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Elasticity of Reported Donations: Difference-in-Differences Estimates^{*}

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ELASTICITY OF REPORTED DONATIONS DIFFERENCE-IN-DIFFERENCES ESTIMATES FROM NEW ZEALAND

Abstract

This paper reports estimates of the effect of tax credits for charitable donations in New Zealand. I focus on the 2009 tax reform that abolished the fixed threshold for donations eligible for tax credits. I use a difference-in-differences identification approach, comparing the change in donation trend differentials before and after the reform between individuals who experience a decline in the marginal price of giving because of the reform to those who were not directly affected by the reform. Donation trend differentials in the untreated parts of the donation distribution validate the plausibility of the identification assumption that donation trend differentials would have remained constant in the absence of the reform. My research finds an elasticity of reported donations of between -0.3 and -0.4.

1. Introduction

In many countries, tax systems provide individuals with incentives for charitable or other public benefit gifts, in the form of a deduction from taxable income or a tax credit.¹ While governments intend for the policy to reinforce charitable giving, it also comes with a fiscal cost. The N.Z. Government offers a 33.33% tax credit for eligible donations up to a set ceiling. The N.Z. Treasury estimates that the revenue foregone because of the donation tax credit was NZD 315 million in 2021/22 (Treasury, 2023)

To evaluate the welfare implications of the donation tax credit in New Zealand, a key parameter needed by the researcher is the responsiveness of donations to the tax price of giving (the elasticity of donations). If the absolute value of the donation elasticity is greater than one, then the tax credit can be considered ‘Treasury efficient’ since the increase in donations because of the tax credit is more than the revenue foregone by the government.

International studies estimating the tax price elasticity of charitable donations are yet to come to a clear conclusion. Earlier studies using cross-sectional data from the United States found large elasticities often greater than one in absolute terms (see for example Feldstein and Taylor, 1976). Since the United States offers a tax deduction for charitable donations, other studies have suggested that these estimates may have suffered from identification problems, since the marginal price of giving is a function of taxable income (see for example Fack and Landais, 2010). Later studies using panel data and outside of the United States have tended to find lower elasticity estimates typically ranging from around -0.8 to -0.2 (for a U.S. study using a long panel of data see Bakija and Heim, 2011; and for studies outside of the US, refer to Adena, 2021; Fack and Landais, 2010, 2016; and Almunia et al., 2020).

In this study I rely on a difference-in-differences (DiD) approach to identify the effect of an exogenous change in the price of giving on the amount donated. I utilise data on the full population of N.Z. donation tax credit claimants before and after a major 2009 reform that abolished the fixed threshold for donations eligible for tax credits. The reform reduced the marginal price of giving by one-third for taxpayers reporting donations above the fixed threshold and did not directly affect the marginal price of giving for taxpayers reporting donations below the fixed threshold. The empirical approach used in this study mirrors the approach from the elasticity of taxable income (ETI) literature which studies tax reforms that affect only part of the income distribution (see for example Gruber and Saez, 2002 that studies U.S. tax reforms in the 1980s that lowered the marginal tax rate for higher income families; Saez et al., 2012 for a survey of the

¹ See OECD (2020) for a summary of the availability and design of donation tax incentives among Organisation for Economic Cooperation and Development (OECD) countries.

ETI literature; and Jakobsen and Sogaard, 2022 that uses a graphical approach to examine tax reforms implemented in Denmark in 2004 and 2009-10)

The methodology used in this study addresses three main empirical challenges. The first challenge is that the treatment (the marginal price of giving) is determined by the outcome of interest (the donation amount) and is therefore endogenous. A naive regression of the donation amount on the marginal price of giving will therefore yield biased estimates. To overcome the endogeneity problem the study isolates the exogenous variation in the price of giving by using the 2009 reform to assign treatment status based on the pre-reform donation amount.²

The second empirical challenge is that since treatment group allocation is assigned based on previous outcomes (the donation amount in the pre-reform period), if there is serial correlation in outcomes, then the common time trend assumption required to identify the donation elasticity will be violated. This may be the case where taxpayers making larger donation amounts in the pre-reform period would have different trend donations even in the absence of the reform, due to mean reversion or secular donation trends. To account for underlying differences in donation trend differentials across the donation distribution I estimate a DiD during the pre-reform period and subtract this from the reform DiD, making this a triple DiD across groups and over time. This allows for a causal interpretation where trend differentials would have been constant over time in the absence of the reform. The plausibility of this identifying assumption is validated by comparing trend differentials before and after the tax reform for taxpayers who were not affected by reform, mirroring the empirical approach from Jakobsen and Sogaard (2022).

The third empirical challenge is that taxpayers may shift donations over time to optimise donation tax incentives without increasing the amount donated over the medium-term. Taxpayers may for example reduce the amount donated in 2008 in anticipation of the 2009 tax reform and donate a larger amount in 2009 after the fixed ceiling for donations eligible for tax credits is removed. If this is the case, then comparing the change in reported donations between 2008 and 2009 would tend to overstate the permanent response to the 2009 tax reform. I address this issue by comparing the change in donations over a three-year period to capture the medium-term response to the tax reform. As a robustness test, I also compare donation changes beginning from the period prior to taxpayers being aware of the 2009 reform.

The N.Z. donation tax credit scheme presents two important advantages when identifying donations elasticities compared to the schemes previously studied. Firstly, the tax credit is a fixed rate, irrespective of an individual's taxable income. This means that there is less potential to conflate price and income

² The study uses a two-stage least squares (TSLS) approach where in the first stage the predicted change in the marginal price of giving (based on the pre-reform donation amount) is used as an instrumental variable (IV) for the actual change in the marginal price of giving. The details of the identification approach are discussed further in section 5.

elasticities as with schemes offering a tax deduction for charitable giving, as in the United States or Germany where the donation tax deduction is larger, and the price of giving therefore lower, for taxpayers with higher taxable incomes. Secondly, since the 2009 reform only affected the marginal price of giving for taxpayers in part of the donation distribution, the study can evaluate the plausibility of the identifying assumption of common time trends by testing whether donation trend differentials were unchanged following the reform in the untreated part of the donation distribution.

My analysis of the N.Z. donation tax credit scheme yields three main empirical results. Firstly, comparing the pre-reform and reform periods, I find the donation trend differentials remain stable in the untreated part of the donation distribution, and are significantly higher for taxpayers in the treated part of the donation distribution where individuals experience a large decline in the marginal price of giving due to the 2009 tax reform. These results support the assumption that there would have been constant trend differentials in reported donations in the absence of the 2009 reform and provide compelling evidence of a behavioural response to the 2009 tax reform.

Secondly, the behavioural responses translate into an elasticity of reported donations of between -0.3 and -0.4. The elasticities suggest a 1% reduction in the marginal price of giving will result in an increase in the reported donation amount of between 0.3% and 0.4%. Since reporting effects will tend to increase the estimated elasticity, this provides an upper boundary on the elasticity of actual donations. The elasticities that are obtained are less than the threshold for tax credits to be considered ‘Treasury efficient’ and are within the range, but slightly smaller than, estimates obtained by other New Zealand research (see Cruickshank, 2022 which uses a ‘bunching’ method to obtain donation elasticities in the range of -0.4 to -0.7).

Lastly, the study finds the elasticity of reported donations is higher in absolute terms (-0.5) for taxpayers reporting donations close to the threshold for donations eligible for tax credits prior to the 2009 reform. The higher elasticity close to the threshold is consistent with these taxpayers being aware of the policy threshold and either optimising actual donations to benefit from the maximum available tax credit, by for example shifting donations over time, sharing donation receipts with their spouse/partner, or reporting less than the true actual donation amount to the tax authority prior to the 2009 reform.

I structure the paper as follows. Section 2 reviews the relevant literature. Section 3 describes the institutional context and I describe the data used for the study in section 4. Section 5 outlines the study’s identification design. Section 6 reports and discusses the main results. Further results are presented in section 7 examining the heterogeneity of elasticities by gender, age group, and taxable income quartile, and the robustness of the estimates to the empirical specifications. Section 8 concludes.

2. Literature Review

2.1. Donation Elasticity Literature

There is an extensive literature investigating the tax price elasticity of charitable donations that has developed over the past 50 years. Earlier studies estimated the elasticity of donations using cross-sectional data from the United States. In countries such as the United States that offer a tax deduction for charitable donations, eligible donations can be deducted from gross taxable income and therefore reduce the individual's tax liability. Because of the tax deduction, the marginal 'price' of giving is therefore less than the price of consuming other goods and services. An individual with a marginal tax rate of 39% can give 100 dollars to charity by foregoing 61 dollars of personal consumption (100 dollars less the 39 dollar reduction in the tax liability). More generally, for taxpayers with a marginal income tax rate of m , the price of giving is $P = 1 - m$. In countries that offer a tax credit for charitable donations m represents the donation tax credit rate.³ In one of the earliest empirical studies on this topic Feldstein and Taylor (1976) use U.S. tax data from 1962 and 1970 to estimate a log-log demand equation for charitable giving (separately for each year):⁴

$$\log Don_i = \beta_0 + \beta_1 \log Y_i + \beta_2 \log P_i + \beta_3 Mar_i + \beta_4 Age_i + \varepsilon_i \quad (1)$$

Where in (1) i indexes the individual, $\log Don_i$ is the log donation amount, $\log Y_i$ is log after-tax income if zero donations were made, $\log P_i$ is the log marginal price of donations if zero donations were made, Mar_i is an indicator variable if the individual is married, and Age_i is an indicator variable if the taxpayer is over

³ The Feldstein and Taylor (1976) study also discusses how the price of giving can be defined considering the additional tax savings that result from the avoidance of capital gains on certain non-monetary donations. Since in the N.Z. case only monetary donations are eligible for tax credits, this topic is not of direct relevance to this study. A related issue is how value-added tax (called goods and services tax in New Zealand) reduces the price of donating relative to consuming goods and services. Since this study examines the effect of a change in the marginal price of giving on the change in the donation trend differential, and the GST rate is the same over most of the study period (the rate was increased from 12.5% to 15% in the second half of the 2011 tax year), I do not adjust the marginal price of giving for the GST rate. If the GST rate change was accounted for, the marginal price of giving for taxpayers affected by the donation tax credit reform would decline by -0.414 log points between 2008 and 2011 (relative to -0.405 log points in the main case), and the elasticity estimate would be slightly smaller in absolute terms (for example -0.277 compared with -0.283 in the main case).

⁴ Equation (1) is equivalent to equation (1.1) from Feldstein and Taylor (1976).

65 years old.⁵ The log-log functional form means that if the model is correctly specified, then coefficients on the price and income variables can be interpreted as elasticities. The elasticity of donations is the percentage change in donations when the price of giving increases by 1%.

There is an important reason why after-tax income, and the marginal price of giving are proxied by hypothetical figures assuming the taxpayer made zero donations. Larger donation amounts may shift the taxpayer into a lower marginal income tax bracket, and so may be associated with a higher tax price of giving.⁶ The endogenous relationship between the amount donated and the tax price of giving means that ordinary least squares (OLS) estimates of the effect of the price of giving on the donation amount will yield biased estimates. Studies have attempted to address the endogeneity problem by proxying the marginal tax price of giving with the marginal price of donations if the taxpayer made zero donations, since the hypothetical marginal price of giving is unrelated to the amount donated.⁷ The coefficient on the price variable, β_2 is interpreted as the price elasticity of donations.⁸ Feldstein and Taylor (1976) find a relatively large donation elasticity of between -1.0 and -1.5 . The study estimates equation (1) separately for different income groups and generally finds a larger absolute elasticity for taxpayers with higher income. As noted in the literature (see for example Fack and Landais, 2010) a limitation of studies based on cross-sectional data is that the identification of the price elasticities may be hindered by the simultaneous variation of income and the price of giving.

Subsequent studies in the field have utilised panel data. Panel data studies have three main benefits. Firstly, studies span years when legislated tax reforms were implemented, to capture exogenous changes in the tax price of giving that are unrelated to changes in taxable income. Secondly, panel data studies control for various potential sources of omitted variable bias via individual fixed effects (time invariant influences on donations that differ across individuals, such as preferences for altruism or religiosity) and time fixed effects (influences on charity that change in the same way over time for everyone, such as the occurrence of natural disaster events). Lastly, by analysing taxpayer donations behaviour over time, studies are also able to distinguish between long-term changes in donations due to changes in the tax price of giving, from

⁵ The study finds that married taxpayers and taxpayers over 65 years of age give more to charity than other taxpayers with the same income and price of giving, although marital status and age are not the primary variables of interest in the study.

⁶ Similarly, in the case of a tax system that offers a tax credit for charitable donations, a large donation amount may increase the marginal price of giving by pushing the amount donated above the threshold for donations eligible for tax credits.

⁷ Later studies have also used the ‘first dollar’ tax price of giving as an instrument for the marginal price of giving.

⁸ The coefficient on the income variable, β_1 is interpreted as the income elasticity of charitable giving, i.e. the percentage increase in the amount donated due to a 1% increase in after-tax taxable income. Since income after-tax and after donations depends on the amount donated, the authors instrument this with hypothetical after-tax income if the taxpayer had made zero donations.

temporary changes in donations due to taxpayers shifting donations to optimise tax incentives. Taxpayers may shift donations in response to an anticipated tax reform, or their own temporarily higher incomes (without increasing the long-term donation amount). The typical regression specification in panel data studies is of the following form:

$$\log Don_{it} = \alpha_i + \alpha_t + X'_{it}\beta_0 + \beta_1\Delta P_{it-1} + \beta_2\Delta\log P_{it} + \beta_3\log P_{it} + \beta_4\Delta\log P_{it+1} + \beta_5\Delta\log Y_{it-1} + \beta_6\Delta\log Y_{it} + \beta_7\log Y_{it} + \beta_8\Delta\log Y_{it+1} + \varepsilon_{it} \quad (2)$$

Where in (2) i indexes the individual and t indexes the year. $\log Don_{it}$ is the log donation amount (plus a small amount such as one, five or ten dollars to account for taxpayers that report zero donations).⁹ Individual fixed effects (α_i) control for unobserved influences on charity that are different between individuals, and time fixed effects (α_t) control for influences on charity that change over time in the same way for everyone. The primary variables of interest are the log of the marginal price of giving ($\log P_{it}$) and the log of after-tax income ($\log Y_{it}$), and lagged and future changes of those variables. X_{it} is a vector of control variables which include taxpayer age, number of children living at home, and the number of dependents, as well as state-level variables, including sales taxes (since sales taxes affect the relative price of consuming goods and services relative to donating), unemployment rate, and local government spending. The long-run effect of a change in the marginal price of giving on the amount donated is given by β_3 , since the two lagged changes and next year's change in the marginal price of giving are held constant (which happens when the price change is persistent). The effect on giving today of an anticipated tax price change next year is given by β_4 . The effect on giving today of transitory price changes that are expected to disappear next year is given by $(\beta_2 + \beta_3 - \beta_4)$.

