Wealth Taxation and Charitable Giving*

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PRELIMINARY

October 13, 2021

Abstract

The role of tax incentives in charitable giving has seen considerable attention. Yet, attention is limited to direct tax incentives, such as tax deductibility. Whether and how taxing household savings affects charitable giving is largely unexplored. While theory suggests a link between capital taxation and giving, the sign of the effect is ambiguous due to opposing income and substitution effects. Our paper presents novel evidence on the linkages between capital taxation and charitable giving on three fronts. First, we use quasi-experimental variation in the annual Norwegian wealth tax, and find a statistically significant negative, but modest, effect on how much households give. We estimate that each additional NOK of annual wealth taxes reduces charitable giving by 0.012. Second, we use a tax-exemption threshold for giving to estimate a modest own-price elasticity of giving that is decreasing in income, age, and wealth. Third, we show that tax incentives interact: wealth taxation increases the sensitivity of giving to its after-tax price. Overall, our evidence is consistent with modest effects of capital taxation on charitable giving that are primarily driven by income effects.

*Financial support from the Norwegian Research Council is acknowledged, project number ES614391. We thank Joel Slemrod and Lydia Fu for helpful comments.

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1 Introduction

The use of tax incentives to promote charitable giving is widespread. These incentives typically take the form of an income tax deduction that lower the marginal price of giving (Saez 2004; Diamond 2006; and List 2011), and have produced fertile grounds for a large empirical literature. The main focus of this literature has been to estimate the (after-tax) price elasticity of giving that is needed for determining the optimal tax incentives (Saez, 2004). However, the non-direct effects of other types of taxation, such as those on household savings, have been neglected (see surveys by Steinberg 1990 and Andreoni and Payne 2013). This is despite a surging interest in more aggressive capital taxation as a way to tame wealth inequality (Bastani and Waldenström 2020b; Scheuer and Slemrod 2021; Saez and Zucman 2019a). For example, we may worry that taxing savings more aggressively will lead to a reduction in how much the wealthy voluntarily redistribute through charitable giving. Yet, these cross effects have not played a role in optimal tax considerations (see, e.g., Saez and Stantcheva 2018), presumably due to a lack of empirical guidance.

This lack of 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 gains tax, reduces the after-tax return on savings that households can achieve. 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. By giving more today, households reduce how much they must pay in taxes during their lifetime. Similarly, capital taxation may reduce the efficacy of common tax schemes that are used to encourage charitable giving. This is because the net benefit of another dollar saved through the tax deductibility of charitable giving is reduced once savings are more heavily taxed. In addition, by reducing lifetime after-tax wealth, capital taxation may also reduce charitable giving and increase its price sensitivity through an income effect. Whether these linkages should be a first-order concern in optimal taxation is an open question.

Empirically studying the effect of capital taxation on giving is challenging due to (i) a lack of identifying variation in the after-tax return on savings 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. We overcome these challenges by using rich Norwegian administrative data and exploiting quasi-experimental variation in the annual taxation of net wealth. To our knowledge, this is the first paper to provide empirical evidence about how taxation of household wealth affects charitable giving behavior.

We present novel evidence on taxation and charitable giving along three dimensions. First, we provide novel empirical evidence on how capital taxation affects charitable giving. In the Norwegian wealth tax, housing wealth enters as a key component in the wealth tax base. It enters at a discounted rate relative to its estimated market value, where the discount rate depends on whether the housing asset is considered the taxpayer's primary or secondary residence. From 2013 to 2018, the discount rate on secondary, but not primary housing, was gradually removed. Due to the progressive nature of the wealth tax, this increased both (i) secondary home-owners' likelihood of paying a wealth tax and (ii) how much they paid in wealth taxes on average. The nature of the reform allows us to control for overall estimated housing wealth, but obtain 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.

We find a modest, negative, and statistically significant effect of wealth taxation on charitable giving. For each additional NOK of annual wealth taxes, charitable giving is reduced by NOK 0.012 (SE=0.003). Due to the presence of non-negative intertemporal substitution effects, our negative point estimate should be larger (more positive) than a pure income effect. Thus an implication of our result is that the marginal propensity to give out of annual unearned income is at least 0.012.

We further use first-stage heterogeneity to isolate the effects of extensive and intensive margin variation in wealth tax exposure. This is useful, as extensive margin variation in wealth tax exposure is, theoretically, most likely to produce positive intertemporal substitution effects with respect to giving. We find that the negative effect of giving is, in accordance with theory, driven by intensive-margin variation. However, we find no evidence of negative extensive-margin effects. Our point estimate is in fact negative and close to zero (t-statistic=-1.5). In terms of the implied semi-elasticity, we can rule out that a 1 percentage point reduction in the marginal after-tax rate-of-return reduces giving by more than 3.6%.[1]

Second, we use a bunching framework to estimate a price elasticity of charitable giving with respect to the after-tax price of giving. In the Norwegian tax code, charitable giving is deductible from the income tax base. However, there is a cap on how much one can deduct. This introduces a jump in the marginal after-tax price of giving from about 0.75 to 1 at the exemption cap. This allows us to make novel use of established bunching estimators to infer the after-tax price elasticity of giving. We find that the average after-tax price elasticity is about -0.38 and is decreasing in income, wealth, and age. When including both income and wealth as explanatory variables, we find that wealth is qualitatively more important in predicting the price elasticity than income.

Third, we combine the two empirical approaches, the DiD-IV framework and the bunching methodology, to study the causal effect of wealth taxation on the price elasticity of giving. Again, there is no clear-cut theoretical prediction. On one hand, taxpayers subject to the wealth tax may find that the tax reduction on from charitable donations are less valuable, since each NOK saved is taxed by the wealth tax. This causes wealth taxation to lower the price sensitivity of giving. On the other hand, wealth taxation also reduces lifetime after-tax purchasing power. To the extent

[1] This is at the conventional 5% level. A 1 percentage point reduction in the marginal after-tax rate-of-return is essentially the difference between paying and not paying a wealth tax.

that the price sensitivity is negatively related to income and wealth, this channel leads wealth taxation to increase the price sensitivity. We find that this income effect dominates, consistent with evidence presented in concurrent work in Thoresen, Ring, Epland, and Nygård (2021).

Literature. Our paper contributes to a growing empirical literature on the effects of capital taxation (see, e.g., Wong 2020; Lavecchia and Tazhitdinova 2021; Agersnap and Zidar 2021), and in particular, the literature on behavioral 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; Ring 2020; Jakobsen, Jakobsen, Kleven, and Zucman 2020; Brülhart, Gruber, Krapf, and Schmidheiny 2021). Our key contribution is to consider the effect on charitable giving.[2] Our findings are particularly consistent with Ring (2020), who finds that income effects dominate substitution effects in household saving responses to wealth taxation.

We further add to the body of research on the role of tax incentives in charitable giving. This literature is particularly concerned with the price elasticity of giving (see, e.g., Feldstein 1975; Randolph 1995; Auten, Sieg, and Clotfelter 2002; Meer 2014; Bakija and Heim 2011; Fack and Landais 2010; Duquette 2016; Almunia, Guceri, Lockwood, and Scharf 2020; Hungerman and Ottoni-Wilhelm 2021; and Cage and Guillot 2021). Our most direct contribution is to provide price-elasticity evidence using a new methodology along 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 often not fixed, but depend on total income, as in the U.S. federal tax code.[3] Our price elasticity of -0.38 is considerably smaller in magnitude than the elasticity of around -1 found in several of the analyses based on U.S. data,[4] larger than the intensive margin elasticity of -0.2 found by Almunia, Guceri, Lockwood, and Scharf (2020), based on U.K. data, but close to that found by Fack and Landais (2010), with data from France.

The main differentiating factor of our paper is that we also study the effects of non-direct tax incentives. We document both how capital taxation affects giving, as well as how capital taxation may moderate direct tax-incentives. This highlights the intertemporal component of giving-related decision-making (see, e.g., Breman 2011; Andreoni and Serra-Garcia 2021; and Meier 2007). It further allows us to provide novel evidence on income effects. By studying the response to wealth taxation, we provide a (lower-bound) marginal propensity to give out of unearned income. To our knowledge, few such quasi-experimental estimates exist (see Drouvelis, Isen, and Marx 2019

[2] Cage and Guillot (2021) also exploit a wealth-tax reform. More specifically, they use the removal of charity wealth-tax deduction to study the price sensitivity of substitution between support to charities and political parties. Thus, the focus is on relative price of charitable versus political giving, rather than effects of a shock to the after-tax return on savings (as in our setting).

