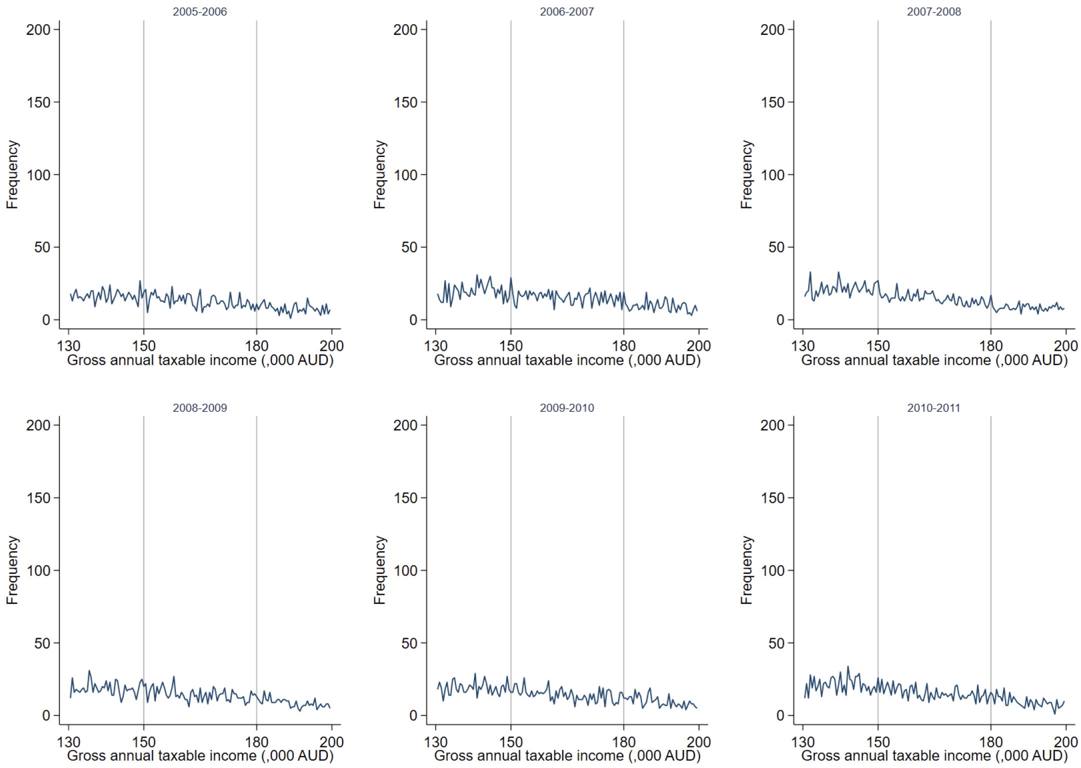
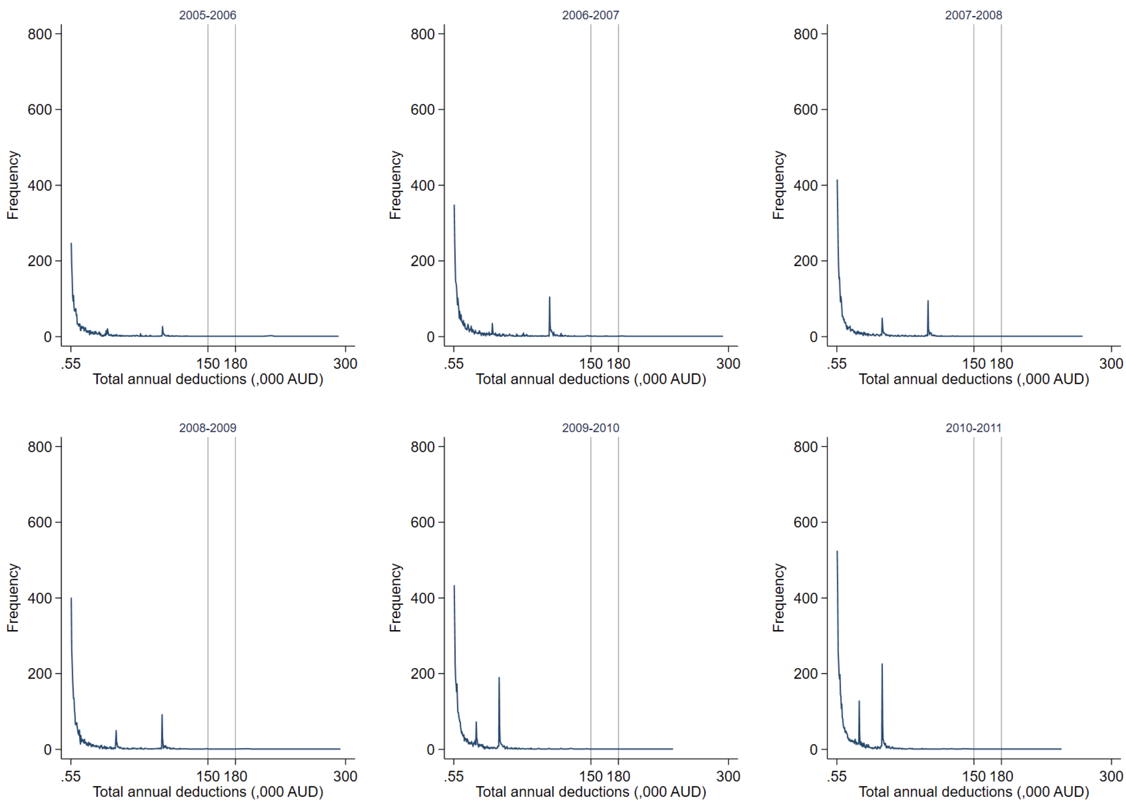