Studies have examined specifications that assume 'perfect foresight' where actual realisations of taxpayer after-tax income and the price of giving are included in the specification for $\Delta\log P_{it+1}$ and $\Delta\log Y_{it+1}$, and 'predictable tax changes' where the actual tax schedule in year $t + 1$ is applied to the taxpayer's predicted year $t + 1$ income (predicted in year t). Taxpayers will typically know the tax schedule in the next year, due to lags between the government announcing and enacting tax changes, but not necessarily their income. What should matter for donations decisions is the ex-ante expectation of future changes in the tax price of giving and income, rather than the actual ex-post realisations. However, the researchers only observe the latter in the data. The study predicts taxpayer's year $t + 1$ income using information about the individual,

⁹ Equation (2) is equivalent to equation (1) in Bakija and Heim (2011).

including income and price from the year in question and the year before as covariates. The authors then use predicted income to calculate predicted future after-tax income and the price of giving using the known year $t + 1$ tax schedule (Bakija and Heim, 2011; Adena, 2021).

To estimate price elasticities where identification comes from differences in the time path of giving across states, studies split price and income variables into separate federal and state components. Researchers calculate the log federal price of giving assuming there are no state or local income taxes, and so deductions for state and local income taxes are set to zero in federal income tax calculations. They then calculate the log state price as the difference between the log price of giving (considering federal, state, and local taxes) and the log federal price of giving.

In certain countries, such as the United States, taxpayers can choose to either ‘itemise’ deductions like donations, or mortgage interest payments to reduce their taxable income, or to take the standard lump sum deduction that reduces taxable income by a fixed amount. If the itemised deduction is larger than the standard deduction, then taxpayers have a financial incentive to itemise. By excluding non-itemisers from elasticity estimates, elasticity estimates may be subject to selection bias. Earlier studies focused on taxpayers that itemised deductions (such as Feldstein and Taylor, 1976). To avoid endogenous sample selection (sample selection related to the amount donated) later studies only include in the sample taxpayers who would have the financial incentive to itemise, even with donations set to zero (see for example Bakija and Heim, 2011; Adena, 2021).

Studies estimate regression (2) using two-stage least squares (TSLS) where the first-dollar versions of variables are used as instruments. The identifying assumption of this approach is that the instruments are correlated to the relevant regressors but have no independent effect on donations except through the regressor. Since many taxpayers do not report donations to the tax authority, studies have also used empirical techniques that address problems that can arise from reported donation amounts being truncated at zero, such as a Tobit regression.

Bakija and Heim (2011) utilise a long panel of tax returns from 1979 to 2006 and find donation elasticity estimates greater than 1 in absolute value in most specifications. Taxpayers are found to adjust donations in advance of large and/or obvious tax reforms and to gradually adjust donations after tax reforms are implemented. Adena (2021) uses a German taxpayer panel 2001-2006 to estimate the elasticity of donations.¹⁰ Germany offers a tax deduction for charitable donations. The study finds a permanent tax price

¹⁰ The study estimates a similar specification to equation (2) except that it includes one lag and one lead of the marginal price of giving and taxable income, because the study is based on a shorter panel of data. The study also estimates a specification where price and income variables are interacted with indicator variables for the four income groups to understand the heterogeneity of elasticities by income. See equations (3) and (4) in Adena (2021).

elasticity of between -0.57 and -0.82, and a higher elasticity of between -1.0 and -1.35 for higher income individuals and households. Taxpayers adjust donations gradually and respond strongly to the tax price in the prior period. Results are not appreciably impacted by using a Tobit estimation approach.

Almunia et al. (2020) estimate separately the intensive margin and extensive margin donation responses using data from the United Kingdom. The United Kingdom has a gift aid program for charitable donations, where the charity can claim a 'match' from the tax authority at a basic rate of tax (20%) for the donation amount received and the taxpayer can claim the difference between their marginal income tax rate and the basic tax rate from the tax authority. The gift aid design is economically equivalent to a tax deduction. The study examines the response of donations to the change in the marginal price of giving separately at the intensive margin (the amount donated by donors) and the extensive margin (the decision to donate/claim the donation tax deduction). The authors estimate the intensive margin response using a regression of the form described in equation (2) for taxpayers with strictly positive donation amounts (without the leads and lags of the price and income variables). The study estimates the extensive margin response by defining the dependent variable as a binary variable equal to one if the taxpayer reports positive donations, and equal to zero if the taxpayer reports no donations. The study spans the 2010 tax reform that increased effective marginal income tax rates, especially for higher income individuals earning more than GBP 150,000. The study therefore essentially relies on a difference-in-differences identification strategy where the 2010 reform affected only taxpayers with higher taxable incomes.

The authors of the study are concerned that the standard IV approach may produce biased estimates, because the 2010 tax reform could affect donations via a negative wealth effect and income response, as well as a price effect. The study attempts to isolate the price effect by estimating a differenced version of equation (2) where the authors use the change in the first-pound price that the individual would have faced if they had declared their prior year $t - k$ income as an instrument for the first-pound price of giving. This approach is adapted from the ETI literature that uses the change in the marginal income tax rate calculated using the tax regime in period t and taxable income in period $t - k$ as an instrument for the change in the marginal income tax rate (see for example Gruber and Saez, 2002). The study estimates short-term and medium-term responses to the reform (up to $k = 3$ years) to avoid capturing tax shifting effects. Using the standard IV specification, the study estimates an intensive margin response of around -0.2 and an extensive margin response of around -0.1, yielding a total elasticity of around -0.3. Using the differenced specification, intensive margin price elasticities are similar, but somewhat larger in absolute terms than with the standard specification (around -0.2 to -0.3).

Another study that utilised a difference-in-differences approach to estimate the donation elasticity is Fack and Landais (2010). Their study compares a treatment group of French households that experienced a

decrease in the tax price of giving due to legislated increases in the donation tax credit rate in 2003 and 2005, to a comparison group of households whose tax price of giving was unchanged due to the reform (price of giving equal to 1 since the household is assessed as having no taxable income due to family size). The two groups of households have similar income but different tax status due to family size. The study obtains elasticity estimates of between -0.2 and -0.6. The authors discuss the potential concern about the accuracy of reported donations of households with no taxable income as these households have no financial incentive to report their donations to the tax authority. The research finds a substantial number of non-taxable households still report donations (12% of non-taxable households compared to 20% of taxable households). The authors note that the identification strategy does not require that all donations are reported to the tax authority, merely that the same fraction of donations is reported over time.

Fack and Landais (2016) is one of the few studies to use a ‘bunching’ approach to estimate the elasticity of donations.¹¹ Their study examines the 1975 to 1988 period in France when donations eligible for tax deduction were capped at 1% of taxable income.¹² The eligibility threshold created a kink in the budget set due to the marginal price of donations jumping from $1 - t$ to 1 for donations above 1% of taxable income (where t is the marginal tax rate faced by the taxpayer). The study is primarily concerned with examining how the level of tax enforcement affects donation elasticities. The study compares the period 1975 to 1979 when the tax authority required taxpayers to hold onto donation receipts for audit purposes, to the period 1984 to 1988 when the tax authority required taxpayers to submit donation receipts to claim the donation tax deduction. The study finds that the requirement to submit donation receipts resulted in a substantial drop in the amount of donations reported to the tax authority. Prior to the reform there were 2.5 more taxpayers reporting donations around the kink point than in the estimated counterfactual distribution, translating into an elasticity of reported donations of -0.28. After the reform there are fewer taxpayers reporting donations around the kink point relative to the counterfactual distribution, translating into an elasticity of reported donations of -0.04.¹³ The study argues that it is more likely that donations were over-reported to the tax authority prior to the reform than that they were under-reported after the reform (due to additional reporting costs), since the fraction of taxpayers who reported small donations increased after the reform and the fraction who reported large donations declined, whereas reporting costs would be expected to stymie the reporting of small donations more-so than large donations.

¹¹ The ‘bunching’ approach was originally developed to estimate the elasticity of taxable income (ETI) and involved examining excess density in the distribution of taxable income around thresholds where the marginal income tax rate increases to estimate how responsive taxpayers are to the change in the marginal price of giving at the threshold (see for example Saez, 2010; Chetty et al., 2011).

¹² The French Government transformed the deduction from taxable income into a donation tax credit in 1989.

¹³ The authors estimate the counterfactual distribution if there was no 1% taxable income threshold for donations eligible for a tax deduction by fitting a curve (polynomial of order 5) to the donation distribution excluding taxpayers reporting donations around the kink point (in the window of 0.9% to 1.1% of taxable income donated).

2.2. Elasticity of Taxable Income Literature

A different, but related, literature to the donation elasticity literature estimates the elasticity of taxable income (ETI) with respect to marginal net-of-tax rate (one minus the marginal tax rate) using tax return data. The ETI literature is of interest for this study since it is the approach that is adopted to estimate the elasticity of donations in New Zealand (the identification design used in this study is described in section 5). The standard empirical approach in the donation literature to address the potential endogeneity of the marginal price of giving with respect to the amount donated is not feasible in the New Zealand context.¹⁴

This is because the donation elasticity studies instrument the marginal price of giving with the price of giving for the first dollar donated, which is not influenced by the amount donated. However, in the New Zealand context the ‘first dollar’ price of giving is not a relevant instrument for the marginal price of giving since it is the same for all taxpayers with positive taxable income (equal to one minus the donation tax credit rate).

Recent ETI studies have used a difference-in-differences approach to estimate the elasticity of taxable income by comparing the change in taxable income of a treatment group experiencing a tax change to an untreated group that does not experience the same or any tax change. The typical empirical specification in panel data studies is as follows:

$$\Delta \log z_{it} = e \cdot \Delta \log \tau_{it} + f(z_{it-1}) + \alpha_t + \varepsilon_{it} \quad (3)$$

Where in (3) the change in log taxable income ($\Delta \log z_{it}$) is regressed on the change in the log marginal net-of-tax rate ($\Delta \log \tau_{it}$), and controls for base year income (z_{it-1}) and time fixed effects (α_t). Since the change in the marginal income tax rate depends on the change in taxable income, studies instrument the change in the marginal net of tax rate, using either an interaction term for being in the treatment group in the reform year (since marginal tax rate changes are concentrated among the treatment group), or the predicted change in the log marginal net of tax rate assuming pre-reform income is the same as in the base year, and allowing the tax schedule to change. The coefficient on the marginal net-of-tax rate variable (e) is interpreted as the ETI. The main assumption needed to identify the ETI is that year-to-year changes in taxable income due to

¹⁴ In the case of tax systems that offer a tax deduction for charitable donations, larger donation amounts potentially increase the marginal price of giving by pushing the taxpayer into a lower marginal income tax bracket and thus result in an endogenous relationship between the amount donated and the marginal price of giving. The N.Z. tax system offers a tax credit for charitable donations, and so I also expect the marginal price of giving to also be endogenous, since larger donation amounts can push taxpayers above the ceiling for donations eligible for tax credits.

mean reversion or secular income trends are stable over the study period. The ETI literature has found a long-run elasticity of taxable income in the range of 0.12 to 0.40. The elasticity could reflect different behavioural responses to the marginal income tax rate, including a labour supply response or tax avoidance or evasion behaviour (see Gruber and Saez, 2002; Saez et al., 2012 for a survey of the ETI literature).

A recent study by Jakobsen and Sogaard (2022) suggests a graphical approach to represent behavioural responses to tax reforms and validate the identifying assumption that income trends would have been unchanged in the absence of the reform. The study examines graphically the change in income trends between the pre-reform and reform periods for taxpayers in the untreated part of the income distribution who experience no or little change in the marginal tax rate, and those in the identification region who experience a change in the marginal tax rate due to a reform. The study examines two tax reforms in Denmark, the first in 2004 that primarily reduced marginal income tax rates in the middle of the income distribution, and the second reform in 2009-10 that primarily reduced marginal income tax rates at the top of the distribution, with minor changes at the bottom of the income distribution. The study estimates an elasticity of taxable income of around 0.2, ranging from 0.1 in the middle of the income distribution to 0.5 at the top. The study concludes that only results from the 2009-10 tax reform are likely to have a causal interpretation, since income trend differentials remained stable in the untreated part of the income distribution between the pre-reform and reform periods, consistent with the identifying assumption, whereas there was significantly higher income growth in the treated part of the income distribution. The 2004 reform finds results are driven by income changes within the untreated part of the income distribution that are likely to be unrelated to the tax reform.

In a N.Z. study, Claus et al. (2012) estimates the ETI for N.Z. taxpayers by examining two tax changes: the 2001 reform that introduced a top 39% income tax rate for taxpayers who had previously paid a 33% rate, and the change in marginal income tax rates due to fiscal drag over the 2001-08 period when marginal income tax rates and thresholds were stable (nominal income growth causing taxpayers to move into a higher tax bracket, since tax brackets were not inflation-adjusted). In the first case, the study uses share analysis to calculate the ETI as the change in the log share of taxable income accruing to taxpayers in the top income percentile or decile before and after the 2001 reform, divided by the change in the log average marginal net-of-tax-rate of these groups before and after the reform. This identifies the elasticity where the income share would have remained unchanged in the absence of the reform.¹⁵ The study uses the 1999 year as the initial period since taxpayers likely shifted income into the 2000 year in response to the pending

¹⁵ Section 3.3 of Saez et al. (2012) provides an overview share analysis to estimate the ETI and presents estimates using U.S. tax data. This approach is conceptually like DiD since it compares the evolution of taxable income of the top decile or percentile relative to the full population.

reform.¹⁶ In the second case the study uses a DiD approach and calculates the ETI as the difference in log average taxable income before and after the reform divided by the difference in the log average net-of-tax rate, for taxpayers in the same initial tax bracket who moved into the highest or second-highest marginal income tax bracket, and those who did not.¹⁷ The assumption to identify the ETI in this case is that absent fiscal drag, the incomes of the two groups would have grown at the same rate. The study obtains elasticity estimates ranging from 0.6 to 1.0 utilising the first approach, and a wide range of estimates utilising the second approach (ranging from 0.0 to 1.7) finding larger elasticity estimates for taxpayers moving into the highest tax bracket relative to the second highest tax bracket.

