Wealth Taxation and Charitable Giving*

Marius A. K. Ring† and Thor O. Thoresen‡

November 9, 2023

Abstract

We study how tax incentives affect charitable giving using two quasi-experiments from Norway. First, using a shock to wealth tax exposure, we estimate the semi-elasticity of giving with respect to the after-tax rate of return on wealth. Inconsistent with the notion that households accelerate giving to reduce future taxes, we find that a 1% wealth tax reduces giving by 26%. Second, using bunching at an income-tax deduction threshold, we estimate a modest own-price elasticity of giving of -0.44. This elasticity exhibits only minor heterogeneity with respect to income and wealth, but is considerably larger for religious than nonreligious giving. We develop a simple life-cycle model with charitable giving to interpret our combined findings. The calibrated model exhibits weak intertemporal substitution effects with an EIS of only 0.08, which implies that the crowd-out effects of capital taxation on giving are substantial among high-giving households.

Keywords: Charitable giving, wealth taxation, capital taxation, intertemporal substitution
JEL codes: H24, H31, H41, D64

*We thank Victoria Marone, Joel Slemrod, Lydia Fu, Benjamin Marx, Jonathan Meer, Alisa Tazhitdinova, Ole Agersnap, Victor Lyonnet, Nick Roussanov, Itay Goldstein, Winston Dou, Dan Garret, Lu Liu, Sergio Salgado, Sasha Indarte, Luke Taylor, and Juliana Londoño-Vélez for helpful comments. Financial support from the Norwegian Research Council is acknowledged (project number ES614391). See www.mariusring.com for the most recent version. †University of Texas at Austin. Corresponding author, email: mariuskallebergring@gmail.com. ‡Research Department, Statistics Norway, and the Department of Economics, the University of Oslo, email: tot@ssb.no. We thank seminar participants at Skatteforum, University of Bergen, Ohio State University, the University of Texas at Austin, and the University of Pennsylvania for questions and comments.

1 Introduction

The use of tax incentives to promote charitable giving is ubiquitous. These incentives typically take the form of an income tax deduction that lowers the after-tax price of giving (Diamond 2006; List 2011). Such policies are in place in nearly all OECD countries (OECD, 2020) and have produced fertile grounds for a large empirical literature. The main focus of this literature has been to estimate the after-tax own-price elasticity of giving that is needed for determining the optimal tax incentives such as the degree of tax deductibility (Saez, 2004). The indirect effects of other types of taxation, such as those on household savings, have been neglected. This is despite a surging interest in reducing wealth inequality through policies such as more comprehensive capital taxation (Bastani and Waldenström 2020; Scheuer and Slemrod 2021; Saez and Zucman 2019a). Importantly, these policies may also curb households' willingness to voluntarily redistribute their wealth through charitable giving. Yet, these cross effects have seen little empirical attention nor played a role in the growing optimal capital taxation literature (see, e.g., Saez and Stantcheva 2018, Straub and Werning 2020, Rotberg and Steinberg 2021, Broer et al. 2021, Guvenen et al. 2021, Gaillard and Wangner 2021, Boar and Knowles 2022).

This paucity of empirical evidence is problematic as there are clearly defined but theoretically ambiguous links between capital taxation and household giving behavior. Capital taxation in the form of a wealth, capital income, or capital gains tax reduces the after-tax return on savings. This renders current consumption as well as charitable giving relatively more attractive than saving for the future, which causes households to give more through an intertemporal substitution effect. This substitution effect behaves as a pseudo avoidance strategy in which households give more today in order to reduce life-time taxes. Working in the opposite direction is the income effect. A tax on savings reduces wealth and disposable income, causing households to give less. In sum, whether the giving channel accelerates the redistributive potential of capital taxation or represses it is theoretically ambiguous. Whether these linkages between giving and capital taxation should be a first-order concern in optimal taxation is an open, unexplored question.

Empirically studying the effect of capital taxation on giving is challenging due to (i) a scarcity of identifying variation in the after-tax return on savings that is both exogenous and plausibly uncorrelated with other determinants of charitable behavior and (ii) limited data on household giving. In many settings, charitable giving is self-reported, which leaves it unclear whether one is observing changes to reporting or actual giving behavior (Tazhitdinova, 2018), which is a distinction that generally matters for welfare analyses (Chetty, 2009) and external validity (Garbinti et al., 2023). We overcome these challenges by exploiting quasi-experimental variation in the annual taxation of net wealth combined with comprehensive third-party-reported data on charitable giving.

We present new empirical evidence on capital taxation and charitable giving on two fronts and tie the results together in a simple life-cycle model that incorporates charitable giving. *First*, we provide novel empirical evidence on how capital taxation affects charitable giving. We obtain identifying variation in both the average and marginal after-tax rates of return on savings from substantial changes to the Norwegian wealth tax. Starting in 2013, the tax authorities began removing the preferential treatment of secondary housing wealth, while leaving it in place for primary homes. This meant that secondary home owners saw a large accounting increase in their taxable wealth, which increased their probability of paying a wealth tax and more than doubled their average wealth tax bill. This extensive-margin shock lowers marginal after-tax rates of returns on wealth and the intensive-margin shock lowers the average after-tax return on wealth. The nature of the reform allows us to control for overall estimated housing wealth while obtaining identification from pre-reform portfolio allocation into secondary versus primary housing wealth. We use this variation in a difference-in-differences (DiD) instrumental variables (IV) framework.

For many years prior to the reform, treated and control households were on identical trajectories in terms of their giving behavior. However, as soon as the reform occurs in 2013, we see a sharp reduction in the giving of secondary home owners. Using our IV specification, we find that a one percentage point increase in the tax rate on wealth decreases giving by 26%.

Theoretically, our negative giving estimate is the combination of two forces: A negative income effect of paying more in wealth taxes on the intensive margin and a positive intertemporal substitution effect from extensive-margin wealth taxation increasing the relative price of future giving. We empirically disentangle these two forces by exploiting the first-stage heterogeneity caused by progressive taxation (as in Gruber and Saez 2002). We find that the negative effect of wealth taxation on giving is, in accordance with theory, driven by households paying more in wealth taxes on the intensive margin. Interestingly, we find no evidence of offsetting positive effects of paying a wealth tax on the extensive margin. Inconsistent with intertemporal substitution effects being important, our point estimate is economically and statistically close to zero. In other words, the pseudo avoidance strategy of giving more now to reduce life-time wealth taxes is not present.

We further examine whether capital taxation affects *whether* households give. We show that the average treated household is about 2.4% less likely to give by the end of our sample period. This finding indicates the presence of fixed costs of giving. By reducing the optimal giving amount, fewer households find it worthwhile to give. We find that this participation effect is entirely driven by reduced entry into giving, which indicates that the fixed cost associated with giving consists entirely of a one-time entry cost as opposed to per-period participation costs.

Second, we use a bunching framework to estimate the elasticity of charitable giving with respect to its after-tax own price. This elasticity, although nominally unrelated to wealth taxation, provides a crucial empirical moment for calibrating a structural model of giving. In Norway, charitable giving is deductible in the income tax base and charitable organizations report giving amounts directly to the tax authorities. Importantly, the presence of a deduction limit creates a large discontinuity in the marginal after-tax price of giving, which allows us to make novel use of a bunching framework to infer the compensated after-tax own-price elasticity. While there is clear evidence that households bunch at the deduction limits, the implied elasticity is economically modest at about -0.44.

Furthermore, we test the common assumption that the compensated own-price elasticity is a constant parameter. By using regression-based techniques to uncover bunching heterogeneity (Bastani and Waldenström, 2021), we find that the magnitude of the elasticity is decreasing in income and wealth, but that this heterogeneity is economically small. We further find no evidence that wealth taxation causally affects the compensated own-price elasticity, suggesting that the elasticity is causally invariant to disposable income. Together, these findings support the common assumption of a constant compensated elasticity.

While our main analyses consider charitable giving as a uniform good, we exploit the granularity of our data to study differential effects of tax incentives based on the type of giving. In terms of the responsiveness to wealth taxation, we find both religious and nonreligious giving to be highly responsive. Among nonreligious giving, the effects are largely explained by a reduction in giving to organizations focused on international issues such as humanitarian aid, which highlights potential far-reaching spillover effects of capital taxation. In terms of the responsiveness of giving to its after-tax own price, we find that religious giving is ten times as elastic as nonreligious giving.

Finally, we combine our empirical findings to inform a simple life-cycle model that endogenizes charitable giving. We assume that households' per-period utility is given by

$$\frac{c_t^{1-1/\sigma}}{1-1/\sigma} + \kappa \frac{g_t^{1-1/\varepsilon}}{1-1/\varepsilon}, \tag{1}$$

where c_t is consumption, σ is the elasticity of intertemporal substitution, g_t is charitable giving, and ε is the key preference parameter governing the own-price elasticity of giving. We first show theoretically that giving responses to wealth taxation are jointly determined by σ and ε. In our calibration, we use the bunching evidence to determine that $\varepsilon = 0.44$. We then find that the EIS (σ) must equal 0.0815 to replicate our findings on how wealth taxes affect giving. The calibration exercise highlights how our findings from two different research designs inform the core parameters needed to model how charitable giving responds to a wide range of tax incentives. We illustrate the applicability of our calibrated model by simulating the partial-equilibrium response of a removal of the income-tax deductibility of giving. The effect of this removal corresponds to an uncompensated own-price elasticity of -0.49.

An important question is whether the effect of wealth taxation on giving is large enough to warrant attention in optimal tax models and from policymakers. In terms of a propensity to give out of wealth tax payments, our estimate is in fact economically modest at -0.012. However, this low level effect is driven by modest charitable giving in a country with ambitious social support systems, such as Norway. Hence, we further use our model to calculate dollar for dollar crowd-out effects in a high-giving environment such as the U.S., where giving as a fraction of GDP is more than ten times higher than in most European countries (OECD, 2020). By recalibrating κ such that giving equals 5% of gross income (List, 2011), we find a considerably higher crowd-out effect: each additional \$1 of annual wealth tax revenue would reduce the revenues of charitable organizations by \$0.28. We further find that the low EIS drives this large crowd-out. Setting the EIS equal to unity (i.e., log utility), each \$1 of annual wealth tax *increases* giving by \$0.03. Hence, spillover effects on charitable giving may indeed play a first-order role in determining the total redistributive effect of capital taxation when the EIS is low, which is what this paper and other quasi-experimental studies find (e.g., Best et al. 2020), and when the overall level of giving is high, as in the U.S. and the U.K.

While our baseline calibration ignores fixed costs of giving, we find that our key finding of a low EIS is highly robust to modeling entry costs. Calibrating the EIS to those who already give, we estimate a virtually identical EIS. In a further exercise, we allow for heterogeneity in the strength of the giving motive (κ) and explicitly model the decision to enter into charitable giving. Using our empirical estimates on participation effects, we calibrate entry costs equal to about one third of present value life-time giving for marginal givers. Using these estimates, we use our model to simulate the effects of removing entry costs. We find that this removal leads to a modest increase in total giving of about 21%.

Literature. Our paper contributes to a growing empirical literature on the effects of capital taxation (see, e.g., Lavecchia and Tazhitdinova 2021; Agersnap and Zidar 2021; Glogowsky 2021; Nekoei and Seim 2021; Goupille-Lebret and Infante 2018; Martínez-Toledano 2020; Boissel and Matray 2021; Arefeva, Davis, Ghent, and Park 2021; Agrawal, Foremny, and Martinez-Toledano 2020; Wong 2020; Londoño-Vélez and Tortarolo 2022; Korevaar and Koudijs 2023) and particularly the literature on household responses to wealth taxation (Seim 2017; Zoutman 2018; Durán-Cabré, Esteller-Moré, and Mas-Montserrat 2019; Londoño-Vélez and Ávila-Mahecha 2020a; Londoño-Vélez and Ávila-Mahecha 2020b; Jakobsen et al. 2020; Brülhart et al. 2022; Ring 2020; Berg and Hebous 2021; Jakobsen, Kleven, Kolsrud, Landais, and Muñoz 2022; Dray, Landais, and Stantcheva 2023; Garbinti, Goupille-Lebret, Muñoz, Stantcheva, and Zucman 2023). Our main contribution to the wealth tax literature is to consider the effect on charitable giving. This contribution is important for three reasons. (i) Any effect on giving may amplify or muzzle the intended redistributional effects of wealth taxation. (ii) There is no other direct evidence on how wealth taxation affects consumption, charitable giving included. (iii) In our setting, charitable giving is third-party reported, which allows us to isolate real responses. The existing wealth tax literature primarily either focuses on evasion or considers combined evasion, avoidance, and real responses to wealth taxes. A central finding in the wealth tax literature is that reported wealth is very sensitive to taxation. Extrapolating from this, one might expect to find that a way in which households reduce their wealth tax burden is to increase their giving. Our findings do not support this notion

We further add to the body of research on the role of tax incentives in charitable giving. This literature is particularly concerned with the own-price elasticity of giving (see, e.g., Feldstein 1975a; Randolph 1995; Auten, Sieg, and Clotfelter 2002; Meer 2014; Meer and Priday 2020; Bakija and Heim 2011; Fack and Landais 2010; Duquette 2016; Almunia, Guceri, Lockwood, and Scharf 2020; Hungerman and Ottoni-Wilhelm 2021; Cage and Guillot 2021). Our most direct contribution is to estimate the after-tax own-price elasticity using a methodology that is new to this literature, in combination with third-party reported data on giving. Few papers in this literature exploit non-linear price schedules, as we do, likely because exemption caps are typically not fixed, but depend on taxable income, as in the U.S. federal tax code.[1] Since we employ third-party reported data on giving, we are able to focus on actual giving rather than itemization responses to tax incentives (Meer and Priday, 2020). Consequently, our price elasticity of -0.44 is considerably smaller in magnitude than the elasticity of around -1 found in several of the analyses based on U.S. data.[2] We further provide important evidence on elasticity heterogeneity. Our finding that richer, higher-income households are, if anything, *less* price elastic suggests that the opposite finding in other settings could be driven by reporting rather than real giving responses.

Our main addition to the charitable giving literature is to consider the effects of capital taxation.[3] By documenting how capital taxation affects giving, we shed new light on the intertemporal aspects of charitable giving (see, e.g., Breman 2011; Andreoni and Serra-Garcia 2021; Meier 2007). In particular, our finding of a weak intertemporal substitution effect implies that households care not only about how much they give but also *when* they give it, which is incompatible with quasi-linear preferences. Our paper also provides novel evidence on income effects. By studying the intensive-margin response to wealth taxation, we provide information on the marginal propensity to give out of unearned income. To our knowledge, few such quasi-experimental estimates exist (see Drouvelis, Isen, and Marx 2019 for an overview). We also study whether capital taxation affects the own-price elasticity of giving. This is related to the notion that behavioral elasticities are not immutable parameters, but can rather be influenced by various policy instruments at the tax authorities' disposal (Slemrod and Kopczuk, 2002). While, e.g., Fack and Landais (2016) document the effect of tax enforcement on the price elasticity of giving, there is no evidence on whether nominally unrelated tax parameters, such as the tax rate on wealth, may alter this elasticity.

Relatedly, we also contribute to the literature that studies crowd-out effects in charitable giving (see, e.g., Deryugina and Marx 2021; Gruber and Hungerman 2007; Andreoni and Payne 2003; Okten and Weisbrod 2000; Meer 2017; Payne 1998; Nyborg and Rege 2003; Hungerman 2005; Boberg-Fazlić and Sharp 2017). This literature is particularly concerned with how government spending crowds out private giving. However, little attention is given to how the *financing* of government spending through taxing household savings may play an additional role.

The paper proceeds as follows. Section 2 introduces a simple life-cycle model with charitable giving that highlights the relationship between our reduced-form findings and structural primitives. Section 3 introduces the data and institutional setting. Section 4 considers the effect of wealth taxation on giving. Section 5 uses a bunching approach to estimate the own-price elasticity. In section 6, we calibrate the life-cycle model and discuss applications of it. Section 7 concludes.

[1] A notable exception is Hungerman and Ottoni-Wilhelm (2021) who exploit a state tax exemption threshold.

[2] We note that the U.S. evidence does not unambiguously point to large estimates (see, e.g., Randolph 1995).

[3] Cage and Guillot (2021) exploit a wealth tax reform in order to obtain identifying variation in the relative price for political and charitable giving, as opposed to the after-tax return on savings (as we do).

2 Conceptual Framework

In this section, we introduce a simple partial-equilibrium model of charitable giving. The comparative statics that follow from the model demonstrate the connection between giving, wealth taxation, and the own-price elasticity of giving. We subsequently calibrate the model in section 6 to discuss the implications of our quasi-experimental findings.

Model. Suppose an agent optimally chooses consumption, c_t, annual giving, g_t, and savings, s_{t+1}. The agent derives per-period utility from consumption and giving. As in Hungerman and Ottoni-Wilhelm (2021) and Almunia et al. (2020), we use additively separable preferences and parameterize "warm-glow" utility from giving as $\kappa\frac{g_t^{1-1/\varepsilon}}{1-1/\varepsilon}$, where κ is a utility weight. This parametrization is convenient as it implies a constant compensated own-price elasticity equal to ε. Our empirical setting allows us to estimate ε and to test whether the constant elasticity assumption is reasonable. Unlike other work, we do not assume quasi-linear preferences. We allow for a finite elasticity of intertemporal substitution (σ) by parameterizing $u(c_t) = \frac{c_t^{1-1/\sigma}}{1-1/\sigma}$.

We define the following household optimization program:

$$\max_{\{c_t, s_{t+1}, g_t\}_{t=0}^T} \quad \sum_{t=0}^T \beta^t \left[\frac{c_t^{1-1/\sigma}}{1-1/\sigma} + \kappa\frac{g_t^{1-1/\varepsilon}}{1-1/\varepsilon}\right], \tag{2}$$

$$\text{such that} \quad c_t = w_t - p_t g_t - s_{t+1} + s_t R_t, \tag{3}$$

where c_t is period t consumption, w_t is exogenous disposable income, g_t is period t giving, and p_t is the (after-tax) price of giving. R_t is the gross after-tax rate of return on any savings. That is, R_t equals 1 plus the interest rate, r_t, minus the wealth-tax rate, τ_t. This implies that $dR_t = -d\tau_t$. Hence, for simplicity, we do comparative statics with respect to R_t, but consider this equivalent to the effect of changing (in an opposite direction) the effective wealth tax rate, τ_t.

Note that we assume that households only receive utility from their own giving. While households may obtain utility from the aggregate level of giving, a given household's marginal effect is typically considered too small to affect responses to tax incentives (see, e.g., Almunia et al. 2020). To keep our framework simple, we assume that giving is a homogenous good. Since this is a rather restrictive assumption (Bursztyn et al., 2022), we supplement with empirical evidence on how tax incentives may have differential effects by the type of giving.

Proposition 1 *Assume that $R_t = R$ is constant from t to the end of the life-cycle, T. Then the level of giving, g_t, at some point in time, t, is determined by:*

$$\underbrace{g_t^{\sigma/\varepsilon}\left(\frac{p_t}{\kappa}\right)^{\sigma}\sum_{s=t}^T \beta^{\sigma(s-t)}R^{(\sigma-1)(s-t)}}_{\textit{Life-time consumption}} + \underbrace{g_t p_t^{\varepsilon}\sum_{s=t}^T p_s^{1-\varepsilon}\beta^{\varepsilon(s-t)}R^{(\varepsilon-1)(s-t)}}_{\textit{Life-time giving}} = \underbrace{\sum_{s=t}^T w_s R^{-(s-t)}}_{\textit{Wealth and Income}}, \tag{4}$$

where w_t also contains beginning-of-period-t wealth.

Proof: This result follows from substituting iterated FOCs into the life-time budget constraint (see

Online Appendix A.1 for details).

Discussion: This equation is useful for calibrating the parameters, σ and ε, as we can use it to simulate the effects of changing R (by increasing the wealth tax rate, τ) on g_t, and then determine which parameters produce responses that best resemble the empirical findings.

Proposition 2 *If R_t is constant over time, $p_t = 1$, and $T = \infty$, then the derivative of giving at time t with respect to the future after-tax rate of return, evaluated at $R = \beta^{-1}$, is given by*

$$\frac{dg_t}{dR} = \underbrace{\frac{\varepsilon g_t}{\sigma c_t + \varepsilon g_t}}_{\text{Sensitivity}} \left\{ \underbrace{-(\sigma-1)\sum_{s=t}^{\infty} w_s R^{-(s-t)-1}}_{\text{Income v. substitution}} \underbrace{-\left(1-\frac{1}{R}\right)\sum_{s=t}^{\infty}(s-t)w_s R^{-(s-t)-1}}_{\text{Human wealth effect}} \underbrace{-\frac{\varepsilon-\sigma}{R^2(1-R^{-1})}g_t}_{\text{Elasticity adjustment}}. \right\} \tag{5}$$

Proof: This result follows from applying the additional assumptions to Proposition 1 and letting $T \to \infty$ (see Online Appendix A.1 for details).

Discussion: Letting $T \to \infty$ and evaluating at $R\beta = 1$ allow for simple comparative statics useful for building intuition. The resulting differential equation shows that the key parameters governing responses to tax-induced rate-of-return shocks are σ and ε. The proposition further shows that the effect is governed by familiar sources: the first term in the brackets is the classic income versus substitution trade-off. Inside this term, the agent increases giving if the after-tax rate goes down (due to, e.g., a wealth tax) if and only if $\sigma > 1$. The second term is a human wealth effect in which lowering R increases the present value of future incomes, and thus giving through a wealth effect. The third term says that if giving is more elastic than consumption ($\varepsilon > \sigma$), then there is an additional intertemporal substitution effect. Empirically, this last term is less important since g_t is small relative to wealth and life-time income. Finally, the *sensitivity* term on the left-hand side says that the giving effect is larger in magnitude whenever the expenditure-weighted giving elasticity (εg_t) is large relative to the consumption elasticity (σc_t).

This proposition demonstrates the theoretical ambiguity in how giving respond to rate-of-return shocks, such as those from wealth taxation. If, for example, $\sigma > \varepsilon > 1$, a reduction in the after-tax rate of return will increase charitable giving. On the other hand, if σ is low and the human wealth effect is small due to a downward-sloping income path (due to, e.g., retirement), the effect may instead be negative. The proposition also shows that one empirical moment is not enough to pin down the structural parameters. Both σ and ε are important, but an empirical estimate of $\frac{dg_t}{dR}$ cannot easily be used to calibrate both. This motivates our empirical strategy, in which we use a bunching design to estimate the own-price elasticity parameter, ε, and then use the empirical estimate of $\frac{dg_t}{dR}$ to calibrate σ.

Corollary 1 If preferences are quasi-linear (i.e., linear in c_t), capital taxation *increases* current giving, regardless of the value of ε.

Proof: The result follows from letting $\sigma \to \infty$ in Proposition 2 (see Online Appendix A.1).

Discussion: Quasi-linear preferences are often assumed in applied studies in public finance. This corollary provides a simple testable implication of this assumption.

Proposition 3 *The sensitivity of giving to the log gross after-tax rate of return is a constant fraction of the consumption sensitivity, and this fraction equals the ratio of the EIS to the compensated own-price elasticity of giving.*

$$\frac{d\log(g_t)}{d\log(R_t)} \quad = \quad \frac{\varepsilon}{\sigma}\,\frac{d\log(c_t)}{d\log(R_t)}. \tag{6}$$

Proof: The budget constraint and FOC for g_t imply that $-\varepsilon\ \log(g_t) + \log\kappa = \log p_t + \log u'(c_t)$. Equation (6) follows from differentiating with respect to $\log(R_t)$.

Discussion: Equation (6) shows that the sign of the giving response, $\frac{d\log(g_t)}{d\log(R_t)}$, equals the sign of consumption responses to changes in the after-tax rate of return. This highlights how the theoretical ambiguity regarding consumption responses to rate-of-return changes applies to charitable giving. It further emphasizes the role of ε in determining the strength of giving responses relative to consumption responses to rate-of-return shocks.