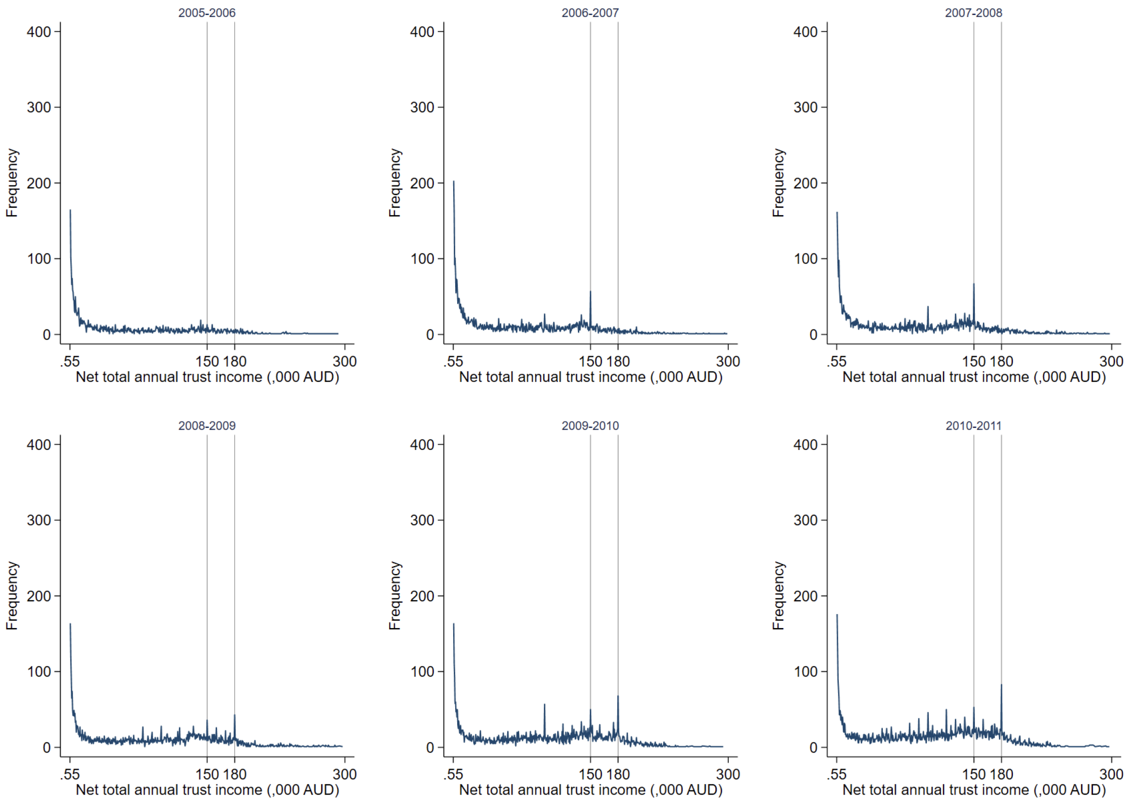
(b) Gross annual taxable income