[3] A notable exception is Hungerman and Ottoni-Wilhelm (2021) who exploit a state-specific $400 exemption threshold in Indiana. However, they estimate a price elasticity based on donations to a single charitable organization (universities), rather than to the total universe of charities (as in the present study).

[4] It should be noted that the U.S. evidence do not unambiguously point to large estimates. While Bakija and Heim (2011) conclude that the price elasticity is below -1, Randolph (1995) report estimates ranging from -0.3 to -0.5.

for an overview.)

Relatedly, we also contribute to the sizable 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; Payne 1998; Nyborg and Rege 2003; and 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 may play an additional role. Our paper addresses whether financing spending through capital taxation leads to additional crowd-out, driven by income effects, or an offsetting crowd-in, driven by intertemporal substitution effects.

We also contribute to the literature using regression-based bunching approaches to derive tax response estimates (Bastani and Waldenström 2020a and Fagereng and Ring 2021). The new approach in this literature is to use indicators for whether households bunch (and are thus sensitive to some tax kink) as a dependent variable in a regression framework. Bastani and Waldenström (2020a) consider responsiveness to income taxation, whereas Fagereng and Ring (2021) consider responses to a (de-facto) income tax whose payments can be delayed. Here, we use this technique to discuss the heterogeneity in the responsiveness of charitable giving to the after-tax price.

The paper proceeds as follows. Section 2 introduces the data and describes the wealth tax scheme and the tax treament of charitable donations of the personal income tax. Section 3 presents estimates of effects of wealth taxation on charitable giving. In section 4, we use a bunching approach to obtain standard tax price elasticity estimates and discuss how these price elasticity estimates are influenced by the taxation of wealth. Section 5 concludes.

2 Data and Institutional Setting

2.1 Data

We employ administrative data on households' income and wealth over the period 2010–2018 (Statistics Norway, 2019). These data describe how much a given household pays in wealth taxes each year, and crucially, the composition of a household's taxable wealth.

Housing wealth is one of the key contributors to households' taxable wealth. It is estimated using a parsimonious hedonic pricing model that is fed with past transaction data (Ring 2020). The tax authorities distinguish between primary (regular abode) and secondary housing wealth, and, importantly for our approach, we observe this distinction in our data.

We combine these administrative data on income and wealth with third-party reported data on charitable giving, available from administrative registers for the 2012–2018 time 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, the tax authorities require these amounts to be reported directly by the recipient organizations.

The tax authorities maintain a comprehensive list of such charitable and religious 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 household level. It follows that these data are not contaminated by issues related to self-reporting.

2.2 The Norwegian wealth tax

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

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

which states that for a household h, observed at the end of the year, t, any taxable net wealth (TNW) in excess of a threshold, T_t, is taxed at a rate of τ_t.[5] Tax rates and allowances (2011–2018) are presented in Panel A of Table 1. We note that the basic allowance increased form NOK 750,000 (USD 80,000; EUR 70,000) in 2012 to NOK 1,480, 000 (USD 157,000; EUR 138,000) in 2018.[6]

The tax revenue from wealth taxation is relatively modest. In 2020, it accounted for 1.2% of total tax revenue and 0.4% of GDP. However, this is not necessarily caused by difficulties enforcing the tax. It is rather due to the (policy) choice of a modest nominal tax rate, as well as favorable treatment of some of the TNW components. In particular, while financial wealth predominantly enters at third-party reported market values, (estimated) housing wealth enters at a discounted value, as indicated by

$$\text{Taxable Value of Housing Wealth} = (1 - d_t^{primary})MVHP_t + (1 - d_t^{secondary})MVHS_t, \tag{2}$$

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.[7] This refers to the value of the habitual abode of households, the address at which households are registered to live in according to government registers. $MVHS$ refers to secondary homes, which are homes that, based on their construction code in real-estate registers, would qualify for permanent residency. However, they are categorized as secondary housing due to their registered current use: taxpayers may only own one unit of primary housing, but multiple units of secondary housing.

[5] Married couples are subject to a double threshold.

[6] Here and in the following we use exchange rates for 2020 to recalculate to US dollars (USD) and euros (EUR).

[7] From 2010 and onwards the tax administration has been operating a completely new valuation procedure for primary and secondary housing. The new procedure is based on hedonic regressions to predict the market value for each Norwegian house. See Ring (2020) for a detailed discussion of the methodology.

The evolution of these discounts, and how they changed for different types of housing, is our central source of identifying variation in wealth tax exposure. The valuation discount on primary housing, $d_t^{primary}$ has been been fixed at 75% over the whole period, while the discount on secondary housing, $d_t^{secondary}$, decreased from 60% in 2011 to 10% in 2018. This implies that even if we keep the total value of housing wealth, $MVH = MVHP + MVHS$, constant, households who hold more $MVHS$ will have a higher TNW. From Equation 1, we see that this may cause both higher annual wealth tax bills, as well as a higher propensity to face a lower marginal return of on any marginal saving (working through τ_t).

The presence of a wealth tax threshold, i.e., the indicator function, $\mathbb{1}[TNW_{h,t} > T_t]$, is a key ingredient to this institutional setting. Had the tax been linear, changes in the discount rates would not affect marginal rates-of-return on savings, and therefore intertemporal substitution effects would not play a role.

2.3 Tax treatment of charitable giving

Since 2003, donations to nonprofit charitable institutions and religious organizations (approx. 400 organizations) are tax deductible in the tax base for ordinary income (net-income tax base). For the 2021 tax year, for example, the government refunds 22% of donations up to a limit of NOK 50,000 (USD 5,300; EUR 4,700).[8] More generally, a taxpayer, i, gets a tax refund of τ_t^g on any charitable giving, $g_{i,t}$, that does not exceed the exemption cap, K_t. This creates a jump in the marginal net-of-tax price of 1 NOK worth of giving when donations exceed the threshold, to 1 from a below-threshold price of $1 - \tau_t^g$.

Over the time period we have data for, τ_t^g and K_t have been substantially altered: whereas the tax rate has gone down from 28% in 2012 to 23% in 2018, the maximum deduction has moved from NOK 12,000 (USD 1,300; EUR 1,100) in 2012 to NOK 40,000 (USD 4,300; EUR 3,700) in 2018.[9] The combination of changes in thresholds and rates is used in the following to obtain estimates of standard (personal income tax) tax elasticities. Using the bunching estimator (Saez 2010; Kleven 2016) over donation amounts where the tax price goes from $1 - \tau^g$ to 1, we obain tax price elasticity estimates for charitable giving.

[8] Norway does not have a particularly strong philanthropic tradition (Sivesind 2015). Whereas giving measured as percentage of GDP is 1.4 in the U.S. and 0.54 in the U.K., it is only 0.11 in Norway—close to Switzerland (0.09), France (0.11), Japan (0.12), and Finland (0.13) according to OECD (2020). A standard explanation for such patterns is that social democratic policies have not supported philanthropy because the Scandinavian type welfare state reduces the need for such support.

[9] See Table 1. The tax rate reductions follow from a reduction in the corporate tax. The rate was reduced from 28% in 2013 to 22% in 2019 and as the Norwegian dual income tax system maintains a link between the corporate tax and the tax on ordinary income in the personal income tax scheme, the tax price on charitable giving changed accordingly.

2.4 Summary Statistics

In Panel B of Table 1, we present some main descriptive statistics of our data. The table shows that 14% of our sample paid a wealth tax in any given year, and conditional on paying the tax, they paid about NOK 8,000 (USD 850; EUR 750). Approximately 13% of our sample owned a secondary house. Further, with respect to donations, 24% of the households in our sample gave in any given year, and conditional on giving, they gave on average approximately NOK 4,700 NOK (USD 500; EUR 430). As explained here, this charitable giving is tax-favored (in the personal income tax) below a year-specific deduction cap.

Table 1: Institutional Details and Summary statistics

Notes: Panel (A) provides details on wealth taxation during our sample period. Panel (B) provides summary statistics for the main analysis sample, at the individual level, restricted to households with strictly positive taxable net wealth (TNW) and market-value adjusted housing wealth (MVH). In addition, we limit attention to households whose TNW did not exceed 2 MNOK in 2012. Charitable giving and age are measured at the individual-level. Wealth taxes, income, and wealth variables are measured at the household level.