3 Data and Institutional Setting

3.1 Data

We employ administrative micro data on households' income and wealth over the period 2010–2018 (Statistics Norway, 2019). The data include information on wealth tax payments and the composition of taxable wealth. We combine the administrative data on income and wealth with third-party reported data on charitable giving, recently available from administrative registers for the 2012–2018 period. Since charitable giving is tax deductible in the personal income tax, the tax authorities keep records of how much taxpayers give to charitable organizations. In order to limit the scope for tax evasion and reduce the the administrative burden for the taxpayer, the tax authorities require these amounts to be reported directly by the recipient organizations. Hence, we observe the identities of both givers and the recipients. The tax authorities maintain a comprehensive list of qualified charitable organizations, and all of these report yearly donated amounts at the individual level to the tax authorities. Importantly, data are not truncated at the personal income tax deduction threshold; full amounts are reported. This provides us with rather unique, as well as comprehensive, panel data of charitable giving at the individual and household level, which is not affected by issues related to self-reporting. Finally, since the untruncated data are only available from 2012, we supplement with a longer panel of charitable giving deductions from income tax returns. While these are truncated at the deduction threshold, they are useful for assessing the internal validity of our study by examining pre-trends.

3.2 The Norwegian Wealth Tax

Norway has a long tradition of annually taxing net wealth using a progressive scheme. As of 2009, the wealth tax has taken a relatively simple form, where households pay wealth taxes according to the following formula:

$$wtax_{h,t} = \tau_t \mathbb{1}[TNW_{h,t} > T_t](TNW_{h,t} - T_t), \tag{7}$$

which states that for household h, observed at the end of year t, any taxable net wealth (TNW) in excess of a threshold, T_t, is taxed at a rate of τ_t.[4] Tax rates and thresholds (2011–2018) are presented in Panel A of Table 1. The threshold increased from NOK 750,000 (USD 125,000) in 2012 to NOK 1,480,000 (USD 250,000) in 2018.[5] This nonlinear wealth tax schedule may be summarized by the marginal and average wealth tax rates:

$$MWTR_{h,t} = \tau_t \mathbb{1}[TNW_{h,t} > T_t] \quad \text{and} \quad AWTR_{h,t} = \frac{wtax_{h,t}}{Net\ Wealth_{h,t}}. \tag{8}$$

These definitions imply that the marginal *return* on wealth is lowered one-for-one by an increase in $MWTR$ and, similarly, the average return on wealth is lowered one-for-one by increases in $AWTR$. The presence of valuation discounts on some assets imply that taxable wealth (TNW) generally differs from overall net wealth. While financial wealth predominantly enters the tax base, TNW, at third-party reported market values, the estimated market value of housing enters at a discounted fraction:

$$\text{Taxable Value of Housing Wealth}_{h,t} = (1 - d_t^{primary})MVHP_{h,t} + (1 - d_t^{secondary})MVHS_{h,t}, \tag{9}$$

where $d_t^{primary}$ and $d_t^{secondary}$ refer to the discount rates for the different types of housing assets. $MVHP$ is the estimated market value for primary housing.[6] A household's primary home is where the household is registered to live according to government registers. $MVHS$ refers to secondary homes. Primary and secondary houses are only distinguished by whether they are registered to be someone's primary abode. Taxpayers may only own one unit of primary housing, but multiple units of secondary housing.

The differential changes to the discount rates on primary and secondary housing is our source of identifying variation in wealth tax exposure. The valuation discount on primary housing, $d_t^{primary}$ is fixed at 75% over the whole period, while the discount on secondary housing, $d_t^{secondary}$, decreased from 60% in 2012 to 10% in 2018. This implies that even if we keep the total value of housing wealth constant, households who hold more $MVHS$ will see their TNW inflated over time. From equation (7), we see that this may cause both a higher annual wealth tax bill as more wealth is pushed above the wealth tax threshold, as well as higher propensity to face a lower return on any marginal savings (working through $\tau_t \mathbb{1}[TNW_{h,t} > T_t]$).

[4] We account for the fact that married households are subject to two times the nominal threshold.
[5] We use the 2012 USD/NOK exchange rates for 2012 of about 6.
[6] The tax authorities employ a hedonic pricing model to estimate the market value of homes (see Ring 2020).

The tax implications of lower discount rates should be salient to secondary home owners who, on average, saw their annual wealth tax bill more than doubled between 2012 and 2018.[7] Annual tax returns are pre-filled with an individual's assets, and how much they contribute to taxable wealth. From this pre-filled return, it is straightforward to see how different housing assets increase the wealth tax bill. In addition, prior to any given tax year, households are notified of their withholding rates and how it is determined, detailing, e.g., how their ownership in secondary housing will affect their wealth tax liabilities.

3.3 Tax Treatment of Charitable Giving

Donations to charitable and religious organizations are tax deductible in the "ordinary income" tax base. The list of exemption-approved organizations is comprehensive (Sivesind, 2015) and includes international organizations such as Amnesty International, the Red Cross, and Doctors Without Borders. The ordinary income tax base is taxed at a flat rate, which implies that the after-tax price of giving does not depend on an individual's taxable income. This differs from other countries, such as the U.S., where charitable giving is also deductible in the tax bases that are subject to progressive taxation. For the 2018 tax year, for example, the government refunded 23% of taxpayers' charitable giving up to a limit of NOK 40,000 (USD 6,700).

More generally, a taxpayer, i, gets a tax refund of τ_t^g of any charitable giving, $g_{i,t}$, that does not exceed the exemption cap, K_t, that is $\min\{\tau_t^g \cdot g_{i,t},\ K_t \cdot \tau_t^g\}$. This creates a jump in the marginal after-tax price of 1 NOK worth of giving from $1 - \tau_t^g$ to 1 at $g_{i,t} = K_t$. The tax treatment of charitable giving thus creates a discontinuity in the marginal (after-tax) price. We summarize the tax scheme in Table 1.

3.4 Summary Statistics

Panel B of Table 1 provides the main summary statistics for our data. We restrict our sample to households for whom changes in housing discount rates may materially affect their wealth tax exposure: Their $TNW_{h,2012}$ is at most 0.5 million NOK (MNOK) below the threshold and at most four times the thresholds.[8] This restricts the sample to households for whom decreases in housing discount rates may materially affect their wealth tax position. We further condition on households having strictly positive estimated housing wealth (MVH) as of 2012. The table shows that 43% of the households in our sample paid a wealth tax in any given year, and conditional on paying the

[7] Appendix Figure A.2 shows that each million NOK (MNOK) of secondary housing wealth increased annual wealth taxes by about NOK 2,800. The summary statistics show that the average secondary home was valued at 1.95 MNOK and that the average secondary home owner paid (after 2012) NOK 10,038 in wealth taxes. Hence, the relative effect is 2800*1.95/(10038-2800*1.95)=119%.

[8] We account for the fact that married households face double the nominal threshold. The reason for the asymmetric cutoffs is that TNW is not symmetrically distributed around the wealth tax threshold. By using symmetric cutoffs, our sample would largely consist of nonpayers of the wealth tax. In addition, as Appendix Figure A.1 shows, if we included more households to the left of the cutoff, in our IV analyses, $MWTR$ effects would be identified by households whose TNW is much lower than those who allow us to identify the $AWTR$ effects. For our reduced-form findings, Appendix Figure A.7 shows that that imposing a symmetric sample criteria does not qualitatively affect our results.

Table 1: Institutional Details and Summary statistics

Notes: Panel (A) provides information on wealth taxation and the tax-deduction scheme for charitable giving. Panel (B) provides summary statistics for the main sample used to study the effects of wealth taxation on giving. Net wealth equals taxable wealth gross of any valuation discounts. Amounts in Norwegian kroner (NOK) may be divided by 6 to obtain an approximate USD amount as of 2012.

Panel A: Institutional Details

	2011	2012	2013	2014	2015	2016	2017	2018
Contribution to TNW, $(1 - d_t^{(\cdot)})$								
Primary, MVHP	25%	25%	25%	25%	25%	25%	25%	25%
Secondary, MVHS	40%	40%	50%	60%	70%	80%	90%	90%
Wealth tax rate, τ_t	1.1%	1.1%	1.1%	1.0%	0.85%	0.85%	0.85%	0.85%
Wealth tax threshold, T_t (MNOK)	0.7	0.75	0.87	1	1.2	1.4	1.48	1.48
Giving tax deduction rate, τ^g	28%	28%	28%	27%	27%	25%	24%	23%
Giving deduction cap, K_t (NOK 1,000)	12	12	12	16.9	20	25	30	40

Panel B: Summary Statistics, main sample, 2012–2018

	N	mean	p25	p50	p75
$1[\text{Giving}_{h,t} > 0]$	4,078,145	0.32			
$\text{Giving}_{h,t}$ if > 0	1,069,227	5,758	1,390	3,000	5,800
$1[wtax_{h,t} > 0]$	4,078,145	0.43			
$wtax_{h,t}$ if > 0	1,765,842	12,734	3,174	7,835	16,299
$wtax_{h,t}$ if $\text{MVHS}_{h,2012} > 0$	730,964	10,038	0	2,373	13,735
$\text{MWTR}_{h,t}$ if > 0	1,765,842	0.96%			
$\text{AWTR}_{h,t}$ if > 0	1,765,842	0.20%			
As of 2012:					
$\text{MVH}_{h,2012}$, MNOK	624,969	3.12	1.72	2.55	3.84
$\text{MVHS}_{h,2012}$ if > 0, MNOK	111,469	1.95	0.92	1.56	2.51
$\text{wealth}_{h,t}$	624,969	3,464,991	2,055,887	3,030,239	4,371,869
$\text{Age}_{h,2012}$	624,969	61	50	62	73
Gross $\text{income}_{h,2012}$	624,969	640,364	311,318	482,711	800,686
Number of adults_h	624,969	1.39			

tax, paid about NOK 12,734 (USD 2,100) on average. Our panel is unbalanced due to, e.g., death or migration[9]

Approximately 19% of the households in our sample owned a secondary house. We further see that 32% of the households in our sample donate in any given year and, conditional on giving, they give approximately NOK 5,758 (USD 770) on average.

For our quasi-experimental evidence on how wealth taxation affects giving, treated households all own secondary homes. Appendix Table A.1 provides summary statistics by secondary home ownership. Some of the differences are intuitive: secondary home owners are wealthier (28% higher means) and have higher incomes (26%). Importantly, we control for these differences in our regression specifications. It is therefore reassuring that the distributions for income and wealth are substantially overlapping. In terms of their charitable giving behavior, the households are very similar. Secondary home owners are only 1 percentage point more likely to give, and, conditional on giving, the median amount of giving is identical.

[9]The number of households in 2012 times the number of sample years (7) exceeds the total number of observations due to some sample attrition (due to, e.g., death).

We make a few adjustments to mitigate the impact of outliers. We bound the amount of wealth taxes paid, $wtax_{h,t}$, to 10% of $TNW_{h,2012}$. This adjustment affects only a modest number of households (who saw a cumulative TNW increase since 2012 of at least 1000%). In addition, to account for moderate level increases from a small initial TNW, we limit $wtax_{h,t}$ to 10% of 1 MNOK if $TNW_{h,2012}$ is below 1 MNOK. We also limit both individual and household-level annual giving to NOK 100,000 (USD 16,700). This also affects very few households.[10] When taking logs of giving, we do not limit the amount, but shift it by an inflation-adjusted NOK 1,000 in order to limit the influence of very small level differences in regressions (see discussion in Appendix E.) We find that this produces similar semi-elasticities as those obtained when re-scaling the level effect to calculate the implied semi-elasticity of giving with respect to the wealth tax rate.[11] Gross income, which is used as a control variable, is shifted by an inflation-adjusted NOK 10,000 prior to taking the logarithm.

3.5 Giving and Its Composition Across the Wealth Distribution

This section graphically describes the composition of giving in Norway. For the 2012–2018, we observe the identity of the recipient organizations. Using the organization identifiers and names, we classify all charitable organizations into one of three types. (i) Religious organizations are local or national churches, missionary organizations, as well as non-christian religious organizations. (ii) Internationally-focused organizations includes groups such as the Red Cross, Amnesty International, and climate or environmental organizations such as the World Wildlife Foundation. Finally, (iii) domestic organizations range from groups that provide support for individuals with disabilities, to coastal rescue organizations, and to local sports clubs.

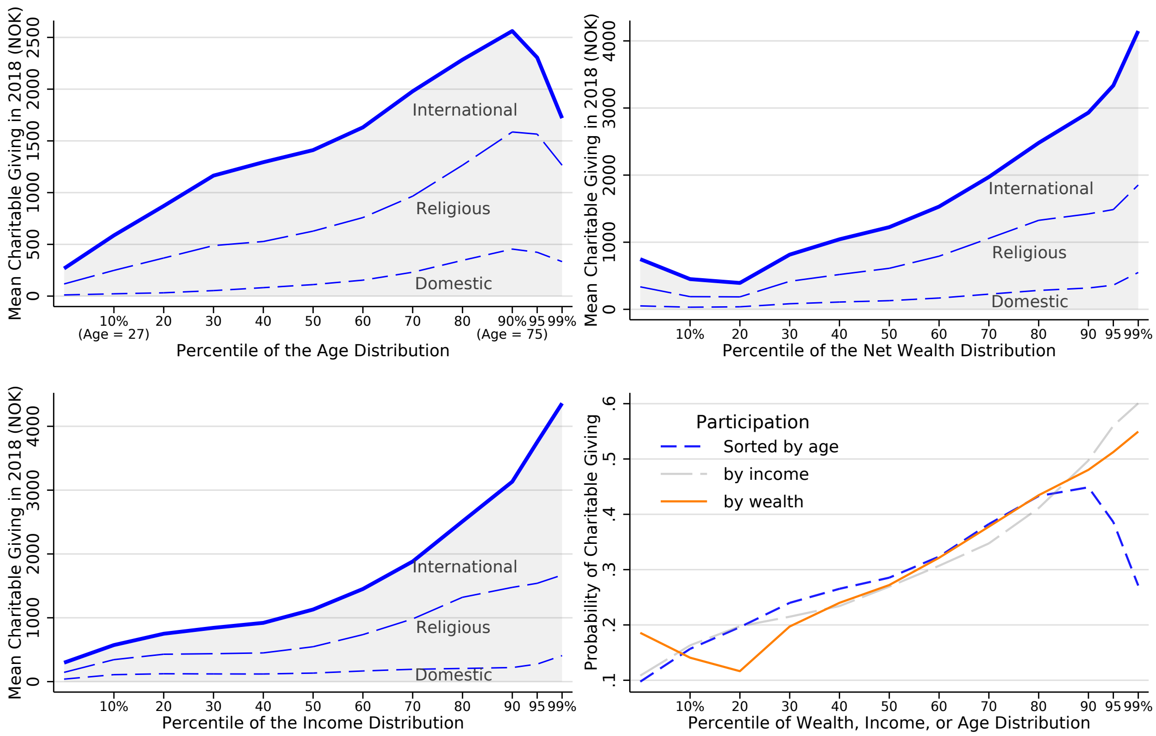
Since we are studying a wealth tax that mostly affects moderately wealthy and older high-income individuals, we plot the amount and decomposition of giving across the wealth, age, and income distributions. We provide our findings in Figure 1. The main distinctive feature of the Norwegian setting is the importance of international giving. While Meer and Priday (2021) find international giving to be modest at around 5% of total giving for moderately wealthy U.S. households, it accounts for almost 50% in our setting. Thus, while it is true that Norwegian households give considerably less on average, they give more than U.S. households to international organizations.[12]

[10] Conditional on giving a positive amount, the 99th percentile of household giving is NOK 50,000.

[11] Dividing the effect of 1 NOK in wealth taxes on the NOK amount of giving, -0.0121 (column 2, Table 2), by the unconditional average amount of giving per household ($5,758 \times 0.32$) and then further by the effect of 1 additional NOK of wealth taxes on the AWTR (1/3464991) provides a semi-elasticity of -22.74, which is almost identical to the semi-elasticity of -22.44 implied by regressing adjusted log giving on the instrumented $AWTR$.

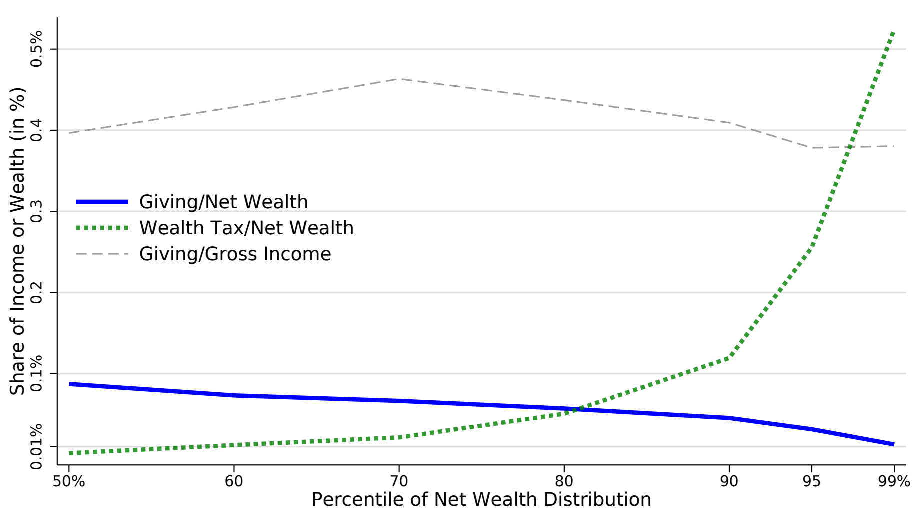
[12] Meer and Priday (2021) find total giving at the 90th percentile of wealth to be about $3,300. With an international share of about 5% then equals about $165. In our setting, mean international giving at the 90th percentile is approximately $250.

Figure 1: Charitable Giving Across the Age, Wealth, and Income Distributions



Notes: The first three panels provide average total and decomposed giving across the age, net wealth, and income distributions, as of 2018. The bottom-right panel provides participation rates (i.e., whether total giving exceeds zero). In the first three panels, average giving amounts are stacked to total overall giving. The y-axis value of a given line at, e.g., the 50th (95th) percentile provides unconditional averages for households with wealth weakly above the 50th (95th) percentile and strictly below the 60th (99th) percentile.

Figure 2: Charitable Giving and Wealth Taxes as a Share of Wealth



Notes: This figure plots giving as a share of wealth across the upper-half net wealth distribution. The short-dashed green line provides the ratio of wealth taxes to net wealth ($AWTR$). This figure only uses data for the last available year, 2018.

While wealthier households give more, Figure 2 shows that they give less as a share of their wealth and about the same as a share of their income. This stands in contrast with the U.S., where wealthier households give a much larger share of their income (Meer and Priday, 2021). A possible explanation for this difference is the highly progressive Norwegian tax system. We emphasize this by also plotting wealth taxes as a share of wealth ($AWTR$). This reveals a steep increase around the 90th percentile. Contrasting the average wealth tax rate with relative giving reveals a negative correlation between forced redistribution (wealth taxation) and voluntary redistribution through giving. Our quasi-experimental approach will help shed light on whether there is a causal relationship behind this negative correlation.

4 The Effect of Wealth Taxation on Charitable Giving

4.1 Quasi-Experiment and Reduced-Form Specification

The fact that wealth tax payers (by construction) are wealthier poses important challenges in obtaining causal effects of wealth taxation. The standard approach is to exploit wealth tax reforms that change marginal tax rates for households above the wealth tax threshold or reforms that change the threshold, which may cause a new group of households to be subject to the wealth tax. This facilitates the removal of confounders that do not vary with time (i.e., fixed effects). However, identification relies on comparing households who differ in terms of their pre-reform (taxable) wealth (see, e.g., Jakobsen, Jakobsen, Kleven, and Zucman 2020) who may be on different *trajectories*. To address this, we employ a quasi-experimental approach that allows us to flexibly control for pre-reform wealth and isolate variation coming from changes to the tax authorities' assessment rules.

More specifically, our empirical framework exploits the fact that households with the same total housing wealth will see differential wealth taxation from 2013 to 2018, depending on the share of taxable housing wealth due to secondary housing (see section 3.2 for details). This allows us to control for different measures of wealth and thereby minimize the concern that wealthier households were on different counterfactual giving trajectories.

Our baseline reduced-form analyses are based on the following regression equation.

$$y_{h,t} \quad = \quad \beta_t MVHS_{h,2012} + \zeta_t MVH_{h,2012} + \alpha_t + \eta_t C_{h,2012} + \epsilon_{h,t}, \quad t = 2006, ..., 2018 \tag{10}$$

where MVH is the total market value of primary ($MVHP$) and secondary housing ($MVHS$), and also the adjusted tax value of any cabins.[13] $C_{h,2012}$ is a vector of household-level controls, which includes third-order polynomials in $TNW_{h,2012}$ and age, as well as a second-order polynomial in family size. $C_{h,2012}$ further includes a dummy variable for whether there are two adults in the

[13] In the government registers, regular housing is divided into secondary and primary based on their current use. MVHS and MVHP are both estimated using hedonic pricing models (see Ring 2020). Cabins, ("recreational housing") however, is a distinct category. The tax value of cabins is based on historical cost (typically initial construction cost) which should not exceed 30% of the market value. Hence, we divide the tax value by 0.3.

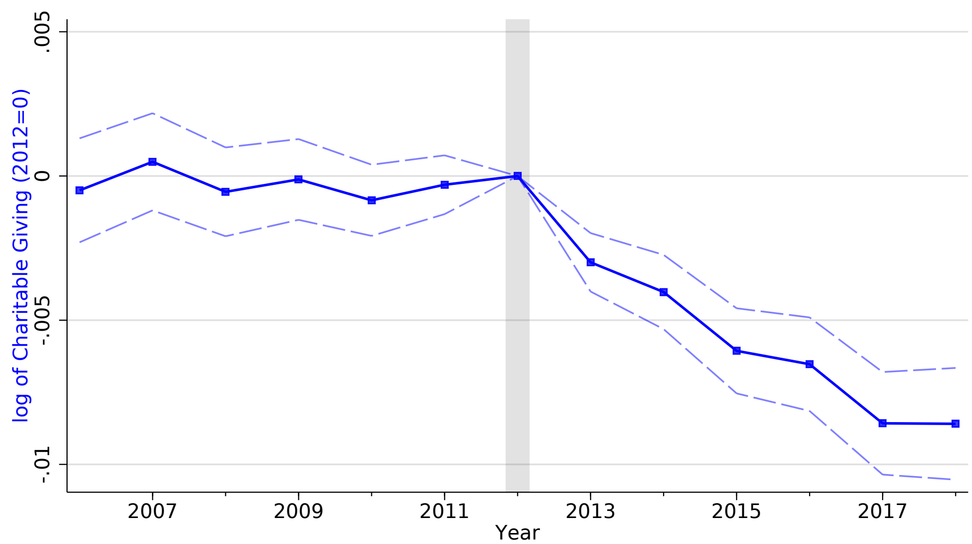
household, and log household labor income in 2012. We also include a 2012-valued indicator variable for whether the household owns a secondary home or a cabin. The estimated coefficient on the $C_{h,2012}$ and $MVHS$ vary by year and thus capture nonlinear trends in giving associated with ex-ante household characteristics. Finally, α_t are year fixed effects and $\epsilon_{h,t}$ are the error terms. Importantly, this is approach uses secondary-housing wealth for identification, but controls for overall housing wealth and other measures of wealth and income.[14]

With our empirical specification, the causal interpretation of our findings is only limited to the extent that households with larger $MVHS$ in 2012—keeping overall wealth and housing wealth fixed—increased or decreased their giving during 2013–2018 for reasons unrelated to wealth taxation. We discuss potential objections to this identifying assumption in section 4.6.

4.2 Reduced-form Evidence on How Wealth Taxation Affects Giving

We first provide reduced-form evidence in Figure 3, which comes from estimating equation (10), normalizing the effect to be zero in 2012. For this analysis, we consider the longer panel of giving that is truncated at the deduction limit but allows us to assess pre-trends.[15]

Figure 3: Wealth Taxation and Charitable Giving: Quasi-Experimental Evidence from the Tax Valuation of Secondary Housing



Notes: This figure shows the reduced-form effect on giving of the 2013-and-onward increase in wealth tax exposure among secondary home owners. Each point estimate shows the effect of owning 1 MNOK more in secondary housing wealth (measured in 2012). The point estimates come from estimating equation (11), simplifying $f(\cdot)$ to be a year-specific linear function of $MVHS_{h,2012}$ alone, and using charitable giving as the left-hand-side variable. Giving is measured using the "long panel" of charitable giving deductions from tax returns. We shift giving by an inflated-adjusted NOK 1,000 to accommodate zeros (and thus entries and exits) and to minimize the impact of small level changes. The dashed lines provide 95% confidence intervals. See Figure 4 for extensive-margin responses.