(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 8.

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, Equation (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 A.5.

D Empirical implementation of bunching models

D.1 Model with no tax sheltering costs

The model used to estimate the Elasticity of Taxable Income (ETI) without considering costs, as introduced by Saez (2010), serves as the foundation for the model that incorporates costs. Saez (2010) model explores the assumed proportional relationship between ETI and bunching at a kink. Individuals choose their taxable income z to maximize their quasi-linear utility function, specified as:

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

Here, 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. 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:

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

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:

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

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, bunching at the z^* kink is defined as:

$$B^* = \int_{z^*}^{z^*+\Delta z^*} h_0(\zeta) d\zeta \approx \Delta z^* h_0(z^*) \tag{D.4}$$

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

$$e = \frac{\Delta z^*/z^*}{(\tau_1 - \tau_0)/(1 - \tau_0)} \tag{D.5}$$

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 500) 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.4) by using the estimated B^* and $h_0(z^*)$. Substituting Δz^* into (D.5) results in the ETI with respect to net-of-tax rates, defined as:

$$e = \frac{\ln\left(1 + \frac{\delta b}{z_1^*}\right)}{\ln\left(\frac{1-\tau_0}{1-\tau_1}\right)} \tag{D.6}$$

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 A.3 in the Appendix A.

D.2 Model with fixed and marginal costs of tax sheltering

In this model, we introduce the assumption that the cost of adjusting taxable income from an initial level z_0 to z to shelter $|z - z_0|$ from taxes is given by:

$$\phi(z_0, z) = \phi_f + \phi_m |z - z_0| \tag{D.7}$$

Here, ϕ_f and ϕ_m represent the fixed and marginal costs of tax sheltering, respectively.

We use the utility function specified in D.1, and we need to estimate three parameters: the ETI (e), ϕ_f, and ϕ_m. Equations (D.9) to (D.16) together form three equations that jointly determine the three parameters. We provide more details below.

Let's assume there is a kink at z_1^* where the marginal tax rates below and above the kink are τ_0 and τ_1, respectively, with $\tau_0 < \tau_1$. Using the utility maximizer's level of taxable income with a linear tax rate of τ_0 specified in (D.2), we can calculate the ability of the marginal buncher as follows:

$$\alpha^{m_{10}} = \frac{\underline{z}_{10}}{(1-\tau_0)^e} \tag{D.8}$$

Feeding this into the marginal buncher equation presented in (1) using the utility function specified in (D.1) results in an equation that implicitly defines $\underline{z}_{10}$ as a function of e and the cost parameters ϕ_f and ϕ_m:

$$\left(\phi_m + (1-\tau_1)\right)\left(\underline{z}_{10} - z_1^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(\underline{z}_{10} - {z_1^*}^{1+\frac{1}{e}} \underline{z}_{10}^{-\frac{1}{e}}\right) + \phi_f = 0 \tag{D.9}$$

We use Δz^*_{10} from (D.3) and the estimated bunching at z^*_1 before the policy change (B_{10}) in the bunching equation specified in (2), resulting in:

$$\underline{z}_{10} = \left(\frac{1-\tau_0}{1-\tau_1}\right)^e z^*_1 - \frac{\delta B_{10}}{h_0(z^*_1)} \tag{D.10}$$

where δ denotes the bin size. Together, (D.9) and (D.10) describe an equation involving e, ϕ_f, and ϕ_m.