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, C_t (NOK 1,000s)	12	12	12	16.9	20	25	30	40

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

	N	mean	p25	p50	p75
$1[Giving_{i,t} > 0]$	10,018,933	0.24			
Giving$_{i,t}$ if > 0	2,362,237	4,659	1,400	2,880	4,500
$1[wtax_{h,t} > 0]$	10,018,933	0.14			
wtax$_h$ if > 0	1,373,936	8,054	1,890	4,422	9,141
2012-valued					
MVH$_h$, MNOK	1,494,813	2.95	1.81	2.58	3.63
MVHS$_h$ if > 0, MNOK	199,569	1.72	0.81	1.43	2.27
Age$_i$	1,494,813	55	42	54	66
log(gross income$_h$)	1,494,813	13.36	12.97	13.44	13.79
N. of adults	1,494,813	1.69	1	2	2

We make a few adjustments to mitigate the impact of outliers in dependent and explanatory variables. For the total amount of wealth taxes, $wtax_{h,t}$, we limit it to 10% of their 2012 TNW, which would only affect households with a cumulative TNW increase of at least 1000%. To account for moderate relative increases from a small initial TNW, we instead limit $wtax_{h,t}$ to 10% of 1 MNOK if the households 2012 TNW was below 1 MNOK. We also limit both individual and household-level annual giving to NOK 100,000. This affects very few households. Conditional on giving a positive amount, the 99th percentile of household giving is NOK 50,000. The natural log of gross income is shifted by an inflation-adjusted NOK 10,000 in order to not ascribe too much significance to very small level differences.

3 The Effect of Wealth Taxation on Charitable Giving

3.1 Descriptive Evidence on Charitable Giving Around the Wealth Tax Threshold

A straightforward way to produce hypotheses on the effects of wealth taxation on giving is to consider charitable giving as a form of consumption. In that case, the theoretical effect is ambiguous due to offsetting income and substitution effects. The income effect lowers the amount of charitable giving, as more wealth taxation lowers lifetime after-tax wealth and assuming that a charitable transfer is a normal good. The substitution effect will cause more giving by changing the relative price of consumption across periods. More specifically, future consumption becomes relatively more expensive, which incentivizes households to consume (and give) more today rather than in the future.

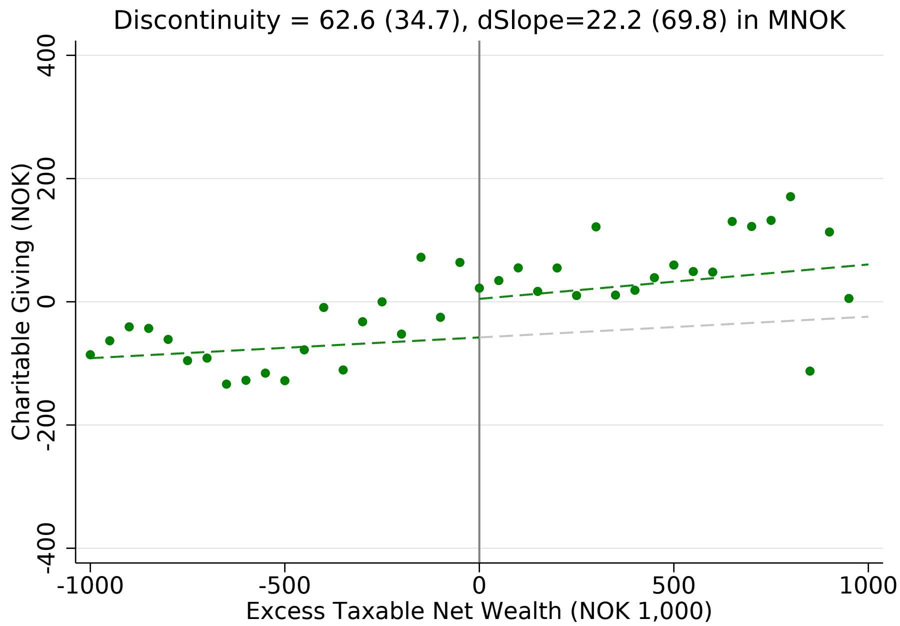
In this section, we provide descriptive evidence on how wealth taxation affects charitable giving. Recall that taxes are only levied on households whose taxable net wealth (TNW) exceeds a given allowance, see Table 1. Therefore, our first-pass analysis examines variation in giving behavior around the threshold of the wealth tax.

Our initial hypothesis of the empirical relationship is based on a set of facts and theories: (i) Wealthier households tend to consume more charitable giving (Andreoni 2006; Meer and Priday 2020; Thoresen, Ring, Epland, and Nygård 2021). (ii) Above the wealth tax threshold, the after-tax rate of return is lower, making it cheaper to give today rather than in the future. Thus, we expect to see a jump in giving behavior above the threshold, consistent with this intertemporal substitution effect; (iii) As we move further above the threshold, lifetime after-tax wealth is reduced by the existence of a wealth tax, while the marginal after-tax return is kept constant. Thus, we expect to see a change in the slope of the relationship between giving and taxable net wealth. Essentially, we expect to see a more negative (or less positive) relationship.

We present graphical evidence by regressing the amount of giving in any given year, $g_{i,t}$, on NOK 50,000 TNW bins, with controls for age, log household gross income, as well as year fixed effects, see Figure 1. The figure also includes estimated slopes, allowing for both a change and discontinuity at the wealth tax threshold. Our initial, admittedly naive hypotheses do not

Figure 1: Descriptive Evidence on Charitable Giving Around the Wealth Tax Threshold

This figure shows the relationship between charitable giving and a household's position relative to the wealth tax threshold. Households with excess taxable net wealth (ETNW) above zero pay the wealth tax on the positive amount. The scatter points are obtained by regressing the amount of charitable giving, at the individual level, on NOK 50,000 TNW bins, reordered such that 0 corresponds to the wealth tax threshold applicable to the household. This regression includes controls for age, log household gross income, as well as year fixed effects. Scatter points are normalized, such that one negative-ETNW bin is zero. The dashed green lines are linear fits, the dashed gray line is an extrapolation of the left hand side green line.



find strong support: we see a weak positive relationship between charitable donations and wealth taxation (around the threshold of the allowance), but do no observe any indications of strong effects of being subject to wealth taxation.

3.2 Quasi-Experimental Evidence from Housing Assessments

3.2.1 Description of Quasi-Experiment

The strong positive relationship between wealth, wealth taxation, and charitable giving presents serious challenges in estimating a causal relationship between wealth taxation and charitable giving. Our solution is to employ quasi-experimental variation in wealth-tax exposure caused by changes in the wealth-tax scheme.

Specifically, we exploit the increase in the assessment multiplier of secondary housing over the period 2013–2018 as instrument for wealth tax exposure. Even when keeping the market value of secondary housing constant, the change in the assessment (one minus the discount rate, d_t) would double the contribution from secondary housing to taxable net wealth over the time period.

The empirical framework builds on the fact that households with the same estimated total housing wealth will see differential taxation from 2013 to 2018, depending on the share of taxable housing wealth due to secondary housing. This is achieved by using an instrumental variable approach, where we use the following system of two equations to identify the effect of wealth tax exposure, x, on some outcome, y.

$$\begin{aligned} x_{i,t} &= f_t(MVHS_{h,12}, TNW_{h,12})P_{t>2012} + \tilde{f}^1(MVHS_{h,12}, TNW_{h,12}) \\ &+ g_t^1(MVH_{h,12}, TNW_{h,12}) + \alpha_t^1 + \eta_t^1 C_{i,t} + \epsilon_{i,t}^1, \end{aligned} \tag{3}$$

$$\begin{aligned} y_{i,t} &= \beta x_{i,t} + \tilde{f}^2(MVHS_{h,12}, TNW_{h,12}) \\ &+ g_t^2(MVH_{h,12}, TNW_{h,12}) + \alpha_t^2 + \eta_t^2 C_{i,t} + \epsilon_{i,t}^2, \end{aligned} \tag{4}$$

where MVH is the total market value of primary ($MVHP$) and secondary housing ($MVHS$), g_t^1 and g_t^2 are estimated as time-varying polynomial functions, which take the same functional form as f, $\tilde{f}^1$, and $\tilde{f}^2$. $C_{i,t}$ is a vector of individual and household-level controls, which includes third-order polynomials in $TNW_{h,2012}$ and age, as well as a second-order polynomial in family size. It further includes a dummy variable for whether there are two adults in the household and controls for log household labor income in 2012. We also include a 2012-valued indicator variable for ownership in secondary or recreational housing.[10] α_t^1 and α_t^2 are year fixed effects, and $\epsilon_{i,t}^1$ and $\epsilon_{i,t}^2$ are the error terms.