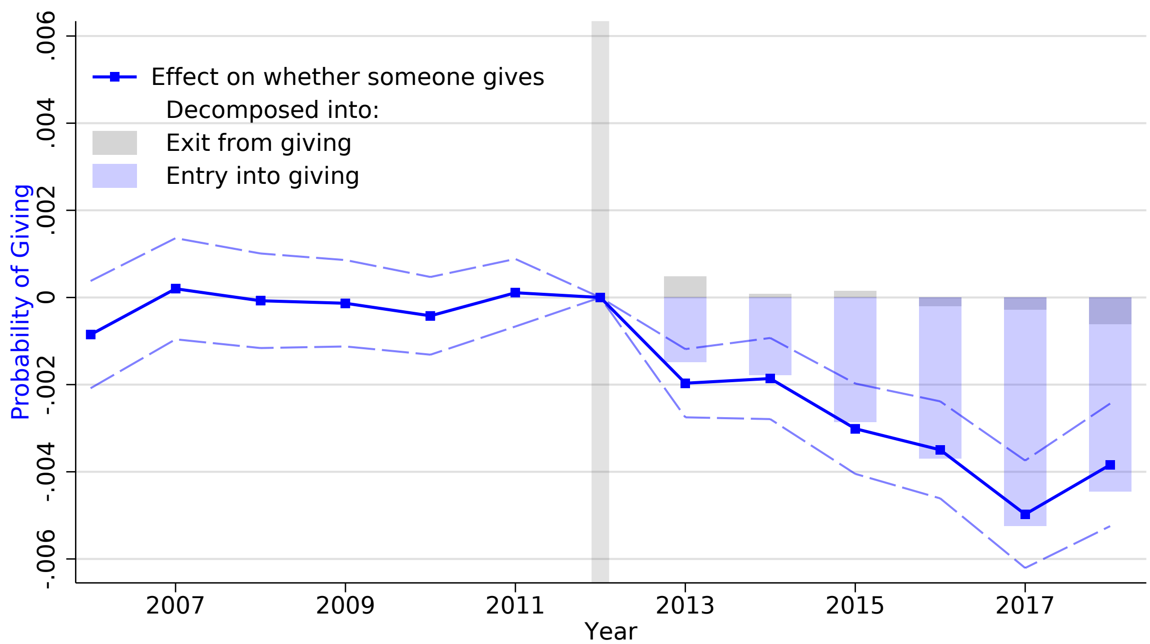
[14] Since some households are also affected by increases in the wealth-tax thresholds and reductions in the marginal tax rates during 2013–2018, our empirical specification differences out these effects by controlling for ex-ante taxable wealth. Hence, we isolate variation in wealth tax exposure to come from ex-ante ownership in secondary housing.

[15] Appendix Figure A.3 shows that the post-2012 effects are the same for truncated and untruncated giving.

Figure 3 shows that initial ownership of more secondary housing, $MVHS_{h,2012}$, has a marked effect on charitable giving. Each additional MNOK of secondary housing wealth *reduces* charitable giving by almost 1%. This negative effect is consistent with income effects dominating substitution effects. We see that households respond gradually, which is likely driven by the gradual reduction in the assessment discount rates, resulting in the first-stage effect on wealth-tax exposure also being gradual (see Appendix Figure A.2).

Extensive-margin responses. The previous results include both intensive and extensive-margin adjustments. We proceed by focusing on extensive-margin effects, that is, whether someone chooses to give. If it is costly for households to participate in charitable giving, due to, e.g., attention or learning costs, households may respond to wealth taxation by stopping to give rather than just reduce the amount they give. Conversely, among households who do not participate in charitable giving, those more exposed to the wealth tax may be less likely to enter.

Figure 4: THE EFFECT OF WEALTH TAXATION ON WHETHER HOUSEHOLDS GIVE: NO EXITS, BUT REDUCED ENTRY



Notes: This figure shows the reduced-form effect of wealth taxation on *whether* a households give. Each point estimate shows the effect of owning 1 MNOK more in secondary housing wealth (measured in 2012), which is our instrument for wealth tax exposure during 2013–2018. The point estimates come from estimating the reduced-form equation (10), simplifying $f(\cdot)$ to be a year-specific linear function of $MVHS_{h,2012}$ alone. The solid blue line provides the effect on whether a household gives ($\mathbb{1}[G_{h,t} > 0]$). We decompose this effect onto entries (blue) and exits (gray). The blue bars consider the number of times the household has gone from not giving to giving a positive amount, starting in 2012. Similarly, the gray bars consider the effect on the number of exists. The sum of these two variables equal a household fixed effect plus $\mathbb{1}[G_{h,t} > 0]$. Hence, the blue bars minus the gray bars should roughly equal the point-estimate for overall participation (solid blue line). $G_{h,t}$ is measured using the "long panel" of charitable giving deductions from tax returns. The dashed lines provide 95% confidence intervals.

Figure 4 shows clear extensive-margin effects. By 2018, the average treated household ($MVHS =$ MNOK 3) is about 0.8 percentage points less likely to give. We find that this effect is entirely driven by reduced entry into giving. The theoretical implication is that there must exist entry costs. For some households, wealth taxation lowers the optimal amount of giving by enough for the utility of giving to be smaller than the (fixed) utility cost of entering the market for giving. Similarly, since there is no effect on exits, there is unlikely to be sizable per-period participation costs.

4.3 Instrumental Variables Methodology

We now use an instrumental variables (IV) approach, where the initial stock of secondary housing wealth is used as an instrument for wealth tax exposure. In order to estimate differential effects with respect to both extensive and intensive margin wealth tax exposure, we employ a more flexible version of the event-study equation (10). The added flexibility is that the first-stage and reduced-form effects of secondary housing wealth may now covary with initial taxable wealth. Below, we discuss how this will allow us to simultaneously instrument for multiple measures of wealth tax exposure (i.e., marginal *and* average tax rates).

More specifically, we estimate the following system of equations to identify the effect of wealth tax exposure on charitable giving behavior:

$$\begin{aligned} wtax_{h,t} &= \underbrace{f_t(MVHS_{h,12}, TNW_{h,12})\mathbb{1}[t > 2012]}_{\text{Secondary housing wealth instrument}} + \tilde{f}^{FS}(MVHS_{h,12}, TNW_{h,12}) \\ &+ g_t^{FS}(MVH_{h,12}, TNW_{h,12}) + \alpha_t^{FS} + \eta_t^{FS} C_{h,2012} + \epsilon_{h,t}^{FS}, \end{aligned} \tag{11}$$

$$\begin{aligned} Giving_{h,t} &= \underbrace{\beta wtax_{h,t}}_{\text{Instrumented variation}} + \underbrace{\tilde{f}^{SS}(MVHS_{h,12}, TNW_{h,12})}_{\text{Differences out 2012 effect}} \\ &+ \underbrace{g_t^{SS}(MVH_{h,12}, TNW_{h,12})}_{\text{Controls for total (housing) wealth}} + \alpha_t^{SS} + \eta_t^{SS} C_{h,2012} + \epsilon_{h,t}^{SS}, \end{aligned} \tag{12}$$

where g_t^{FS} and g_t^{SS} are estimated as time-varying polynomial functions, which take the same functional form as f, $\tilde{f}^{FS}$, and $\tilde{f}_t^{SS}$.[16] In particular, we allow the identifying variation from differences in $MVHS_{h,2012}$ to covary with initial TNW. Naturally, we also control for TNW separately in all regressions. More specifically, in the system of equations (11)–(12), the instrumental variation comes from $f_t(MVHS_{h,2012}, TNW_{h,2012})$, which provides identifying variation for $t > 2012$, when the post-2012 indicator, $\mathbb{1}[t > 2012]$, turns on. This approach isolates exogenous variation in wealth tax exposure to come from an increased contribution of $MVHS$ to the wealth tax base over time, and allows us to estimate β, the coefficient of interest. The $\tilde{f}(\cdot)$ terms difference out the baseline (2012) effect from the instrument, which implies that we are using a DID–IV specification, and the g_t terms controls for initial TNW and overall housing wealth, MVH.

Intensive versus extensive-margin effects. A reasonable assumption is that households with

[16] For each function, g_t^{FS}, g_t^{SS}, f_t, $\tilde{f}^{FS}$, and $\tilde{f}^{SS}$, we estimate distinct parameters (η_{b_j}).

higher initial TNW, and who therefore are further away from the wealth tax threshold, see relatively larger intensive margin (i.e., amount they pay) than extensive margin effects (i.e., whether they pay) of higher assessed secondary housing wealth. We verify this in our first-stage regressions (see Appendix Figure A.1), which means that we are able to separately identify the effects of intensive and extensive margin variation in wealth tax exposure.[17] We parameterize by letting first-stage and reduced-form effects vary non-parametrically with initial TNW.

$$f(MVHS, TNW) = \sum_j \eta_{b_j} \mathbb{1}[b_j \leq TNW - T_{12} \leq b_{j+1}] \cdot MVHS, \tag{13}$$

where T_{12} refers to the wealth tax threshold in 2012,[18] and $b_j = -0.5, -0.4, ..., 0.3,\ 0.4, 0.6, 0.8, 1.2, 1.6,\ 2M, \infty$ MNOK, and the sample is limited to households with $TNW_{h,12} - T_{12} \geq b_1$. We include b_j dummies as control variables in all regressions (first-stage, reduced-form, and second-stage) to isolate the identifying variation to come from increased housing assessment as opposed to differences in ex-ante TNW.

In one application of this approach, we define the intensive margin to be the average wealth tax rate, $AWTR$, and the extensive margin to be the marginal rate, $MWTR$. We thus estimate two coefficients, β^{AWTR} and β^{MWTR}, essentially by having two versions of the first-stage equation 11 with $AWTR$ and $MWTR$ as the left-hand-side variables.

4.4 IV Results on How Wealth Taxation Affects Giving Behavior

In Table 2, we present results from the full DID-IV estimation, which uses the nontruncated panel on charitable giving that starts in 2012. We present our findings in two ways.

Estimated propensities to give out of higher wealth taxes. Columns (1)-(2) examine the effect on the amount given. In column (1), we find that each additional NOK paid in wealth taxes reduces giving by 0.012. This estimate may also be obtained from considering the dynamic effects on the amount of giving and wealth taxes in Appendix Figure A.2. Importantly, this estimate does not isolate intensive-margin effects. If intertemporal substitution is strong, the estimate of 0.012 is potentially a combination of stronger, negative income effects and slightly weaker positive substitution effects. However, the results in column (2) do not support this. The instrumented variation in *whether* households pay a wealth tax does not cause additional giving. The point estimate of NOK -28.58 (USD 5) is economically small and statistically insignificant.

Semi-elasticity of giving with respect to the wealth tax rate. Columns (3)-(4) consider the log of giving as the outcome variable and tax rates as the explanatory variables. This produces point estimates that correspond to semi-elasticities. Column (3) says that a 1 percentage point reduction in the marginal wealth tax rate reduces charitable giving by about 10%.

[17] See Gruber and Saez (2002) for an implementation of this approach in the context of income taxation and Ring (2020) in the context of saving responses to wealth taxation.

[18] While there is no household-level subscript on T_{12}, we account for the fact that married households face a double threshold by using 2012 marital status.

Table 2: Wealth Taxation and Charitable Giving:
Main Results from DID-IV Regressions

Notes: The table provides the key coefficients from estimating the system of equations in (11)-(12). We allow first-stage effects on wealth tax exposure to vary by ex-ante $TNW_{h,12}$ bins to obtain first-stage heterogeneity, but include $TNW_{h,12}$ bin fixed effects as a control to isolate the identifying variation to come from ex-ante $MVHS$. $AWTR$ is the average wealth tax rate, defined as the amount of wealth taxes paid divided by net wealth (net wealth equals TNW absent valuation discounts). We reduce ill-defined $AWTR$ due to negative MNW by setting $AWTR = 0$ for when $wtax = 0$ and limiting $AWTR_{h,t}$ to τ_t. This leaves some missing values, explaining the different N in columns (3) and (4). $MWTR = \tau_t \mathbb{1}[wtax_{h,t} > 0]$. See Appendix Tables A.3 and A.4 for the underlying reduced-form and first-stage estimates. In the log-giving specifications, giving is shifted by an inflation-adjusted NOK 1,000 to accommodate zeros and limit influence of outliers. Standard errors are clustered at the household level. One, two, and three stars indicate statistical significance at the 5%, 1%, and 0.1% levels.

	Giving (in NOK)		Adj. log of Giving			$\mathbb{1}[G_{h,t} > 0]$
					(intensive margin)	(extensive margin)
	(1)	(2)	(3)	(4)	(5)	(6)
Instrumented variables						
$\text{wtax}_{h,t}$ (NOK)	-0.0124***	-0.0121***				
	(0.0029)	(0.0034)				
$1[\text{wtax}_{h,t} > 0]$		-28.582				
		(125.987)				
$\text{AWTR}_{h,t}$				-22.44***	-26.03*	-23.83***
				(5.28)	(11.20)	(3.89)
$\text{MWTR}_{h,t}$			-10.29***	-3.73	0.21	-2.72
			(1.68)	(2.26)	(4.71)	(1.60)
Implied effect of proportional tax change						
= sum of coefficients on MWTR + AWTR				-26.18***	-25.83**	-26.55***
				(4.12)	(8.42)	(3.12)
Sample restriction					$G_{h,t} > 0$	$G_{h,pre} = 0$
rk-F-statistic	225.69	269.89	291.81	316.54	91.24	189.57
N	4,007,561	4,007,561	4,007,561	3,730,726	1,300,392	2,614,018

Importantly, column (3) implicitly assumes that either marginal and average tax rates are the same or that only marginal tax rates matter. Column (4) instead provides estimates of the effect of both marginal ($MWTR$) and average tax rate ($AWTR$) variation. This shows that the negative effect on giving is due to average tax rate variation: the point estimate on $AWTR$ is large, negative, and highly significant. The point estimate on $MWTR$ is insignificant. This suggests that while income effects matter, intertemporal substitution effects do not.

Column (4) provides the implied effect of a proportional change in the effective wealth tax rate. By summing the coefficients on $AWTR$ and $MWTR$, we obtain a semi-elasticity of giving with respect to a (linear) tax on wealth of -26.18. We use this point estimate later to calibrate our structural model. Using this summed coefficient allows us to be agnostic about the exact decomposition of the effect (i.e., the relative effects of changing $AWTR$ and $MWTR$) and to test whether our model calibration corresponds, qualitatively, to the individual coefficients on $AWTR$ and $MWTR$. The calibration counterpart of a $MWTR$ coefficient close to zero is a very small EIS.

We may use the intensive-margin estimate ($AWTR$ coefficient) to compute a back-of-the-envelope *elasticity of annual giving with respect to after-tax wealth.* Assuming a 2% perpetual interest rate, a horizon of 30 years, the mechanical present value of a 1% tax on wealth is 1% $\times$ 23.40. Hence, our findings indicate that a 23.40% reduction in after-tax wealth reduces giving by 22.44%, implying an elasticity of 0.96: As a household's wealth grows, their charitable giving grows almost as much.

Log-transformations of variables that contain zeros are subject to caveats (see Online Appendix E). However, we obtain a very similar semi-elasticity of giving with respect to $AWTR$ by using sample means to transform the level effect in column (2) of Table 2 to a semi-elasticity.[19]

Model-based implications for how consumption responds to rate-of-return shocks. Our findings also speak to the theoretical ambiguity of consumption responses to changes in the after-tax rate of return. The frameworks underlying this ambiguity typically consider the effect of a "linear" or "proportional" change in the after-tax rate of return. This implies equally changing average and marginal tax rates. Our approach allows us to estimate the implied effect of such a change, which is the sum of the coefficients on $MWTR$ and $AWTR$. We find that this coefficient is statistically significant and negative. Under Proposition 3, our findings imply that income effects dominate substitution effects in how *consumption* responds to rate-of-return shocks. Additional implications are discussed when we calibrate our model in section 6.

First-stage and reduced-form regressions. We report reduced-form and first-stage coefficients for these IV regressions in Appendix Tables A.3 and A.4. The first-stage results are intuitive: households initially close to the threshold see larger extensive margin (*whether you pay a wealth tax*) effects, and households initially further above the threshold see larger intensive margin (*amount paid in taxes*) effects. It is this heterogeneity that allows us to identify the effects of two different margins of wealth tax exposure using only one core instrument. The fact that there is (i) much starker first-stage variation in extensive than intensive-margin effects and (ii) limited variation in reduced-form effects is what causes the IV approach to attribute reduced-form responses to the intensive-margin treatment.

Our findings compared to existing estimates on the marginal propensity to give. Since the effects we find appear to be driven by income effects, it is useful to compare our findings to studies that strictly consider income effects on giving. For this, we rely on Drouvelis, Isen, and Marx (2019) who provide a summary of existing estimates. They show that existing non-experimental estimates on the marginal propensity to give (MPG) out of total income range from 0.024 to 0.093. However, estimates from windfall gains may be more closely aligned with our quasi-random variation in wealth taxation, and these are considerably larger, ranging from 0.16 to 0.74 (Drouvelis et al. 2019), which is an order of magnitude more than our estimated effect of 0.012. However, this low MPG is likely driven by an overall low level of giving in Norway. In section 6.3, we partially recalibrate our model to a high-giving environment and find an MPG of 0.29, which is

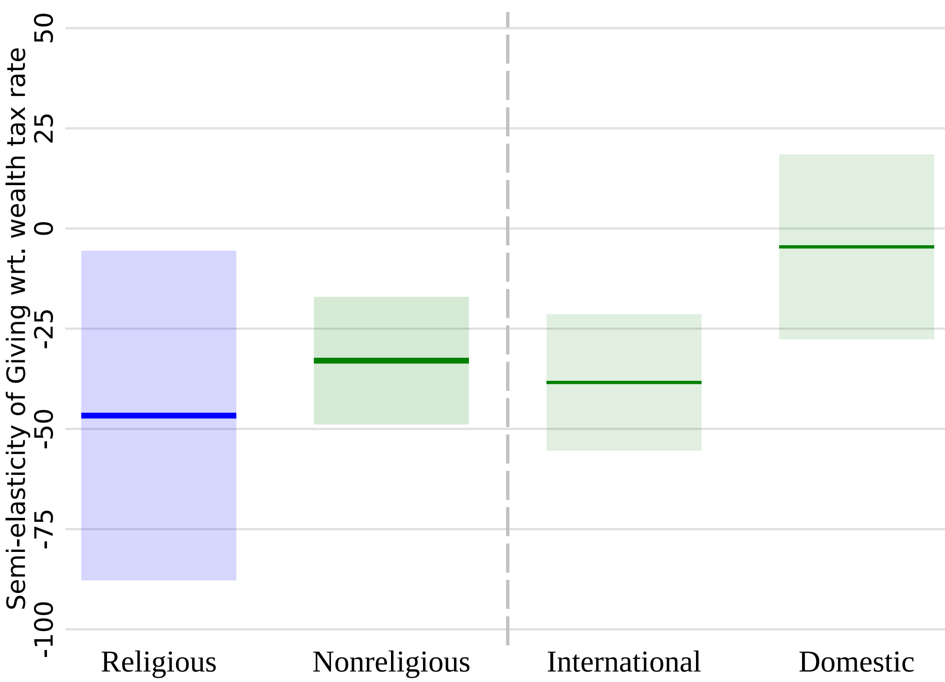
[19] Dividing -0.0121 by the unconditional average amount of giving per household ($5,758 \times 0.32$) and then further by the effect of 1 additional NOK of wealth taxes on the AWTR (1/3464991) provides a semi-elasticity of -22.74.

still in the lower range of existing windfall-gain estimates.

4.5 Religious Heterogeneity in Responses to Wealth Taxation

Policymakers may place different weights on different kinds of charitable giving when considering the spillover effects of capital taxation. Hence, it may be useful to examine whether there are heterogeneous effects across different types of charities. For this purpose, we divide charitable giving into two main types: religious and nonreligious giving. During 2012–2018, we find that only 6% of households gave to religious organizations, but the conditional amount is quite large at NOK 10,758 (USD 1,800) . About 26% gave to nonreligious organizations, but the conditional amount is considerably lower at NOK 3,325 (USD 550).

Figure 5: How Wealth Taxation Affects Different Types of Charitable Giving



Notes: This figure shows the implied effect of changing a proportional (linear) wealth tax by 1 percentage point on different types of charitable giving. The underlying estimates are based on our IV methodology and are provided in Appendix Table A.6. The lines mark the point estimates and the shaded areas provide 95% confidence intervals. Each effect is estimated on the subset of households who engaged in that particular type of giving in 2012.

We provide our main findings in Figure 5. Each effect is estimated on the subset of households who engaged in that particular type of giving in 2012. We find that religious and nonreligious giving both respond to wealth taxation. While the point estimate for religious giving is larger in magnitude, it is imprecisely estimated since only 6% of households give to religious organizations. In further splitting nonreligious giving into international and domestic, we find that the effect is largely driven by international giving. While the point estimate for domestic giving is small at about -4.56, we cannot rule out more substantial effects (i.e., the lower-bound of the 95% confidence interval is -27.64.

As suggested by the fact that international giving constitutes a substantial share of overall giving, these findings emphasize the possibility that capital taxation may have unintended cross-border spillover effects.

4.6 Discussion of Potential Confounding Factors

Our empirical approach controls flexibly for pre-reform wealth interacted with year dummies. Accordingly, we are not subject to the standard concern that wealthier households are changing their behavior for reasons unrelated to wealth taxation. The causal interpretation of our findings is, however, limited to the extent that households with larger $MVHS$ in 2012—keeping overall wealth and housing wealth fixed—increased or decreased their giving during 2013–2018 for reasons unrelated to wealth taxation. Importantly, the lack of pre-trends in Figure 3 is reassuring. We also find no evidence of pre-trends within TNW bins in Appendix Figure A.8.[20] We are not aware of other reforms or economic shocks occurring in 2012 that would differentially affect secondary home owners. Since we address differential trends that may be driven by differences in initial overall taxable wealth, total housing wealth, income, age, and family size—any confounding factors would be limited to the convex allocation of housing into primary and secondary housing assets—and they would have to only play a role as of 2013.

To ensure that nothing about our treatment selection procedure, either mechanically or due to confounding factors, produces sharply negative giving estimates following treatment assignment, we perform a placebo test by assigning treatment in 2010 as opposed to 2012.[21] Fortunately, Appendix Figure A.4 shows no indication of any reduction in giving during the placebo years 2011 and 2012. We further show that our results are robust to controlling for the potential number of heirs (children and grandchildren) in Appendix Figure A.5.

Property taxation. One potential concern is municipality-level property taxation. While the tax authorities' discount rates are unrelated to local governments' property tax schemes,[22] secondary home owners may benefit from per-house exemption thresholds. These favor a strictly convex allocation of housing wealth into primary *and* secondary housing. It is thus conceivable that we identify effects from households that are paying less in property taxes. However, municipality level property taxation has been in place for decades, and there were no trend-breaking changes in 2012. Hence, the lack of pre-trends in Figure 3 is reassuring, and suggests that our DiD strategy will address this issue by taking out a baseline effect in 2012. Furthermore, if property taxation lowers giving through an income effect, this would lead to an *upward* bias in our estimates (i.e., toward

[20] This speaks to the concern that a subsample of households drive our results and that this subsample was on a particular giving trend that is cancelled out when aggregating.

[21] Given that data on secondary housing wealth is only available as of 2010, this is the earliest year we can use for this placebo test.

[22] In Norway, effective local property tax rates rarely exceed 0.5% and many municipalities do not collect property taxes. While *some* municipalities began using the tax authorities' assessment values for property taxation as of 2015 (they were either not allowed or strongly discouraged during 2010–2014, see discussion in Ring 2020), the change in discount rates would not affect the values provided to municipalities, as these are not discounted.

zero). Given our findings, this is not a material concern in terms of the qualitative conclusions.