Subsection 2.1 summarised the main empirical approaches that have been utilised to estimate the elasticity of donations. The literature is yet to come to a clear view about the magnitude of the elasticity of donations, but it does appear to be lower in absolute terms than initial estimates using cross-sectional data suggested, and perhaps lower for countries outside of the United States. Subsection 2.2 reviewed the related literature that estimates the elasticity of taxable income, since my research applies empirical approaches from the ETI literature to estimate the elasticity of donations in New Zealand.

3. Institutional Setting

In this section I describe the tax incentives for charitable giving in New Zealand. Note that income is taxed at the individual level in New Zealand, and the tax year starts on April 1st and ends on March 31st of the following year. For simplicity, I refer to the tax year 1999/2000 as 2000, and similarly for the other years.

The N.Z. donation tax credit scheme provides individual taxpayers with a tax credit of 33.33 cents for every NZD 1 of eligible cash donations made from their after-tax income. To be eligible for tax credits, donations must be of NZD 5 or more and less than a set ceiling. The ceiling is the lower of the individual's annual taxable income, or a specified fixed ceiling.

The government increased the fixed ceiling for donations eligible for tax credits to NZD 1,890 from NZD 1,500 in the 2003 tax year (in nominal NZD). The government abolished the fixed ceiling for donations eligible for tax credits in 2009. From 2009 onwards, donations up to an individual's annual taxable income were eligible for tax credits. Except for a small fraction of taxpayers wanting to donate more than their

¹⁶ The study notes that companies paid out large profits in 2000 before the new top tax rate came into effect, and so there was an increase in dividend income observed in that year.

¹⁷ Given the significant variation in income movements, the study compares the income change of taxpayers between periods $t + 1$ and $t + 2$, where the taxpayers were in the same income tax bracket in period t , and some taxpayers moved into a higher income tax bracket in period $t + 1$.

annual taxable income, the 2009 reform had the effect of removing the ceiling for donations eligible for tax credits. Table 1 summarises the donation tax credit structures in place over the study period.

Table 1: Donation Tax Credit Rates

2003-2008 structure		2009-present structure	
Donation range (NZD)	Rate (%)	Donation range (NZD)	Rate (%)
5-1,890	33.33	more than 5	33.33
more than 1,890	0		

Source: Inland Revenue Department.

Note: Donation ranges are in nominal NZD; rates are for eligible donations less than an individual taxpayer's total taxable income.

The process for individuals to claim donation tax credits was largely unchanged over the study period. Individual taxpayers apply for tax credits by submitting a tax credit claim form to the tax authority, and reporting 'the total amount paid in donations to approved charities' during the tax year. The tax authority requires that claimants provide the original donation receipt(s) either in their own name, or the name of their spouse/partner. Receipts must be issued by an eligible organisation. Most eligible organisations are registered charities, but other organisations also qualify, such as most schools. Taxpayers have up to four years to claim donation tax credits.¹⁸ The tax authority assesses donation tax credit claims at the end of the tax year once the individual's annual taxable income is known, and then pays the donation tax credit into the individual's nominated bank account. From January 2010, the government introduced another way for individuals to claim donation tax credits, by allowing individuals to make donations through workplace payroll giving schemes and have their 'pay as you earn' tax obligation immediately reduced by the tax credit amount.¹⁹ Payroll giving represents around 2% of donation tax credit claims and less than 1% of

¹⁸ Where a tax agent or representative claims donation tax credits on behalf of the donor, the law requires that the tax agent sights the receipts and that the taxpayer retains the receipts, but it does not require either party to submit the receipts to the tax authority (under section LD 1 of the *Income Tax Act 2007*). The tax authority assesses donation tax credit claims against an individual's taxable income in the tax year during which the taxpayer made the donation(s).

¹⁹ PAYE (pay as you earn) withholding tax scheme makes regular income tax deductions from an individual's paycheck before the individual receives it. Payroll giving reduces the PAYE tax obligation by the donation tax credit amount.

reported donations.²⁰ The total reported donation amount considered in this study includes both the reported donation amount on the donation tax credit claim form, as well as any amount donated through payroll giving.

4. Data and Summary Statistics

I use administrative data for the full population of N.Z. donation tax credit claimants before and after the major reform of donation tax credits in 2009. The data set includes a cross-sectional identifier for each taxpayer, the donation amount reported by the taxpayer to the tax authority (via the tax credit claim form and payroll giving), as well as their taxable income and demographic characteristics (age, gender). The donation tax credit rate is not observed in the data, and so I infer the rate based on a straightforward comparison of the taxpayer's reported donation amount and the ceiling for donations eligible for tax credits.

I construct a pre-reform period leading up to the 2009 reform, and a reform period spanning the reform. The baseline specification considers three-year changes from 2005 to 2008 in the pre-reform period and from 2008 to 2011 spanning the reform period. I consider changes over a three-year period to allow for potentially gradual responses to the reform, and to avoid short-term donation shifting affecting the estimates. Later in subsection 7.2 I examine changes over different time periods (ranging between one and four years), and also use a lagged initial donation amount to assign treatment status prior to any possible taxpayer responses in anticipation of the 2009 reform.

For each period I select individuals that are present in the tax data with a positive reported donation amount over the period considered and with an initial reported donation amount within a range around the donation tax credit threshold. I select individuals with a real reported donation amount of NZD 1,250 to NZD 3,750 in the initial period (the threshold for donations eligible for tax credits was NZD 1,890 in nominal NZ dollars and around NZD 2,250 in real 2017 NZ dollars in the 2008 year). In the pre-reform period, for me to include the taxpayer in the sample, the taxpayer must report a positive donation amount in 2005 and 2008 and report an initial donation amount (in 2005) between NZD 1,250 to NZD 3,750. In the period spanning the 2009 reform, for me to include the taxpayer in the sample, the taxpayer must report a positive donation amount in 2008 and 2011 and report an initial donation amount (in 2008) between NZD 1,250 to NZD 3,750. The approach follows Jakobsen and Sogaard (2022) and include taxpayers in the sample irrespective of whether they report donations in both the pre-reform and reform periods. Further results in subsection

²⁰ From 1 April 2019 individuals can apply for donation tax credits by submitting receipts to the tax authority online. The taxpayer can submit receipts during the year. The tax authority pays tax credits after the end of the tax year once an individual's annual taxable income for the year is known.

7.2 show the results are not different when I use a balanced sample of taxpayers who claim donation tax credits in both periods.

The sample restrictions leave the study with around 90,000 individual taxpayers per period which is around one quarter of the taxpayers who report donations to the tax authority.²¹ Table 2 shows descriptive statistics for donation tax credit claimants in the pre-reform and reform periods. The descriptive statistics measure observations in the initial year of the period. Taxable income and age increase and the share of female claimants remains around the same between the pre-reform initial year (2005) and the initial year for the period spanning the 2009 tax reform (2008).

Table 2: Sample and Initial Descriptive Statistics

	Pre-Reform				Reform			
	P25	P50	Mean	P75	P25	P50	Mean	P75
A. Full sample								
Donation amount (NZD '000)	1.7	2.3	2.2	2.5	1.7	2.2	2.2	2.5
Taxable income (NZD '000)	20.2	39.2	56.0	65.8	21.7	42.4	60.3	69.3
Female (%)	-	-	53%	-	-	-	53%	-
Age (years)	41	51	53	64	42	53	54	66
B. Validation region								
Donation amount (NZD '000)	1.4	1.7	1.7	1.9	1.5	1.7	1.7	1.9
Taxable income (NZD '000)	18.9	36.4	55.7	65.4	20.9	40.7	60.6	70.0
Female (%)	-	-	53%	-	-	-	54%	-
Age (years)	43	54	54	67	44	55	56	69
C. Identification region								
Donation amount (NZD '000)	2.5	2.6	2.8	3.0	2.7	2.9	3.0	3.3
Taxable income (NZD '000)	21.2	41.8	56.3	65.8	25.1	45.1	63.1	71.1
Female (%)	-	-	51%	-	-	-	52%	-
Age (years)	39	49	50	61	41	51	52	63
Number of observations	93,302				87,511			

Notes: Monetary values are deflated to 2017 levels using the Consumer Price Index (CPI) from the national statistical authority. I measure values for the pre-reform period (2005-08) in 2005 and values for the period spanning the reform (2008-11) in 2008. Taxpayers in the identification region report donations of between NZD 2,450 and NZD 3,750 and taxpayers in the validation region report donations of between NZD 1,250 and NZD 2,250. NZD 1 $\approx$ USD 0.71 over the study period.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

²¹ Around 3% of total taxpayers since around 12% of taxpayers claim donation tax credits.

5. Identification Design

This section outlines the empirical approach utilised in this study to examine the behavioural response to donation tax credits in New Zealand. The study's objective is to estimate the causal effect of a change in the marginal price of giving on reported donations. The 2009 donation tax credit reform changed the marginal price of giving in a way that was correlated with the amount donated, since it was taxpayers reporting higher donation amounts who benefited from a decline in the marginal price of giving. This situation has parallels with the elasticity of taxable income (ETI) literature where tax reforms are studied that change marginal income tax rates in a way that is correlated with income, for example, tax reforms that change marginal income tax rates at the top of the income distribution more than at the bottom (see for example, Gruber and Saez, 2002; Saez et al., 2012). This study therefore adapts the empirical approach from the ETI literature to estimate the elasticity of reported donations in New Zealand. I first outline the three main empirical challenges to obtaining causal elasticity estimates and how the study addresses these. I then outline in more detail the three-step approach that I use to graphically represent and validate behavioural responses to the 2009 reform of donation tax credits in New Zealand and to obtain the implied elasticity of reported donations, following the empirical approach developed by Jakobsen and Sogaard (2022). Lastly, I describe the three key features of the donation elasticities estimated by this study.

There are three main empirical challenges that I address in this research. The first challenge is that the treatment (the marginal price of giving) is determined by the outcome of interest (the amount donated) and is therefore endogenous. As noted earlier, a naive regression of the change in the marginal price of giving on the change in the reported donation amount will not yield causal estimates since the marginal price of giving is determined by the amount donated (whether the amount donated is above or below the threshold for donations eligible for tax credits). To overcome this problem, the study isolates exogenous variation in the treatment by using the 2009 tax reform to assign treatment status based on pre-reform information (the pre-reform donation amount). More specifically, the study emulates the approach used in the ETI literature and uses a simulated instrumental variable (IV) strategy, utilising the predicted change in the marginal price of giving, driven only by the 2009 tax reform, as an instrument for the change in the marginal price of giving. To yield causal estimates there needs to be a significant first stage relationship between the predicted and actual changes in the marginal price of giving (I expect this to be the case, since the instrument is highly correlated with the actual change in the tax price of giving), and the tax reform should only affect the reported donation amount through the change in the marginal price of giving (the exclusion restriction).²²

²² The donation elasticity literature typically uses the 'first-dollar' price of giving as an instrument for the marginal price of giving, since the amount donated does not affect the first dollar price. This instrument is not relevant in the

The second challenge I address is that since the study assigns treatment group allocation based on previous outcomes (the donation amount in the pre-reform period), if outcomes are serially correlated then the difference-in-differences identifying assumption of common time trends would be violated. For example, if the study classifies taxpayers as part of the treatment group due to transitory increases in the amount donated, then the change in reported donations of the treatment group, over-and-above the untreated group, will be downwardly biased due to mean reversion. Also, if there are secular trends in the amount donated (for example, due to increasing income inequality, taxpayers making larger donation amounts have higher donation growth than taxpayers making smaller donation amounts) then the study would incorrectly attribute excess donations growth of the treatment group to the tax reform. To correct for underlying differences in donation trend differentials across the donation distribution I estimate a DiD during a pre-reform period and subtract this from the reform DiD, making this a triple DiD across groups and over time. This allows a causal interpretation where trend differentials are constant over time. I gauge the plausibility of the identifying assumption by comparing trend differentials before and after the reform for taxpayers who were not directly affected by the reform. If I do not observe any change in donation trend differentials in the untreated part of the donation distribution, then this adds to the plausibility of the common trend differentials identifying assumption.

The last main empirical challenge that the research addresses is that taxpayers may shift donations over time to optimise donation tax incentives without increasing the amount donated over the medium-term. Taxpayers may for example reduce the amount donated in 2008 in anticipation of the 2009 tax reform and donate a larger amount in 2009 after the government abolished the fixed ceiling for donations eligible for tax credits. If this is the case, then comparing the change in reported donations between 2008 and 2009 would tend to overstate the medium-run response to the 2009 tax reform. My research addresses this issue in two ways. Firstly, by comparing the change in donations over a three-year period to capture the medium-term response to the tax reform, and secondly by using lagged values of the initial reported donation amount to assign treatment status prior to taxpayers being aware of the 2009 reform.²³

I now describe in more detail the specific empirical approach that I employ in my research. The research utilises variation in the marginal price of giving created by the 2009 reform of donation tax credits that changed the marginal donation tax credit rate differently for different donation groups. This study employs the three-step estimation procedure from Jakobsen and Sogaard (2022). What the Jakobsen and Sogaard

New Zealand context since the first dollar price of giving is the same for all taxpayers with positive taxable income (i.e. equal to one minus the donation tax credit rate).

²³ The ETI literature typically examines tax reforms over a three- to four-year period to allow for gradual behavioural responses to occur, and to avoid short-term income shifting having an effect on estimates (see for example Gruber and Saez, 2002).

(2022) approach adds over the standard empirical approach in the ETI literature is that it graphically represents the behavioural response to tax reforms.