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, $P_{t>2012}$, turns on. This exploits exogenous variation in wealth tax exposure driven by an increased assessment of $MVHS$ over time, which allows us to estimate β, the coefficient of interest. The $\tilde{f}(\cdot)$ terms are treated as exogenous variables and take out a baseline (2012) effect from the instrument. In other words, we employ a DiD-IV specification.

In order to estimate differential effects on extensive and intensive margin wealth tax exposure, we allow the first-stage effect of $MVHS_{h,12}$ to vary by TNW in 2012. A reasonable assumption is that households with higher initial TNW (and therefore are further away from the wealth tax threshold) will see relatively larger intensive margin effects. To the extent that this is true, we will be able to separately identify the effects of intensive and extensive margin variation in wealth tax exposure. We parameterize this as

$$f(TNW, MVHS) \equiv \eta^1 MVHS + \eta^2 MVHS \cdot (TNW - T_{12})/T_{12} + \eta^3 MVHS \cdot [(TNW - T_{12})/T_{12}]^2, \tag{5}$$

[10] This allows us to include identifying variation from extensive margin ownership in secondary housing while still addressing differential trends for households who own more than one habitable unit. A third category of housing, recreational housing (as cabins and other recreational dwellings) is assessed at historical cost as this assessment schems has not been yet been revised (recall discussion of hedonic price model above).

where T_{12} refers to the wealth tax threshold in 2012.[11] η^1, η^2, and η^3 are separate parameters to be estimated.

Note that charitable donations are measured at the individual level (i) while tax variables are measured at the level of the individual's household (h). Analyses considering the amount of charitable giving are done at the household level, while analyses on price elasticity of giving is done at the individual level.[12] Standard errors are always clustered at the household level.

It follows from the empirical approach that we control for the overall estimated market value of housing wealth and obtain identifying variation from the developments in the valuation of secondary housing wealth by the wealth tax scheme. Using a DiD methodology, we only extract the effect of secondary housing wealth on charitable giving above what is estimated for the base year, 2012.

3.2.2 Discussion of potential confounding factors

Given the empirical approach, a causal interpretation of our findings depends on whether households with more $MVHS$ in 2012 increased or decreased their giving during 2013–2018 for reasons unrelated to wealth taxation. It is useful to narrow down the potential issue in light of our residual identifying variation.

Since we control for differential trends that may be driven by differences in initial overall taxable wealth, overall 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. We address this to some extent by including an indicator variable that captures ownership in secondary housing *or* recreational housing. Recreational housing (as cabins) is often qualitatively similar to secondary housing, but is treated in a particularly tax-favored way, due to a different valuation system, and does therefore not give much variation in wealth tax exposure.[13] Thus, this control dummy may largely take out differential trends arising from owning a second housing unit, while retaining considerable first-stage predictive power on wealth tax exposure. In our opinion, this likely removes potential confounding effercts arising due to changes in the economies of scale in homeownership.[14] Unfortunately, the fundamentally different ways in which secondary and recreational housing is valued precludes the use of recreational-housing owners as the exclusive

[11] 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.

[12] When we study the price elasticity of giving, the relevant outcome is bunching at individual-level thresholds. Hence, for that part of the analysis we keep the data on the individual level. Furthermore, the perfect within household correlation in wealth tax treatment is addressed by clustering standard errors at the household level.

[13] Structures are typically categorized as either housing (potentially primary or secondary) or recreational housing based on the intended use at time of construction. While tax values for primary and secondary housing are estimated using a hedonic pricing model, recreational housing is typically given a value shortly after construction, which is inflated by using nation-wide multiples up until 2010. After 2010 the assigned values have remained fixed, and are typically thought to severly understate the true market value, in particular for older dwellings.

[14] Keeping total housing wealth fixed, it may have become more or less lucrative to allocate this wealth into two or more distinct housing units.

control group.

Relatedly, another potential challenge, given the identification strategy, may come from municipality-level property taxation. Keeping overall housing wealth (MVH) fixed, the common presence of per-house exemption thresholds for municipal-level property taxation favors strictly convex allocation of housing wealth into primary *and* secondary housing. It is thus conceivable, that we identify effects from households paying less in property taxes. Assuming that more property taxation lowers giving through an income effect, this would lead to an *upward* bias in our estimates. Given our findings, this is not a material concern in terms of the qualitative conclusions. Furthermore, the DiD methodology will mitigate this channel to the extent that it was present in the base year, 2012. Moreover, it should be noted that to levy a property tax or not is locally decided (at the municipality level) and effective tax rates are low in comparison to for example the U.S.[15]

Finally, one concern is that households who owned more secondary housing in 2012 are, presumably, more likely to have recently acquired more housing of that type. Increased recent housing investments may lower future medium-term expenditures on, e.g., charitable giving. In light of our empirical findings, we doubt that this plays a large role. This is because giving expenditures should intuitively be at their minimum at the time of the large investment and then revert back to previous levels over time. This would lead to a positive bias in our setting, which would not qualitatively affect our conclusion that wealth taxes negatively affect giving. Nevertheless, as a robustness check, we control for differential trends in giving behavior caused by pre-period changes in secondary housing wealth. As demonstrated by Figure A.2 in the Appendix, introducing this control variable barely affects our reduced-form estimates.

Data limitations preclude us from considering pre-trends in charitable giving behavior. However, we do consider the association between our identifying variation and income trajectories in Figure A.1 in the Appendix. This reveals that households with more secondary housing units were not on different income trajectories. We can rule out that a 1 MNOK increase in $MVHS$ is associated with a 2010–2012 excess growth rate outside of $\pm$ one-tenth of a percentage point. Interestingly, however, the figure reveals a noticeable, positive effect on post-period income, consistent with the positive effect of wealth taxation on labor supply documented in Ring (2020).

3.2.3 Results on Giving Behavior

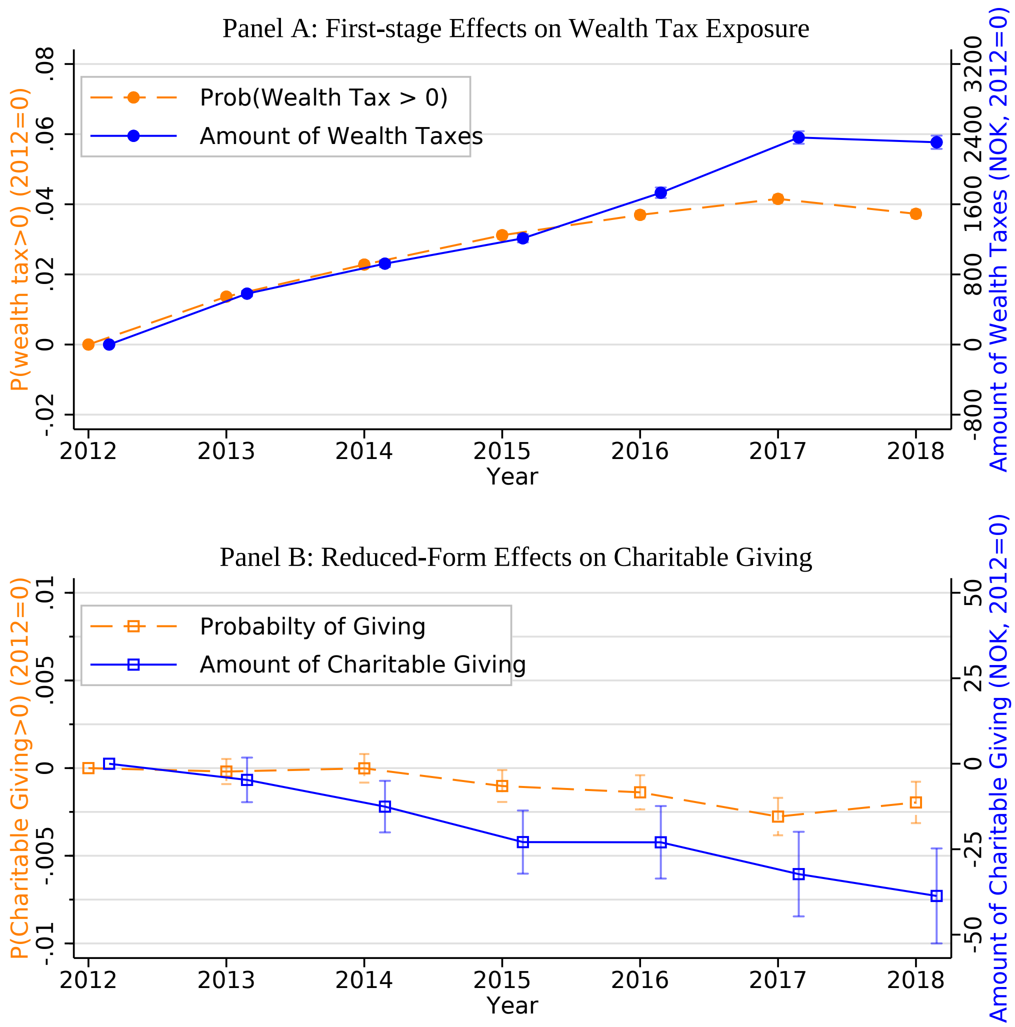
Graphical, reduced-form evidence. We first provide some initial reduced-form evidence in Figure 2 on how the secondary-housing ownership affects wealth-tax exposure and charitable giving over time.