House price effects. Finally, it is worth noting why potential house price effects of the reform do not affect how we interpret the findings. Most importantly, price effects do not lead to additional income effects that can explain our findings. Any price effect simply decreases the attractiveness of households' undoing the treatment of the discount-rate change by liquidating their housing position. If they sell, some of the benefits (lower tax bill) is offset by a lower sales price. We find that it is useful to think of the income or wealth effects of the reform in terms of a decision tree. If households never liquidate their secondary-housing position, the income effect is driven only by higher wealth tax payments. If households do liquidate, the wealth-tax income effect ceases and the price effect materializes. Importantly, the two effects are not at play simultaneously. This means that price effects may make the income effects more persistent—but not larger than what is implied by having to pay higher wealth taxes. Secondly, price effects are likely limited. Recall that a given house is categorized as primary or secondary based on its current rather than potential use. If (current) primary and secondary homes are homogenous, there should not be any price effect. However, following the reductions in the valuation discount rates, ownership in secondary housing becomes less attractive for the subset of households who anticipate being above the wealth tax threshold.[23] Thus, to the extent that secondary homes are more likely to be resold as secondary homes, due to their particular location or features, we would expect a negative house-price capitalization effect.

5 The Own-Price Elasticity of Charitable Giving

We now turn our attention to the *own-price* elasticity of charitable giving by using a bunching design to estimate the compensated own-price elasticity of giving. This estimate both informs our model presented in section 2 and is a key input to determining optimal tax incentives (Saez, 2004). We extend the analysis by studying elasticity heterogeneity in terms of income and wealth and the type of giving, and we study whether households' exposure to wealth taxation affects their own-price elasticity.

5.1 Bunching Methodology

As described in section 3.3, charitable giving is deductible in a specific portion of the income tax base that is subject to a flat tax rate, τ_t^g, of 22–28%. This means that the effective discount on charitable giving is independent of overall income. Importantly, deductions are subject to a cap. The presence of a cap on giving deductions creates a setting in which the marginal after-tax price of giving jumps at a pre-specified threshold. The bunching methodology exploits the fact that the marginal after-tax price of giving jumps from $1 - \tau_t^g$ to 1 at the exemption cap, K_t and allows us

[23] 42% of secondary home owners paid a wealth tax as of 2018. Among these wealth-tax-paying secondary home owners, if we consider secondary-housing wealth to be the marginal asset class subject to the wealth tax, approximately 66% of it was subject to the wealth tax. In other words, the presence of the wealth-tax threshold shielded about 72%=1-42%×66% of taxable secondary housing wealth from taxation.

to estimate the giving elasticity,

$$e = \frac{\Delta G^*/K^*}{\Delta \log(1-\tau^g)}, \tag{14}$$

where ΔG^* is the reduction in giving of the marginal buncher who is at an interior optimum at the exemption cap, K^* (i.e., the kink). In the modeling framework in section 2, this compensated own-price elasticity is a fixed parameter and equal to $-\varepsilon$.

The bunching mass is denoted B. By construction (see Saez 2010 and Kleven 2016 for graphical intuition), B equals $\int_{K^*}^{K^*+\Delta G^*} h_0(G)dG$, where $h_0(G)$ is the counter-factual (absent a kink) probability density function of giving. We apply the standard approximation

$$B = \int_{K^*}^{K^*+\Delta G^*} h_0(G)dG \approx -h_0(K^*)\Delta G^*. \tag{15}$$

Dividing through by K^*, we may write the (approximated) relative change in the giving of the marginal buncher as

$$\frac{\Delta G^*}{K^*} = \frac{-B}{h_0(K^*)K^*} \equiv \frac{-b}{K^*}. \tag{16}$$

This equation represents one of the central insights of the bunching literature, namely that the marginal buncher's response to the kink is proportional to the excess mass at the kink.

We empirically estimate b, which we refer to as the bunching estimate, using the methodology in Chetty, Friedman, Olsen, and Pistaferri (2011). The empirical analog of K^* is the (average) exemption cap for giving denominated in the same units (NOK 100) as the empirical giving bins.[24] We write our estimated compensated own-price elasticity as

$$\hat{e} = \frac{-\hat{b}/\bar{K} \cdot 100}{-\log(1-\tau^g)}, \tag{17}$$

where we have used that $\Delta \log(1-\tau^g) = \log(1) - \log(1-\tau^g) = -\log(1-\tau^g)$. In our main approach, we pool observations across years. We use K_t to sort households into bins and calculate $\hat{b}$, but use the across-year averages for K_t and τ_t^g, which are denoted without t subscripts, to compute $\hat{e}$ according to equation (17).

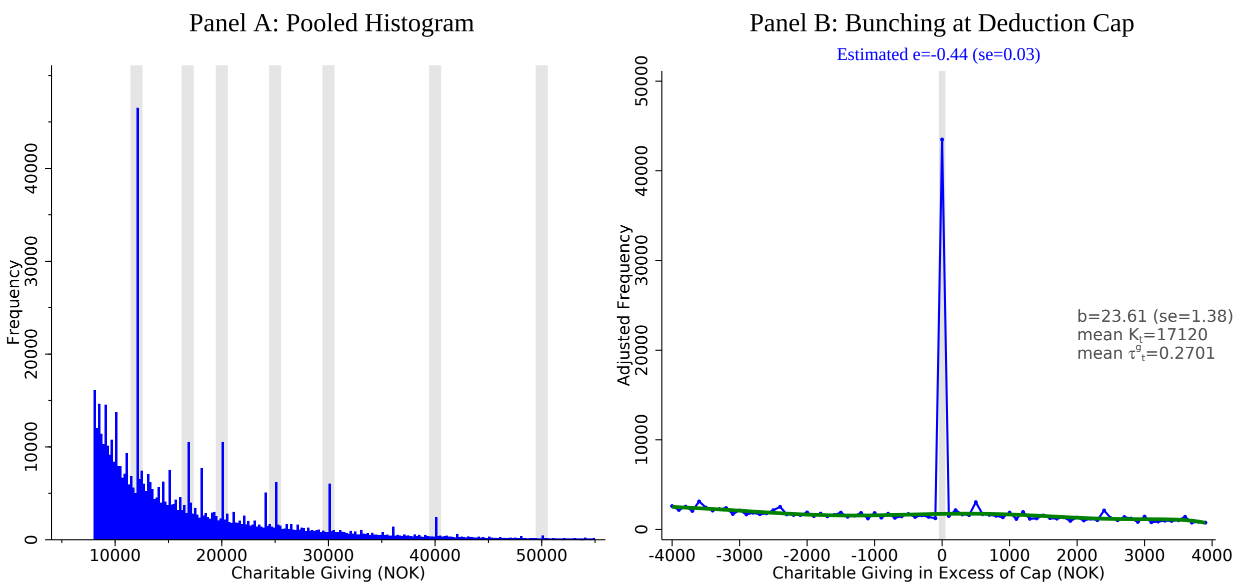
5.2 Bunching Results: The Own-Price Elasticity of Giving

Panel A of Figure 6 shows evidence of bunching at deduction caps (vertical gray lines) in the raw data. Panel B provides formal evidence of bunching. We sort taxpayers based on how much they gave relative to the deduction cap, K_t, applicable for that year. A value of 1000 on the x-axis indicates that the taxpayer donated between NOK 1000 to NOK 1099 more than the cap. Since it is

[24]Thus $K^* = \bar{K}_t/100$. Alternatively, we could multiply $\hat{b}$ by the width of the earnings bins (NOK 100), and let K equal the threshold in NOK.

common to donate round-numbered amounts, and donation-exemption caps are round numbers, we adjust the frequencies for round-number bunching that is unrelated to the tax incentive at hand (see Appendix C). The dotted blue line (at the bottom of Panel B) shows the adjusted frequency, while the solid green line describes the counterfactual adjusted frequency. The counterfactual density function is produced by estimating a 5th order polynomial on all observations outside the bunching region, $BR_t \equiv [K_t - 1000, K_t + 1000]$, measured in NOK.

Figure 6: Bunching at the Tax-Deduction Cap for Charitable Giving



Notes: The vertical gray lines, from left to right, in Panel A, represent the deductibility caps for 2012–2013, 2014, 2015, 2016, 2017, and 2017, respectively. The average amount of charitable giving at the kink point in panel B is NOK 20,240, and the bin width is NOK 100. In Panel B, the frequency is adjusted for round-number (thousands) bunching. Standard errors (se) are obtained from a 200-repetition bootstrap procedure.

We see clear evidence of sharp bunching at the deduction cap. This sharp bunching is consistent with charitable giving being easier to adjust than, e.g., labor earnings, which is the main focus of bunching design applications. The estimated $\hat{b}$ is 23.61. This number says that there are 2,361% excess givers at the kink. This large bunching mass translates into a more modest elasticity due to the strong change in tax incentives at the kink: inserting $\hat{b} = 23.61$, $\bar{K}/100 = 17.120$, and $\tau^g = 0.2701$ into equation (17) produces an elasticity estimate (and standard error) of

$$\hat{e} = \begin{array}{c} -0.44 \\ (0.03) \end{array} . \tag{18}$$

The implied estimate for the parameter ε in our model (see section 2) is thus 0.44.

Own-price elasticity estimate relative to other findings. Our own-price elasticity of -0.44 is considerably smaller than the elasticity of around -1 found in several analyses based on U.S. data. Finding a smaller elasticity in Norway than in the U.S. is reasonable as a U.S. price elasticity reflects both real giving responses as well as itemization responses, where the latter reflects whether taxpayers choose to deduct charitable giving (Meer and Priday, 2020).[25] While bunching at tax thresholds is often an upper bound for structural elasticities (see, e.g., Akcigit, Lequien, and Stantcheva 2022), the fact that our giving measure is not self-reported suggests that we are in fact identifying a (real) structural elasticity. It is unlikely that the magnitude of our elasticity estimate is low due to the absence of income effects in our bunching design (see discussion below). In section 6.2, we use our calibrated model to calculate an implied uncompensated elasticity of -0.39.

What kind of elasticity is estimated. In a dynamic setting, bunching estimates are considered to reflect the Frisch elasticity (Saez 2010, Kleven 2016). In our context, this would be the constant-marginal-utility-of-wealth own-price elasticity of giving, which is a constant parameter and equal to $-\varepsilon$. Importantly, this assumes that income effects play an immaterial role in determining bunching responses. In our setting, this assumption seems reasonable: consider the households counterfactually located far beyond the exemption cap in Panel B of Figure 6. Absent the exemption cap, they would pay NOK 4,000 times 27% less in tax. This is about NOK 1,100 (USD 180). Multiplying this by our estimated wealth-tax income effect coefficient (MPG) of 0.012, we would expect the total income effect here to only be NOK 12 (USD 2) and thus too small to meaningfully impact our elasticity estimate. In section 6, we discuss how other factors, such as optimization frictions, may affect $\hat{e}$ and thus also our inferences from the calibration.

A potential issue with using bunching at a threshold that applies to all taxpayers is that the threshold may become a reference point. This may create an upward bias in the implied elasticities (Seibold, 2021). However, this cannot explain why our elasticity is lower than what is found in panel-data regressions. Furthermore, as we discuss in the calibration section, this would not qualitatively affect our findings, as an even lower EIS would be required to rationalize our findings if the true ε is lower than 0.44.

5.3 Regression-based Own-Price Elasticity Heterogeneity

Following Bastani and Waldenström (2021), we estimate a linear probability model to study the correlation between various characteristics, Z, and the probability of bunching at the deduction cap for giving (a measure of price sensitivity), $\mathbb{P}[G_{i,t} \in BR_t]$. This is done by estimating the following regression equation,

$$\mathbb{1}[G_{i,t} \in BR_t] = \alpha_t + \delta \mathbf{Z}_{i,t} + p(G_{i,t}) + \varepsilon_{i,t}, \tag{19}$$

where α_t takes out year fixed effects and $\mathbf{Z}_{i,t}$ is a vector of characteristics of interest. A particularly attractive feature of this regression-based approach for uncovering bunching heterogeneity is that it avoids the omitted variable bias that normally arises when simply doing sample splits by some variable. In our case, we are particularly interested in income and wealth as explanatory variable, which are two highly correlated characteristics. We also include age as an explanatory variable since

[25] The self-reporting aspect is also present in the U.K., where Almunia et al. (2020) document an intensive margin elasticity of only -0.2. However, in the U.K., the after-tax price is lowered by a combination of tax deductibility and governmental matching of private donations. Beyond the different research designs, the possibility that taxpayers value matching less than deductions may explain the different findings (see, e.g., Karlan and List 2007).

it is highly correlated with income and particularly wealth. An innovation in our paper is to also include a third-order polynomial in the amount of charitable giving, $p(G_{i,t})$, as a control variable to address the issue that whether someone bunches is generally correlated with the amount they donate.[26] We run these regressions for observations where $G_{i,t} \in SR_t \equiv [K_t - 10\,000, K_t + 10\,000)$ and report the results in Table 3.

The estimates in Table 3 show that older, higher income, and wealthier taxpayers are less likely to bunch at the deduction cap for giving. When simultaneously estimating these correlations, however, the role of wealth is removed in favor of income. While our results imply that older, higher-income individuals are less price elastic, the economic relevance of this heterogeneity does not follow directly from the regression estimates. To address this, Appendix D introduces a simple methodology for relating the estimated coefficients from equation (19) to differences in the own-price elasticity. We exploit the fact that the own-price elasticity is proportional, by a sample-specific factor of to the in-sample probability of bunching. In our main sample, this factor is equal to -8.27. Hence, if we find in a regression framework that some covariate find that a unit increase in some giving covariate, Z, causes the probability of bunching to increase by $\hat{\delta}$, then it causes the implied own-price elasticity to change by

$$\widehat{\frac{de}{dZ}} \approx -\hat{\delta} \times 8.27. \tag{20}$$

Age heterogeneity. We find that 10 year older households are 1 percentage point less likely to bunch, which translates into a

$$10 \cdot \frac{0.0938}{100} \times 8.27 \approx 8 \text{ percentage point} \tag{21}$$

lower elasticity (see equation 20). This is not a negligible correlation, but it is also not particularly large relative to the common baseline elasticity of -1. With an average elasticity of -0.44, it would be a fair characterization that even households 20 years younger than the mean are still modestly elastic at -0.63.

Income heterogeneity. Controlling for age and wealth, we find that a 10% higher income is associated with a 0.98 percentage point lower elasticity. While statistically significant, this correlation is zero in terms of its economic impact.

Wealth-based heterogeneity. When controlling for income and age, we find that wealth is a statistically and economically modest predictor of the price elasticity: a 10% increase in *Net Wealth* lowers the elasticity by about 0.05 percentage points.

[26] Roughly, we may think that this correlation problem occurs when the threshold location differs from the mean amount of donations in the sample or estimation region. Since many characteristics correlate with G_i, we control flexibly for the amount of charitable giving, $G_{i,t}$, in order to minimize the risk of picking up spurious correlations with bunching behavior. Of course, we may not control too flexibly for $G_{i,t}$: for example, granular fixed-effect bins are in danger of completely absorbing the dependent variable, the bunching indicator. A third-order polynomial, on the other hand, seems to be a reasonable way to address correlations between G_i and Z_i without absorbing the correlation between Z_i and $\mathbb{1}[G_{i,t} \in BR_t]$.

The finding of no economically important heterogeneity is consistent with the constant elasticity assumption inherent to our model in section 2. However, it may be driven by preference heterogeneity cancelling out a causal effect of higher income and wealth. For example, having higher incomes may cause taxpayers to become less elastic, but at the same time, high-income households may tend to have less elastic preferences. We explore this potential explanation in subsection 5.4.

Table 3: HETEROGENEITY IN THE AFTER-TAX OWN-PRICE ELASTICITY

Notes: The dependent variable is a bunching indicator (multiplied by 100). The unconditional sample mean is 5.09 (%). The implied effect on the tax-price elasticity can be obtained by multiplying the point estimates by the elasticity multiplier near the bottom of the table. To calculate the multipliers, the sample-specific estimates for b are used (see Figure 6). The sample consists of homeowners, but we do not exclude households based on $TNW_{h,2012}$. Stars indicate significance at the 5%, 1%, and 0.1% levels.

	BUNCHING PROBABILITY (%)			
	(1)	(2)	(3)	(4)
$\text{Age}_{i,t}$	-0.0938***			-0.0973***
	(0.0024)			(0.0027)
log(Gross $\text{Income}_{h,t}$)		-0.5472***		-1.1892**
		(0.0636)		(0.0695)
log(Net $\text{Wealth}_{h,t}$)			-0.2925***	-0.0627
			(0.0348)	(0.0346)
$f(G_{i,t})$	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Unconditional Probability	5.09%			
$\hat{P}^{cf}[G_i \in BR]$	0.2245%			
Multiplier for Elasticity	8.27			
R^2	0.2441	0.2403	0.2399	0.2380
N	792,271	789,820	740,570	739,411

Literature comparison. Our findings contrast the intensive-margin results reported in Bakija and Heim (2011) and Almunia, Guceri, Lockwood, and Scharf (2020), both pointing to *increasing* responsiveness with respect to income. They also contrast the finding in Fack and Landais (2010) that price elasticities are increasing in the level of giving, which is highly correlated with income and wealth. The fact that we find different results is likely driven by differences in the reporting regimes. Third-party reporting is shown to substantially increase the number of observed givers in tax data (Gillitzer and Skov, 2018), which broadens the set of households that we can study. When focusing on self-reported giving, Meer and Priday (2020) find that the main driver of their estimated price elasticity is households' beginning to report charitable giving on the extensive margin, i.e., starting to itemize. In our setting, however, individuals cannot choose whether their donations are reported to the tax authorities; thus the extent to which higher-income taxpayers are more diligent in claiming tax deductions from giving does not play a role.

5.4 Quasi-Experimental Evidence on the Relationship between Wealth Taxation and the After-Tax Own-Price Elasticity

In this section, we provide quasi-experimental evidence on how wealth taxation affects the own-price elasticity of giving. As in subsection 5.3, we use a regression-based framework to uncover bunching heterogeneity and map this into differences in the own-price elasticity. The innovation in this section is that we employ the quasi-experimental variation in wealth taxation from section 4 as the source of heterogeneity. This allows us to obtain plausibly causal evidence on the effects of wealth taxation on the own-price elasticity. This exercise is useful for two reasons. First, given our finding that wealth taxation reduces charitable giving, a natural follow-up question is how a government may use direct tax incentives (e.g., deductibility) to undo the effect of introducing a wealth tax. To answer this question, one needs to know the own-price elasticity of giving *and* whether the price elasticity is itself affected by wealth taxation. Second, studying how wealth taxation affects the own-price elasticity allows us to test the constant compensated-price elasticity assumption underlying our model in section 2. The modeling assumption of constant compensated price elasticities is ubiquitous in public finance and macroeconomics (e.g. when assuming a constant Frisch elasticity in models of labor supply decisions). Our quasi-experimental setting to test whether wealth causally affects the own-price elasticity of giving.

We present our findings in Appendix Table A.5. Focusing on column (1), we see that a NOK 1,000 increase in wealth taxes increases the propensity to bunch by a modest and statistically insignificant 0.05 percentage points. To grasp the potential economic significance of the point estimate, we use the methodology introduced in Appendix D to map these bunching effects into a price-elasticity effect by multiplying point estimates by 8.[27] Hence, considering the effect of a fairly large increase in the annual wealth tax bill of NOK 10,000, we find that

$$\Delta wtax_{h,t} = \text{NOK } 10{,}000 \quad \Rightarrow \quad \Delta \hat{e} = \begin{array}{c} 0.0392 \\ (0.0472) \end{array}, \tag{22}$$

which is a very modest effect. In column (2), we see that these point estimates are fairly robust to isolating intensive-margin wealth-tax effects by also instrumenting for whether a household pays a wealth tax ($\mathbb{1}[wtax_{h,t} > 0]$).

We also transform our findings into a second-order cross elasticity by using average and marginal wealth tax rates ($AWTR$ and $MWTR$) as our instrumented explanatory variables in column (3). Keeping the marginal tax rate constant, we find that a 0.2 percentage point increase in $AWTR$ (the mean $AWTR$ of wealth tax payers) would increase the probability of bunching by about 0.884 percentage points, and hence the own-price elasticity by a modest 0.07.[28]

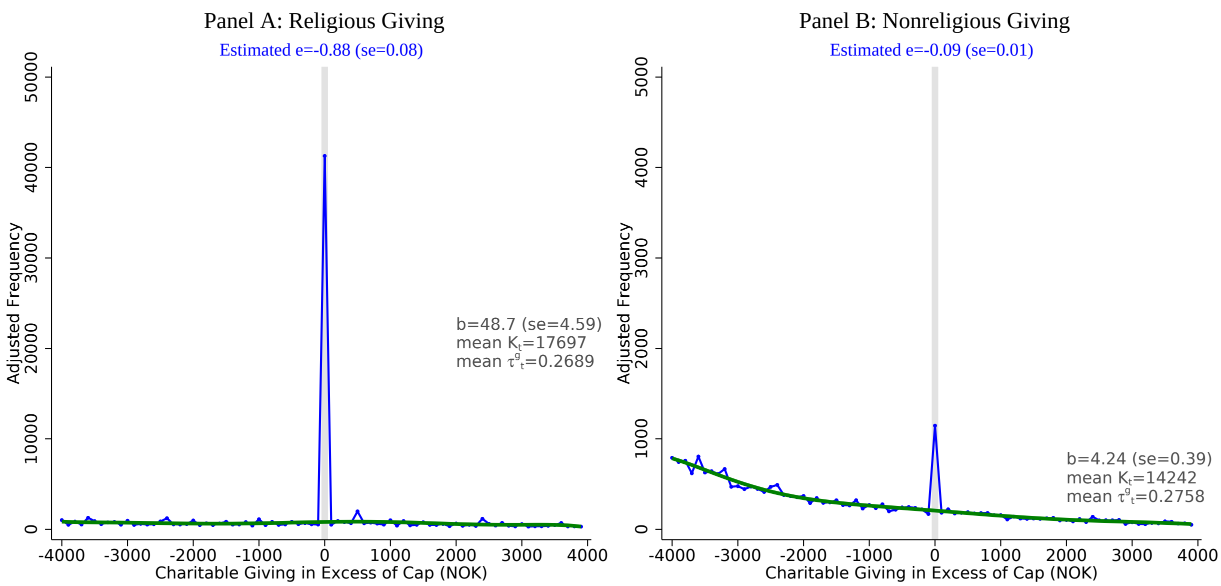
[27] Previously, the multiplier was 8.27. We obtain a slightly different multiplier due to differences in sample characteristics. Here, we have that $\hat{P}^{a}[G_{i,t} \in BR_t] = 5.2837\%$, which implies that $\hat{P}^{cf}[G_{i,t} \in BR_t] = 0.2330\%$. Thus the multiplicative factor becomes 8≈(1/0.002330)*(100/17120)*(1/ln(1-0.27)).

[28] This is small relative to the knife-edge case where the elasticity takes a value of 1. While it is less small relative to our own estimate of 0.44, our estimate is already quite low. For example, Saez (2004) only considers values of 0.5, 1, and 1.5 in calibrating a model of optimal tax deductions on giving.

5.5 Religious Price-Elasticity Heterogeneity

Our final heterogeneity exercise considers the *type* of charitable giving. Optimal tax incentives for expenditures, such as giving, depend critically on how elastic these expenditures are (Saez, 2004). If, for example, the government cares equally about all types of giving, but price elasticities are heterogenous, then the government will be undersubsidizing some types, and oversubsidizing others. While there is some work on tax-price heterogeneity,[29] we benefit from an empirical setting that offers both quasi-experimental individual-level price variation and data that distinguish between different types of giving.

Figure 7: Religious Own-Price Elasticity Heterogeneity



Notes: We repeat the main bunching analysis (Panel B of figure 6) for two subsamples. In Panel A, we consider the subsample of individuals who only gave to religious organizations (e.g., local or national churches, missionary organizations, theological institutes, and non-Christian charitable organizations. In Panel B, we consider households who only gave to nonreligious organizations. Appendix Figure A.10 considers the subset of givers who only give to internationally-focused (nonreligious) organizations.