Step 1 compares predicted changes in the marginal price of giving in the pre-reform and reform periods. This indicates the initial reported donation amounts where the marginal price of giving is stable in both periods (the ‘validation region’), and the initial reported donation amounts where the marginal price of giving changes significantly in the reform period only (the ‘identification region’). In the Jakobsen and Sogaard (2022) study, the Danish Government indexes marginal income tax thresholds to inflation annually, and so the thresholds do not change in real terms because of inflation.

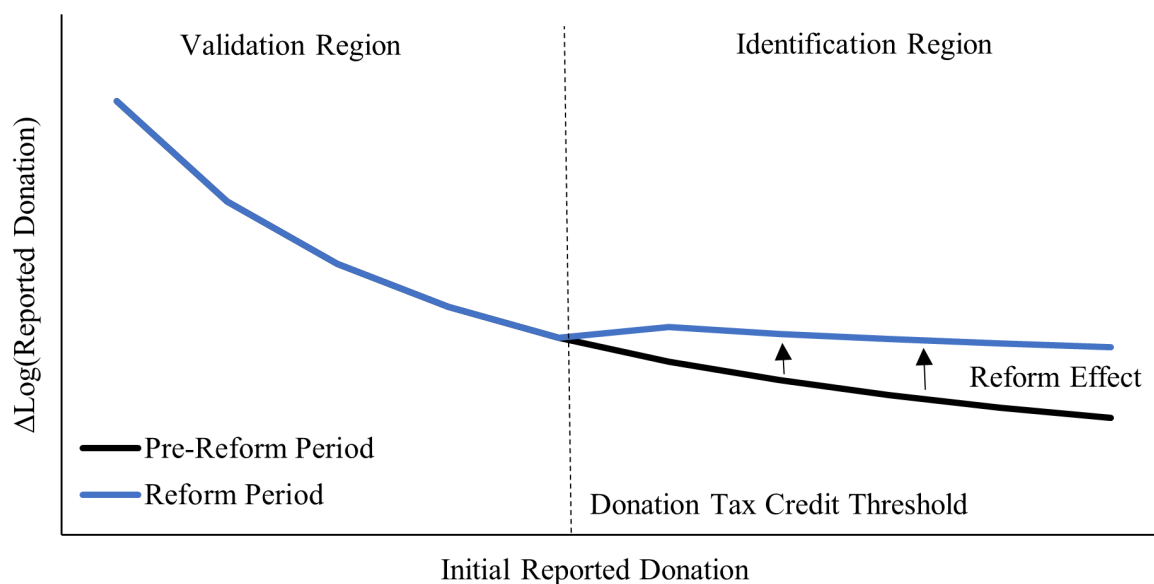
An additional quirk in the N.Z. case is that since the government does not inflation-adjust the ceiling for donations eligible for tax credits on a regular basis fiscal drag causes a decline in the real value of the fixed dollar threshold for donations eligible for tax credits in the pre-reform period. This causes the marginal price of giving to increase in the pre-reform period for taxpayers reporting donations close to the ceiling for donations eligible for tax credits (the ‘fiscal drag’ region).

Step 2 compares donation trend differentials across the distribution of reported donations in the pre-reform and reform periods to see if the assumption of constant trend differentials in the pre-reform and reform periods holds in the validation region. This is done graphically and econometrically to test for significant changes in trend differentials in the validation region. As illustrated in figure 1, I would expect donation trend differentials to be unchanged between the pre-reform and reform period for taxpayers in the validation region (reporting donations less than the fixed threshold for donations eligible for tax credits in the initial period) and to increase for taxpayers in the identification region (affected by the reform, since they report donations of more than the fixed ceiling). Under the identifying assumption that the pattern would have remained unchanged in the absence of the reform, the study can identify the reform effect from the differences between the reform and pre-reform periods for individuals affected by the tax reform (the identification region). The observation of no differences in the part of the donation distribution unaffected by the reform (the validation region) is a test of the plausibility of the identifying assumption of common trend differentials. The downward-sloping relationship between the change in log reported donations and the initial reported donation amount is consistent with mean reversion. That is, taxpayers reporting higher initial donation amounts experience lower subsequent growth in reported donations due to transitory increases in reported donations.

Step 3 is to obtain estimates of the elasticity of reported donations by estimating a two-stage least squares (TSLS) regression where in the second stage the log change in the reported donation amount is regressed on the initial reported donation amount, an indicator variable for the reform period, and the change in the marginal price of giving. The study instruments the marginal price of giving with the predicted change in

the marginal price of giving, as described earlier. The elasticity is either estimated on the full sample (except for the fiscal drag region, to which I assign a weight of zero, since the marginal price of giving is not stable in the pre-reform period) or using parts of the identification region to investigate heterogeneity in the elasticity for different initial reported donation amounts. Responses to changes in the marginal price of giving may be higher close to the ceiling for donations eligible for tax credits due to taxpayers adjusting their actual and/or reported donation amount in response to the ceiling, or for taxpayers reporting higher donation amounts, since some studies have found that taxpayers making larger donations are more responsive to the tax price of giving (for example Adena, 2021; Fack and Landais, 2010).

Figure 1: Illustration of Validation and Identification Regions



Notes: Figure shows the change in the log of reported donations in the pre-reform period and the reform period, where the tax system is stable in the pre-reform period, and in the reform period the fixed threshold for donations eligible for tax credits is abolished. The downward sloping relationship between the change in log reported donations and the initial reported donation amount is consistent with mean reversion. Under the identifying assumption that the pattern would have remained unchanged in the absence of the reform, the reform effect can be identified by the differences between the reform and pre-reform periods for individuals affected by the tax reform (the identification region). The observation of no differences in the part of the donation distribution unaffected by the reform (the validation region) is a test of the plausibility of the identifying assumption.

Sources: Author's illustration, adapted from Jakobsen and Sogaard (2022).

Next, I describe the three key features of the donation elasticities estimated by this study. The first is that this study estimates the intensive margin response to the 2009 tax reform – the effect of the tax reform on the reported donation amount of tax credit claimants. This contrasts with the extensive margin response –

which is the effect of the reform on a taxpayer's decisions to claim tax credits. Since the 2009 reform reduced the marginal price of giving for taxpayers making larger reported donation amounts, it is likely that the 2009 reform had more impact on the intensive margin than the extensive margin. The share of new donation tax credit claimants in 2009, was similar to previous years. In 2009 22.0% of claimants had not claimed donation tax credits in the prior year, and in 2010 the share was 21.7% of claimants. This is similar to the historical average of 21.8% over the period 2001-2008.

Secondly, the study estimates a price elasticity *centred on different points* in the identification region to investigate the heterogeneity of responses. In practice, there may be reasons why reported donation elasticities differ across the population of donation tax credit claimants. Previous studies have tended to find taxpayers who make larger donation amounts react more to tax incentives than smaller donors (see for example Fack and Landaï, 2010). An additional consideration in our case is that taxpayers reporting donations close to the fixed threshold for donations eligible for tax credits may respond more to the 2009 reform if they were aware of the policy threshold and either optimising actual donations to benefit from the maximum available tax credit (for example, by shifting donations over time, or sharing donation receipts with a spouse/partner), or reporting less than the true actual donation amount to the tax authority prior to the 2009 reform.

Thirdly, previous studies have found that donation elasticities are sensitive to aspects of donation tax incentive design, other than the donation tax credit or deduction rate. Fack and Landaï (2016) for example find that donation elasticities are sensitive to the level of enforcement, and more specifically, elasticities were found to be smaller when the tax authority introduced the requirement for donors to submit receipts to claim a donation tax deduction in France relative to the prior regime where receipts only needed to be retained by the taxpayer. The ETI literature similarly finds that the design of the tax system can affect the estimated elasticity of taxable income. In particular, the more deductions that the tax system allows, the more 'loopholes' in the system and the higher the taxable income elasticity (Saez et al., 2012).

The elasticity estimated by this study therefore reflects the response of taxpayers to the change in the marginal price of giving, given the institutional design of the N.Z. donation tax credit scheme. Changes in the design of the scheme may alter the elasticity of reported donations. To date, many of the key aspects of the donation tax credit scheme have been unchanged since 2009, including the requirement to submit a separate claim to the tax authority, and provide donation receipts. Payroll donating was introduced in 2010, but it remains a very small share of overall donation tax credit claims and tax credits. Since 2019 taxpayers have been able to submit donation tax credit claims online (previously it was a paper-based system), but taxpayers still need to submit receipts and wait until after the end of the tax year to receive donation tax

credits. Given the remarkable stability of the donation tax credit regime in New Zealand, there is little reason to believe that donation elasticities would have changed because of institutional design changes.

6. Main Results

In this section I present my main empirical results. I step through the empirical specifications used, following the three-step approach outlined in the identification design. I use the notation from the ETI literature, adapted to this research context. First, I present the predicted changes in the marginal price of giving across the donation distribution for the pre-reform and reform periods. The marginal price of giving is defined as one minus the donation tax credit rate. I construct the predicted change in the marginal donation tax credit rate by comparing the individual marginal donation tax credit rate in period t and $t - 1$ given the in-period tax credit schedule, but holding fixed the real reported donation amount at the $t - 1$ level (plus NZD 10). That way the predicted change in the marginal price of giving is due only to the change in the ceiling for donations eligible for tax credits, and not to the change in the amount donated.²⁴

In the pre-reform period, the donation tax credit schedule was stable in nominal terms, and so the real value of the threshold declined from NZD 2,450 in 2005 to NZD 2,250 in 2008. The tax regime is stable in the pre-reform period for taxpayers donating less than NZD 2,250 or more than NZD 2,450, and for those taxpayers, within a given reported donation level (as illustrated by the P10-P90 range). Taxpayers affected by fiscal drag (the decline in the real value of the ceiling for donations eligible for tax credits due to price inflation) experience an increase in the predicted marginal price of giving in the pre-reform period.

In the reform period, the abolition of the fixed threshold for donations eligible for tax credits reduced the marginal price of giving by approximately 40 log points for taxpayers making larger reported donation amounts (more than NZD 2,250), while the average change for taxpayers with lower amounts of reported donations is close to zero (0.2 log point reduction).²⁵

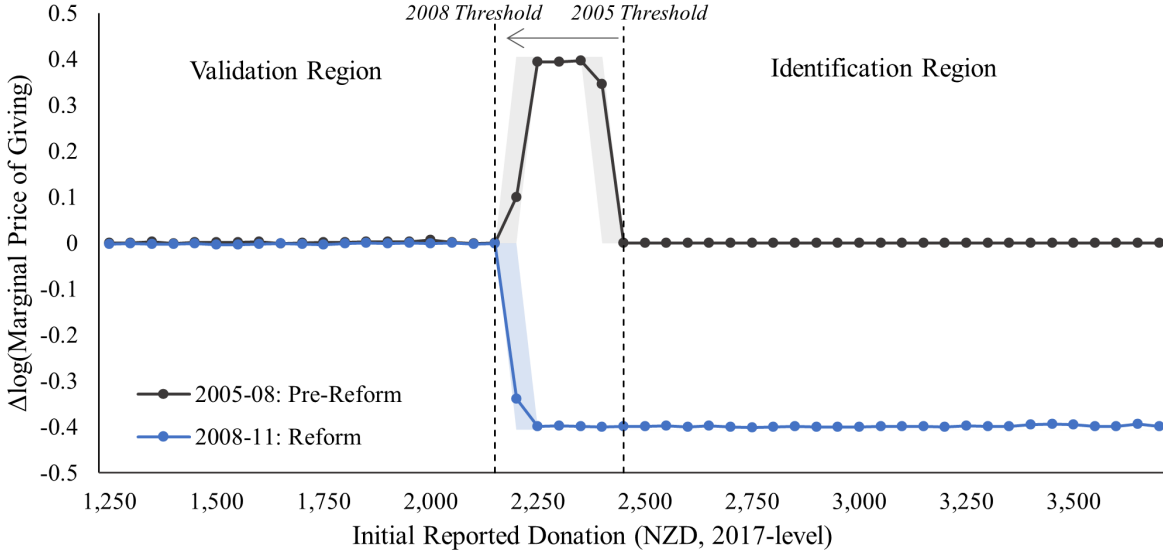
The study defines the validation region as taxpayers with initial reported donations to the left of the first vertical dashed line at NZD 2,250. These are taxpayers subject to a stable tax regime in the pre-reform

²⁴ For example, a taxpayer with an initial reported donation amount of NZD 1,000 will experience no change in the predicted marginal price of giving due to the 2009 reform, since the marginal price of giving is 66.66 cents for every dollar donated before and after the tax reform. A taxpayer with an initial reported donation amount of NZD 3,000 will experience a decline in the predicted marginal price of giving due to the 2009 reform since the marginal price of giving is NZD 1 for every dollar donated before the reform and 66.66 cents for every dollar donated after the reform (assuming in both cases that the taxpayer's annual taxable income is more than the reported donation amount).

²⁵ For these individuals, the predicted marginal price of giving would change only where the ceiling for donations eligible for tax credits changes because of changes to the taxpayer's taxable income.

period, and unaffected or less affected by the 2009 reform. The identification region is taxpayers with initial reported donation amounts of more than NZD 2,450, with initial reported donations to the right of the second vertical dashed line. These are taxpayers subject to a stable tax regime in the pre-reform period and affected by the 2009 tax reform.

Figure 2: Predicted Change in the Marginal Price of Giving



Notes: Figure shows the predicted change in the log marginal price of giving from 2005-08 (the pre-reform period) and from 2008-11 (the reform period). The curves show the average changes within each NZD 50 donation bin and the shaded areas show the 10th and 90th percentile ranges. The vertical dashed lines separate donation bins in the validation region, fiscal drag region (subject to fiscal drag during the pre-reform period), and the identification region.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

I next (step 2) examine donation trend differentials across the donation distribution in the pre-reform period (2005-08) and reform period (2008-11) to validate the assumption of constant donation trend differentials for taxpayers in the validation region of the donation distribution. If there is no significant change in donation trend differentials between the two periods for taxpayers in the validation region, this helps support the plausibility of the assumption that donation trend differentials would have remained unchanged in the identification region in the absence of the reform. I run the following regression separately for each period:

$$\Delta \log z_{it} = \beta_0^t + \beta_1^{t'} D_{it-1}^{don} + v_{it} \quad (4)$$

Where $\Delta \log z_{it}$ is the change in the log donation amount between period $t - 1$ and t , D_{it-1}^{don} is a vector of 50 initial donation bin indicator variables based on the reported donation amount measured in the initial period (either 2005 or 2008).²⁶ The width of the donation bin is NZD 50. I exclude the indicator variable for donation bin 10 (NZD 1,700), and so the coefficients β_1^t measure the differences in log donation growth between individuals with different initial donation amounts relative to bin 10. Subsection 7.2 shows that results are not sensitive to the chosen bin width, or reference bin.