In the reduced form analyses underlying Figure 2, f_t, is simplified to $f_t(MVHS) = \eta_t MVHS$. In other words, we restrict the effect of $MVHS_{h,2012}$ to be linear in both the first and second

[15] In Norway, effective property tax rates rarely exceed 0.5%.

Figure 2: Wealth Taxation and Charitable Giving: Quasi-Experimental Evidence from the Tax Valuation of Secondary Housing

Notes: In Panel (A), we plot the effects of owning more secondary housing, while controlling for over-all housing wealth, on wealth tax exposure along two dimensions: (i) the dashed orange line shows extensive-margin exposure and the (ii) solid blue line shows intensive-margin exposure in terms of the amount of wealth taxes accrued in a given year. The point-estimated come from regressing the wealth tax exposure measures on the amount (in MNOK) of secondary housing owned, as of 2012. Controls include the over-all TNW as well as over-all estimated housing wealth. In Panel (B), the dashed orange line proves the estimated effect on extensive-margin giving, i.e., whether or not charitable giving is strictly positive. The solid blue line provides the estimated effect on the amount of charitable giving. The point estimates come from estimating equations and , simplifying $f(\cdot)$ to be year-specific linear function of $MVHS_{h,2012}$ alone.



stage, but we allow the slope to vary by year. This lets us plot both first-stage and reduced-form effects against time (x-axis). We normalize such that $\eta_{2012} = 0$, to take out the fixed effect of $MVHS_{h,2012}$ on $y_{i,t}$.

Panel (A) of Figure 2 shows that initial ownership of more secondary housing, $MVHS_{h,2012}$, provides a strong predictor for wealth tax exposure along both the extensive (dotted line) and the intensive margin (solid line). One additional million NOK (USD 106,000; EUR 93,000) in $MVHS_{2012}$ leads to an increase in the annual amount of wealth tax of about NOK 2,400 (USD 300; EUR 250) by 2018. We further see that it increases the probability of paying the wealth tax by almost 6 percentage points. In Panel (B), we find that larger $MVHS$ is associated with households both being less likely to give and to give less, on average. We further see that, just like for the first-stage, estimates grow over time.

Comparing the estimates in panels (A) and (B) for the year 2018, we find that for each NOK 1,000 increase in annual wealth taxes, households give about NOK 15 less.

IV results. Table 2 presents results from the full IV estimation strategy. Columns (1) and (2) describe the first-stage relationships between instruments and wealth tax exposure. Column (1) considers extensive margin exposure and shows that more secondary housing wealth has a smaller effect whenever the initial TNW is larger relative to the wealth tax threshold, T_{12}, and increasingly so due to the second-order interaction term also being negative. Column (2) finds the opposite relationship for intensive margin exposure. Both of these columns yield intuitive first-stage results: households initially closer to the threshold are more likely to get pushed above, while households initially being located far above the threshold, primarily see more of their wealth exposed to the tax. The large t-statistics on the interaction terms (and different signs across the columns) suggest that we have enough first-stage heterogeneity to separately identify extensive and intensive-margin effects—if they are present.

Column (3) shows the reduced-form estimates. It reveals a statistically significant negative relationship between our instrument and charitable giving. However, the lack of significance of interaction terms with initial TNW suggests that the effect is fairly linear in $MVHS$. Since both the extensive (column 1) and intensive-margin (column 2) effects are increasing in $MVHS$, the observed heterogeneity leaves little room for signing the two effects differently.

Column (4) shows the resulting IV estimates. This reveals negative coefficients on both margins of exposure. The coefficient on the amount of wealth taxes takes the theoretically appropriate negative sign, consistent with negative income effects. However, the coefficient on the extensive-margin variation is also negative. From a simplified theoretical perspective, we would expect to find a positively signed coefficient on $1[wtax > 0]$. This is because, all else equal, $1[wtax > 0]$ reduces the marginal rate-of-return, which induces households to frontload consumption through an intertemporal substitution effect. In light of this, we interpret the point-estimate as being supportive of a very modest positive extensive-margin effect rather than the effect actually being negative. The fact that our IV specification cannot ascribe statistically significant effects to intensive and extensive-margin is directly driven by the reduced-form behavior, in which we see non-significant interaction terms with initial threshold distance, rather than a lack of first-stage heterogeneity.

Following through on the notion that our evidence in column (4) is consistent with the

TABLE 2: WEALTH TAXATION AND CHARITABLE GIVING: IV REGRESSIONS

This table provides the key coefficients from estimating the system of equations in 3-4. Columns (1) and (2) consider the first-stage effects on whether households pay a wealth tax and how much they pay. Column (3) provides reduced-form effects on charitable giving. Column (4) treats both $1[wtax > 0]$ and $wtax$ as endogenous variables, thus exploiting information in columns (1)-(3). Column (5) considers only $wtax$ as the endogenous variable, and thus uses information from columns (2) and (3). Similarly, column (6) only uses the first-stage estimate in column (1). Standard errors are clustered at the household level. one, two, and three stars indicate statistical significance at the 10%, 5%, and 1% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	First-stage		Red.-form	IV	IV	IV
Dependent var =	$1[\text{wtax}_{h,t}>0]$	$\text{wtax}_{h,t}$	$g_{h,t}$	$g_{h,t}$	$g_{h,t}$	$g_{h,t}$
$1[\text{wealth tax}_{h,t}>0]$				-218.250		-439.417***
				(144.958)		(113.312)
$\text{wealth taxes}_{h,t}$				-0.009**	-0.012***	
				(0.004)	(0.003)	
$\text{MVHS}_{i,2012}$	0.047***	1319.650***	-20.894***			
	(0.001)	(23.637)	(5.550)			
$\text{MVHS}_{i,2012}\times(T_t - TNW_{h,2012})$	-0.008***	515.994***	-1.132			
	(0.000)	(20.543)	(3.084)			
$\text{MVHS}_{i,2012}\times(T_t - TNW_{h,2012})^2$	-0.012***	51.983***	0.443			
	(0.000)	(15.277)	(2.424)			
rk-F-statistic				1267.82	1493.61	2546.77
N	9301446	9301446	9301446	9301446	9301446	9301446

extensive-margin effect being very small (rather than negative), we use the regression statistics to provide the an upper-bound compensated semi-elasticity. The implied 95% lower-bound (LB) on the compensated elasticity of giving with respect to the after-tax rate of return can be calculated in the following back-of-the-envelope manner:

$$\begin{array}{l}\text{95\% LB comp.}\\ \text{semi-elasticity}\end{array} = \frac{\text{95\% LB coeff/avg giving}}{\text{change in after-tax rate}} = \frac{(-218 + 1.96 * 145)/(0.24 * 4,659 * 1.69)}{-0.96\%} = -3.6.^{16} \tag{6}$$

In other words, we can rule out that a 1 percentage point increase in the marginal after-tax rate reduces charitable giving by more than 3.6%. There is nothing to directly compare this lower bound with, but it rings fairly small relative to tax-base elasticities found elsewhere in the empirical wealth tax literature,[17] and may thus serve as a relevant reference point for future research who identify capital taxation effects from marginal tax rate variation.

Focusing on either intensive margin variation (column 5) or extensive margin variation (column 6) makes it clear that more exposure to wealth taxation reduces the amount that households

[16] Where -124+1.96*101 comes from the regression table; 0.24*4,659 from the summary statistics table; 1.69 is the number of adults per household, which we use since the summary statistics are at the individual level; and 0.96% is the mean nominal wealth tax rate during over the period from 2013 to 2018.