We present our main findings in Figure 7. We find a remarkable difference in the propensity to bunch. Religious giving displays a bunching elasticity that is more than ten times higher than nonreligious giving. Per equation (17), we translate the bunching estimates into the implied compensated own-price elasticities. We find that religious giving displays an elasticity of 0.88, while nonreligious giving displays an implied elasticity of only 0.09. While religious giving is close to elastic, nonreligious giving is particularly irresponsive to tax incentives. In Appendix Figure A.10, we zoom in on giving to internationally-focused organizations. Here, we find a slightly lower implied elasticity of 0.07.

The finding that own-price elasticities are much larger for religious giving contrasts existing

[29] See, e.g., Brooks 2007, Yetman and Yetman 2013, and Duquette 2016; and Reinstein 2011 who finds that religious giving is less sensitive than overall giving.

evidence. At the recipient level, Duquette (2016) finds no heterogeneity with respect to religiosity and Reinstein (2011) finds that religious giving is *less* price sensitive. At the micro-level, the findings in Feldstein (1975b) suggests that religious giving is less elastic and Brooks (2007) finds only small differences between, e.g., social and religious giving.

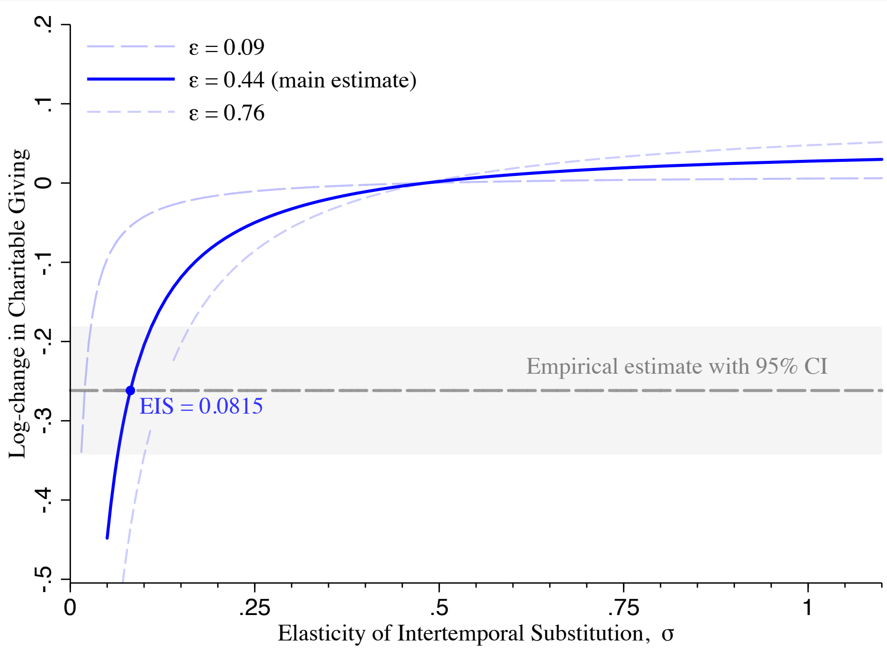
6 Model Calibration, The EIS, and Applications

6.1 Main calibration results

We calibrate our model presented in section 2 to our empirical setting, and contrast the theoretical and observed treatment effects of wealth taxation in Figure 8. We employ a representative agent model (as in Jakobsen, Jakobsen, Kleven, and Zucman 2020) and endow the agent with the characteristics of the average household from Table 1. We use the precise estimate of ε of 0.44 obtained from bunching at the deductibility cap, and plot theoretical treatment effects for different values of the elasticity of intertemporal substitution (σ). We describe the calibration exercise in more detail in Appendix B. For the purpose of this calibration, we leave heterogeneity with respect to the type of giving aside and focus on overall charitable giving.

Figure 8: Comparing Model-based and Empirical Effects of Wealth Taxation on Charitable Giving

Notes: This figure shows model-based treatment effects on charitable giving for combinations of the elasticity of intertemporal substitution (σ) and the absolute value of the compensated own-price elasticity (ε). Using a life-cycle model with endogenous giving that is calibrated to our empirical setting, we plot the effects of a 1 percentage point unexpected reduction in the after-tax rate (i.e., a 1% wealth tax). Under our baseline $\varepsilon = 0.44$, we find that $\sigma = 0.0815$ replicates our empirical findings. Our calibration is described in more detail in Appendix B and the main elements are presented in Proposition 1. The dashed gray line provides the empirical estimate of the implied effect of changing a proportional wealth tax rate, which is presented in column (4) of Table 2. The middle, blue line provides the theoretical treatment effect assuming that $\varepsilon = 0.44$, corresponding to the bunching evidence in section 5.2. The dashed lines provide the theoretical effects assuming ε equals the estimates from the religious and nonreligious subsamples (see Figure 7)



Our central finding is that a very low elasticity of intertemporal substitution is needed to replicate our main empirical results. The empirical finding we try to match is the implied effect on log giving of changing a linear (proportional) tax on wealth by 1 percentage point, which we found to be -0.2618 percentage points in column (4) of Table 2. Figure 8 shows that this requires

$$\sigma = 0.0815. \tag{23}$$

This low EIS is considerably smaller than most empirical estimates (Havránek, 2015). While Jakobsen et al. (2020) also calibrate the EIS to quasi-experimental moments from wealth taxation, their EIS estimates of 2 to 6 are considerably larger. A possible explanation is that their EIS estimate is driven by changes to evasion or avoidance behavior since they examine changes in taxable wealth where (self-reported) business assets is a major component. When using changes to reported wealth to infer how intertemporally elastic consumption is (via the budget constraint), changes to reported wealth that is driven by evasion or avoidance will make consumption seem more intertemporally elastic than it truly is. Our approach differs by considering only third-party reported behavior on giving, and inferring the consumption EIS indirectly (through the intratemporal first-order conditions). This approach allows us to avoid important empirical issues related to self-reporting of taxable wealth (see Advani and Tarrant 2021 for a review). Reassuringly, our low EIS estimate is very close to that from other quasi-experimental settings where self-reporting is not a factor (see, e.g., Best, Cloyne, Ilzetzki, and Kleven 2020 who find an EIS of 0.1).

An interesting observation is that the structural parameter, ε, which governs the own-price elasticity, is almost six times larger than the consumption elasticity, σ. As Proposition 2 illustrates, this means that giving effects can be large relative to consumption effects even the initial level of giving is relatively low. In terms of the relative economic importance of giving vis-a-vis consumption (measured in terms of expenditures), the high ratio of ε to σ may substantially make up for the fact that the ex-ante level of giving is small relative to consumption. This can be inferred from the *Sensitivity* term in Proposition 2, where the effect on giving is multiplied by $\varepsilon g_t/(\varepsilon g_t + \sigma c_t)$.

Unmodeled frictions and potential biases in the inferred EIS. We find that our findings are best rationalized by intertemporally inelastic consumption preferences. An alternative explanation is that inattention or other frictions prevent even high-EIS households from responding more. In our setting, the negative effect on disposable incomes may be more salient relative to the intertemporal tax incentive that should accelerate giving. Hence, the fact that households may be quite passive in response to intertemporal incentives (Chetty, Friedman, Leth-Petersen, Nielsen, and Olsen 2014) may lead to low-EIS mimicking behavior.

In general, the presence of financial frictions may cause low-EIS-like behavior since households who are financially constrained may be unable to optimally increase their giving in response to wealth taxation. However, we believe financial frictions play a very limited role in our setting. Firstly, Norwegian wealth tax payers generally have considerable amounts of liquid wealth (Ring, 2020). This holds true in our sample as well, and in Appendix F.1, we show that our main findings are highly robust to dropping a small sample of potentially constrained households. A second argument against financial frictions playing an important role is that secondary home owners who pay a wealth tax will, by design, tend to have considerable home equity, implying that they have collateral available for borrowing.[30] Finally, intertemporal substitution effects should be driven by those affected on the extensive margin (i.e., those who see a reduction in the marginal after-tax rate of return) and these are the households for whom the overall liquidity effect should be the smallest.

Another potential caveat is that biases arising from estimating ε using a bunching design may influence the calibrated EIS. For example, it may be costly for households to pay attention to the tax rules. Hence, they may not know the exact deduction threshold and thus be less likely to bunch. Even if households know the location of the threshold, bunching may be costly (Mavrokonstantis and Seibold, 2022). These frictions may downward bias the estimated ε. Recent evidence also suggests that households may keep bunching at a prior year's tax threshold to avoid revealing tax evasion (Londoño-Vélez and Ávila-Mahecha, 2020a). However, in our setting, charitable giving bunching is not indicative of evasion. In addition, any downward bias in our estimate of ε does not play a material role in our calibration exercise. This is apparent from Figure 8 which shows that even a considerably larger ε of 0.76 implies a very similar EIS. Another possibility is that our estimate of ε is upward biased. This may happen if, e.g., charitable organizations use the deduction caps as reference points when soliciting donations. This could cause an upward "reference-point bias" in the implied elasticity (Seibold, 2021). This only strengthens our key finding of a low EIS. This is apparent from Proposition 2 and Figure 8 that show that a lower ε requires a lower σ to replicate our empirical findings.

A related concern is that some of the households in our sample may be irresponsive to wealth taxation since they are bunching at the tax-deduction cap. This implies that our model may exaggerate giving responses and thus allow us to replicate a given negative effect with a higher EIS. To the extent that this biases our EIS, the bias works in the opposite direction of our finding of a low EIS.

In terms of external validity, it is possible that our sample is skewed in favor of nonreligious giving, which we find to be less price elastic (see Figure 7). However, even if we calibrate the EIS to a considerably higher ε of 0.76 (from the religious-giving subsample), the required EIS is still very small at about 0.12. This can be seen in Figure 8, where we provide simulated treatment effects when $\varepsilon = 0.76$.

6.2 Model Application I: Uncompensated Own-Price Elasticity

In section 5.2, we estimated an own-price elasticity of -0.44. Importantly, this elasticity identifies the response of marginal bunchers and thus provides a *compensated* price elasticity. This elasticity does not give the full answer to the question of what would happen to charitable giving if, for

[30] This is because taxable net wealth is *net* of the full market value of debt.

example, the tax deductibility was removed. This is because income effects would also play a role: as the tax-incentive is removed, households become poorer and thus give less.

Our calibrated model (with $\sigma = 0.08$ and $\varepsilon = 0.44$) allows us to calculate the implied uncompensated price elasticity. We do this by calculating the log-change in giving caused by changing the after-tax price p_s from 0.73 to 1 for $s = t, ..., T$. This results in a

$$\text{Model-implied } \hat{e}^{\text{uncompensated}} = -0.4914, \tag{24}$$

which is quite close to our compensated elasticity estimate. This implies rather weak income effects of price changes, consistent with the low *level* of giving in our data. If we calibrate our model to a 10 times higher level of giving (through increasing the utility weight κ, see discussion in next subsection), the uncompensated elasticity remains modest at -0.6626. Hence, our model implies that our low elasticity estimate relative to the existing literature is unlikely to be driven by the fact that we estimate a compensated as opposed to uncompensated elasticity.

Our low implied uncompensated elasticity says that giving is inelastic, and thus that increasing the deduction rate (τ^g) would likely be an inefficient way to undo the negative effects of wealth taxes on giving.

Wealth taxation and the *uncompensated* own-price elasticity. We also investigate whether our model predicts different elasticities depending on the wealth tax regime. We investigate this by calculating the uncompensated elasticity in the presence of a 1% proportional (applied to all wealth) wealth tax. We find virtually no effect: the own-price elasticity decreases modestly in magnitude to -0.4810.

6.3 Model Application II: Wealth Taxation in a High-Giving Environment

We found empirically that each additional NOK of wealth tax reduces charitable giving by about 0.012. This is rather small in terms of a crowd-out effect. If governments care about the wealth tax revenue *plus* the amount of charitable giving, the net effect of raising another NOK of wealth taxes is only reduced to 0.988 due to this crowd-out. However, this small effect is in part driven by the low *level* of giving in Norway. While intuition suggests that the large relative effect on giving implies that the crowd-out would be larger if the level of giving were larger, we proceed by quantifying this by using our model.

We recalibrate our model to an agent that gives an amount equal to 5% of gross income, the average fraction reported by List (2011) for the U.S. This is done through increasing the utility weight on giving, κ (see equation 50), and keeping $\sigma = 0.0815$ and $\varepsilon = 0.44$.[31] We then calculate the implied level effect on g_t and divide this by the amount raised in wealth taxes, $1\% \cdot s_{t+1}$, where s_{t+1} includes behavioral responses to the tax increase. We illustrate our findings in Figure 9. We

[31]One justification for assuming that the elasticity parameters, σ and ε stay fixed but κ changes is that we may think of κ as not being a deep structural parameter but rather something that depends on the extent of overall government services and redistribution.

find that the

$$\text{Model-implied } MPG \text{ out of wealth taxes in a high-giving environment} = -0.2784, \tag{25}$$

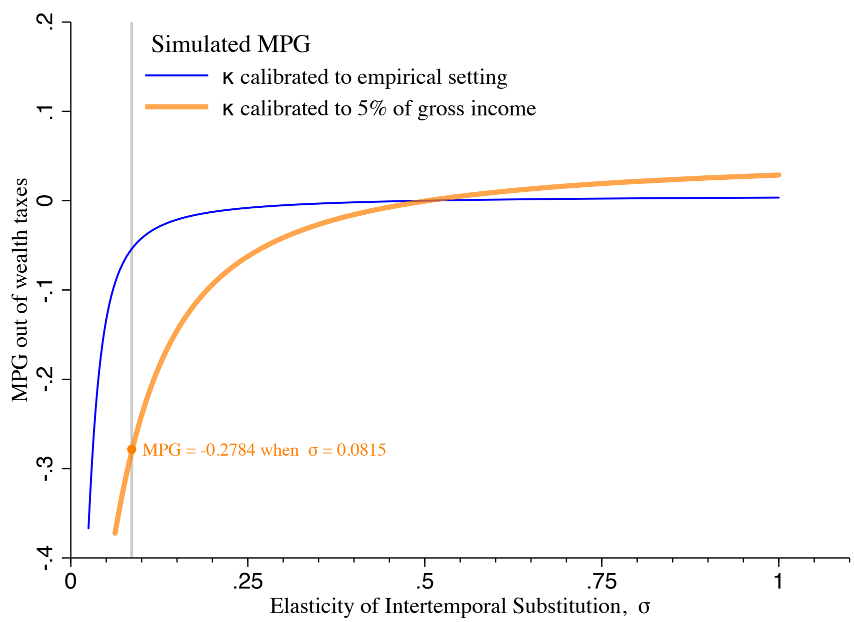
which represents a substantial effect. If governments want to compensate charitable organizations for such a large crowd-out effect, they effectively face a 28% "tax" on any wealth tax revenues. We further numerically explore the importance of the EIS for this large crowd-out effect. Setting the EIS to be 1, which corresponds to log utility of consumption, we instead find that the

$$\text{Model-implied } MPG \text{ out of wealth taxes in a high-giving environment}\Big|_{\sigma=1} = 0.0335 > 0. \tag{26}$$

This stark change in both magnitude and sign highlights the importance of pinning down the EIS to in order to model how giving responds to tax reforms that affect the after-tax rate-of-return.

Figure 9: Crowd-out from Wealth Taxation

Notes: This figure shows model-based treatment effects on charitable giving. The outcome variable (y-axis) is the marginal propensity to give (MPG) out of wealth taxes. We plot simulated treatment effects for two scenarios. The first (thin blue line) shows the effect when the level of giving is calibrated to our empirical setting. The second (thick orange) line provides the effect when the level of giving is calibrated to equal 5% of gross income through increasing κ.



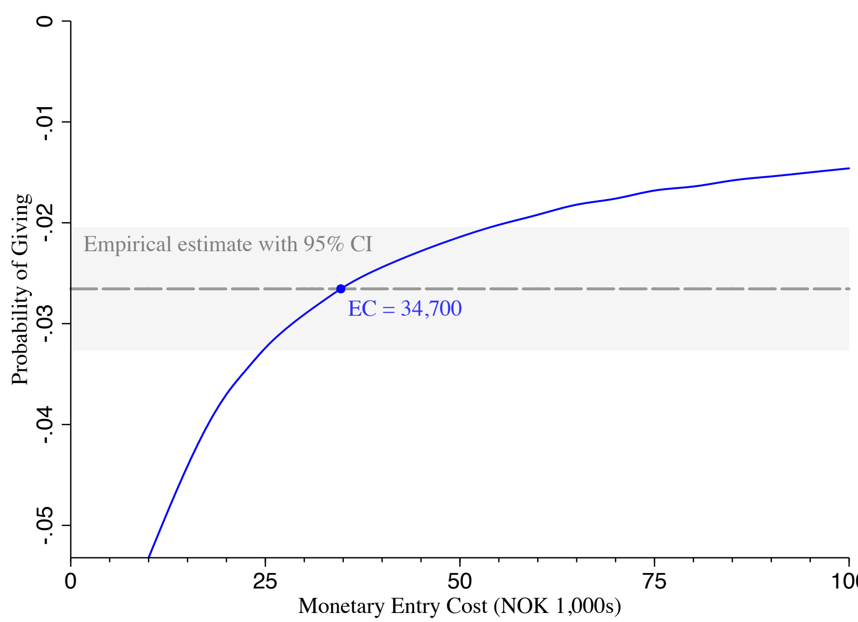
While our rudimentary extrapolation to a high-giving setting by no means provides a perfect forecast of how a wealth tax would affect giving in a high-giving country such as the U.S., it nevertheless emphasizes the point that the link between charitable giving and wealth taxation may be a first order concern for policymakers.

6.4 Calibrating Fixed Costs of Giving

Our baseline calibration exercise ignores fixed costs of giving. However, since we find an effect of wealth taxation on whether households give, we use this to infer the implied fixed cost. Since our empirical findings do not indicate any effect on exits, we focus solely on entry costs (as opposed to per-period participation costs that would also induce exits). Acknowledging the presence of fixed costs in giving, we recalibrate the EIS, σ, to the effect on conditional giving, since conditional on giving, the optimal giving amount is not affected by fixed costs. We find that for the purpose of calibrating the EIS, it does not matter if we model extensive-margin variation directly. Our new estimate is 0.0785 and thus very similar to to the baseline estimate of 0.0815.

Figure 10: Inferring Entry Costs from How Wealth Taxation Affects Participation in Charitable Giving

Notes: This figure shows model-based treatment effects on entry into charitable giving. Using a life-cycle model with endogenous giving that is calibrated to our empirical setting, we plot the effects of a 0.1 percentage point unexpected reduction in the after-tax rate (i.e., a 0.1% wealth tax). We find that a monetary entry cost (MEC) of NOK 34,700 replicates our empirical findings. Our calibration is described in more detail in Appendix B. The dashed gray line provides the empirical estimate of the implied effect of changing a proportional wealth tax rate, which is presented in column (6) of Table 2. The blue solid provides the simulated treatment effect assuming that $\varepsilon = 0.44$, corresponding to the bunching evidence in section 5.2, and an EIS (σ) of 0.0785 (calibrated to the empirical effect on conditional giving).



Using an EIS estimate of 0.0785 and our existing estimate of $\varepsilon = 0.44$, we model how households respond on the extensive margin in the presence of entry costs. We describe the exercise in detail in Appendix B. The key new modeling ingredients are heterogeneity in the strength of the warm-glow motive, κ, and an entry cost, EC.

For a given entry cost, EC, a household chooses to give if the utility of giving exceeds the utility of not giving—and if not giving, receiving an endowment shock equal to EC. This implies that households only choose to give whenever the utility gain from giving exceeds the utility gain from optimally consuming EC over their life-cycle. This approach of modeling entry costs imply that agents behave as if the entry cost entered as a one-time utility cost in their utility function, but it allows us to model the entry cost as a monetary amount.

We graphically illustrate our second-step calibration in Figure 10. We find that a one-time entry cost of

$$EC = \text{NOK } 34{,}700 \text{ (USD } 5{,}800\text{)} \tag{27}$$

is needed to replicate our findings. This equals 41.46% of the present-value life-time giving of the marginal untreated entrant. We know of no comparable entry cost estimates. While Almunia, Guceri, Lockwood, and Scharf (2020) estimate fixed costs, they estimate the per-period cost of *declaring* charitable giving on tax returns—not cost of participating in or entering into charitable giving.

While we find a positive relationship between the probability of giving and entry costs in Figure 10, this is not a result by itself. It is rather caused by the first-step calibration: keeping the fraction of households that chooses to give constant, a larger EC makes it less likely that the wealth-tax shock is large enough to push someone's optimal giving amount above or below the threshold for participation.

Counterfactual experiment of removing entry costs. Our calibrated model with heterogeneity in κ allows us to investigate the effect of removing the cost of entering into giving. While this is a purely hypothetical exercise (since we do not know exactly what creates the entry costs), it is useful to quantify the overall importance of fixed costs in charitable giving. We find that the average ex-ante nonparticipant would enter and give NOK 575 ($96) if entry costs were removed. Applying this to our sample summary statistics, we would have an increase in total giving of about 21%.[32]

7 Summary

The public finance literature has devoted significant attention to why and how the personal income tax system can be used to encourage charitable giving (see, e.g., Saez 2004, Diamond 2006, and List 2011). To what extent donation behavior could be influenced by capital taxation, in the form of a wealth, capital income or capital gains tax, has been largely neglected. New evidence thus seems prudent in light of the surging interest for using capital taxation, and wealth taxes in particular, as a policy instrument to address economic inequality (see, e.g., Saez and Zucman 2019b).

To our knowledge, this paper is the first to present empirical evidence on how capital taxation, or wealth taxation in particular, affects charitable giving. Our finding of a negative effect is surprising

[32] The unconditional mean would increase by $575 \cdot (1\text{-}0.32)$, where 0.32 is the participation rate. Dividing this by the baseline unconditional mean $(0.32 \times 5{,}758)$, we obtain an increase of 21.22%.

in the sense that standard preference parameters (e.g., an elasticity of intertemporal substitution of 1) imply a positive effect. Our results thus indicate that the redistributive effects of wealth taxation may be offset by reduced giving.

We also provide new evidence on how responsive giving is to its after-tax own price. Our findings suggest that actual giving may be considerably less responsive to tax incentives than reported giving. Our heterogeneity analyses show that the sensitivity of giving is not higher for higher-income and wealthier individuals. However, our data demonstrates substantially heterogeneity with respect to the type of charitable giving. The presence of elasticity heterogeneity with respect to the type of giving implies that, even if a social planner values different types of giving equally, efficiency losses may arise from using uniform tax incentives.

Recent work by Garbinti, Goupille-Lebret, Muñoz, Stantcheva, and Zucman (2023) emphasizes that differences in reporting requirements may substantially affect behavioral elasticities with respect to wealth taxation and therefore break the link between empirical and structural elasticities. Our setting is robust to this issue in that we observe actual as opposed to reported behavior. Accordingly, we are able to more concretely guide optimal taxation and policy by providing the structural preference parameters that can explain our empirical findings. Since we observe actual as opposed to reported giving. These may be more useful than our reduced-form findings as they do not explicitly depend on the peculiarities of the tax code (e.g., the progressivity or avoidance and evasion opportunities) or the economic characteristics of the taxpayers. Importantly, they may be used to model the effects of a wide range of tax reforms, such as changing the direct tax incentives for giving, changing the tax rate on capital income, or introducing a progressive wealth tax.

While we find that the crowd-out effect of giving is modest in a NOK for NOK sense, our structural parameters imply that this crowd-out may be economically large in a setting where the ex-ante level of giving is higher, such as the U.S. or the U.K. While crowding out giving by itself reduces the potential benefits of wealth taxation, this crowding-out cannot, structurally, occur in a vacuum. This is because the crowd-out is driven by a low elasticity of intertemporal substitution. A low EIS in standard frameworks generally imply low efficiency costs of capital taxation. Our findings suggest that optimal tax models that ignore giving may overstate the attractiveness of more comprehensive capital taxation when the EIS is low and the ex-ante level of giving is high.

References

Advani, A. and H. Tarrant (2021): "Behavioural responses to a wealth tax," *Fiscal Studies*, 42, 509–537.