Figure 3 plots the coefficients β_1^t from the estimation of equation (4) for the two periods. There are several notable points from the chart. Firstly, there is a negative relationship between the change in log donations and the initial reported donation amount across the donation distribution. This is consistent with mean reversion, that is, individuals with higher initial reported donation amounts being more likely to experience smaller increases or larger declines in reported donations in the subsequent period as the result of transitory increases in the amount donated.

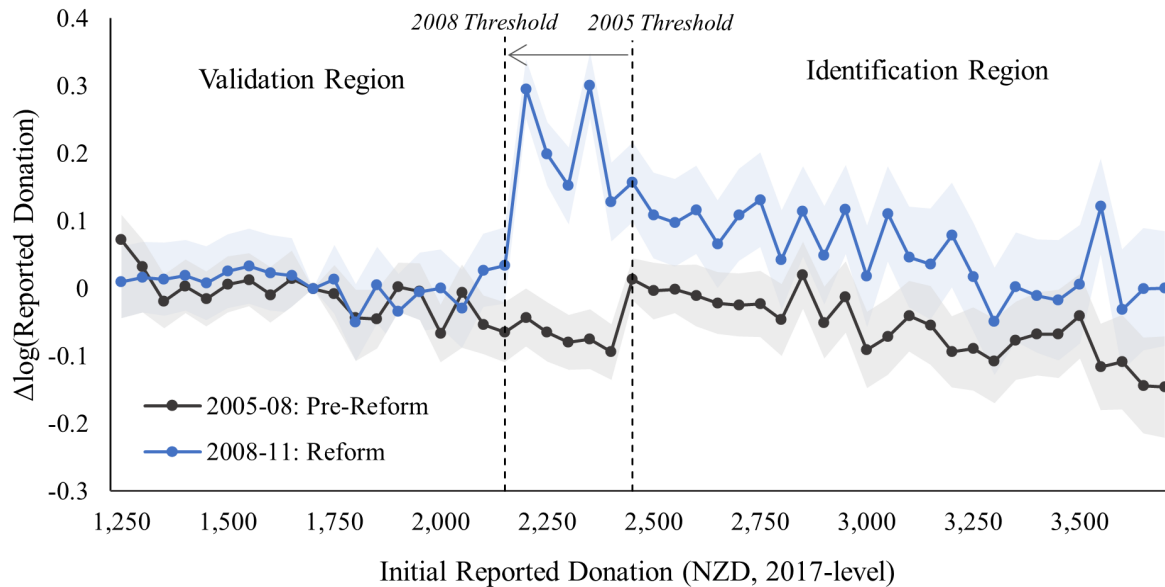
Secondly, there is a marked difference in donation trend differentials in the pre-reform and reform period for taxpayers in the treated part of the donation distribution, where individuals experience a large decline in the marginal price of giving in the reform period (the identification region). These individuals experience a growth rate of reported donations in the reform period that is significantly higher than the growth rate in the pre-reform period. In contrast, there is essentially the same donation trends in the two periods for taxpayers in most of the untreated part of the donation distribution (the validation region). There is some evidence that taxpayers with initial donations close to the ceiling for donations eligible for tax credits in 2005 have lower growth in donations in the pre-reform period, and that taxpayers with initial donations close to the ceiling in 2008 have higher donation growth in the reform period, which could suggest that taxpayers constrain reported donations in the pre-reform period due to the fixed ceiling and then increase reported donations in the reform period when the fixed ceiling is abolished. Nonetheless the chart provides graphical evidence of constant trend differentials in reported donations across much of the untreated part of the donation distribution. Under the assumption that donation trends would have remained constant in the absence of the 2009 reform, the study identifies the reform effect from the difference in donation trends between the reform and pre-reform periods for the population with initial reported donations in the identification region.

²⁶ I focus on taxpayers reporting similar donation amounts in the initial period (donation bins range from NZD 1,250-1,300 to NZD 3,700-3,750). Taxpayers reporting donations outside of this range in the initial period are excluded from the analysis. Most observations that are dropped from the analysis are taxpayers making initial reported donations of less than NZD 1,250.

Lastly, individuals reporting donations in the fiscal drag region (with initial reported donations between the vertical dashed lines) experience an increase in the marginal price of giving in the pre-reform period due to fiscal drag. These individuals experience lower donations growth in the pre-reform period than individuals with reported donations to the neighbouring left or right of the fiscal drag region. Taxpayers in the fiscal drag region also experience a decline in the marginal price of giving in the reform period because of the removal of the fixed ceiling for donations eligible for tax credits. In the reform period, the two ‘spikes’ in reported donation growth are for taxpayers reporting initial donations in 2008 at the fixed ceiling for donations eligible for tax credits (NZD 1,890 nominal NZD) and at a round number marginally above the fixed ceiling (NZD 2,000 nominal NZD).

The elasticity of reported donations with respect to the marginal price of giving estimated by this study primarily considers individuals reporting initial donation amounts in the identification region, since for those in the fiscal drag region the marginal price of giving was not stable in the pre-reform period.

Figure 3: Trend Differentials Across the Distribution



Notes: Figure reports the estimated donation trend differentials using equation (4) for 2005-08 and 2008-11 relative to the average growth for donation amounts around NZD 1,700 (donation bin 10). The curves show the coefficient estimates (β_1^i) and the shaded areas show the 95% confidence intervals around the estimates.

Sources: Inland Revenue, Statistics New Zealand, author’s calculations.

Next, I estimate the changes in trend differentials between the pre-reform and reform periods by running the following regression on data pooled over the two periods:

$$\Delta \log z_{it} = \delta_0 + \delta'_1 \mathbf{D}_{it-1}^{don} + \delta_2 D_{it}^{reform} + \delta'_3 \mathbf{D}_{it-1}^{don} \times D_{it}^{reform} + v_{it} \quad (5)$$

Where D_{it}^{reform} is a binary variable for the reform period, and $\mathbf{D}_{it-1}^{don} \times D_{it}^{reform}$ is a vector of donation bin indicator variables interacted with the reform period binary variable. I exclude the interacted term for donation bin 10 (NZD 1,700) and so coefficients δ_3 capture the changes in donation trend differentials across the donation distribution relative to the change at that donation level.

Figure 4 shows that there do not appear to be systemic changes in trend donation growth between the pre-reform and reform periods for individuals reporting initial donations over much of the validation region, consistent with the identifying assumption of constant trend differentials. A standard F-test of $\delta_3 = 0$ in the validation region yields a p-value of < 0.000 . The finding of significant trend differentials is driven by the indicator variables for donation amounts on the edges of the validation region (donation amounts around NZD 1,250 to 1,300 and NZD 2,100 to 2,150). Excluding these indicator variables yields a p-Value of 0.2661.²⁷

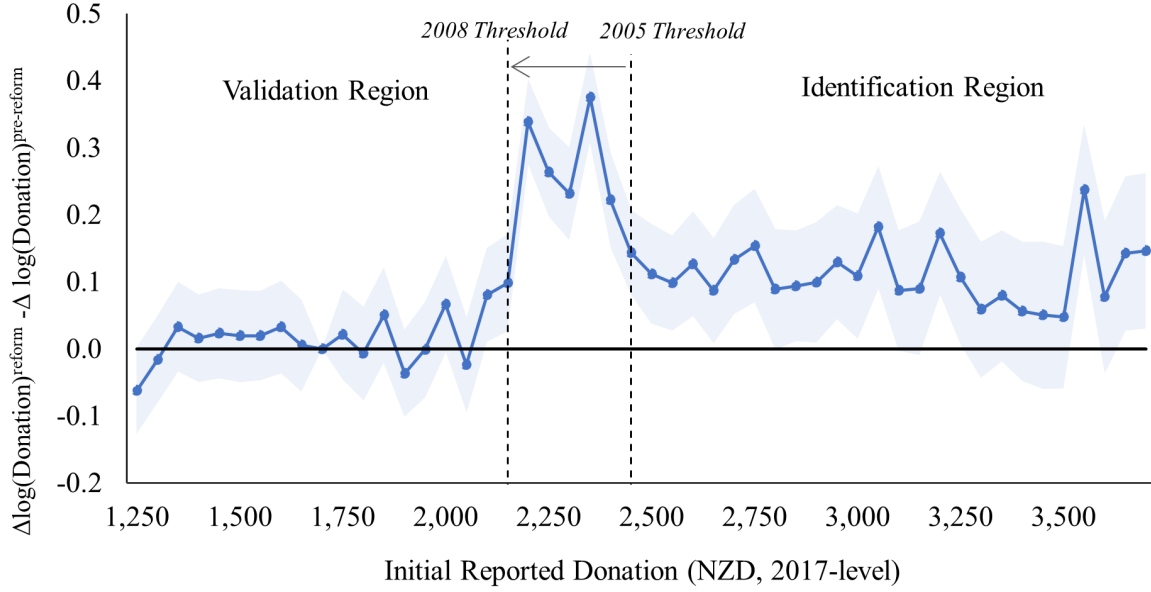
For individuals reporting donations in the identification region, by contrast, I find compelling evidence of a behavioural response to the 2009 tax reform. Changes in reported donations are generally higher on average in the reform period than the pre-reform period. Assuming trend differentials would have remained constant in the identification region in the absence of the reform, this provides causal estimates of donation responses to the 2009 reform.

The substantial effect on reported donations could be driven by a range of factors, such as an increase in the true total donation amount, reduced under-reporting of actual donation amounts to the tax authority following the reform, or changes in household claims behaviour. These possible explanations are considered further in subsection 6.1.²⁸

²⁷ Jakobsen and Sogaard (2022) has a similar situation, finding that the result of significant trend differentials in the validation region is driven by incomes around DKK 340,000 (close to the identification region) and that excluding that donation bin at that level from the F-test yields a p-Value that does not reject the null hypothesis of common trend differentials before and after the tax reform at a 10% statistical significance level.

²⁸ The elasticity of taxable income literature (ETI) similarly considers factors that could drive the elasticity of taxable income, such as ‘real’ labour responses from additional effort, hours worked, occupational choice, as well as tax avoidance or evasion responses. Studies typically find smaller elasticities when self-employed individuals are excluded from the analysis, which is attributed to the self-employed being more able to engage in tax planning (see Jakobsen and Sogaard, 2022).

Figure 4: Changes in Donation Trend Differentials



Notes: Figure reports the estimated changes in donation trend differentials based on equation (5) pooling the periods 2005-08 and 2008-11. The curve shows the coefficient estimates (δ_3) and the shaded areas show the 95% confidence intervals around the estimates.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

The last major part of the analysis (step 3) is to translate donation trend differentials into donation elasticities. I estimate the donation elasticity using the entire identification region and using only particular parts of the identification region to investigate the heterogeneity of responses. In practice, there may be reasons why reported donation elasticities differ across the population of donation tax credit claimants. For example, elasticities may be higher at the top of the donation distribution or close to the threshold for donations eligible for tax credits. To explore the heterogeneity of elasticities across the donation distribution, I follow the approach of Jakobsen and Sogaard (2022) and estimate a weighted two-stage least squares (TSLS) linear regression centred on different points throughout the identification region $h \in (\text{NZD } 2,650, 2,850, \dots, 3,450)$ with the following second stage equation:

$$\Delta \log z_{it} = \gamma_0 + \gamma'_1 \mathbf{D}_{it-1}^{don} + \gamma_2 D_{it}^{reform} + \gamma_3 \Delta \log \tau_{it} + \gamma_4 \Delta \log \tau_{it} \times (z_{it} - h) + v_{it} \quad (6)$$

Where in (6) $\mathbf{D}_{it-1}^{don}$ is a vector of NZD 50 donation bin indicator variables. The regression includes the marginal price of giving both by itself and interacted with the initial reported donation amount to capture the level of the donation elasticity centred on h and its slope (that is, whether the elasticity increases or

declines within the segment of the identification region considered). Since both price terms ($\Delta \log \tau_{it}, \Delta \log \tau_{it} \times (z_{it} - h)$) are endogenous, I instrument these with the corresponding predicted changes in the marginal price of giving ($\Delta \log \bar{\tau}_{zt-1}^P, \Delta \log \bar{\tau}_{zt-1}^P \times (z_{it-1} - h)$).²⁹

For the weights, individuals in the validation region are assigned to a comparison group with a constant weight of 1, individuals in the fiscal drag region are assigned a weight of zero, and individuals in the identification region are assigned triangular weights (w) within $\pm \text{NZD } 200$ of h , computed as:

$$w = \max(200 - |z - h|, 0)/200 \quad (7)$$

The comparison group is therefore kept the same, and I estimate heterogeneous elasticities by moving the treatment group up through the donation distribution. The central point receives a weight of 1 and donations $\pm \text{NZD } 200$ from the central point receive a positive but smaller weight the further away the initial donation amount is from the central point. Using this strategy, I estimate elasticities for reported donations of between -0.246 and -0.306 for initial reported donation amounts over the identification region. The estimated elasticity is not increasing in the initial reported donation amount. This contrasts with previous studies that have tended to find taxpayers who make larger donation amounts react more to tax incentives than smaller donors (see for example Fack and Landais, 2010). The regression results are shown graphically in figure 5 and reported in the appendix.

Centred on the mid-point of the identification region ($h = \text{NZD } 3,100, \pm \text{NZD } 650$) the estimated elasticity of reported donations is -0.283 (SE= 0.027, 95% confidence interval -0.230 to -0.336).³⁰ Estimating the elasticity of reported donations centred on the fiscal drag region ($h = \text{NZD } 2,325, \pm \text{NZD } 125$), I obtain a higher absolute elasticity estimate of -0.484 (SE=0.043, 95% confidence interval -0.401 to -0.567).

