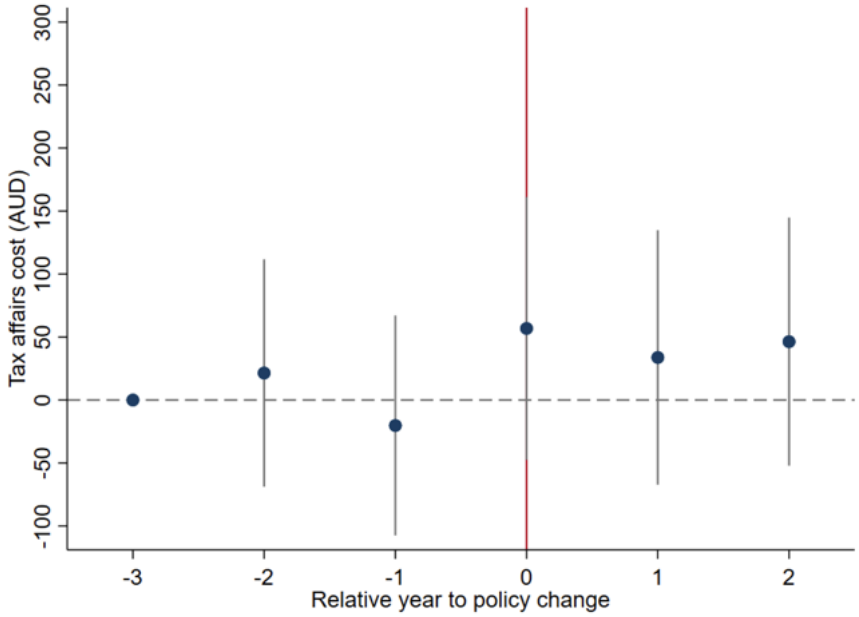
Figure F.1: Distribution of tax affairs costs



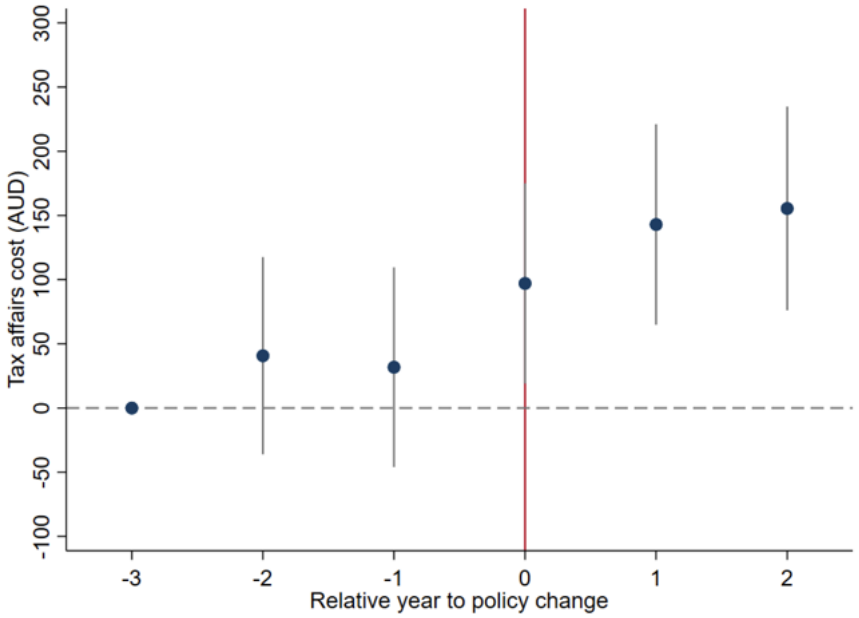
Notes: This figure illustrates the distribution of tax affairs costs in our study sample. The study sample consists of individuals with taxable income between AUD 130,000 and AUD 200,000. Bunchers are defined as individuals with taxable income within a AUD 5,000 window around the top kink. The gray, green, and red lines represent the average tax affairs costs for all individuals, those with trust income, and bunchers, respectively. The costs show an increase in the policy change year, indicating a re-optimization cost.

Figure F.2: Estimated effects of the policy change on tax affairs fees

(a) Sharp Bunchers



(b) Those with Trust Income



Note: This figure illustrates the estimated impacts of the policy change (α_j) on tax affair fees from (F.3). The first panel displays the effects for the flexible bunchers, and the second panel exhibits the coefficients for individuals with trust income. The dots represent the point estimates, and the 95 per cent confidence intervals are depicted as spikes. For more information, see notes to Table F.1.

G Government Revenue and Pareto Improvement

The policy change increased the top tax threshold from AUD 150,000 to AUD 180,000 without altering the marginal tax rates below and above the kink (40 and 45 percent, respectively). This change extended the budget set for all individuals, regardless of their position in the income distribution. Therefore, when considering the government as an additional agent in society, a sufficient condition for the policy change to be Pareto improvement is its impact on government tax revenue (Moore, 2022).

The effects of this policy change on government tax revenue can be divided into two components: the *"mechanical effect"* and the *"behavioural effects."* The mechanical effect refers to the decrease in tax revenue from taxpayers with income within the range affected by the change in marginal tax rates. The behavioural effect captures changes in taxpayer behaviour resulting from the policy change.