Agersnap, O. and O. Zidar (2021): "The tax elasticity of capital gains and revenue-maximizing rates," *American Economic Review: Insights*, 3, 399–416.

Agrawal, D. R., D. Foremny, and C. Martinez-Toledano (2020): "Paraísos fiscales, wealth taxation, and mobility," .

Akcigit, P. A. U., M. G. M. Lequien, and S. Stantcheva (2022): "Tax Simplicity or Simplicity of Evasion? Evidence from Self-Employment Taxes in France," .

Almunia, M., I. Guceri, B. Lockwood, and K. Scharf (2020): "More giving or more givers? The effects of tax incentives on charitable donations in the UK," *Journal of Public Economics*, 183, 104–114.

Andreoni, J. and A. A. Payne (2003): "Do government grants to private charities crowd out giving or fund-raising?" *American Economic Review*, 93, 792–812.

Andreoni, J. and M. Serra-Garcia (2021): "Time inconsistent charitable giving," *Journal of Public Economics*, 198.

Arefeva, A., M. A. Davis, A. C. Ghent, and M. Park (2021): "The Effect of Capital Gains Taxes on Business Creation and Employment: The Case of Opportunity Zones," .

Auten, G. E., H. Sieg, and C. T. Clotfelter (2002): "Charitable giving, income, and taxes: An analysis of panel data," *American Economic Review*, 92, 371–382.

Bakija, J. and B. T. Heim (2011): "How does charitable giving respond to incentives and income? New estimates from panel data," *National Tax Journal*, 64, 615–650.

Bastani, S. and D. Waldenström (2020): "How should capital be taxed?" *Journal of Economic Surveys*, 34, 812–846.

——— (2021): "The ability gradient in tax responsiveness," *Journal of Public Economics Plus*, 2, 100007.

Berg, K. and S. Hebous (2021): "Does a wealth tax improve equality of opportunity?" CESifo Working Paper No. 9174, CESifo, Munich.

Best, M. C., J. S. Cloyne, E. Ilzetzki, and H. J. Kleven (2020): "Estimating the elasticity of intertemporal substitution using mortgage notches," *The Review of Economic Studies*, 87, 656–690.

Boar, C. and M. P. Knowles (2022): "Optimal taxation of risky entrepreneurial capital," NBER Working Paper 29961, National Bureau of Economic Research.

Boberg-Fazlić, N. and P. Sharp (2017): "Does welfare spending crowd out charitable activity? Evidence from historical England under the poor laws," *The Economic Journal*, 127, 50–83.

Boissel, C. and A. Matray (2021): "Dividend Taxes and the Allocation of Capital," Working Paper, Princeton University.

Breman, A. (2011): "Give more tomorrow: Two field experiments on altruism and intertemporal choice," *Journal of Public Economics*, 95, 1349–1357.

Broer, T., A. Kohlhas, K. Mitman, and K. Schlafmann (2021): "Information and wealth heterogeneity in the macroeconomy," *CEPR Discussion Paper No. DP15934*.

Brooks, A. C. (2007): "Income tax policy and charitable giving," *Journal of Policy Analysis and Management*, 26, 599–612.

Brülhart, M., J. Gruber, M. Krapf, and K. Schmidheiny (2022): "Taxing wealth: Evidence from Switzerland," *American Economic Journal: Economic Policy*.

Bursztyn, L., T. Chaney, T. A. Hassan, and A. Rao (2022): "The Immigrant Next Door: Long-Term Contact, Generosity, and Prejudice," .

Cage, J. and M. Guillot (2021): "Is charitable giving political? Evidence from wealth and income tax returns," *SSRN Working Paper*.

Chen, J. and J. Roth (2022): "Log-like? ATEs defined with zero outcomes are (arbitrarily) scale-dependent," *Working Paper*.

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

Chetty, R., J. N. Friedman, S. Leth-Petersen, T. H. Nielsen, and T. Olsen (2014): "Active vs. passive decisions and crowd-out in retirement savings accounts: Evidence from Denmark," *The Quarterly Journal of Economics*, 129, 1141–1219.

Chetty, R., J. N. Friedman, T. Olsen, and L. Pistaferri (2011): "Adjustment costs, firm responses, and micro vs. macro labor supply elasticities: Evidence from Danish tax records," *The Quarterly Journal of Economics*, 126, 749–804.

Cohn, J. B., Z. Liu, and M. I. Wardlaw (2022): "Count (and count-like) data in finance," *Journal of Financial Economics*, 146, 529–551.

Deryugina, T. and B. M. Marx (2021): "Is the supply of charitable donations fixed? Evidence from deadly tornadoes," *American Economic Review: Insights*, 3, 383–98.

Diamond, P. (2006): "Optimal tax treatment of private contributions for public goods with and without warm glow preferences," *Journal of Public Economics*, 90, 897–919.

Dray, S., C. Landais, and S. Stantcheva (2023): "Wealth and property taxation in the United States," Tech. rep., National Bureau of Economic Research.

Drouvelis, M., A. Isen, and B. Marx (2019): "The bonus-income donation norm," CESifo Working Paper No 7961, CESifo, Munich.

Duquette, N. J. (2016): "Do tax incentives affect charitable contributions? Evidence from public charities' reported revenues," *Journal of Public Economics*, 137, 51–69.

Durán-Cabré, J. M., A. Esteller-Moré, and M. Mas-Montserrat (2019): "Behavioural responses to the (re)introduction of wealth taxes: Evidence from Spain," .

Fack, G. and C. Landais (2010): "Are tax incentives for charitable giving efficient? Evidence from France," *American Economic Journal: Economic Policy*, 2, 117–41.

——— (2016): "The effect of tax enforcement on tax elasticities: Evidence from charitable contributions in France," *Journal of Public Economics*, 133, 23–40.

Fagereng, A., M. B. Holm, B. Moll, and G. Natvik (2019): "Saving behavior across the wealth distribution: The importance of capital gains," .

Feldstein, M. (1975a): "The income tax and charitable contributions: Part I–Aggregate and distributional effects," *National Tax Journal*, 28, 81–100.

——— (1975b): "The income tax and charitable contributions: Part II–The impact on religious, educational and other organizations," *National Tax Journal*, 28, 209–226.

Gaillard, A. and P. Wangner (2021): "Wealth, returns, and taxation: A tale of two dependencies," *Available at SSRN 3966130*.

Garbinti, B., J. Goupille-Lebret, M. Muñoz, S. Stantcheva, and G. Zucman (2023): "Tax Design, Information, and Elasticities: Evidence From the French Wealth Tax," Tech. rep., Working Paper, Paris School of Economics.

Gillitzer, C. and P. E. Skov (2018): "The use of third-party information reporting for tax deductions: evidence and implications from charitable deductions in Denmark," *Oxford Economic Papers*, 70, 892–916.

Glogowsky, U. (2021): "Behavioral responses to inheritance and gift taxation: Evidence from Germany," *Journal of Public Economics*, 193.

Goupille-Lebret, J. and J. Infante (2018): "Behavioral responses to inheritance tax: Evidence from notches in France," *Journal of Public Economics*, 168, 21–34.

Gruber, J. and D. M. Hungerman (2007): "Faith-based charity and crowd-out during the great depression," *Journal of Public Economics*, 91, 1043–1069.

Gruber, J. and E. Saez (2002): "The elasticity of taxable income: Evidence and implications," *Journal of Public Economics*, 84, 1–32.

Guvenen, F., G. Kambourov, B. Kuruscu, and S. Ocampo (2021): "Taxing wealth and capital income with heterogeneous returns," .

Havránek, T. (2015): "Measuring intertemporal substitution: The importance of method choices and selective reporting," *Journal of the European Economic Association*, 13.

Hungerman, D. M. (2005): "Are church and state substitutes? Evidence from the 1996 welfare reform," *Journal of public economics*, 89, 2245–2267.

Hungerman, D. M. and M. Ottoni-Wilhelm (2021): "Impure impact giving: Theory and evidence," *Journal of Political Economy*, 129, 1553–1614.

Jakobsen, K., K. Jakobsen, H. Kleven, and G. Zucman (2020): "Wealth taxation and wealth accumulation," *The Quarterly Journal of Economics*, 135, 329–388.

Jakobsen, K., H. Kleven, J. Kolsrud, C. Landais, and M. Muñoz (2022): "Wealth Taxation and Migration Patterns of the Wealthy: Evidence from Scandinavia," *Working Paper*.

Karlan, D. and J. A. List (2007): "Does price matter in charitable giving? Evidence from a large-scale natural field experiment," *American Economic Review*, 97, 1774–1793.

Kleven, H. J. (2016): "Bunching," *Annual Review of Economics*, 8, 435–464.

Korevaar, M. and P. Koudijs (2023): "Shocking Wealth: The Long-Term Impact of Housing Wealth Taxation," *Available at SSRN 4351981*.

Lavecchia, A. M. and A. Tazhitdinova (2021): "Permanent and Transitory Responses to Capital Gains Taxes: Evidence from a Lifetime Exemption in Canada," Working Paper 28514, National Bureau of Economic Research.

List, J. A. (2011): "The market for charitable giving," *Journal of Economic Perspectives*, 25, 157–80.

Londoño-Vélez, J. and J. Ávila-Mahecha (2020a): "Behavioral responses to wealth taxation: Evidence from Colombia," Working Paper.

——— (2020b): "Enforcing Wealth Taxes in the Developing World: Quasi-Experimental Evidence from Colombia," *American Economic Review: Insights*, 3, 157–165.

Londoño-Vélez, J. and D. Tortarolo (2022): "Revealing 21% of GDP in Hidden Assets: Evidence from Argentina's Tax Amnesties," .

Martínez-Toledano, C. (2020): "House price cycles, wealth inequality and portfolio reshuffling," WID. world Working Paper No 2020/02, World Inequality Lab.

Mavrokonstantis, P. and A. Seibold (2022): "Bunching and Adjustment Costs: Evidence from Cypriot Tax Reforms," .

Meer, J. (2014): "Effects of the price of charitable giving: Evidence from an online crowdfunding platform," *Journal of Economic Behavior & Organization*, 103, 113–124.

——— (2017): "Does fundraising create new giving?" *Journal of Public Economics*, 145, 82–93.

Meer, J. and B. A. Priday (2020): "Tax prices and charitable giving: Projected changes in donations under the 2017 Tax Cuts and Jobs Act," *Tax Policy and the Economy*, 34, 113–138.

——— (2021): "Generosity across the income and wealth distributions," *National Tax Journal*, 74, 655–687.

Meier, S. (2007): "Do subsidies increase charitable giving in the long run? Matching donations in a field experiment," *Journal of the European Economic Association*, 5, 1203–1222.

Nekoei, A. and D. Seim (2021): "How do inheritances shape wealth inequality? Theory and evidence from Sweden," CESifo Working Paper No 9017, CESifo, Munich.

Nyborg, K. and M. Rege (2003): "Does public policy crowd out private contributions to public goods," *Public Choice*, 115, 397–418.

OECD (2020): *Taxation and Philantropy*, Organisation for Economic Co-operation and Development, Paris, OECD Publishing.

Okten, C. and B. A. Weisbrod (2000): "Determinants of donations in private nonprofit markets," *Journal of Public Economics*, 75, 255–272.

Payne, A. A. (1998): "Does the government crowd-out private donations? New evidence from a sample of non-profit firms," *Journal of Public Economics*, 69, 323–345.

Randolph, W. C. (1995): "Dynamic income, progressive taxes, and the timing of charitable contributions," *Journal of Political Economy*, 103, 709–738.

Reinstein, D. A. (2011): "Does one charitable contribution come at the expense of another?" *The BE Journal of Economic Analysis & Policy*, 11.

Ring, M. A. K. (2020): "Wealth taxation and household saving: Evidence from assessment discontinuities in Norway," Working Paper, University of Texas, at Austin.

Rotberg, S. and J. B. Steinberg (2021): "Tax evasion and capital taxation," .

Saez, E. (2004): "The optimal treatment of tax expenditures," *Journal of Public Economics*, 88, 2657–2684.

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

Saez, E. and S. Stantcheva (2018): "A simpler theory of optimal capital taxation," *Journal of Public Economics*, 162, 120–142.

Saez, E. and G. Zucman (2019a): "Progressive wealth taxation," *Brookings Papers on Economic Activity*, Fall 2019, 437–533.

——— (2019b): *The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay*, WW Norton & Company.

Scheuer, F. and J. Slemrod (2021): "Taxing Our Wealth," *Journal of Economic Perspectives*, 35, 207–30.

Seibold, A. (2021): "Reference points for retirement behavior: Evidence from german pension discontinuities," *American Economic Review*, 111, 1126–1165.

Seim, D. (2017): "Behavioral responses to wealth taxes: Evidence from Sweden," *American Economic Journal: Economic Policy*, 9, 395–421.

Sivesind, K. H. (2015): "Giving in Norway: An ambitious welfare state with a self-reliant nonprofit sector," in *The Palgrave Handbook of Global Philanthropy*, London, 230–248.

Slemrod, J. and W. Kopczuk (2002): "The optimal elasticity of taxable income," *Journal of Public Economics*, 84, 91–112.

Statistics Norway (2019): *Income and Wealth Statistics for Households*, https://www.ssb.no/en/inntekt-og-forbruk/statistikker/ifhus.

Straub, L. and I. Werning (2020): "Positive long-run capital taxation: Chamley-Judd revisited," *American Economic Review*, 110, 86–119.

Tazhitdinova, A. (2018): "Reducing evasion through self-reporting: Evidence from charitable contributions," *Journal of Public Economics*, 165, 31–47.

Wong, F. (2020): "Mad as Hell: Property Taxes and Financial Distress," *Available at SSRN 3645481.*

Yetman, M. H. and R. J. Yetman (2013): "How does the incentive effect of the charitable deduction vary across charities?" *The Accounting Review*, 88, 1069–1094.

Zoutman, F. T. (2018): "The elasticity of taxable wealth: Evidence from the Netherlands," Working Paper, Norwegian School of Economics.

Online Appendix

for Wealth Taxation and Charitable Giving

by Marius A. K. Ring and Thor O. Thoresen

A Model and Derivations

Consider the following optimization problem:

$$\max_{\{c_t, s_{t+1}, g_t\}} \quad \sum_{t=0}^{T} \beta^t \left[\frac{c_t^{1-1/\sigma}}{1-1/\sigma} + \kappa \frac{g_t^{1-1/\varepsilon}}{1-1/\varepsilon} \right], \tag{28}$$

$$\text{such that} \quad c_t = w_t - p_t g_t - s_{t+1} + s_t R_t, \tag{29}$$

where c_t, s_{t+1}, and g_t is the consumption, saving, and charitable giving undertaken in year t. β is the temporal discount factor, σ is the elasticity of intertemporal substitution (the EIS, for consumption) and ε is the giving elasticity. w_t is exogenous income. w_0 may be considered the initial wealth of the agent. p_t is the price of a unit of giving. R_t is the gross after-tax rate of return, net of any wealth taxes. Agents start their optimization problem at $t = 0$ and end their life cycle at $t = T$.

In applying this model to our empirical setting, it will be convenient to assume that agents start their optimization problem at some other time $t > 0$, such as when they face a wealth tax shock. In this case, we can replace time 0 with t and replace T with $T - t$.

A.1 Solving the life-cycle optimization problem.

s_{t+1}-FOC may be written the following ways:

$$c_t^{-1/\sigma} = \beta R_{t+1} c_{t+1}^{-1/\sigma} \quad \Leftrightarrow \quad c_{t+1} = (\beta R_{t+1})^{\sigma} c_t \tag{30}$$

s_t-FOC iteration yields:

$$c_t \quad = \quad \beta^{\sigma t} \Pi_{s=0}^{t} R_s^{\sigma} c_0 \tag{31}$$

g_t-FOC may be written the following ways:

$$c_t^{-1/\sigma} p_t = \kappa g_t^{-1/\varepsilon} \Leftrightarrow c_t = \left(\frac{p_t}{\kappa}\right)^{\sigma} g_t^{\sigma/\varepsilon} \Leftrightarrow g_t = \left(\frac{\kappa}{p_t}\right)^{\varepsilon} c_t^{\varepsilon/\sigma} \tag{32}$$

Substitute in the s_t-FOC iteration into the g_t-FOC, and then the g_0-FOC:

$$g_t = \left(\frac{\kappa}{p_t}\right)^{\varepsilon} c_t^{\varepsilon/\sigma} = \left(\frac{\kappa}{p_t}\right)^{\varepsilon} \beta^{\varepsilon t}\Pi_{s=0}^{t} R_s^{\varepsilon} c_0^{\varepsilon/\sigma} = \left(\frac{\kappa}{p_t}\right)^{\varepsilon} \beta^{\varepsilon t}\Pi_{s=0}^{t} R_s^{\varepsilon} \left(\frac{p_0}{\kappa}\right)^{\varepsilon} g_0 \tag{33}$$

$$= \left(\frac{p_0}{p_t}\right)^{\varepsilon} \beta^{\varepsilon t}\Pi_{s=0}^{t} R_s^{\varepsilon} g_0 \tag{34}$$

Budget constraint iteration yields the present-value condition:

$$\sum_{t=0}^{T} c_t \Pi_{s=0}^{t} R_s^{-1} = \sum_{t=0}^{T} w_t \Pi_{s=0}^{t} R_s^{-1} - \sum_{t=0}^{T} p_t g_t \Pi_{s=0}^{t} R_s^{-1}. \tag{35}$$

Now we substitute in the iterated FOC expressions for g_t and c_t.

$$c_0 \sum_{t=0}^{T} \beta^{\sigma t} \Pi_{s=0}^{t} R_s^{\sigma-1} = \sum_{t=0}^{T} w_t \Pi_{s=0}^{t} R_s^{-1} - g_0 \sum_{t=0}^{T} p_t^{1-\varepsilon} p_0^{\varepsilon} \beta^{\varepsilon t} \Pi_{s=0}^{t} R_s^{\varepsilon-1}. \tag{36}$$

We then substitute in the g_0-FOC:

$$g_0^{\sigma/\varepsilon} \left(\frac{p_0}{\kappa}\right)^{\sigma} \sum_{t=0}^{T} \beta^{\sigma t} \Pi_{s=0}^{t} R_s^{\sigma-1} = \sum_{t=0}^{T} w_t \Pi_{s=0}^{t} R_s^{-1} - g_0 \sum_{t=0}^{T} p_t^{1-\varepsilon} p_0^{\varepsilon} \beta^{\varepsilon t} \Pi_{s=0}^{t} R_s^{\varepsilon-1}. \tag{37}$$

This expression provides the initial level of giving, g_0, that solves the optimization problem. All other endogenous variables then follow from the FOCs.

Simplified problem. Now, we simplify and set $R_t = R$ and $p_t = 1 \ \forall t$.

$$g_0^{\sigma/\varepsilon} \left(\frac{1}{\kappa}\right)^{\sigma} \frac{(\beta^{\sigma} R^{\sigma-1})^{T+1} - 1}{\beta^{\sigma} R^{\sigma-1} - 1} = \sum_{t=0}^{T} w_t R^{-t} - g_0 \frac{(\beta^{\varepsilon} R^{\varepsilon-1})^{T+1} - 1}{\beta^{\varepsilon} R^{\varepsilon-1} - 1}. \tag{38}$$

Note that we may substitute in s for 0, and also replace T with $T - s$ to determine the level of giving for some point in time s. The in-text proposition is similar to the simplified expression above but does not assume that p_t is constant over time.

Simplified, infinite-horizon, when $T = \infty$, assuming $\beta^{\varepsilon} R^{\varepsilon-1} < 1$ and $\beta^{\sigma} R^{\sigma-1} < 1$, yields the condition:

$$g_0^{\sigma/\varepsilon} \frac{1}{1 - \beta^{\sigma} R^{\sigma-1}} \left(\frac{1}{\kappa}\right)^{\sigma} = \sum_{t=0}^{T} w_t R^{-t} - g_0 \frac{1}{1 - \beta^{\varepsilon} R^{\varepsilon-1}} \tag{39}$$

$$g_0^{\sigma/\varepsilon} \left(\frac{1}{\kappa}\right)^{\sigma} = \left(1 - \beta^{\sigma} R^{\sigma-1}\right) \sum_{t=0}^{T} w_t R^{-t} - g_0 \frac{1 - \beta^{\sigma} R^{\sigma-1}}{1 - \beta^{\varepsilon} R^{\varepsilon-1}} \tag{40}$$

Differentiating yields

$$\frac{\sigma}{\varepsilon} g_0^{\sigma/\varepsilon-1}\left(\frac{1}{\kappa}\right)^{\sigma} dg_0 = -(\sigma-1)\beta^{\sigma}R^{\sigma-2}\sum_{t=0}^{T} w_t R^{-t} dR - \left(1-\beta^{\sigma}R^{\sigma-1}\right)\sum_{t=0}^{T} t w_t R^{-t-1} dR \tag{41}$$

$$- \quad dg_0 \frac{1-\beta^{\sigma}R^{\sigma-1}}{1-\beta^{\varepsilon}R^{\varepsilon-1}} \tag{42}$$

$$+ \quad g_0 \frac{(\varepsilon-\sigma)\beta^{\sigma+\varepsilon} - (\varepsilon-1)\beta^{\varepsilon}R^{\sigma+1} + (\sigma-1)\beta^{\sigma}R^{\sigma+1}}{R\left(\beta^{\varepsilon}R^{\varepsilon}-R\right)^2} dR. \tag{43}$$

Reorder terms, particularly the last term, and we obtain

$$\left(\frac{\sigma}{\varepsilon} g_0^{\sigma/\varepsilon-1}\left(\frac{1}{\kappa}\right)^{\sigma} + \frac{1-\beta^{\sigma}R^{\sigma-1}}{1-\beta^{\varepsilon}R^{\varepsilon-1}}\right)\frac{dg_0}{dR} = -(\sigma-1)\beta^{\sigma}R^{\sigma-1}\sum_{t=0}^{T} w_t R^{-t} \tag{44}$$

$$- \quad \left(1-\beta^{\sigma}R^{\sigma-1}\right)\sum_{t=0}^{T} t w_t R^{-t-1} \tag{45}$$

$$- \quad g_0\left[\frac{(\varepsilon-1)\beta^{\varepsilon}R^{\varepsilon-2}(1-\beta^{\sigma}R^{\sigma-1})}{(1-\beta^{\varepsilon}R^{\varepsilon-1})^2} - \frac{(\sigma-1)\beta^{\sigma}R^{\sigma-2}}{1-\beta^{\varepsilon}R^{\varepsilon-1}}\right]$$

Now consider this differential equation when $\beta R = 1$:

$$\left(\frac{\sigma}{\varepsilon} g_0^{\sigma/\varepsilon-1}\left(\frac{1}{\kappa}\right)^{\sigma} + 1\right)\frac{dg_0}{dR} = -(\sigma-1)R^{-1}\sum_{t=0}^{T} w_t R^{-t} \tag{46}$$

$$- \quad \left(1-R^{-1}\right)\sum_{t=0}^{T} t w_t R^{-t-1} \tag{47}$$

$$- \quad g_0\left[\frac{(\varepsilon-1)R^{-2}(1-R^{-1})}{(1-R^{-1})^2} - \frac{(\sigma-1)R^{-2}}{1-R^{-1}}\right]$$

After some reordering and cancelling out, we get

$$\left(\frac{\sigma}{\varepsilon}\kappa^{-\sigma} g_0^{\sigma/\varepsilon-1} + 1\right)\frac{dg_0}{dR} = \underbrace{-(\sigma-1)\sum_{t=0}^{T} w_t R^{-t-1}}_{\text{Income v. substitution}} \underbrace{-\left(1-R^{-1}\right)\sum_{t=0}^{T} t w_t R^{-t-1}}_{\text{Human wealth effect}} \underbrace{-\frac{\varepsilon-\sigma}{R^2(1-R^{-1})} g_0}_{\text{Elasticity adjustment}}. \tag{48}$$

The first two terms on the right-hand side are driven by consumption adjustments across periods. The third term says that if giving is more elastic than consumption ($\varepsilon > \sigma$), then current giving drops by even more than what is implied by the first two consumption-related terms. Note that from the intratemporal g_0-FOC, we get that $\kappa^{-\sigma} g_0^{\sigma/\varepsilon} = c_0$. Hence, we can also write

$$\left(\frac{\sigma}{\varepsilon}\frac{c_0}{g_0} + 1\right)\frac{dg_0}{dR} = \underbrace{-(\sigma-1)\sum_{t=0}^{T} w_t R^{-t-1}}_{\text{Income v. substitution}} \underbrace{-\left(1-R^{-1}\right)\sum_{t=0}^{T} t w_t R^{-t-1}}_{\text{Human wealth effect}} \underbrace{-\frac{\varepsilon-\sigma}{R^2(1-R^{-1})} g_0}_{\text{Elasticity adjustment}}. \tag{49}$$

Note that left-hand-side term in parentheses may also be rewritten as $\frac{\sigma c_t + \varepsilon g_t}{\varepsilon g_t}$.