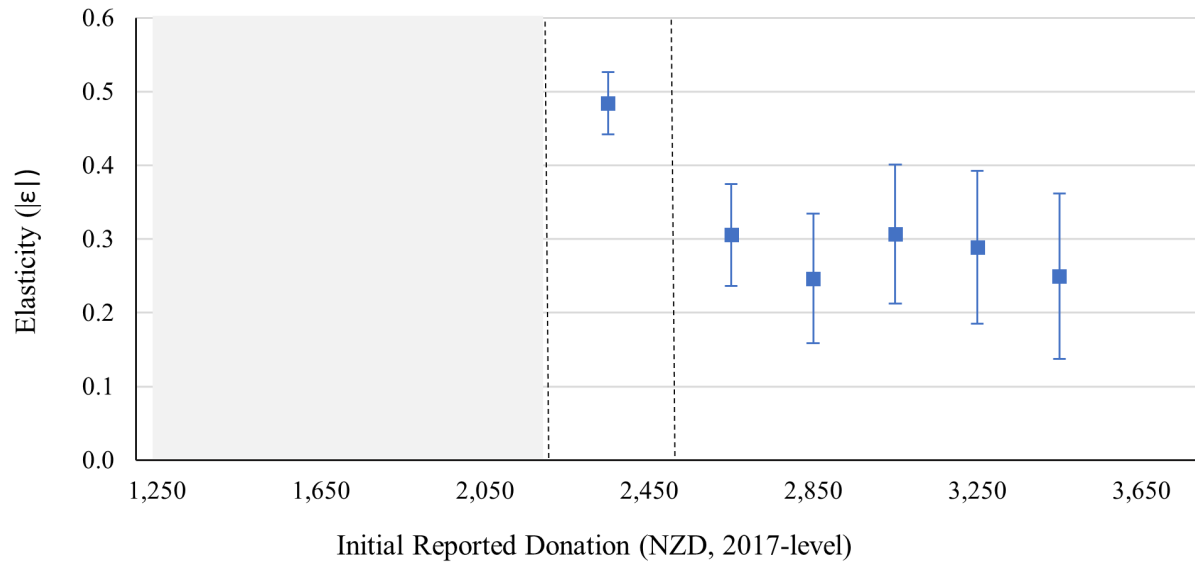
Overall, the results provide compelling evidence of a behavioural response to the 2009 tax reform. The effect of the 2009 reform on the reported donation amount could reflect a range of responses, including a ‘real’ donation response to the 2009 tax reform or pure reporting effects, i.e. taxpayers reporting donation amounts to the tax authority more than the previous policy threshold, that were under-reported prior to the

²⁹ Recall that the price variables are endogenous since a larger change in reported donations can lead to an increase in the marginal price of giving if it pushes the reported donation amount above the ceiling for donations eligible for tax credits.

³⁰ The results are indistinguishable regardless of whether I assign a weight of 1 to the entire validation region (as illustrated by the shaded grey area in figure 5) or part of the validation region (assigning a zero weight to observations in the two left and right most donation bins). In the latter case, the elasticity estimate is -0.276 (SE=0.027, 95% confidence interval -0.222 to -0.330). The estimated slope of the donation elasticity ($\hat{\gamma}_4$) within the identification region being considered is small (around 0.0001).

2009 reform. The next subsection 6.1 discusses possible drivers of the observed behavioural response to the tax reform.

Figure 5: Implied Elasticities



Notes: Figure shows the implied elasticities over the donation distribution estimated using the TSLS local linear estimation described in equation (6). The elasticity estimate centered on the fiscal drag region ($h = \text{NZD } 2,325, \pm \text{NZD } 125$) is shown between the vertical dashed lines. Elasticity estimates centered on different points in the identification region are shown to the right of the second vertical dashed line, centered on $h \in (\text{NZD } 2,650, \text{NZD } 2,850, \dots, \text{NZD } 3,450)$, within $\pm \text{NZD } 200$. The grey shaded area illustrates the interval included as the comparison group in the elasticity estimations. The 95% confidence bounds are based on standard errors.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

6.1. Drivers of Behavioural Response

The substantial effect of the 2009 tax reform on reported donations captures not only any ‘real’ increase in the amount donated due to the reduction in the marginal price of giving for larger donation amounts, but also all other behavioural responses to the tax reform including reporting incentive effects. Studies that utilise tax returns or claims as a main data source confront the issue that the observed behavioural response may reflect an actual behavioural change or pure reporting effects. For example, the ETI literature considers whether changes in taxable income as the result of a tax reform reflect a ‘real’ labour supply response (due to changes in effort, or hours worked), or instead reflect changes in tax avoidance or evasion behaviour (i.e. tax reporting, akin to donation reporting in this research context) (Saez et al., 2012). In the donation literature the financial incentive to report charitable donations generally operates to encourage the reporting

of donations to the tax authority. This contrasts with the ETI literature where there is a tax cost of reporting taxable income.

Donation studies have examined reporting effects, and obtained two results that are of interest for this study. Firstly, many taxpayers report donations to the tax authority even if there is no financial incentive to do so. The Fack and Landais, 2010 study use as a comparison group, households that are unaffected by tax reforms in France in 2003 and 2005, since they have no taxable income. The study finds that even though non-taxable households have no financial incentive to report donations to the tax authority, 12% of households still report donations (compared to 20% of taxable households). In my study context around 20% of donation tax credit claimants report larger donation amounts to the tax authority that are ineligible for tax credits in the year prior to the 2009 tax reform, which suggests that N.Z. taxpayers do report donations to the tax authority that are ineligible for tax credits.

Secondly, there is evidence that non-reporting of smaller donation amounts to the tax authority is a more prevalent source of under-reporting than the underreporting of larger donation amounts. In the N.Z. case, donation tax credits are generally claimed by submitting a separate tax credit claim form to the tax authority and attaching donation receipts, and so there could be a substantial cost in terms of the time and inconvenience of claiming donation tax credits, especially for small donation amounts. Gillitzer and Skov (2018) study the move to third-party reporting of charitable donations in Denmark in 2008 and find that it tended to be smaller donation amounts that went unreported to the tax authority prior to the reform, which the study attributes to compliance costs of self-reporting donations and passive choice. In the N.Z. case it is also likely that there are many donations eligible for tax credits that go unclaimed. Evidence from the N.Z. Charities Services surveys conducted in 2008, 2010 and 2014 find that between 59% and 74% of donors report not claiming a ‘tax refund’ for donations made in the past year.

Since this study focuses on the change in reported donations of donation tax credit claimants before and after the 2009 tax reform, the key question for the interpretation of this study’s results is whether claimants under-report the true actual donation amount more than the NZD 1,890 ceiling to the tax authority, prior to the 2009 reform. On paper, taxpayers are asked to report ‘the total amount paid in donations to approved charities’ during the tax year, and around 25% of claimants report large donation amounts at or above the threshold for donations eligible for tax credits in the year prior to the 2009 reform.³¹ However, an examination of donation data sources not subject to the same potential under-reporting as the tax data does not show as large an increase in donations following the 2009 tax reform as the tax data, which suggests that some of the increase in donations reported to the tax authority following the 2009 reform may be due

³¹ After the 2009 tax reform the ceiling for donations eligible for tax credits is a taxpayer’s annual taxable income, which is unlikely to be a binding ceiling for most taxpayers.

to the reporting of previously unreported donations. The two other data sources that I examine are donations income reported by registered charities and state and state-integrated schools.

The donation amount reported to the tax authority increased by 20% in inflation-adjusted terms between the 2008 and 2009 tax years. The Charities Register is a database of publicly available information on N.Z. registered charities. Donations reported to the Charities Register include donations made by individuals, businesses, and trusts, and should not be subject to the same potential under-reporting bias during the pre-2009 period as the tax data. Donations income reported by registered charities increased by 4% in 2009 and 1% in 2010.³²

Charity financial reporting periods do not always align with the tax year. For example, for charities with a year ending 30 June, the year ending 2008 includes three quarters prior to the 2009 tax reform, and one quarter after the reform, and the year ending 2009 is the first full financial reporting period following the 2009 tax reform. For charities that file an annual return for the year ending in the first half of the year (where 9-12 months of the 2008 financial year falls during pre-tax reform period), donations income increased by 12% in 2009 and 10% in 2010.³³

Few charities file an annual return in the 2007 year, since the register was opened only in February of that year. Donations income of charities that file annual returns in the 2007 and 2008 years (89 charities) increased by 12% in 2008 and by 9% for charities that file an annual return in the second half of the year (where 6-9 months of the 2008-year falls after the 2009 tax reform).

Donations to most schools in New Zealand are eligible for donation tax incentives. Schools report on a calendar year basis running from 1 January to 31 December. The 2009 donation tax credit reform was implemented from the 2009 tax year that runs from 1 April 2008 until 31 March 2009, and so first 3-quarters of the change occurred during the 2008 calendar year, and the first full year of implementation was the 2009 calendar year. Donations reported in the annual financial statements of state and state-integrated schools declined by -1% in the 2008 calendar year (year of partial implementation of the tax reform) and increased by 3% in the 2009 calendar year (first year of full implementation) (Ministry of Education,

³² The sample includes the 1,946 registered charities that report donations to the Charities Register for the years ending 2008, 2009 and 2010. I drop from the sample charities where year-on-year reported donations change by more than 1,000 times, since this could reflect data that charities have reported in different units (such as thousands of NZD rather than NZDs). The total donations reported by this sample of charities equate to around half of the total donation amount reported to the tax authority over the 2008-10 period.

³³ The sample includes the 611 registered charities that have a financial year ending in the first half of the year and report donations to the Charities Register for the years ending 2008, 2009 and 2010.

2018).³⁴ Donations income reported by schools therefore does not show as large an increase following the 2009 tax reform as donations reported to the tax authority.

If a fraction of the increase in the average reported donation of taxpayers in the treated part of the donation distribution following the 2009 reform reflects the reporting of previously under-reported donations, then this suggests the elasticity of reported donations obtained by this study should be interpreted as an upper boundary on the actual donation response. This means that the ‘real’ donation elasticity could be anything between zero, or very small, ‘up to’ the value of the reported donation elasticity of -0.3 to -0.4.

An elasticity of -1.0 implies that the increased donations received by charities because of the tax credit exactly offsets the loss of tax revenue to the Treasury. Price elasticities less than one (in absolute terms, as in our case) suggest that the amount donated increases by less than the revenue loss to the Treasury. In other words, donors pass only part of the tax credit onto the charity through a larger donation amount. It is important to note that there may be cases where donation tax credits are justifiable at lower (absolute) elasticity levels, such as where private donations are more effective than funds given directly by the government, or where it would be too administratively complex for government to allocate funding to a large number of charities.

7. Further Results

This section presents further results. Subsection 7.1 examines whether taxable income, age, or gender differences in donation trend differentials and elasticities are important. Subsection 7.2 investigates the robustness of the main results by seeing how far the main results are sensitive to the regression specifications.

³⁴ The government owns and funds state schools, and state-integrated schools are private schools that the government has integrated into the state system and which receive government funding. Calculation considers data from 1,146 state and state-integrated schools that report positive donations each year from 2007 to 2009. Figures are in real inflation-adjusted terms. The total reported donation amount by these schools was equivalent to 14% of the donation amount reported to the tax authority over the 2007 to 2009 period. When considering the 771 schools that report positive donations each year from 2006 to 2010, the results are qualitatively similar, with donations income increasing by 7% in 2007 (prior to tax reform), declining by -1% in 2008 (year of partial implementation of the tax reform), increasing by 1% in 2009 (first year of full implementation), and declining by -1% in 2010.

7.1. Heterogeneity

Estimates by Taxable Income Level

International studies suggest that higher income households tend to give more to charity in dollar terms than lower income households (Andreoni and Payne, 2013), and in New Zealand, taxpayers with higher taxable incomes are more likely to claim donation tax credits and report a higher mean donation amount. This could reflect underlying donations behaviour, or that higher income households are more likely to report donations to the tax authority, or some combination of the two reasons. Higher income taxpayers may be more aware of the claims process or may be already submitting an income tax return to the tax authority and so face lower compliance costs of submitting a donation tax credit claim. In other research contexts, higher income taxpayers are found to be more responsive to tax changes than lower income taxpayers (see for example the ETI literature reviewed in subsection 2.2).

Table 3 shows donation elasticity estimates separately for donation tax credit claimants with different levels of taxable income. Claimants are divided into four equal groups according to individual taxable income in the initial year (2005 or 2008). Quartile one represents the lowest 25% of claimants by taxable income (with mean taxable income of NZD 13,369 in 2005 and NZD 15,094 in 2008 in constant 2017 NZD), and quartile four represents the highest 25% of claimants by taxable income (with mean taxable income of 131,931 in 2005 and 141,696 in 2008 in constant 2017 NZD). Taxpayers in the lowest income quartile may be different from other taxpayers, for example, have low or no labour income and a small amount of capital income. It is important to note that household members may be in different taxable income deciles, and household income may be a better measure of income relevant to household donations behaviour than individual taxable income. However, since New Zealand taxes on an individual basis, and the data for this study is available at an individual level, the individual is the unit that is used for donation elasticity estimates.

Results are reported centred on the mid-point of the identification region ($h = \text{NZD } 3,100$) with triangular weights $\pm \text{NZD } 650$ around the central point as defined in equation (7).³⁵ The results show no clear difference in donation elasticities by taxable income quartile, other than some evidence of higher donation elasticities for taxpayers in the highest taxable income quartile.

³⁵ Elasticities are estimated utilising observations over the full identification region, since data becomes thin when considered by quartile.

Table 3: Donation Elasticity Estimates by Income Quartile

Income quartile	No. obs	First stage $\Delta \log(\tau_{it}^p)$	Second stage $\Delta \log(\tau_{it})$	95% CI
Quartile 1	36,745	1.072 (0.007)	-0.200 (0.055)	-0.308 to -0.092
Quartile 2	36,966	1.083 (0.006)	-0.201 (0.053)	-0.305 to -0.098
Quartile 3	36,686	1.082 (0.006)	-0.153 (0.054)	-0.260 to -0.047
Quartile 4	37,362	1.073 (0.006)	-0.409 (0.060)	-0.526 to -0.292

Notes: Table summarises the implied elasticities over the identification region using the TSLS local linear estimation described in equation (6), estimated separately for each taxable income quartile, and centered on the mid-point of the identification region ($h = \text{NZD } 3,100, \pm \text{NZD } 650$). The comparison group is taxpayers in the validation region who are unaffected or less affected by the tax reform. Standard errors are reported in parentheses.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

Turning to the share of income that is donated, some studies have found a downward-sloping relationship between income and the share of income donated, and other studies have found a 'U-shaped' relationship. The higher share of income donated by lower income households has been attributed to higher religious giving amongst lower-income households or a 'standard of giving' that does not adjust proportionately with income. Studies are yet to come to a consensus about whether the share of giving increases for higher income households or continues to decline, and the pattern may differ across countries (see for example Benediktson, 2018 that finds a downward-sloping relationship in the case of Denmark, and James and Sharpe, 2007 that finds a 'U-shaped' relationship for giving to secular causes in the United States).