We use the residual bunching at z^*_1 kink after the policy to construct another equation. $\underline{z}_{11}$ is the initial income of a marginal buncher at z^*_1 from (D.2). Then the ability of the marginal buncher $\alpha^{m_{11}}$ is:

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

Feeding (D.11) into the marginal buncher equation defined in (3) using the utility function specified in (D.1) results into:

$$(\phi_m - (1-\tau_0))(\underline{z}_{11} - z^*_1) - \frac{1-\tau_0}{1+\frac{1}{e}}\left({z^*_1}^{1+\frac{1}{e}}\underline{z}_{11}^{-\frac{1}{e}} - \underline{z}_{11}\right) + \phi_f = 0 \tag{D.12}$$

Feeding the estimated bunching at z^*_1 after the policy change (B_{11}) into bunching condition defined in (4) results in:

$$\underline{z}_{11} = \underline{z}_{10} + \frac{\delta B_{11}}{h_0(z^*_1)} \tag{D.13}$$

where together (D.12) and (D.13) describe the second equation.

We repeat a similar procedure for the bunching at the new kink at z^*_2. The following equations together describe the third equation:

$$\alpha^{m_2} = \frac{\underline{z}_2}{(1-\tau_0)^e} \tag{D.14}$$

$$(\phi_m + (1-\tau_1))(\underline{z}_2 - z^*_2) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(\underline{z}_2 - \underline{z}_2^{-\frac{1}{e}}{z^*_2}^{1+\frac{1}{e}}\right) + \phi_f = 0 \tag{D.15}$$

$$\underline{z}_2 = \left(\frac{1-\tau_0}{1-\tau_1}\right)^e z^*_2 - \frac{\delta B_2}{h_0(z^*_2)} \tag{D.16}$$

Here, α^{m_2} and $\underline{z}_2$ denote the ability and initial utility-maximizing taxable income of the marginal buncher at z^*_2 kink, and b_2 is the normalized bunching at the kink.

We use the distribution of taxable income from both before (2008-2009) and after the policy change (2009-2010), as plotted 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 bunching at z_2 = AUD 180,000 using the procedure described in Section C. We set the parameters as $\delta = 500$, $D = 6$, $l = u = 6$. 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 $\tau_1 = 0.45$. (D.9) to (D.16) together define a system of equations that we solve numerically to determine e, ϕ_f, and ϕ_m. We use the method explained in Section 4.2.2 to estimate standard errors and make inferences about the estimated parameters. The estimates are presented in Table 3.

We also estimate a model with only fixed costs by setting $\phi_m = 0$. We solve Equations (D.9) to (D.13) to determine e and ϕ_f. The estimates are presented in Table A.2.

D.3 Dynamic model with cost of tax sheltering

The dynamic model explores the evolution of bunching from the former threshold at z_1^* to the new one at z_2^* with marginal tax rates of τ_0 and τ_1 respectively below and above the threshold where $\tau_0 < \tau_1$. We use bunching at z_1^* two years before the policy change and residual bunching at z_1^* and bunching at z_2^* three years after the policy. The time periods below are relative to the policy change.