Corollary 1 proof: Letting $\sigma \to \infty$ in Proposition 2, we see that $-dg_t/dR_t$ is positive as long as (R times the present-value of) wealth and income exceeds $\frac{g_t}{1-R^{-1}}$. Since the last term equals the present value of giving (g_t is constant under the assumptions of Proposition 2), the budget constraint implies that this inequality must weakly hold.

Two additional conditions independently cause the inequality to strictly hold. Since the marginal utilities of giving and consumption are infinite as we approach zero, c_t and g_t will be strictly positive. Hence, when $c_t > 0$, the budget constraint implies that the inequality holds strictly. In addition, since the present-value of wealth and income is multiplied by $R > 0$, the inequality must also hold strictly.

This implies that a decrease in R (due to capital taxation) must strictly increase giving. Finally, when we let $\sigma \to \infty$, ε seizes to matter, which implies that this corollary holds for any $\varepsilon > 0$.

B Calibration

B.1 Baseline calibration, without entry costs

We use Proposition 1 for calibration. We first set $\varepsilon = 0.44$ in line with our bunching estimate and set $\beta = 0.98$. We set $R^{base} = \beta^{-1}$. This implies $R \approx 1.02$, which is in line with the low interest rates in Norway during this time period. We then select a σ, and compute a value for κ (see below). We enter empirical values for $\{w_s\}_{s=t}^{T}$ and T (also see below), and solve for the g_t that would arise under two values of R: R^{base} and $R^{shocked}$, and compute the log difference. We do this for many σ values, and search for the one that gives the closest match to our empirical estimates on the implied effect of a proportional wealth tax rate change.

We choose κ from a level calibration. Given, σ and ε, we use the first-order condition that $\kappa = g_t^{1/\varepsilon} c_t^{-1/\sigma} p_t$ to assign κ. We assume that c_t equals 93% of after-tax income, consistent with the net saving rate of 6–8% found by Fagereng, Holm, Moll, and Natvik (2019) for wealthier households. Gross income is set to the mean amount of gross income, 0.77 MNOK. We assume a tax rate of 40%. Hence, $\hat{c}_t = 0.93 \cdot 0.77 \cdot (1 - 0.40) = 0.43$. The mean amount of giving in our sample is 5,225 conditional on giving (see Table A.1). Multiplying by the probability of giving, 0.3, we set $\hat{g}_t = 1,568$. We set $p_t = 0.72$, which is the after-tax price in 2012. Note these values, $\hat{g}_t$ and $\hat{c}_t$, are only used to calibrate κ, and do not otherwise affect the calibration exercise.

$$\kappa \equiv \hat{c}^{-1/\sigma} \hat{g}^{1/\varepsilon} = 0.43^{-1/\sigma} \cdot 0.001568^{1/\varepsilon} \cdot 0.72. \tag{50}$$

w_t is set to $0.77 \cdot (1 - 0.40) + 4.23$. This is the average yearly income and wealth for households in our sample as of 2012 (Table A.1). The average person in our sample is 59. we set $t = 58$ and assume that starts declining linearly at $t = 62$ and reaches 50% of the original income at age 66 based an assumed retirement at 66 and a 50% income replacement rate. We set the duration of the life cycle to be $T = 85$.

When calculating simulated log-treatment effects, we shift giving amounts by NOK 1,000 prior to taking logs in order to match the empirical specification, which employs this shifting argument to accommodate zeros and avoid a large influence from trivial level changes.

B.2 Calibration, with entry costs

Intensive-margin calibration. We still use our empirical bunching-design estimate to inform ε. We calibrate σ to intensive-margin giving responses, using the same procedure as when there were no entry costs.

We calibrate the warm-glow strength as before:

$$\kappa^c \equiv \hat{c}^{-1/\sigma} \hat{g}^{1/\varepsilon} \cdot p_t, \tag{51}$$

where $\hat{c} = 0.93 \cdot 0.77 \cdot (1 - 0.4)$, $\hat{g} = 0.005225$ (both denominated in MNOK), and p_t equals the 2012 after-tax price of giving of 0.72. Our calibration exercise thus differs from the baseline (no entry cost) by using a higher (conditional) $\hat{g}$. We obtain an EIS estimate of 0.0696.

Extensive-margin calibration. In order to calibrate entry costs, we first choose some entry cost, EC, and iterate until we find the EC that produces similar treatment effects on extensive-margin giving as we find empirically. Households will choose between giving (as if there were no entry cost) or not giving, in which case they receive EC as compensation and can use this to optimally increase consumption.

One issue with the standard approach of modeling per-period utility from giving as $\kappa \frac{g^{1-1\varepsilon}}{1-1/\varepsilon}$ is that the marginal utility of giving tends to infinity as $g \to 0$. We circumvent this issue by using a first-order Taylor-series approximation around the optimal conditional giving amount to pin down the per-period utility losses from seizing to give.

Our exercise defines two identical households, where one is the control and one is the treated household who sees a reduction in R. We then examine the effect on participation, $\mathbb{1}[g_t > 0]$.

In order to simulate a non-binary effect on participation, we need heterogeneity (i.e., only a fraction of shocked households should give a positive amount). We choose to model this as heterogeneity in the strength of the warm-glow utility of giving, that is, κ. This approach has precedent in Almunia et al. (2020). We assume that κ is distributed according to the log-normal distribution, $\ln(\psi_{mean}, \psi_{sdev})$, with CDF $\Psi(\kappa)$. We choose ψ_{mean} and ψ_{sdev} such that (i) the probability of giving matches the share of ex-ante non-givers who choose to give during 2013–2018. In the model, we solve for the κ^*, above which a household chooses to start giving in the presence of entry costs. (ii) We also require the mean κ to correspond to the κ^c that produces the sample-mean conditional amount of giving. This means that we have two equations in two unknowns that we can use to solve for the log-normal distribution parameters, ψ_{mean}, ψ_{sdev}:

$$\Psi(\kappa^*; \psi_{mean}; \psi_{sdev}) \equiv 12\%, \tag{52}$$

$$\mathbb{E}[\kappa] = \kappa^c. \tag{53}$$

Since these cannot be solved analytically, we obtain our estimates for ψ_{mean}, ψ_{sdev} by minimizing the sum of squared differences between the simulated moments and the moments we want to match.

We discretize the heterogeneity by modeling the behavior of $N_h = 4,999$ households. Each household draws a κ from a unique quantile of the κ distribution. We denote this as $h = 1, 2, ..., N_h$. A given household's κ is then

$$\kappa_h = \Psi^{-1}\left(\frac{h}{N_h + 1}\right). \tag{54}$$

Our calibration exercise then considers the mean treatment effect (by comparing treatment and control) across households, h. We graphically show which EC provide a simulated mean treatment that replicate our empirical findings.

This approach provides a EC and κ distribution that replicates the observed probability of giving during 2013–2018 among those who did give during 2006–2012. However, it does not replicate the fact that these households did not give ex-ante. To replicate this dynamic one would need some kind of shock to either preferences, endowment or other state variables. For example, we could (trivially) replicate ex-ante non-participation by assuming that prior to year t, all the households had very low κ_h, but in year t everyone draws a new κ_h according to our calibrated log-normal distribution.

C Adjusting for round-number bunching

We adjust for round number bunching by deducting the mean frequency, at the "giving-bin-year" level, in a leave-me-out fashion. For round-number bins, defined as multiples of NOK 1,000, this involves calculating the mean frequency across other years in which the deduction cap was different. Then to obtain a baseline frequency, absent round-number bunching, the mean frequency of two adjacent bins is added. If the resulting adjusted frequency is below the mean of the two adjacent bins, which occurs for a handful of bins, the value is set to the mean of the adjacent bins. Frequencies are then calculated at the bin level by aggregating across sample years. This adjustment procedure lowers the estimated bunching elasticity by 12%.

D Relating regression-based differences in bunching to elasticity differences

First note that the estimated relative excess mass of givers at the threshold, $\hat{b}$, can be rewritten as the relative excess probability of observing an individual at the threshold,

$$\hat{b} = \frac{\hat{P}^a[G_i \in BR] - \hat{P}^{cf}[G_i \in BR]}{\hat{P}^{cf}[G_i \in BR]}, \tag{55}$$

where $\hat{P}^a$ denotes the actual empirical probability of observing anyone in the bunching region, BR, and $\hat{P}^{cf}$ refers to the estimated counterfactual probability. We thus use equation (17) and rewrite

$\hat{e}$ as

$$\hat{e} = -\frac{\hat{P}^a[G_i \in BR] - \hat{P}^{cf}[G_i \in BR]}{\hat{P}^{cf}[G_i \in BR]} \frac{100}{\overline{K}} \frac{1}{-\log(1-\tau^g)}, \tag{56}$$

where $100/\overline{K} = 1/K^*$. Hence, the effect of a unit increase in some covariate, $Z_{i,t}$, on e is

$$\widehat{\frac{de}{dZ}} = -\hat{\delta} \frac{1}{\hat{P}^{cf}[G_i \in BR]} \frac{100}{\overline{K}} \frac{1}{\log(1-\tau^g)}, \tag{57}$$

where $\hat{\delta}$ is a regression estimate of how Z affects the propensity to bunch. We obtain the estimate for the scaling parameter $\hat{P}^{cf}[G_i \in BR]$ by solving equation (55), using the bunching-sample mean $\hat{P}^a[G_i \in BR] = 5.09\%$ and the estimated $\hat{b}$ from Figure 6. This implies that $\hat{P}^{cf}[G_i \in BR] = \frac{5.09\%}{23.67-1} = 0.2245\%$. We further use $\tau^g = 27\%$ and $\bar{K}$ =17,120 to get

E Taking logs

When taking logs of charitable giving, we shift giving by an inflation-adjusted NOK 1,000 (USD 167). A common alternative is to use the inverse hyperbolic sine function (arcsinh). While arcsin approach may be appropriate in other settings, it is problematic when considering charitable giving where extensive-margin responses are important. For example, increasing giving from 0 to only NOK 50 is, for most purposes, economically unimportant, but causes an approximated log difference of 4.60 when using arcsinh. Using the "log(1+y)" is also problematic (Cohn, Liu, and Wardlaw, 2022), and in this example method produces a log difference of 3.93. Essentially, we would interpret this small effect as a 393–460% increase. Our approach, $\log(1000 * 1.02^{t-2012} + y)$, for $t = 2012$ instead produces a very small log difference of 0.049 and is equivalent to assuming that all households give an unobserved amount of NOK 1,000 (USD 167) that is unaffected by the treatment.

Setting the log-shifting argument equal to $c = 1000$ is equivalent to using $\log(1 + a \cdot y)$ with $a = 1/1000$. Chen and Roth (2022) show theoretically that this leads to more conservative (smaller-in-magnitude) ATE estimates when there are extensive-margin effects, which there are in our setting, relative to using, e.g., $\log(1 + y)$, which would be equivalent to setting $a = 1$.

However, we do not believe this conservative approach necessarily causes a substantial downward bias. As discussed in the IV results section, we obtain obtain a very similar semi-elasticity of giving with respect to $AWTR$ by using sample means to transform the level effect in column (2) of Table 2 to a semi-elasticity.[33]

To verify that using larger log-shifting arguments, c, in fact provides more conservative estimates, we re-estimate the main event study equation when varying c. We provide the results in Appendix Figure A.6. This shows that the findings in Chen and Roth (2022) apply here. For $c = 100$, we obtain the largest (negative) effects on giving and with $c = 2000$, we obtain smaller-in-magnitude

[33]Dividing -0.0121 by the unconditional average amount of giving per household $(5,758 \times 0.32)$ and then further by the effect of 1 additional NOK of wealth taxes on the AWTR (1/3464991) provides a semi-elasticity of -22.74.

but still statistically significant estimates.

F Supplementary Figures and Tables

Table A.1: Summary Statistics by Secondary Home Ownership

Notes: This table provides household-level summary statistics for two subsamples of our main analysis sample as of 2012. Net wealth equals taxable wealth gross of any valuation discounts. Amounts in Norwegian kroner (NOK) may be divided by 6 to obtain an approximate USD amount as of 2012. Note that the statistics for charitable giving are done at the household level in this table. In the main summary statistics table, summary statistics for giving are computed at the individual level since this is the unit of analysis when using the bunching framework.

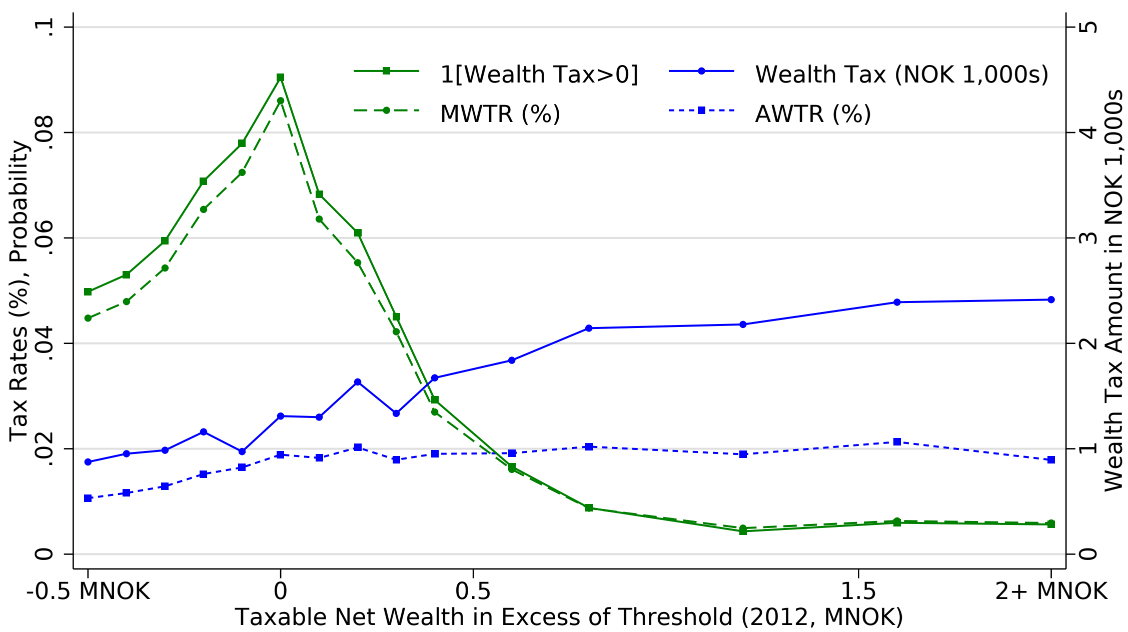
	$MVHS_{h,2012} = 0$				$MVHS_{h,2012} > 0$			
	mean	p25	p50	p75	mean	p25	p50	p75
$1[\text{Giving}_{h,2012} > 0]$	0.29				0.30			
$\text{Giving}_{h,2012}$ if > 0	4,906	1,200	2,880	5,020	5,225	1,400	2,880	5,400
$1[wtax_{h,2012} > 0]$	0.52				0.61			
$wtax_{h,2012}$ if > 0	9,298	2,621	6,416	13,089	11,914	3,644	8,746	17,110
$\text{MVH}_{h,2012}$, MNOK	2.87	1.70	2.44	3.52	4.23	1.95	3.52	5.70
$\text{MVHS}_{h,2012}$, MNOK	0.00	0.00	0.00	0.00	1.95	0.92	1.56	2.51
Net $\text{Wealth}_{h,2012}$, MNOK	3.30	2.03	2.93	4.14	4.23	2.23	3.74	5.62
Age of household $\text{head}_{h,2012}$	62	50	63	74	58	48	59	68
Gross $\text{income}_{h,2012}$, MNOK	0.61	0.30	0.46	0.75	0.77	0.36	0.60	1.01
Number of adults_h	1.37				1.49			

Table A.2: Summary Statistics for Secondary Home Owners by Whether They Gave During 2006–2012

Notes: This table provides household-level summary statistics for two subsamples of treated households (those with $MVHS_{h,2012} > 0$) as of 2012. Nonparticipants gave zero each year during 2006–2012. Participants gave a strictly positive amount each year. Net wealth equals taxable wealth gross of any valuation discounts. Amounts in Norwegian kroner (NOK) may be divided by 6 to obtain an approximate USD amount as of 2012.

	Nonparticipants ($G_{h,pre} = 0$)				Participants ($G_{h,pre} > 0$)			
	mean	p25	p50	p75	mean	p25	p50	p75
$\mathbb{1}[\text{Giving}_{h,t} > 0]$ if $t > 2012$	0.12				0.94			
$\text{Giving}_{h,2012}$					6,496	2,640	3,440	6,660
$1[wtax_{h,2012} > 0]$	0.58				0.67			
$wtax_{h,2012}$ if > 0	10,949	3,273	7,957	15,692	14,066	4,758	10,722	20,387
$\text{MVH}_{h,2012}$, MNOK	3.77	1.69	3.06	5.05	5.27	2.97	4.67	6.92
$\text{MVHS}_{h,2012}$, MNOK	1.85	0.88	1.47	2.37	2.12	0.99	1.75	2.72
Net $\text{Wealth}_{h,2012}$, MNOK	3.83	1.96	3.32	5.08	5.24	3.26	4.81	6.77
$\text{Age}_{h,2012}$	57	47	58	68	61	53	61	68
Gross $\text{income}_{h,2012}$, MNOK	0.66	0.32	0.51	0.85	1.05	0.56	0.90	1.33
Number of adults_h	1.40	1.00	1.00	2.00	1.73	1.00	2.00	2.00

Figure A.1: First-Stage Heterogeneity



This figure shows our first-stage regression coefficients: that is, how the effect of owning more secondary housing wealth (i.e., more $MVHS_{h,2012}$) affected wealth tax exposure for households with different levels of taxable wealth in 2012 ($TNW_{h,2012}$). The point estimates correspond to the coefficients in Appendix Table A.4.

Figure A.2: Dynamic Reduced-Form Effects on Level of Giving and Wealth Taxes

Notes: The point estimates come from estimating equation (10). Giving is measured using the "long panel" of charitable giving deductions from tax returns. The horizontal lines provide 95% confidence intervals

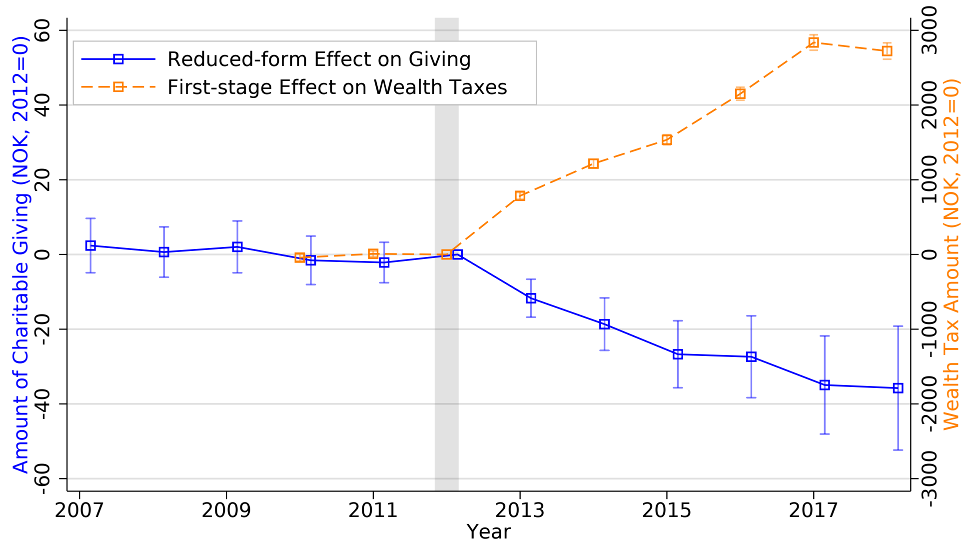


Figure A.3: Reduced-form Effects on Giving Using Both Data Sources on Giving

Notes: The long panel comes from tax returns and reflects actual amount deducted from the income tax base. The short panel is the total amount of giving that was directly reported by the charitable organizations. The point estimates come from estimating equation (10).

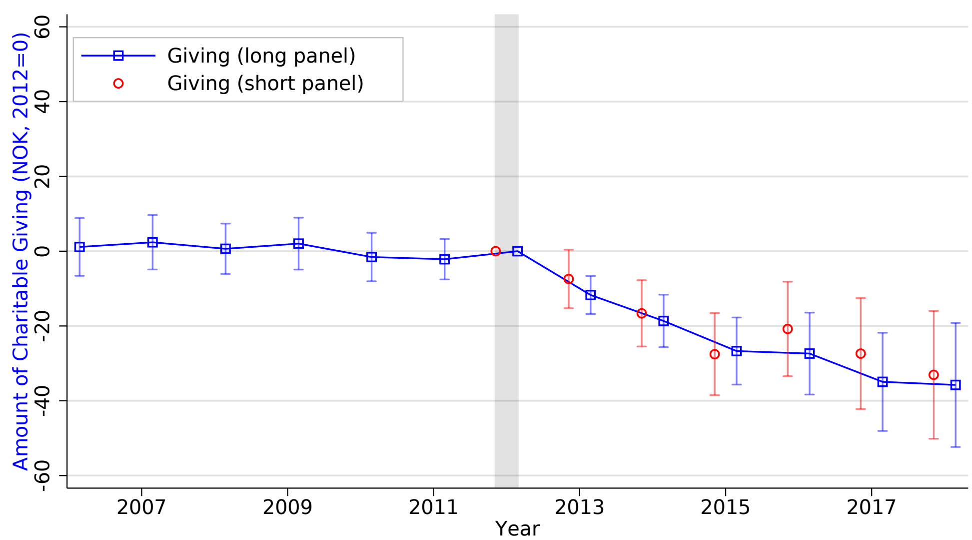


Figure A.4: Reduced-form Effects on Giving with Earlier Treatment Assignment

This figure shows the reduced-form effect on charitable giving based on estimating equation (10). The blue line (circles) provide the estimated effect using the main specification (with 2012 as the base year). The orange line (circles) provide the estimated effect when using 2010 as the base year. When using 2010 as the base year, only 2010 valued information is used to assign treatment status, construct control variables, and perform sample selection. **Comment**: The purpose of using 2010 as the baseline year is to test whether the treatment-assignment procedure causes a *reduction* in giving during 2011 or 2012—before the reform is enacted. Our findings are inconsistent with this (see the *positive* point estimate for the 2012 effect when using 2010 as the base year.