I define donation share as the taxpayer's reported donation amount as a share of annual taxable income in the initial period (2005 for the pre-reform period, and 2008 for the reform period). Table 4 reports donation elasticity estimates for taxpayers who report donating different shares of their taxable income in the initial period. Quartile one represents the lowest 25% of tax credit claimants by donation share (with median donation share of 2.1% of taxable income in the pre-reform period and 2.0% of taxable income in the reform period). Quartile four represents the highest 25% of tax credit claimants by donation share (with median donation share of 14.8% of taxable income in the pre-reform period and 13.1% of taxable income in the reform period). The difference between taxpayers with high and low donation shares is more driven by

differences in taxable incomes than reported donation amounts.³⁶ The results show some evidence that taxpayers reporting donations that are a smaller share of their taxable income are more responsive to the 2009 reform than other claimants.

Table 4: Donation Elasticity Estimates by Donation Share

Income quartile	No. obs	First stage $\Delta \log(\tau_{it}^p)$	Second stage $\Delta \log(\tau_{it})$	95% CI
Quartile 1	38,105	1.107 (0.009)	-0.599 (0.089)	-0.774 to -0.424
Quartile 2	35,333	1.092 (0.007)	-0.410 (0.059)	-0.526 to -0.295
Quartile 3	37,138	1.067 (0.006)	-0.148 (0.047)	-0.241 to -0.056
Quartile 4	34,831	1.062 (0.006)	-0.312 (0.045)	-0.401 to -0.224

Notes: Table summarises the implied elasticities over the identification region using the TSLS local linear estimation described in equation (6), estimated separately for each quartile of donation tax credit claimants by donation share (reported donation amount as a share of taxable income). Quartile one is the lowest 25% of taxpayers by donation share, and quartile four is the highest 25% of taxpayers by donation share. Elasticity estimates are centred on the mid-point of the identification region ($h = \text{NZD } 3,100, \pm \text{NZD } 650$). The comparison group is taxpayers in the validation region who are unaffected or less affected by the tax reform. Standard errors are reported in parentheses.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

Estimates by Age Group

Previous studies have found that charitable giving increases with age up to a certain point (around 65 or 75 years old) and then begins to decline (Wiepking and James, 2013). In New Zealand donation tax credit claimants are around 10 years older than taxpayers who do not claim donation tax credits.

Table 5 shows donation elasticity estimates separately for donation tax credit claimants within different age groups. Donation tax credit claimants are classified into an age group based on their age in the initial pre-reform or reform year (2005 and 2008 respectively). Youth represent donation tax credit claimants who are less than 25 years old, prime age are taxpayers 25-54 years old, and older taxpayers are defined as claimants 55 years or older. Over the study period, 4% of claimants are in the youth age group, 51% are in the prime

³⁶ Median taxable incomes of taxpayers in quartile four is NZD 15,417 in the pre-reform period, and NZD 16,558 in the reform period relative to taxpayers in quartile one who have median taxable incomes, around six times higher (NZD 90,850 in the pre-reform period and NZD 96,098 in the reform period). Median reported donation of taxpayers in quartile four is NZD 2,453 in the pre-reform period and NZD 2,258 in the reform period, around 23% higher than taxpayers in quartile one (NZD 1,875 in the pre-reform period and NZD 1,835 in the reform period).

age group, and 45% of claimants are in the older age bracket. The results suggest that the hypothesis that reported donations of young taxpayers did not respond to the 2009 tax reform cannot be rejected. For prime age and older taxpayers, I find the elasticity of reported donations is significantly different from zero, and not statistically different between prime age and older taxpayers.

Table 5: Donation Elasticity Estimates by Age Group

Age group	No. obs	First stage $\Delta \log(\tau_{it}^p)$	Second stage $\Delta \log(\tau_{it})$	95% CI
Youth (<25 years)	5,579	1.151 (0.020)	0.090 (0.159)	-0.221 to 0.400
Prime age (25-54 years)	74,008	1.089 (0.005)	-0.254 (0.039)	-0.331 to -0.177
Older (55+ years)	65,667	1.064 (0.005)	-0.360 (0.039)	-0.437 to -0.238

Notes: Table summarises the implied elasticities over the identification region using the TSLS local linear estimation described in equation (6), estimated for taxpayers in different age groups and centred on the mid-point of the identification region ($h = \text{NZD } 3,100, \pm \text{NZD } 650$). The comparison group is taxpayers in the validation region who are unaffected or less affected by the tax reform. Standard errors are reported in parentheses.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

Estimates for Males and Females

A N.Z. Gallup poll conducted in the years 2011 to 2013 found that more female respondents report donating money in the prior month than males (72% of females compared to 57% of males) (Charities Aid Foundation, 2011, 2012, 2013). In New Zealand female taxpayers are more likely than male taxpayers to claim donation tax credits and report a lower mean donation amount on average than male taxpayers. Over the study period 52% of donation tax credit claims were made by taxpayers with traditionally female titles (such as Ms, Mrs or Miss), 47% of claims were made by taxpayers with traditionally male titles (such as Mr or Master), and 1% of claims were made by taxpayers with non-gender-specific titles (such as Dr., Professor, Judge).³⁷ Table 6 shows donation elasticity estimates for male and female donation tax credit claimants. This reveals that the elasticities of male taxpayers are larger in absolute value than females.

³⁷ These figures consider claims in the study sample, where a taxpayer claims donation tax credits in either 2005 and 2008 (pre-reform) or 2008 and 2011 (reform), and the initial reported donation amount (in 2005 or 2008) is within the range of NZD 1,250 to NZD 3,750 in real 2017 NZ dollars. The share of taxpayers who are female is similar in the pre-reform and reform periods.

Table 6: Donation Elasticity Estimates by Gender

Gender	No. obs	First stage $\Delta \log(\tau_{it}^p)$	Second stage $\Delta \log(\tau_{it})$	95% CI
Female	77,740	1.075 (0.004)	-0.137 (0.022)	-0.180 to -0.095
Male	68,578	1.084 (0.005)	-0.418 (0.024)	-0.465 to -0.371

Notes: Table summarises the implied elasticities over the identification region using the TSLS local linear estimation described in equation (6), estimated separately for taxpayers with traditionally male and female titles and centred on the mid-point of the identification region ($h = \text{NZD } 3,100, \pm \text{NZD } 650$). The comparison group is taxpayers in the validation region who are unaffected or less affected by the tax reform. Standard errors are reported in parentheses.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

Comparing male and female taxpayers within the same taxable income quartile, gender differences persist within each taxable income quartile, which suggests gender differences in responsiveness to donation tax credits are not only due to differences in taxable incomes between male and female claimants. Gender differences could reflect differences in responsiveness to donation tax credits by gender (as suggested by some previous literature) or changes in household claims behaviour because of the 2009 reform. To be included in the sample in the reform period taxpayers need to have claimed donation tax credits in periods spanning the reform period (2008 and 2011) and reported a donation amount of between NZD 1,250 to NZD 3,750 in the initial period (2008) in real 2017 NZ dollars. If households shift from filing two donation tax credit claims prior to the reform (2008) to submitting one larger claim following the reform (2011), and the one claim is more likely to be made by the male member of the household, then this could explain the larger observed response in reported donations of male donation tax credit claimants.

Table 7: Donation Elasticity Estimates by Gender and Taxable Income

Gender and income quartile	No. obs	First stage $\Delta \log(\tau_{it}^p)$	Second stage $\Delta \log(\tau_{it})$	95% CI
A. Female				
Quartile 1	23,153	1.069 (0.009)	-0.033 (0.069)	-0.168 to 0.102
Quartile 2	23,274	1.080 (0.008)	-0.142 (0.065)	-0.207 to -0.014
Quartile 3	18,634	1.075 (0.008)	0.009 (0.078)	-0.144 to 0.163
Quartile 4	12,504	1.067 (0.010)	-0.283 (0.106)	-0.491 to -0.075
B. Male				
Quartile 1	13,365	1.077 (0.012)	-0.486 (0.094)	-0.670 to -0.303
Quartile 2	13,474	1.087 (0.010)	-0.281 (0.090)	-0.457 to -0.104
Quartile 3	17,789	1.091 (0.009)	-0.319 (0.076)	-0.467 to -0.171
Quartile 4	23,823	1.077 (0.007)	-0.459 (0.074)	-0.604 to -0.315

Notes: Table summarises the implied elasticities over the identification region using the TSLS local linear estimation described in equation (6), estimated separately for taxpayers by taxable income quartile with traditionally male and female titles. Elasticity estimates are centered on the mid-point of the identification region ($h = \text{NZD } 3,100, \pm \text{NZD } 650$). The comparison group is taxpayers in the validation region who are unaffected or less affected by the tax reform. Standard errors are reported in parentheses.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

7.2. Robustness to Specifications

This subsection examines the sensitivity of the main results to three aspects of the empirical specification: mean reversion, the period over which donation trends are examined, and alternative specifications (the donation groups chosen, the donation reference level, weights, balanced panel).

Mean Reversion

For the first robustness test I investigate donation trend differentials across the donation distribution in a similar way to the main results but using a further lag of the initial donation amount to group individuals.

This approach allows me to examine the extent to which results are influenced by mean reversion, that is, individuals with higher reported donations in the initial year being more likely to experience smaller increases or larger declines in the reported donation amount in the subsequent period due to transitory increases in reported donations. This line of investigation emulates the approach used in the ETI literature which finds that using lagged initial income to assign treatment status makes the mean reversion problem less pronounced (see for example Figure A. VII of Jakobsen and Sogaard (2022) which shows that the curve relating initial income and subsequent income growth becomes flatter using initial income lagged one, two or three years to group individuals).

I use the lagged reported donation amount measured in period $t - 2$ to group individuals (i.e. the 2004 year for the pre-reform period, and the 2007 year for the reform period). Naturally, this approach requires an additional year of data leading to the pre-reform period and reduces the sample size by 8,673 individuals on average in each period compared to the baseline specification. I use one lag of reported donations to group individuals since I want the tax system to be stable in the pre-reform period and to avoid the effects of the 2003 adjustment to the ceiling for donations eligible for tax credits influencing the results.

Centred on the mid-point of the identification region ($h = \text{NZD } 3,100, \pm \text{NZD } 650$) the estimated elasticity of reported donations is -0.439 (SE= 0.036, 95% confidence interval -0.509 to -0.369).³⁸ The implied elasticity is somewhat larger than the main results. This suggests that mean reversion may reduce the absolute value of the implied elasticity estimate in the baseline case. The results are reported in panel B of table 8 and in the appendix.

Time Period Considered

The second set of tests considers examining donation changes over a shorter time-period of one or two years to see if the temporary behavioural response to the 2009 tax reform differs from the response over a three-year period. Examining the one-year change in reported donations (2007-08 pre-reform period and 2008-09 reform period), and the two-year change (2006-08 pre-reform period and 2008-10 reform period) results in elasticity estimates that are indistinguishable from the main results. This suggests that the elasticity estimates are not sensitive to whether a one, two-year post-reform period is examined, and that much of the taxpayer response to the 2009 tax reform occurred in the year of implementation and was sustained subsequently. There was a major natural disaster in New Zealand in 2011 (Canterbury earthquake,

³⁸ Graphically, donation trend differentials appear to be unchanged in the validation region between the pre-reform and reform periods for most lagged initial donation amounts, and higher in the fiscal drag and identification regions. A standard F-test of ($\delta_3=0$) in the validation region yields a p-value of 0.0017. The finding of significant trend differentials is driven by the indicator variables for donation amounts of less than NZD 1,400 and around NZD 1,850 to 1,900. Excluding these variables yields a p-Value of 0.2065.

22 February 2011) and so this result also suggests that the donation elasticity is not being driven by donations being made in response to this event. For completeness, I also examine changes over a longer four-year time-period 2004-08 pre-reform and 2008-12 reform) since this is the timeframe that has been used in many ETI studies, and again find results which are very similar to the main results.³⁹

A further consideration in the case of the 2009 reform of donation tax credits is that donation time shifting in anticipation of the reform may influence the results. The government passed the Income Tax Act 2007 removing the dollar-cut off for donations eligible for tax credits on 1 November 2007, five months prior to the change taking effect on 1 April 2008. The government introduced the Bill into Parliament around a year earlier on 15 November 2006. Taxpayers could therefore have been aware of the possibility of the tax change prior to the reform coming into effect. Using a lag of the initial reported donation amount to group taxpayers and examining changes over the three-year period from 2004-07 and 2007-10 allows me to assign taxpayers to a group and examine donation trends prior to anticipation effects potentially influencing the reported donation amount in the 2008 tax year. Centred on the mid-point of the identification region ($h = \text{NZD } 3,125, \pm \text{NZD } 625$) the estimated elasticity of reported donations is -0.333 ($\text{SE}=0.028$, 95% confidence interval -0.388 to -0.278).⁴⁰ Results are reported in panel C of table 8 and in the appendix.

Alternative Specifications

The last set of tests considers changing details of the empirical specification. I first consider changing the donation groups from NZD 50 bins to either NZD 25 or NZD 100 bins, thereby either doubling or halving the number of bins. The narrower or wider bin width has no appreciable impact on the elasticity estimate. In the case of the NZD 25 bin width, the sample size increases relative to the baseline case since narrower donation bins allow a finer definition of the fiscal drag region. In the case of the NZD 100 bin width the sample size is smaller than the baseline case since wider donation bins require a broader definition of the fiscal drag region.⁴¹ Changing the initial donation reference level with which donation trend differentials are compared from an initial donation level of NZD 1,700 (bin 10) to either NZD 1,450 (bin 5) or NZD

³⁹ Examining changes over longer time periods requires more years of data leading to the pre-reform period when the tax regime was stable. The fixed threshold for donations eligible for tax credits was increased to NZD 1,890 from NZD 1,500 in 2003, and so 2004 is the earliest pre-reform year that I examine.