[17] See the summary in Appendix Table A.1 in Brülhart, Gruber, Krapf, and Schmidheiny (2021) for an overview.

give. The resulting estimates provide useful quantities to summarize our findings. Column (5) says that each additional NOK 1,000 of wealth taxes reduce giving by about NOK 1.2. This number is quite close to 1.5, which was the number implied by the simplified analysis in connection to Figure 2. Column (6) says that households subject to taxation of wealth give about NOK 265 (USD 38; EUR 25) less each year, compared to the non-taxed.

Drouvelis, Isen, and Marx (2019) provide a particularly useful graphical summary of existing estimates on income effects in charitable giving. Existing non-experimental estimates on the marginal propensity to give (MPG) out of unearned income range from 0.024 to 0.093. This is roughly of the same magnitude as our findings, but considerably larger. 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. Our findings thus suggest that negative disposable-income shocks coming from taxation have much more modest effects than those found in other settings. In a lab experiment setting, Drouvelis, Isen, and Marx (2019) estimate MPGs that are statistically indistinguishable from zero when consideirng earned income, and quite large and highly significant MPGs for unearned income. Taking our findings together suggest that even (quasi) random taxes affect giving behavior in a way more similar to earned rather than to unearned income.

4 Relationship to the After-Tax Price Elasticity of Charitable Giving

4.1 Bunching Methodology

Next, we turn the attention to how the wealth tax interacts with the conventional tax price elasticity of charitable giving. First, we derive tax price elasticity estimates, before we describe the heterogeneity of the responses. Most importantly, we use a DiD set-up, similar to the approach used to explain how charitable donations are influenced by the wealth tax, to explain how the tax price elasticity estimates are influenced by the wealth tax.

Recall that the tax treatment of charitable donations by the personal income tax is characterized by the tax price, defined as one minus the marginal tax rate, and the maximum deduction, see Section 2. For a long time the dual income tax system of Norway was characterized by ordinary income (or net-income) being taxed by a flat 28% rate.[18] Given that the Norwegian dual income tax system maintains a link between the corporate tax and the tax on ordinary income, and as the corporate rate was reduced from 28% in 2013 to 22% in 2019,[19] the tax on ordinary income follows the same path. As donations to charitable organizations are deductible in the

[18] A dual income tax system is characterized by separate tax schedules for capital and wage income. In the Norwegian version, after the reform in 1992, net income (or ordinary income) was taxed by a (basic) flat rate of 28%, whereas a two-tier surtax supplemented the basic rate with respect to wage income.

[19] Due to downward international pressure on the corporate tax.

ordinary income tax base, the marginal tax price of charitable donations has changed accordingly over the time period we have data for; from $1-0.28=0.72$ in 2012 to $1-0.23=0.77$ in 2018.[20] To counteract the effect of the increased price, the maximum deduction has been increased, from NOK 12,000 (USD 1,280; EUR 1,120) in 2012 to NOK 40,000 (USD 4,260; EUR 3,730) in 2018 (see Table 1).

This creates a setting where the marginal after-tax price of giving jumps at a pre-specified threshold. In contrast to the existing literature on tax price elasticities of charitable giving, e.g., Auten, Sieg, and Clotfelter (2002) and Almunia, Guceri, Lockwood, and Scharf (2020), we employ the bunching estimator, introduced by Saez (2010), to identify price elasticities.

More specifically, this 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. Any excess mass of households directly to the left of the cap is interpreted as being caused by a behavioral response to the marginal price jump. The estimator of the implied price elasticity may be written as

$$\hat{e} = \frac{-\hat{B}}{-\log(1-\tau^g)}, \tag{7}$$

where $-\hat{B}$ provides the relative reduction in giving caused by a log-increase in the marginal price of $\log(1) - \log(1-\tau^g) = -log(1-\tau^g)$. We follow the approach in Chetty, Friedman, Olsen, and Pistaferri (2011) to measure $\hat{B}$. We first sort households into NOK-denominated giving bins. Then we estimate a counterfactual distribution of givers around the exemption cap, K_t. This is done by estimating a fifth-order polynomial density function, but omitting observations near the exemption cap. Given a counterfactual distribution, we can count the number of excess observations near the exemption cap (i.e., in the "bunching region"). We then assume that all excess observations are located in the bin directly to the left of the cap. This allows us to calculate the relative excess number of givers in the bin directly to the left of the cap. We follow the standard convention in denoting this figure by a lowercase b. We proceed by translating this into a more informative number, $\hat{B}$, in two steps. First, we multiply $\hat{b}$ by the width of the giving bins to provide the estimated giving response in NOK. We then divide by the average amount of giving at the cap, approximated by the cap itself. This implies that $\hat{B}$ provides an estimate of the relative reduction in giving caused by the presence of the marginal price increase.

In our main approach, we pool observations across years. We use K_t to sort households into bins, but use the across-year averages for K_t and τ_t^g, which are denoted without t subscripts, to calculate $\hat{e}$ once $\hat{B}$ is estimated.

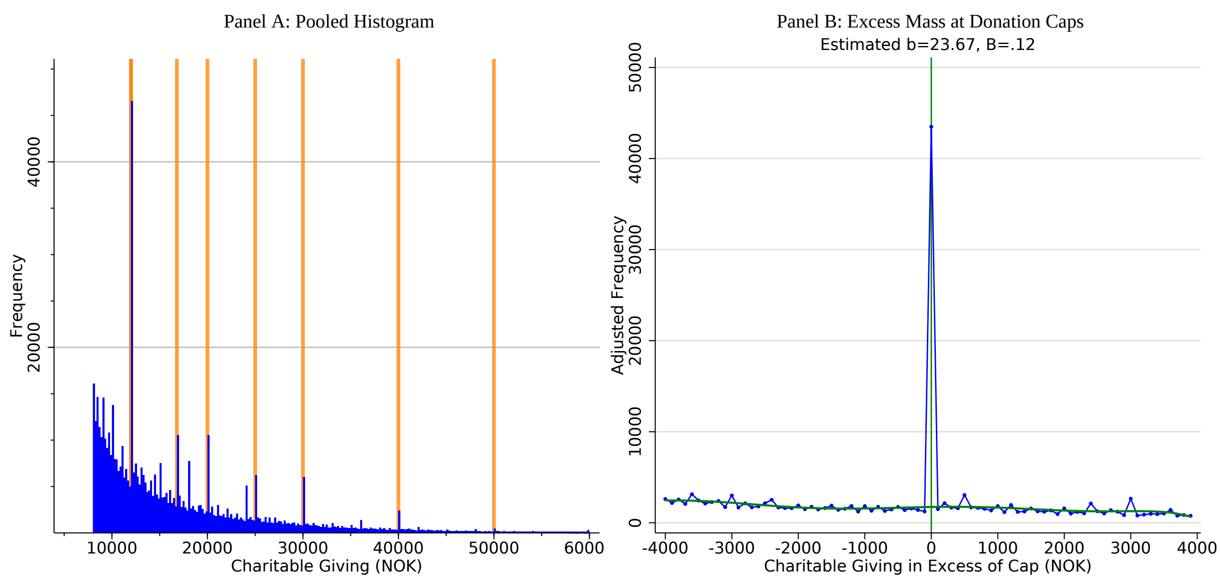
[20]Note that the last step, down to 22%, was taken in 2019.

4.2 Estimating the Unconditional Price Elasticity

Panel A of Figure 3 describes the observed bunching behavior using a histogram. The y-axis measures the raw frequency of observed observations for a given NOK 1,000 giving bin, where giving is measured in excess of that year's prevailing deduction cap. The spikes of the diagram clearly illustrate that there are reasons to expect tax motivated adjustments to the tax-favorization scheme. In Panel B, the frequency is adjusted for round-number bunching.[21] The dotted line (at the bottom of Panel B) shows the adjusted frequency, while the solid line describes the counterfactual density. The counterfactual density is calculated by estimating a 5th order polynomial on all observations outside the bunching region, $BR_t \equiv [K_t - 1000, K_t + 1000]$, which is denominated in NOK.

Figure 3: Sensitivity of Charitable Giving to Deductibility Cap

The vertical orange 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. Given an average 27% exemption rate, the implied pooled price elasticity is -0.12/-log(1-0.27) =-0.38. In Panel B, the frequency is adjusted for round-number (thousands) bunching.



The estimated $\hat{b}$ is 23.67, which says that there are 2,367% extra givers directly to the left of the kink. In terms of the amount of giving, we find that there is $\hat{B} = 12\%$ excess giving to the left of the threshold, which is interpreted as the reduction in giving caused by the threshold. When divided by the average tax-rate increase, $-\log(1 - 0.27)$, we obtain an implied price elasticity of

[21] This is done by first 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 the 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 elasticities by a modest 12%.