$\underline{t = -2}$

Bunching at z_1^*

$$(\phi_m + (1-\tau_1))\left(\underline{z}_{10}^{t=-2} - z_1^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(\underline{z}_{10}^{t=-2} - z_1^{*1+\frac{1}{e}}\underline{z}_{10}^{t=-1-\frac{1}{e}}\right) - \phi_m = 0 \qquad \text{(from Equation (D.9))}$$

$$\underline{z}_{10}^{t=-2} = \left(\frac{1-\tau_0{}^{e}}{1-\tau_1}\right) z_1^* - \frac{B_1^{t=-2}}{h_0(z_1^*)^{t=-2}} \qquad \text{(from Equation (D.10))}$$

$\underline{t = -1}$

Bunching at z_1^*

$$(\phi_m + (1-\tau_1))\left(\underline{z}_{10}^{t=-1} - z_1^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(\underline{z}_{10}^{t=-1} - z_1^{*1+\frac{1}{e}}\underline{z}_{10}^{t=-1-\frac{1}{e}}\right) - \phi_f = 0 \qquad \text{(from Equation (D.9))}$$

$$\underline{z}_{10}^{t=-1} = \left(\frac{1-\tau_0{}^{e}}{1-\tau_1}\right) z_1^* - \frac{B_1^{t=-1}}{h_0(z_1^*)^{t=-1}} \qquad \text{(from Equation (D.10))}$$

$$B_1^{t=-1} = \pi_{-1}B_1 + (1-\pi_{-1})B_1^* \qquad \text{(from Equation (8))}$$

$$B_1^* = z_1^*\left(\left(\frac{1-\tau_0}{1-\tau_1}\right)^e - 1\right) h_0(z_1^*)^{t=-2} \qquad \text{(from Equation (D.4))}$$

where B_1 denotes the immediate bunching at z_1^* at $t = -2$ when the kink at z_1^* was introduced.

$\underline{t=0}$

Residual bunching at z_1^*

$$(\phi_m - (1-\tau_0))\left(\underline{z}_{11}{}^{t=0} - z_1^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(z_1^{*1+\frac{1}{e}}\left(\underline{z}_{11}{}^{t=0}\right)^{-\frac{1}{e}} - \underline{z}_{11}{}^{t=0}\right) + \phi_f = 0 \quad \text{(from Equation (D.12))}$$

$$\underline{z}_{11}{}^{t=0} = \underline{z}_{10}{}^{t=-1} + \frac{\delta B_1^{t=0}}{h_0(z_1^*)^{t=0}} \quad \text{(from Equation (D.13))}$$

$$B_1^{t=0} = (1-\pi_{-1})\pi_0\left(B_1^* - B_1\right) + \pi_0\left(\underline{z}_{11}{}^{t=0} - \underline{z}_{10}{}^{t=-1}\right)h_0(z_1^*)^{t=0} \quad \text{(from Equation (8))}$$

Bunching at z_2^*

$$(\phi_m + (1-\tau_1))\left(\underline{z}_2^{t=0} - z_2^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(\underline{z}_2^{t=0} - z_2^{*1+\frac{1}{e}}\underline{z}_2^{t=0-\frac{1}{e}}\right) - \phi_f = 0 \quad \text{(from Equation (D.15))}$$

$$\underline{z}_2^{t=0} = \left(\frac{1-\tau_0}{1-\tau_1}^{e}\right) z_2^* - \frac{B_2^{t=0}}{h_0(z_2^*)^{t=0}} \quad \text{(from Equation (D.10))}$$

$\underline{t=1}$

Residual bunching at z_1^*

$$(\phi_m - (1-\tau_0))\left(\underline{z}_{11}{}^{t=1} - z_1^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(z_1^{*1+\frac{1}{e}}\left(\underline{z}_{11}{}^{t=1}\right)^{-\frac{1}{e}} - \underline{z}_{11}{}^{t=1}\right) + \phi_f = 0 \quad \text{(from Equation (D.12))}$$

$$\underline{z}_{11}{}^{t=1} = \underline{z}_{10}{}^{t=0} + \frac{\delta B_1^{t=1}}{h_0(z_1^*)^{t=0}} \quad \text{(from Equation (D.13))}$$

$$B_1^{t=1} = (1-\pi_{-1})\pi_0\pi_1\left(B_1^* - B_1\right) + \pi_0\pi_1\left(\underline{z}_{11}{}^{t=2} - \underline{z}_{10}{}^{t=-2}\right)h_0(z_1^*)^{t=0} \quad \text{(from Equation (8))}$$