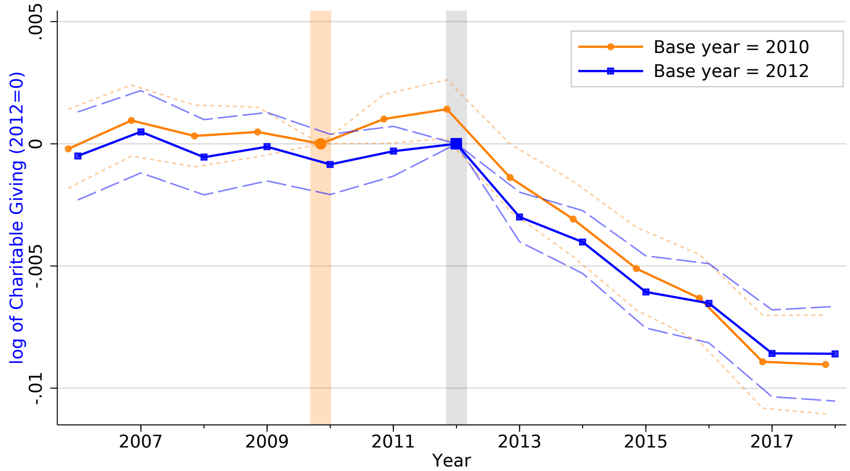


Figure A.5: Robustness to controlling for number of (grand) children

This figure shows the reduced-form effect on charitable giving based on estimating equation (10). The blue line (squares) provide the estimated effect using the main specification. The orange line (circles) provide the estimated effect when including, in the vector of household-level control variables ($C_{h,2012}$), terms capturing the number of children and grandchildren. This is parameterized as second-order polynomials in the number of (grand) children. We also include the interaction between the number of children and both $MVH_{h,2012}$ and $TNW_{h,2012}$. Note that the coefficients on all terms in $C_{h,2012}$ is allowed to vary by year, and thus captures potentially nonlinear trends associated with variables in $C_{h,2012}$. **Comment:** Our base specification controls for family size, which is the number of co-habitating family members. The purpose of this robustness is to address the concern that households who own more secondary housing have a larger set of heirs (which may not be cohabitating with the household), which may affect the dynamics of their wealth accumulation and charitable giving behavior. Reassuringly, this reveals very similar effects: introducing these additional control variables *increases* the magnitude of the point estimate by about 0.02 percentage points.

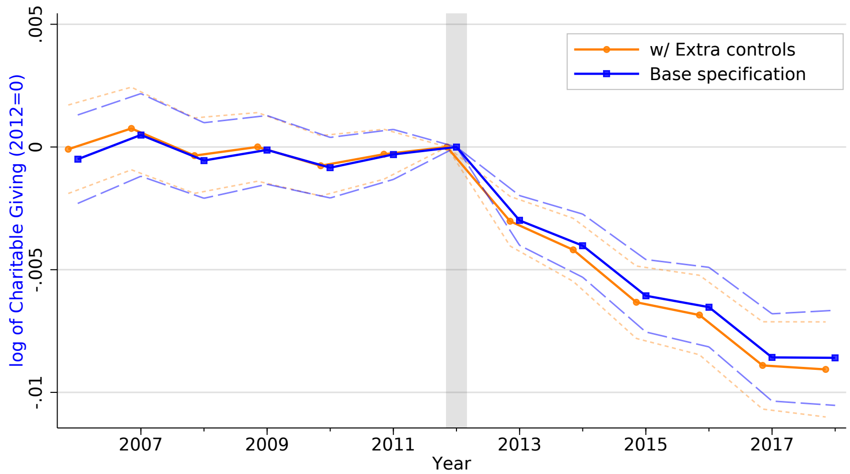


Figure A.6: Sensitivity to changing the log-shifting argument

This figure shows the reduced-form effect on charitable giving based on estimating equation (10). The blue line (squares) provide the estimated effect using the main specification. The different orange lines provide the effects with alternative log-shifting arguments: that is, when the left-hand-side variable equals $\log(c \cdot 1.02^{t-2012} + Giving_{h,t})$, for c = 100, 500, 1000 (baseline), and 2000. **Comment**: As we discuss in Appendix E, we *should expect* different point estimates when varying c. The sensitivity analysis that this figure provides verifies our intuition that a higher c provides more conservative estimates—and that our results are not qualitatively affected by the exact choice of c.

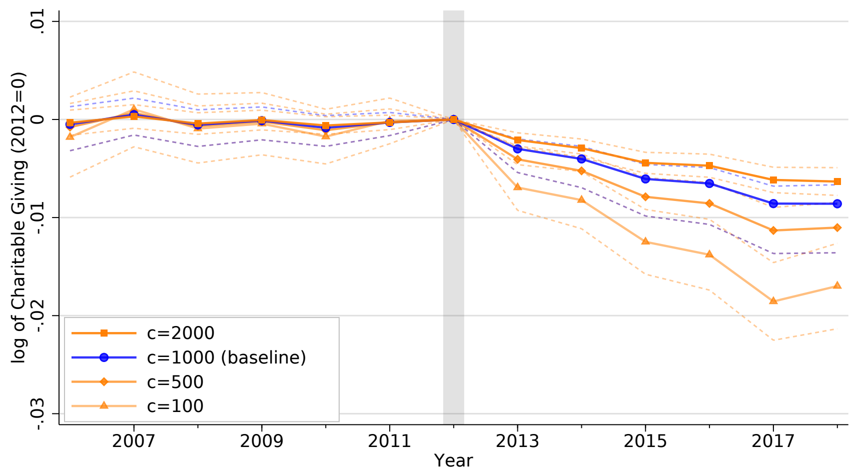


Figure A.7: Robustness to changing sample criteria

This figure shows the reduced-form effect on charitable giving based on estimating equation (10). The blue line (squares) provide the estimated effect using the main specification and sample selection criteria. The orange line (circles) provide the estimated effect when instead imposing symmetric bounds on $TNW_{h,2012}$: That is we keep households whose $|TNW_{h,2012}| \leq 2 \times T_{12}$, where T_{12} is the wealth tax threshold in 2012. We account for the fact that married households face twice the nominal threshold. This sample includes 15,847,807 household-year observations over a total of 13 years (2006–2018), with a total of 1,225,102 unique households. The number of unique households times 13 is larger than the total sample size due to some attrition (e.g., death).

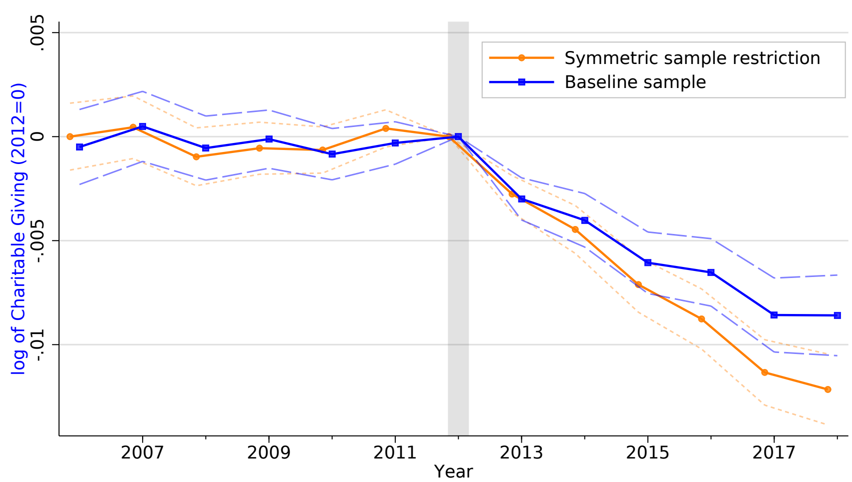


Figure A.8: (Pre-)Treatment Dynamics within Wealth Bins

This figure shows the dynamic reduced-form effects of wealth taxation on charitable giving for different 2012 taxable net wealth bins. As in our IV specification, we allow the effect of $MVHS_{h,2012}$ to vary by $TNW_{h,12}$. That is, we modify equation (10) to allow the coefficient β_t on $MVHS_{h,12}$ to vary by TNW bins, b_j. For this figure, we use coarser bins than in our IV specification to reduce noise in the estimates. Assignment to bins is given by the following set of indicator functions: $\mathbb{1}[b_j \leq TNW - T_{12} \leq b_{j+1}]$, where b_j = -500, -250, 0, 250, 500, 1000, 2000, and b_j is denominated in thousands of NOK. We account for the fact that married households face a double wealth tax threshold. We also interact the set of indicators, b_j, with year dummies. We also allow the coefficient on $MVH_{h,12}$ to vary with year and the b_j indicators (in the baseline equation (10), the coefficient on $MVH_{h,12}$ only varies by year.)

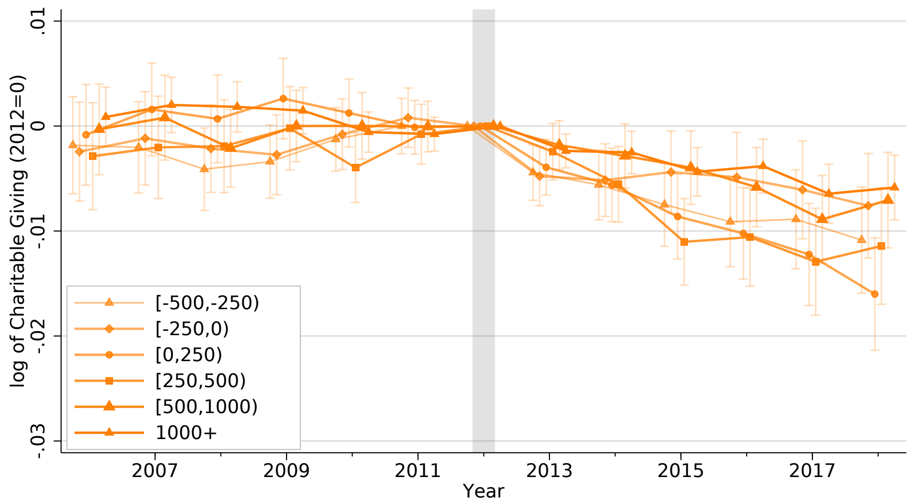


Figure A.9: The Effect of Wealth Taxation on Giving For Households Who Already Gave During 2006–2012

Notes: We re-estimate the baseline effect on charitable giving on the subset of households who gave during 2006–2012, that is, $\{h : G_{h,t} > 0,\ \text{t=2007, ... , 2012}\}$.

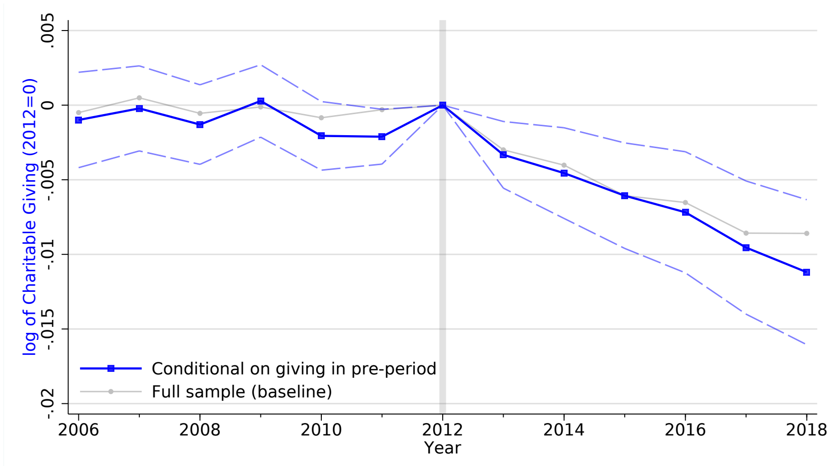


Table A.3: Wealth Taxation and Charitable Giving: Reduced-form Estimates

Notes: The table provides the underlying **reduced-form** coefficients on instruments from estimating the system of equations in (11)-(12) when using instrumenting for two endogenous variables. Reduced-form estimates correspond to columns (2), (4), (5), and (6) in Table 2. Each b corresponds to a binned range of $TNW_{h,2012} - T_{12}$. Note that the underlying regression specification also includes controls for the b_j indicator variables, and thus only uses the interaction between ex-ante taxable wealth and initial $MVHS$ for identification. Standard errors are clustered at the household level. One, two, and three stars indicate statistical significance at the 10%, 5%, and 1% levels. ◦ The dynamic effects corresponding to column (2) are provided in Figure A.8 by using coarser bins.

	(1)	(2)	(3)	(4)
	Amount	Adj. log of Giving		$\mathbb{1}[G_{h,t} > 0]$
			(int. marg)	(ext. marg)
1[b=-0.5M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-3.9742 (21.4034)	-0.0027 (0.0053)	-0.0007 (0.0059)	-0.0083*** (0.0019)
1[b=-0.4M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-30.5709 (23.3192)	-0.0175*** (0.0058)	-0.0104* (0.0062)	-0.0018 (0.0021)
1[b=-0.3M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-16.0972 (16.6025)	-0.0075 (0.0048)	-0.0056 (0.0063)	-0.0041** (0.0020)
1[b=-0.2M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-10.7655 (17.8286)	-0.0015 (0.0049)	0.0041 (0.0057)	-0.0078*** (0.0021)
1[b=-0.1M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	5.8157 (17.9541)	0.0084* (0.0047)	0.0040 (0.0057)	-0.0058*** (0.0020)
1[b= 0.0M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-14.1549 (18.5622)	-0.0113** (0.0048)	-0.0071 (0.0060)	-0.0028 (0.0022)
1[b= 0.1M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-59.3281*** (22.1992)	-0.0075 (0.0048)	-0.0085 (0.0065)	-0.0109*** (0.0021)
1[b= 0.2M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-18.4781 (21.5499)	-0.0067 (0.0047)	-0.0001 (0.0066)	-0.0060*** (0.0023)
1[b= 0.3M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-7.9617 (19.9548)	-0.0075 (0.0054)	-0.0108 (0.0066)	-0.0073*** (0.0023)
1[b= 0.4M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-14.3258 (16.6426)	-0.0055 (0.0037)	-0.0085* (0.0050)	-0.0061*** (0.0017)
1[b= 0.6M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-22.3208 (18.7102)	-0.0050 (0.0034)	0.0007 (0.0053)	-0.0049** (0.0020)
1[b= 0.8M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-19.4996 (12.9985)	-0.0050* (0.0027)	-0.0051 (0.0038)	-0.0037** (0.0015)
1[b= 1.2M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-48.4032*** (16.6534)	-0.0099*** (0.0029)	-0.0087* (0.0045)	-0.0050*** (0.0017)
1[b= 1.6M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-30.5940* (18.3917)	-0.0012 (0.0031)	-0.0130*** (0.0049)	-0.0030 (0.0020)
1[b= 2.0M]$\times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	-22.0533 (14.6045)	-0.0037* (0.0021)	-0.0006 (0.0030)	-0.0057*** (0.0014)
N	4007561	3730726	1300392	2614018

Table A.4: Wealth Taxation and Charitable Giving: First-Stage Estimates

Notes: The table provides the underlying **first-stage** coefficients on instruments from estimating the system of equations in (11)-(12) corresponding to columns (2) and (4) in Table 2. Each b corresponds to a binned range of $TNW_{h,2012} - T_{12}$. Note that the underlying regression specification also includes controls for the b_j indicator variables, and thus only obtains identifying first-stage variation from the interaction between ex-ante taxable wealth and initial $MVHS$. Standard errors are clustered at the household level. One, two, and three stars indicate statistical significance at the 5%, 1%, and 0.1% levels.

	(1) $1[\text{wtax}_{h,t} > 0]$	(2) $\text{wtax}_{h,t}$	(3) $\text{MWTR}_{h,t}$	(4) $\text{AWTR}_{h,t}$
$1[\text{b=-0.5M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.04980*** (0.00204)	874.73955*** (65.51051)	0.00064*** (0.00003)	0.00015*** (0.00001)
$1[\text{b=-0.4M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.05303*** (0.00219)	953.16318*** (67.78993)	0.00075*** (0.00004)	0.00018*** (0.00001)
$1[\text{b=-0.3M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.05944*** (0.00231)	985.71233*** (80.83699)	0.00079*** (0.00004)	0.00018*** (0.00001)
$1[\text{b=-0.2M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.07080*** (0.00256)	1160.72179*** (89.39980)	0.00094*** (0.00004)	0.00023*** (0.00001)
$1[\text{b=-0.1M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.07793*** (0.00281)	973.36174*** (78.10608)	0.00095*** (0.00005)	0.00022*** (0.00001)
$1[\text{b= 0.0M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.09045*** (0.00340)	1310.09234*** (92.70186)	0.00118*** (0.00007)	0.00023*** (0.00001)
$1[\text{b= 0.1M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.06830*** (0.00344)	1299.60026*** (88.07988)	0.00101*** (0.00006)	0.00026*** (0.00001)
$1[\text{b= 0.2M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.06096*** (0.00317)	1634.19799*** (94.93024)	0.00084*** (0.00005)	0.00028*** (0.00001)
$1[\text{b= 0.3M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.04507*** (0.00320)	1335.55172*** (94.91412)	0.00065*** (0.00005)	0.00023*** (0.00001)
$1[\text{b= 0.4M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.02926*** (0.00225)	1672.77469*** (78.45694)	0.00042*** (0.00003)	0.00025*** (0.00001)
$1[\text{b= 0.6M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.01661*** (0.00227)	1839.41726*** (94.96646)	0.00030*** (0.00003)	0.00026*** (0.00001)
$1[\text{b= 0.8M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.00879*** (0.00160)	2143.87031*** (87.35073)	0.00015*** (0.00002)	0.00026*** (0.00001)
$1[\text{b= 1.2M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.00433** (0.00162)	2179.56331*** (112.62815)	0.00008*** (0.00002)	0.00024*** (0.00001)
$1[\text{b= 1.6M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.00596*** (0.00161)	2390.55274*** (131.17084)	0.00010*** (0.00002)	0.00024*** (0.00001)
$1[\text{b= 2.0M}] \times MVHS_{h,12} \times \mathbb{1}[t > 2012]$	0.00564*** (0.00088)	2414.78097*** (120.22911)	0.00006*** (0.00001)	0.00020*** (0.00001)
N	4007561	4007561	3730726	3730726

Table A.5: Wealth Taxation and the Price Elasticity of Giving: Quasi-Experimental Evidence

Notes: This table provides the key instrumental variables coefficients from estimating the system of equations in (11)-(12). Standard errors are clustered at the household level. One, two, and three stars indicate statistical significance at the 5%, 1%, and 0.1% levels. Point estimates may be multiplied by 6.74 to obtain the effect on the magnitude of the price elasticity. We consider a wider sample region ($SR_t = [K_t - 10\ 000, K_t + 10\ 000)$) than in Figure 6 in order to obtain a larger sample to increase power in our IV design.

	(1)	(2)	(3)
Dependent variable =		Bunching Probability (%)	
Instrumented variables			
$\text{wtax}_{h,t}$ (NOK 1,000)	0.049	0.036	
	(0.059)	(0.066)	
1[$\text{wtax}_{h,t}$ >0]		1.499	
		(2.317)	
$\text{AWTR}_{h,t}$ (%)			4.422
			(7.423)
$\text{MWTR}_{h,t}$ (%)			1.135
			(2.518)
sum of coefficients AWTR+MWTR			5.557
			(6.137)
rk-F-statistic	40.49	39.43	39.838
N	299019	299019	299019

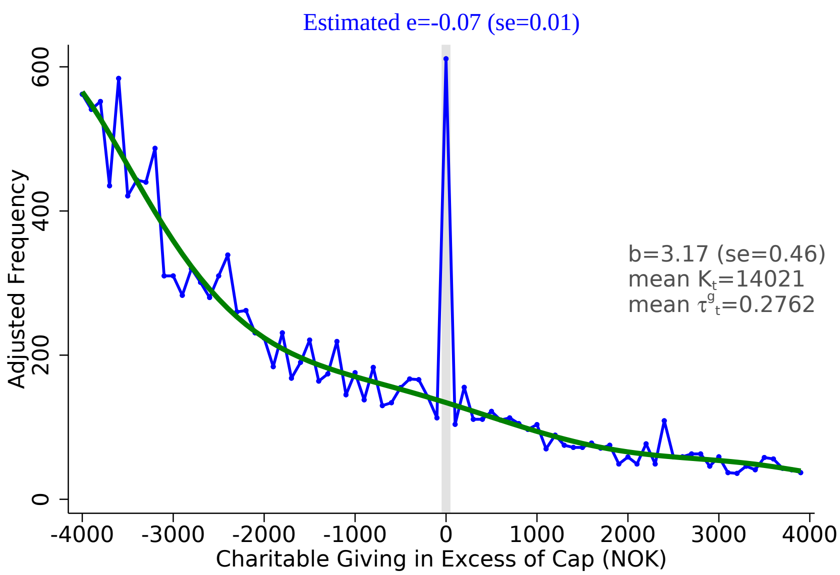
Table A.6: Wealth Taxation and (Non)Religious Giving

Notes: This table considers different types of charitable giving. Religious giving consists of donations to religious organizations such as local or national churches, theological institutions, and missionary organizations. International giving consists of donations to organizations with an international focus, such as humanitarian, aid, human rights, and environmental. The table provides the IV (second-stage) coefficients from estimating the system of equations in (11)-(12). $AWTR$ is the average wealth tax rate, defined as the amount of wealth taxes paid divided by net wealth (net wealth equals TNW absent valuation discounts). $MWTR$ is the marginal wealth tax rate and equals the nominal wealth tax rate if the household is above the wealth tax threshold and zero otherwise. In the log-giving specifications, giving is shifted by an inflation-adjusted NOK 1,000 to accommodate zeros (and thus entries or exits) and limit influence of outliers. Standard errors are clustered at the household level. One, two, and three stars indicate statistical significance at the 5%, 1%, and 0.1% levels.

	Religious	**Nonreligious**	**International**	**Domestic**
	Adj. log($G^{rel}_{h,t}$)	Adj. log($G^{nonrel}_{h,t}$)	Adj. log($G^{intl}_{h,t}$)	Adj. log($G^{dom}_{h,t}$)
	(1)	(2)	(3)	
Instrumented variables				
AWTR	-29.91	-19.55	-24.29*	2.52
	(25.10)	(10.76)	(11.67)	(14.68)
MWTR	-16.77	-13.42**	-14.11**	-7.09
	(9.92)	(4.74)	(5.22)	(6.02)
Implied effect of proportional tax change	-46.68*	-32.97***	-38.41***	-4.57
	(20.99)	(8.12)	(8.69)	(11.77)
Sample restriction (based on giving in 2012)	Religious > 0	Nonreligious > 0	International> 0	Domestic > 0
rk-F-statistic	24.06	69.67	58.27	23.06
N	265,903	1,046,692	890,086	302,470
Additional summary statistics (full sample, 2012–18)				
Share who give to type of charity	0.06	0.26	0.22	0.07
Conditional mean giving	10,758	3,325	3,449	1,394

Figure A.10: Bunching in Giving to International Organizations

Notes: We repeat the bunching analysis done in Panel B of Figure 6 for the subsample of givers who only give to organizations with an international focus (excluding missionary organizations), such as the Red Cross, Amnesty, and the World Wildlife Foundation.



F.1 Exploring the Role of Financial Frictions

In this section, we explore whether our main findings on how wealth taxation affects giving is robust to dropping households for whom the the treatment may harshen financial constraints. While our data does not include information on the amount of bank deposits, we observe annual interest income in 2012. We capitalize this by the average bank deposit interest rate during 2012 (2.4%) to obtain an estimate of ex-ante liquidity. We then drop households for whom the maximal first-stage effect on the amount of wealth taxes may exceed 10% of ex-ante liquidity. We calculate the maximal first-stage effect as 1.1% (the highest marginal tax rate during 2013–2018) times the amount of secondary housing wealth in 2012. Generally, the first-stage effect will be smaller since some of taxable wealth is shielded by the wealth tax threshold.

Our procedure drops only about 8% of the observations, which underscores the point that few treated households are likely to be financially constrained. We report our main finding in Table A.7 below. We see that the coefficient on $AWTR$ is virtually unaffected while the coefficient on $MWTR$ is somewhat smaller in magnitude, but still statistically equal to zero. While this lack of subsample heterogeneity is not surprising, it is reassuring that the small sample of households who may be constrained are not driving our baseline findings.

Table A.7: Robustness: Effect of Wealth Taxation on Charitable Giving when Removing Illiquid Households

Notes: The table provides the main IV estimated when restricting the sample to households where the effect of more secondary housing wealth on the annual wealth tax bill at most equals 10% of the capitalized 2012 interest income:

$$1.1\% \times MVHS_{h,2012} < 10\% \times InterestIncome_{h,2012}/2.4\%,$$

where 2.4% is the average interest rate on bank deposits in 2012. This implies that we only retain (the vast majority of) households for whom the effect of owning more secondary housing, in terms of their subsequent wealth tax payments, will be small relative to their liquid assets.

	Adj. log of Giving
	(1)
Instrumented variables	
$\text{AWTR}_{h,t}$	-20.05***
	(5.93)
$\text{MWTR}_{h,t}$	-1.38
	(2.61)
Implied effect of proportional tax change	
= sum of coefficients on MWTR + AWTR	-21.43***
	(4.56)
rk-F-statistic	254.33
N	3,730,726