-0.38.

A price elasticity of -0.38 is considerably smaller than the elasticity of around -1 found in several of the analyses based on U.S. data, but larger than the intensive margin elasticity of -0.2 found by Almunia et al. (2020), based on U.K. data, and in the similar range of Randolph (1995) (with U.S. data) and Fack and Landais (2010) (with French data).

Compensated or uncompensated elasticity. Despite the relatively large change in the relative price of giving at the threshold (average of 27%), intuition suggests that the income effect of the threshold has a limited impact on the elasticity estimates. Consider the households counterfactually located far to the right in Panel B of Figure 3. Absent the exemption cap, these households would pay NOK 4,000*28% less in tax. This is about NOK 1,100 (USD 120; EUR 100). If we use the point estimate of Table 2, column (4), for intensive margin wealth tax variation, we get a point estimate of -0.009. Applying this to NOK 1,100, the predicted effect is around NOK 10 (USD 1; EUR 1). This implied income effect is thus much too small to have a meaningful effect on the implied elasticity. Thus, whereas the interpretation of implied elasticity estimates as reflecting a compensated effect is subject to notable caveats (Blomquist et al. 2021), we adopt the convention of considering our bunching estimate as an uncompensated elasticity.

4.3 Regression Approach to Uncovering Price-Elasticity Heterogeneity

Before we in the next sub-section discuss the relationship between wealth taxation and elasticity estimates in a quasi-experimental setting, we provide descriptive evidence on how elasticity estimates vary with respect to income and wealth.

We estimate the following baseline equation,

$$\mathbb{1}[d_{i,t} \in BR_t] = \alpha_t + \beta Z_{i,t} + f(d_{i,t}) + \varepsilon_{i,t}, \tag{8}$$

where α_t takes out year fixed effects and $Z_{i,t}$ is a vector of characteristics of interest. $f(d_{i,t})$ is a polynomial in the amount of charitable giving, which is essentially a control variable that addresses that bunching is typically correlated with the amount donated.[22] We run these regressions for observations where $d_{i,t} \in SR_t \equiv [K_t - 7,000, K_t + 7,000)$.[23]

Since 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, we may rewrite $\hat{e}$ as

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

[23]We consider a wider region than in Figure 3 in order to obtain a larger sample. A larger sample will be very useful once we introduce the IV methodology, in which more observations allow us to more precisely estimate the first-stage relationship between secondary housing wealth and wealth-tax exposure.

$$\hat{e} = \frac{-\hat{B}}{-\log(1-\tau^g)} = \frac{\hat{P}^a[g_i \in BR] - \hat{P}^{cf}[g_i \in BR]}{\hat{P}^{cf}[g_i \in BR]} \frac{1}{-\log(1-\tau^g)}, \tag{9}$$

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. Since $\hat{P}^a$ enters linearly into the formula for the price elasticity, we have that

$$\Delta e/e = (\Delta \hat{P}^a)/\hat{P}^a. \tag{10}$$

Thus, we can scale the estimated coefficients in Table 3 by the unconditional sample mean of the dependent variable, which equals $\hat{P}^a$, to obtain the relative effect on the price elasticity of giving.

To illustrate the economic meaning of the regression estimates, consider column (1) of Table 3. With an unconditional $\hat{P}^a = 5.09\%$, a coefficient of -0.0124 for log household gross income implies the following: a 10% increase in household income is associated with a reduction in price elasticity of giving by $0.10 \cdot 0.0124/5.09\% = 2.44\%$. This difference is rather modest and not fully compatible with intensive margin results reported in Bakija and Heim (2011) and Almunia, Guceri, Lockwood, and Scharf (2020), both pointing to increasing response with respect to income. However, Almunia et al. (2020) find that both price and income elasticities fall with respect to income at the extensive margin (of charitable giving).

An interesting observation is that the role of income is severely reduced by three quarters when we include wealth as an explanatory variable. This can be seen by comparing columns (1) and (4). Columns (2)–(3) and (5)–(6) also show how wealth-tax exposure correlates with bunching behavior. There is a consistent negative effect on the extensive margin (1[wealth tax > 0]), but no correlation on the intensive margin. This differs from the causal effect that one would expect, which we discuss in more detail in the next subsection.

4.4 Quasi-Experimental Evidence on the Relationship between Wealth Taxation and The After-Tax Price Elasticity

Conjectures. We may may think of wealth taxation, or capital taxation in general, to affect giving through two channels. Firstly, a wealth tax reduces the after-tax rate-of-return on savings. This essentially lowers the lifetime utility of additional tax savings caused by more charitable giving. Each additional dollar of tax refunds is now worth less since any portion of it that is saved is now meets a lower (after wealth tax) rate of return. Thus, this extensive margin effect will lower the price-sensitivity of charitable giving.

Secondly, a wealth tax also reduces lifetime wealth. The more of a household's wealth that is subject to the wealth tax, the more is the lifetime after-tax purchasing power reduced by the tax. Given that bunching is negatively correlated with income and wealth, see Table 3, we would

Table 3: Descriptive Regressions Studying Price-Elasticity Heterogeneity

Notes: Unconditional sample mean of dependent variable (bunching indicator) is 5.09%. Market-value Net Wealth is often negative, hence the log argument is shifted upward by an inflation-adjusted 1 MNOK.

	(1)	(2)	(3)	(4)	(5)	(6)
			Bunching Probability			
$\text{Age}_{i,t}$	-0.0010***	-0.0010***	-0.0010***	-0.0010***	-0.0010***	-0.0010***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
log(Household Gross $\text{Income}_{h,t}$)	-0.0124***	-0.0109***	-0.0116***	-0.0033**	-0.0031**	-0.0045***
	(0.0007)	(0.0007)	(0.0007)	(0.0015)	(0.0015)	(0.0015)
1[wealth $\text{tax}_{h,t}$>0]		-0.0061***	-0.0055***		-0.0058***	-0.0053***
		(0.0008)	(0.0008)		(0.0008)	(0.0008)
wealth $\text{tax}_{h,t}$ (MNOK)			0.0004			0.0012
			(0.0008)			(0.0009)
log(Market-value Net $\text{Wealth}_{h,t}$)				-0.0195***	-0.0170***	-0.0153***
				(0.0033)	(0.0033)	(0.0035)
f($d_{i,t}$)	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.2446	0.2447	0.2434	0.2446	0.2448	0.2435
N	789820	789820	742072	789820	789820	742072

expect this intensive margin wealth tax channel to contribute to higher price sensitivity. In sum, the extensive and intensive margin effects of wealth tax exposure likely work in opposite directions, and the net effect is ambiguous.

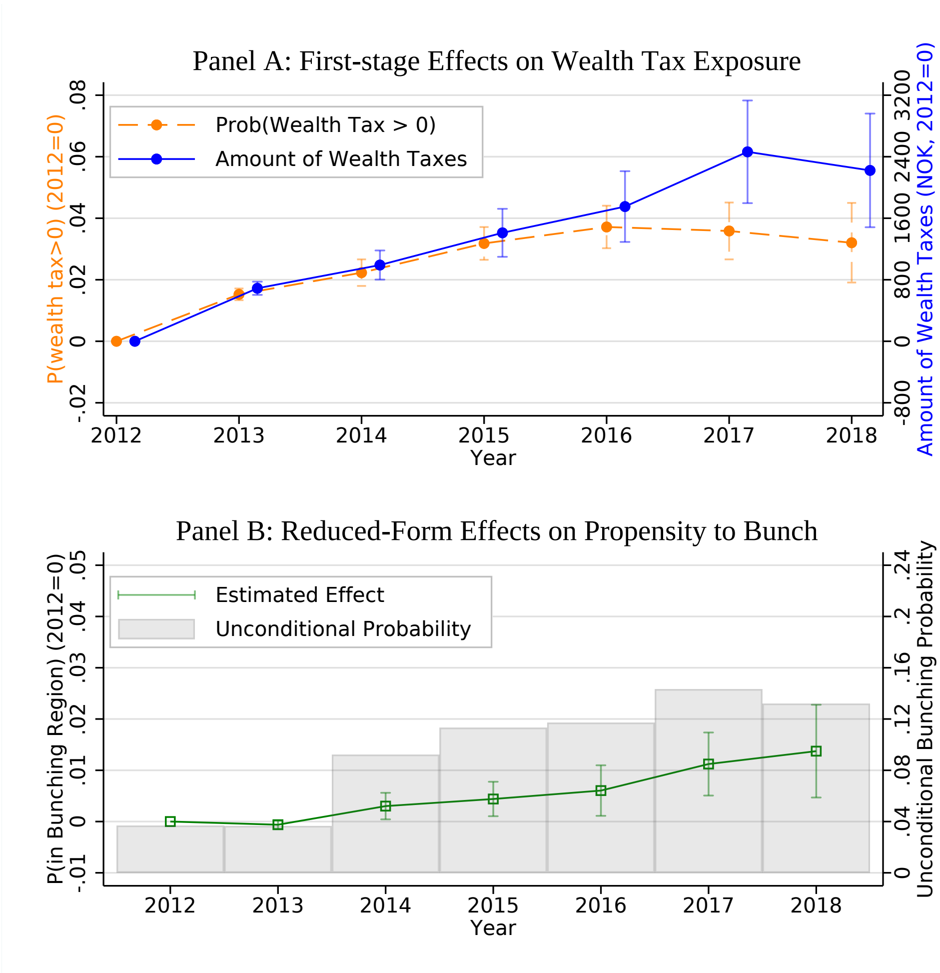
In order to further explore these effects empirically, we return to the quasi-experimental framework used to study the effects on overall charitable giving, replacing charitable giving with a measure of bunching. Note that in this part of our empirical investigation, we use data only on households that donate to charitable organizations.