Bunching at z_2^*

$$(\phi_m + (1-\tau_1))\left(\underline{z}_2^{t=1} - z_2^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(\underline{z}_2^{t=1} - z_2^{*1+\frac{1}{e}}\left(\underline{z}_2^{t=1}\right)^{-\frac{1}{e}}\right) - \phi_f = 0 \quad \text{(from Equation (D.15))}$$

$$\underline{z}_2^{t=1} = \left(\frac{1-\tau_0}{1-\tau_1}^{e}\right) z_2^* - \frac{B_2^{t=1}}{h_0(z_2^*)^{t=1}} \quad \text{(from Equation (D.16))}$$

$$B_2^{t=1} = \pi_0\pi_1 B_2 + (1-\pi_0\pi_1)\, B_2^* \quad \text{(from Equation (9))}$$

$$B_2^* = z_2^*\left(\left(\frac{1-\tau_0}{1-\tau_1}\right)^e - 1\right)h_0(z_2^*)^{t=0} \quad \text{(from Equation (D.4))}$$

$\underline{t=2}$

Residual bunching at z_1^*

$$\left(\phi_m - (1-\tau_0)\right)\left({\underline{z}_{11}}^{t=2} - z_1^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left({z_1^*}^{1+\frac{1}{e}}\left({\underline{z}_{11}}^{t=2}\right)^{-\frac{1}{e}} - {\underline{z}_{11}}^{t=2}\right) + \phi_f = 0 \quad \text{(from Equation (D.12))}$$

$${\underline{z}_{11}}^{t=2} = {\underline{z}_{10}}^{t=1} + \frac{\delta B_1^{t=2}}{h_0(z_1^*)^{t=2}} \quad \text{(from Equation (D.13))}$$

$$B_1^{t=2} = (1-\pi_{-1})\pi_0\pi_1\pi_2\left(B_1^* - B_1\right) + \pi_0\pi_1\pi_2\left({\underline{z}_{11}}^{t=0} - {\underline{z}_{10}}^{t=-2}\right) h_0(z_1^*)^{t=0} \quad \text{(from Equation (8))}$$

Bunching at z_2^*

$$\left(\phi_m + (1-\tau_1)\right)\left(\underline{z}_2^{t=2} - z_2^*\right) - \frac{1-\tau_0}{1+\frac{1}{e}}\left(\underline{z}_2^{t=2} - {z_2^*}^{1+\frac{1}{e}}\left(\underline{z}_2^{t=2}\right)^{-\frac{1}{e}}\right) - \phi_f = 0 \quad \text{(from Equation (D.15))}$$

$$\underline{z}_2^{t=2} = \left(\frac{1-\tau_0}{1-\tau_1}^{e}\right) z_2^* - \frac{B_2^{t=2}}{h_0(z_2^*)^{t=2}} \quad \text{(from Equation (D.16))}$$

$$B_2^{t=2} = \pi_0\pi_1 B_2 + (1-\pi_0\pi_1)\, B_2^* \quad \text{(from Equation (9))}$$

$$B_2^* = z_2^*\left(\left(\frac{1-\tau_0}{1-\tau_1}\right)^e - 1\right) h_0(z_2^*)^{t=0} \quad \text{(from Equation (D.4))}$$

We use the data from two years of pre- and three years of post-policy change from 2006-2007 to 2010-2011 for estimating the dynamic model. We use the method described in Appendix 4.2 for estimating bunching at each kink. We numerically solve the equations specified above to estimate e, ϕ_f, ϕ_m, and the cumulative probabilities of drawing positive cost π_{-2}, $\pi_{-2}\pi_{-1}$, π_0, $\pi_0\pi_1$, $\pi_0\pi_1\pi_2$. The estimates are presented in Table 4.