The behavioural effect has three components. First, when keeping the bunching mass constant, tax revenue increases because the bunching shifts to a higher income level at the new threshold. However, this bunching group is not homogeneous; it includes individuals who previously bunched at the old kink who decided to either continue bunching at the old kink or increase their income while staying below the new, higher kink. Additionally, it includes those who bunched at the former kink and continue to bunch at the new higher kink. Both these effects result in increased tax revenue. Finally, individuals whose income was above the new kink before the policy change might decrease their income to bunch at the new kink, resulting in a decrease in tax revenue.

Moore (2022) shows that the bunching mass at a kink is a sufficient statistic for analyzing the behavioural effects on tax revenue resulting from changes to that kink's threshold, assuming marginal tax rates remain constant. Similarly, the probability of individuals falling above the kink is a sufficient statistic for understanding the mechanical revenue effects of the reform. Moore (2022)'s findings suggest that the change in tax revenue resulting from increasing the kink threshold z^* by ΔK can be approximated as follows:

$$\Delta R \approx \underbrace{\tau_0 \overbrace{\left(H_{\tau_1}(z^*) - H_{\tau_0}(z^*)\right)}^{\text{taxpayers bunching at } z^*} \Delta K}_{\text{behavioral effects}} \underbrace{-(\tau_1 - \tau_0) \overbrace{\left(1 - H_{\tau_1}(z^*)\right)}^{\substack{\text{taxpayers} \\ \text{located above } z^*}} \Delta K}_{\text{mechanical effects}} \tag{G.1}$$

where ΔR represents the change in the government's income tax revenue, and τ_0 and τ_1 denote the marginal tax rates below and above the kink at 0.40 and 0.45, respectively. $H_\tau(.)$ denotes the cumulative distribution of taxable income with linear tax rates of τ. The terms $H_{\tau_1}(z^*) - H_{\tau_0}(z^*)$ and $1 - H_{\tau_1}(z^*)$ represent the estimated bunching at the z^* kink and the mass of taxpayers with taxable income higher than z^*, respectively. If the estimated ΔR is non-negative, it implies that the new tax schedule represents a Pareto improvement over the previous one.

For our analysis, we consider z^* as the location of the initial kink (AUD 150,000) and ΔK as the increase in the kink threshold to the new kink (AUD 180,000) at AUD 30,000. We use data from one year before the policy change in 2007-2008 to estimate bunching at the kink.

Table G.1 presents the estimated behavioural effects, mechanical effects, total changes in government revenue resulting from the policy change, and fiscal externalities, defined as the ratio of behavioural effects to mechanical effects. The first row shows the estimates for our study sample. The estimated effects of the policy change indicate a decrease in annual tax revenue of approximately AUD 13.7 million. This consists of a AUD 6.5 million increase in revenue due to behavioural effects and a AUD 20.3 million decrease due to mechanical effects. The fiscal externalities of the policy change is high at approximately 32 cents, indicating that for each dollar lost through mechanical effects, 32 cents are gained due to behavioural effects. Since the total change in the revenue is negative, this policy change was not Pareto improving.

Table G.1 also presents the estimates for different sub samples. The estimated total revenue for all sub samples is negative, except for self employed individuals with trust income. Estimated fiscal externalities are very high at 1.09 indicating that for each dollar lost through mechanical effects, AUD 1.09 is gained due to behavioural effects. The fiscal externalities for those with trust income shows an almost one-to-one relationship between behavioural and mechanical effects.

These findings shed light on the intricate interplay between tax policy changes, taxpayer behaviour, and government revenue, offering valuable insights for tax policy makers.

Tables

Table G.1: Estimated changes to the government's income tax revenue due to the policy change

	Behavioural effects (,000,000 AUD)	Mechanical effects (,000,000 AUD)	Total change in revenue (,000,000 AUD)	Fiscal externality
All sample	6.554	-20.280	-13.725	-0.323
Gender: Male	3.169	-15.012	-11.842	-0.211
Gender: Female	3.376	-5.268	-1.891	-0.641
Age: 18-44 years	4.073	-9.412	-5.340	-0.433
Age: 45-59 years	2.007	-8.193	-6.186	-0.245
Age: Over 60 years	0.467	-2.647	-2.207	-0.174
Has spouse	4.765	-15.042	-10.276	-0.316
Has child	2.022	-6.630	-4.607	-0.305
Live in major city	5.034	-15.580	-10.545	-0.323
Main earner	2.460	-11.146	-8.686	-0.221
Employment type: Wage and salary earner	0.559	-10.818	-10.259	-0.052
Employment type: Self employed	6.004	-9.462	-3.458	-0.634
Occupation: Professional and managers	2.127	-11.716	-9.589	-0.181
Used tax agent	6.195	-17.061	-10.865	-0.363
Spent more than 10 hours filing taxes	6.577	-20.179	-13.602	-0.325
Has trust income	5.429	-6.283	-0.854	-0.864
Self employed with trust income	5.104	-4.687	0.416	-1.089

Note: This table presents the estimated changes in government income tax revenue resulting from the policy change, as calculated using (G.1). The estimates are based on the distribution of taxable income from one year before the policy change in 2007-2008, and bunching is estimated using the method described in Appendix C. Fiscal externalities are calculated as the ratio of behavioural effects to mechanical effects.