⁴⁰ The mid-point of the identification region is marginally higher than the baseline case since the identification region begins at around NZD 2,500 compared to NZD 2,450 in the baseline case (since the fixed threshold for donations eligible for tax credits was higher in real NZD in 2004 than 2005).

⁴¹ The baseline specification defines the fiscal drag region as donation bins NZD 2,200 to NZD 2,400. With a narrower NZD 25 bin width, the fiscal drag region includes donation bins NZD 2,225 to NZD 2,425, and with a wider NZD 100 bin width the fiscal drag region includes donation bins NZD 2,150 to NZD 2,350.

1,950 (bin 15) leads to elasticity estimates which are identical to the baseline case (by definition). Results are reported in panel D and E of table 8.

The main results follow the approach in Jakobsen and Sogaard (2022) and do not restrict the sample to taxpayers that report donations in both pre-reform and reform periods. To test if the main results are driven by the change in the composition of donation tax credit claimants in the pre-reform and reform periods (for example, taxpayers that stop claiming donation tax credits after the reform), I focus only on taxpayers who claim donation tax credits in both the pre-reform and reform periods. To be included in the balanced sample taxpayers must claim donation tax credits in the 2005, 2008, and 2011 years. To be included in the pre-reform sample taxpayers must report donations in the range of NZD 1,250 to NZD 3,750 in the initial period (2005), and to be included in the reform sample taxpayers must report donations in that same range in the 2008 year. This reduces the sample size by 17,648 individuals on average in each period relative to the baseline specification. Focusing on the balanced panel of taxpayers I obtain an elasticity estimate of -0.333 (SE=0.029, 95% confidence interval -0.390 to -0.275), similar to the main results. The regression results are reported in panel F of table 8 and in the appendix.

Lastly, the main elasticity estimates are centred on the identification region, with triangular weights as defined by equation (7). The central point receives a weight of 1 and donations receive a positive but smaller weight the further away the initial reported donation amount is from the central point. If instead I weight equally all observations within the identification region, I obtain an elasticity estimate of -0.332 (SE=0.025, 95% confidence interval -0.381 to -0.284).⁴¹ The regression results are reported in panel G of table 8.

Table 8: Donation Elasticity Estimates: Robustness Testing

	No. obs	First stage $\Delta \log(\tau_{it}^p)$	Second stage $\Delta \log(\tau_{it})$	95% CI
A. Baseline				
2008 to 2011 changes ⁽¹⁾	148,079	1.079 (0.003)	-0.283 (0.027)	-0.336 to -0.230
B. Mean reversion				
Lagged donation amount ⁽²⁾	130,733	0.787 (0.005)	-0.439 (0.036)	-0.509 to -0.369
C. Time period				
2008 to 2009 changes	188,665	1.059 (0.002)	-0.283 (0.019)	-0.320 to -0.245
2008 to 2010 changes	147,882	1.074 (0.003)	-0.250 (0.025)	-0.299 to -0.202
2008 to 2012 changes	134,663	1.090 (0.003)	-0.315 (0.030)	-0.374 to -0.256
2007 to 2010 changes ⁽³⁾	147,465	1.083 (0.003)	-0.333 (0.028)	-0.388 to -0.278
D. Bin width				
NZD 25, ref bin 20	150,091	1.081 (0.003)	-0.275 (0.027)	-0.329 to -0.221
NZD 100, ref bin 5	144,489	1.076 (0.003)	-0.288 (0.027)	-0.341 to -0.235
E. Reference bin				
Ref bin 5	148,079	1.079 (0.003)	-0.283 (0.027)	-0.336 to -0.230
Ref bin 15	148,079	1.079 (0.003)	-0.283 (0.027)	-0.336 to -0.230
F. Balance panel				
2008 to 2011 changes ⁽⁴⁾	112,783	1.084 (0.003)	-0.333 (0.029)	-0.390 to -0.275
G. Weights				
Uniform weights ⁽⁵⁾	148,079	1.007 (0.003)	-0.332 (0.025)	-0.381 to -0.284

Notes: Table summarises the estimated elasticity of reported donations from the 2009 reform using the TSLS estimator like in equation (6) centred on the mid-point of the identification region. Standard errors in parentheses. (1) Bin width NZD 50, reference bin 10, 3-year changes pre-reform (2005-08) and spanning the reform period (2008-11), unbalanced panel. (2) Initial donation amount measured in period $t - 2$, i.e. 2004 and 2007. (3) 3-year changes pre-reform (2004-07) and spanning the reform period (2007-10). (4) Individuals who report donations in both the pre-reform and reform periods. (5) Uniform weights over identification region (rather than triangular weights).

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

8. Conclusions

This chapter used the 2009 reform of donation tax credits in New Zealand to provide new estimates of the effect of tax credits on charitable donations. In this chapter I applied the empirical approach from the Elasticity of Taxable Income (ETI) literature to estimate donation elasticities. I presented compelling evidence that there was a behavioural response to the 2009 tax reform that abolished the fixed ceiling for donations eligible for tax credits, by showing there was a significant increase in reported donations in the part of the donation distribution affected by the 2009 tax reform. The observed behavioural response implies an elasticity of reported donations of around -0.3 to -0.4. I further showed that donation trend differentials remained stable in the untreated part of the donation distribution, which adds to the plausibility of the key identifying assumption that donation trends would remain unchanged in the absence of the reform.

The elasticity of reported donations is a key behavioural parameter when assessing the efficiency of tax incentives for charitable donations. The elasticity of reported donations obtained by this study provides an upper boundary on the elasticity of actual donations, since any under-reporting of the actual donation amount prior to the 2009 reform would only increase the estimated donation elasticity. Since the estimate provides an upper boundary on the actual donation response, this means that the ‘real’ donation elasticity could be anything between zero, or very small, ‘up to’ the reported donation elasticity. The magnitude of the estimated elasticities obtained by this study suggest an actual donation response of less than one in absolute terms which implies that the increase in donations caused by the tax reform was smaller than the foregone revenue to the government.

Appendix: Implied Elasticity Estimates

Table A.1 reports the main elasticity estimates that are presented graphically in figure 5 of the paper.

Table A.1: Summary of Elasticity Estimates: Main Results

	NZD 2,325 (1)	NZD 2,625 (2)	NZD 2,825 (3)	NZD 3,050 (4)	NZD 3,250 (5)	NZD 3,450 (6)
Second stage $\Delta \log(\tau_{it})$	-0.484 (0.022)	-0.305 (0.035)	-0.282 (0.044)	-0.306 (0.048)	-0.288 (0.053)	-0.249 (0.057)
First stage $\Delta \log(\tau_{it}^p)$	0.876 (0.003)	1.077 (0.005)	1.095 (0.005)	1.101 (0.006)	1.104 (0.007)	1.106 (0.007)
Donation controls	NZD 50 bins					
Time periods	2005-2008 2008-2011					
Width (NZD)	125	200	200	200	200	200
Observations	117,896	122,827	101,626	99,079	96,449	94,685

Notes: Table reports the details of the TSLS estimates based on equation (6) centred on the fiscal drag region (column 1) and different points in the identification region (columns 2 to 6), using triangular weights defined in equation (7). Standard errors are presented in parentheses.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

Table A.2 reports elasticity estimates using a lag of the initial reported donation amount to group taxpayers to lessen mean reversion, expanding on the results presented in table 8 of the paper.

Table A.2: Summary of Elasticity Estimates: Lagged Reported Donation

	NZD 2,325 (1)	NZD 2,625 (2)	NZD 2,825 (3)	NZD 3,050 (4)	NZD 3,250 (5)	NZD 3,450 (6)
Second stage	-0.518	-0.426	-0.455	-0.604	-0.349	-0.373
$\Delta \log(\tau_{it})$	(0.036)	(0.048)	(0.059)	(0.065)	(0.071)	(0.075)
First stage	0.577	0.736	0.758	0.772	0.794	0.811
$\Delta \log(\tau_{it}^p)$	(0.004)	(0.007)	(0.008)	(0.008)	(0.010)	(0.011)
Donation controls	NZD 50 bins					
Time periods	2005-2008 2008-2011					
Width (NZD)	125	200	200	200	200	200
Observations	104,161	108,939	91,595	86,627	84,229	82,799

Notes: Table reports the details of the TSLS estimates based on equation (6) but using lags of initial reported donations to assign treatment status (i.e. reported donations in 2004 and 2007). The elasticities are estimated centred on the fiscal drag region (column 1) and different points in the identification region (columns 2 to 6), using triangular weights defined in equation (7). Standard errors are presented in parentheses.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

Table A.3 reports elasticity estimates using the balanced panel of taxpayers who report donations in both the pre-reform and reform periods (tax years 2005, 2008 and 2011), expanding on the results presented in table 8 of the paper.

Table A.3: Summary of Elasticity Estimates: Balanced Panel

	NZD 2,325 (1)	NZD 2,625 (2)	NZD 2,825 (3)	NZD 3,050 (4)	NZD 3,250 (5)	NZD 3,450 (6)
Second stage	-0.511	-0.370	-0.336	-0.343	-0.332	-0.305
$\Delta \log(\tau_{it})$	(0.023)	(0.038)	(0.047)	(0.052)	(0.057)	(0.062)
First stage	0.893	1.084	1.099	1.105	1.108	1.109
$\Delta \log(\tau_{it}^p)$	(0.003)	(0.005)	(0.006)	(0.006)	(0.007)	(0.008)
Donation controls	NZD 50 bins					
Time periods	2005-2008 2008-2011					
Width (NZD)	125	200	200	200	200	200
Observations	91,114	93,229	77,766	75,716	73,615	72,339

Notes: Table reports the details of the TSLS estimates based on equation (6) for the balanced panel of taxpayers that claim donation tax credits each year (2005-08 and 2008-11). The elasticities are estimated centred on the fiscal drag region (column 1) and different points in the identification region (columns 2 to 6), using triangular weights defined in equation (7). Standard errors are presented in parentheses.

Sources: Inland Revenue, Statistics New Zealand, author's calculations.

References

- Adena, M. (2021). Tax-price elasticity of charitable donations: Evidence from the German taxpayer panel. In H. Peter & G. L. Huber (Eds.), *The Routledge Handbook of Taxation and Philanthropy* (1st ed., pp. 219–235). Routledge.
- Almunia, M., Guceri, I., Lockwood, B. & Scharf, K. (2020). More giving or more givers? The effects of tax incentives on charitable donations in the UK. *Journal of Public Economics*, 183.
- Bakija, J. & Heim, B. (2011). How does charitable giving respond to incentives and income? New estimates from panel data. *National Tax Journal*, 64 (2), 615–650.
- Charities Aid Foundation. (2011). World Giving Index 2011: A global view of giving trends (tech. rep.). <https://www.cafonline.org/docs/default-source/about-us-publications/world-giving-index-2011-191211.pdf>
- Charities Aid Foundation. (2012). World Giving Index 2012: A global view of giving trends (tech. rep.). <https://www.cafonline.org/docs/default-source/about-us-publications/worldgivingindex2012web.pdf>
- Charities Aid Foundation. (2013). World Giving Index 2013: A global view of giving trends (tech. rep.). <https://www.cafonline.org/docs/default-source/about-us-publications/worldgivingindex2013-1374aweb.pdf?sfvrsn=e215f440>
- Charities Services and Charities Commission (2008, 2010, 2014) “Trust and Confidence Survey”, <https://charities.govt.nz/charities-in-new-zealand/research-into-charities>.
- Charities Services. (2023). New Zealand Charities Register [accessed 30 January 2023]. <https://register.charities.govt.nz/AdvancedSearch>.
- Chetty, R., Friedman, J., Olsen, T. & Pistaferri, L. (2011). Adjustment costs, firm responses, and micro vs. macro labor supply elasticities: Evidence from Danish tax records. *The Quarterly Journal of Economics*, 126 (2), 749–804.
- Claus, I., Creedy, J. & Teng, J. (2012). The elasticity of taxable income in New Zealand. *Fiscal Studies*, 33 (3), 287–303.
- Cruikshank, A. (2022) “Elasticity of reported donations: Bunching evidence from New Zealand”, *VUW Working Papers in Public Finance*, 21/2022.
- Fack, G. & Landais, C. (2010). Are tax incentives for charitable giving efficient? Evidence from France. *American Economic Journal: Economic Policy*, 2 (2), 117–41.

- Fack, G. & Landais, C. (2016). The effect of tax enforcement on tax elasticities: Evidence from charitable contributions in France. *Journal of Public Economics*, 133, 23–40.
- Feldstein, M. & Taylor, A. (1976). The income tax and charitable contributions. *Econometrica*, 44 (6), 1201–22.
- Gillitzer, C. & Skov, P. (2018). The use of third-party information reporting for tax deductions: Evidence and implications from charitable deductions in Denmark. *Oxford Economic Papers*, 70 (3), 892–916.
- Gruber, J. & Saez, E. (2002). The elasticity of taxable income: Evidence and implications. *Journal of Public Economics*, 84 (1), 1–32.
- Jakobsen, K. M. & Sogaard, J. E. (2022). Identifying behavioral responses to tax reforms: New insights and a new approach. *Journal of Public Economics*, 212, 104691.
- Ministry of Education. (2018). Donations received by schools as reported in their audited financial accounts 2000–2015 [Email received 2 October 2018].
- New Zealand Treasury (2023) “2023 Tax expenditure statement”, 18 May 2023 <https://www.treasury.govt.nz/publications/tax-expenditure/2023-tax-expenditure-statement>.
- OECD. (2020). Taxation and philanthropy (tech. rep. No. 27). Organisation for Economic Cooperation and Development. <https://doi.org/10.1787/df434a77-en>
- Saez, E. (2010). Do taxpayers bunch at kink points? *American Economic Journal: Economic Policy*, 2 (3), 180–212.
- Saez, E., Slemrod, J. & Giertz, S. H. (2012). The elasticity of taxable income with respect to marginal tax rates: A critical review. *Journal of Economic Literature*, 50 (1), 3–50.

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