First-stage. In Figure 4, Panel (A), we provide year-by-year estimates of the first-stage effects. A 1 million NOK (USD 106,000; EUR 93,000) increase in the amount of (estimated market value) secondary housing wealth ($MVHS_{h,2012}$), keeping total housing wealth fixed, causes a steady increase in yearly wealth tax that reaches approximately NOK 1,600 (USD 170; EUR 150) by 2018. We find a faster response on the extensive margin of the wealth tax exposure. By 2013, a 1 million NOK increase in $MVHS$ leads to an increase in the probability of paying a wealth tax by 3 percentage points. This effect rises to around 5.5 percentage points by 2018. These first-stage effects are estimated less precisely than in Figure 2, since we are now only considering the subsample of taxpayers who are engaged in charitable giving.

Reduced-form. In Panel (B), we use the first-stage equation to estimate the reduced-form effects on the propensity to bunch near the exemption threshold. The connected line provides the reduced-form effects, whereas the shaded gray bars provide the unconditional bunching probabil-

Figure 4: Secondary-housing Assessment, Wealth Tax Exposure, and the Price Elasticity of Charitable Giving

Notes: In Panel (A), we plot the effects of owning more secondary housing, while controlling for over-all housing wealth, on wealth tax exposure along two dimensions: (i) the dashed orange line shows extensive-margin exposure and the (ii) solid blue line shows intensive-margin exposure in terms of the amount of wealth taxes accrued in a given year. The point-estimated come from regressing the wealth tax exposure measures on the amount (in MNOK) of secondary housing owned, as of 2012. Controls include the over-all TNW as well as over-all estimated housing wealth. In Panel (B), the solid green line provides the reduced-form effect on the propensity to locate at or near the donation threshold. The gray bars indicate the unconditional probability of locating at or near the threshold for each year. By comparing the point estimate (in green) with the value of the gray bars, we may obtain the relative effect on the probability of bunching.



ities.[24] From these numbers, we see that a 1 million NOK (USD 106,000; EUR 93,000) increase in $MVHS_{h,2012}$ has little effect on the propensity to bunch until 2016–2018. By 2018, a 1 million NOK increase in $MVHS_{h,2012}$ leads to an increase in the bunching probability of approximately 1.25 percentage points. Relative to the unconditional mean of around 13%, this is a relative

[24]The jump in the unconditional probability from 2013 to 2014 is driven by the sample selection procedure. Specifically, it is caused by 2012 and 2013 having the same threshold, which is lower than threshold of 2014. The fixed bandwidth in terms of NOK thus implies that the 2014-sample includes considerably more households to the left of the threshold. Hence, there are more donors and non-bunchers in 2012-2013, which lowers the unconditional probability, relative to 2014 and subsequent years.

increase of approximately 10%. Thus, this suggests that the reduced-form effect of a 1 million NOK increase in $MVHS$ is to increase the price elasticity of giving by 10%.[25]

IV Approach. The results from estimations of the system of equations 3–4 with respect to bunching are provided in Table 4. Columns (1)–(2) show the estimated first-stage coefficients. Column (4) and (5) provide IV estimates when incorporating only one endogenous variable at a time. In column (5), we see that for each additional NOK 1,000 (USD 106; EUR 93) paid in wealth tax, households are 0.153 percentage points more likely to bunch, whereas column (6) shows that wealth-tax paying households are 6.793 percentage points more likely to bunch at the deduction cap. When jointly estimating these effects in column (4), both coefficients enter positively, but neither are statistically different from zero.

Our empirical variation is thus not sufficient to empirically distinguish between effects at the extensive and intensive margin with respect to the effect of the wealth tax. As we discussed in section 3.2.3, this is not necessarily driven by a lack of first-stage heterogeneity, but rather a lack of reduced-form variation, as we can glean from the non-significant interaction effects in column (3). Thus our estimates can still be used to create bounds on these effects that may be reasonably precise.[26]

We now translate the IV estimates from columns (5) and (6) into effects on the price elasticity. Given a baseline bunching probability of 5.09%, column (5) says that each additional NOK 1,000 (USD 106; EUR 93) in wealth tax increases the price elasticity by 3% = 0.153/5.09. Column (6) expresses that households that are subject to wealth taxation, have a price elasticity that is 128% = 6.51/5.09 higher. Larger responses in terms of the tax price elasticity of charitable giving is in accordance with results reported in Thoresen, Ring, Epland, and Nygård (2021), which derive results by employing a standard fixed effects panel data approach, reporting extensive and intensive margin effects for all and for households in wealth-tax position alone.

5 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 and Diamond 2006). To what extent donation behavior could be influenced by capital taxation, in the form of a wealth, capital income or 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 for example Saez and Zucman (2019b)

In this paper, we first examine how the wealth tax affects charitable giving directly. Does

[25] Note that this is not measured in terms of percentage points, as our specification identifies the relative (not absolute) effect on the price elasticity.

[26] Since empirically distinguishing between extensive and intensive-margin effects of wealth taxes on giving is novel to this paper, we cannot compare the precision of our estimates to other studies.

Table 4: Wealth Taxation and the Price Elasticity of Giving: Instrumental Variables Approach

This table provides the key coefficients from estimating the system of equations in 3-4. Columns (1) and (2) consider the first-stage effects on whether households pay a wealth tax and how much they pay. Column (3) provides reduced-form effects on the propensity to bunch at the deduction cap; to improve formatting, this indicator is multiplied by 100. Column (4) treats both $1[wtax > 0]$ and $wtax$ as endogenous variables, thus exploiting information in columns (1)-(3). Column (5) considers only $wtax$ as the endogenous variable, and thus uses information from columns (2) and (3). Similarly, column (6) only uses the first-stage estimate in column (1). Standard errors are clustered at the household level. one, two, and three stars indicate statistical significance at the 10%, 5%, and 1% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	First-stage		Red.-form	IV	IV	IV
Dependent var =	1[wtax>0]	wtax$_{i,t}$	Indicator for Bunching at Deduction Cap ×100			
1[wealth tax$_{h,t}$>0]				5.091		6.793**
				(3.844)		(3.019)
wtax$_{h,t}$ (NOK 1,000s)				0.064	0.153**	
				(0.085)	(0.068)	
MVHS$_{h,2012}$	0.031***	0.842***	0.216**			
	(0.002)	(0.064)	(0.096)			
MVHS$_{h,2012}\times(T_t - TNW_{h,2012})$	-0.004***	0.362***	0.008			
	(0.001)	(0.060)	(0.059)			
MVHS$_{h,2012}\times(T_t - TNW_{h,2012})^2$	-0.007***	0.010	-0.040			
	(0.001)	(0.046)	(0.046)			
rkf				85.25	87.04	155.85
N	702315	702315	702315	702315	702315	702315

the wealth tax crowd out donations in the sense that agents would have given their seized wealth to charity if not taxed? Perhaps, but to a very small extent. This negative effect is consistent with income effects dominating the substitution effects in the effects of capital taxation on the (consumption of) charitable giving.

Moreover, we also provide new evidence on the tax-price elasticity itself, exploiting a non-linear tax schedule along with third-party reported data on giving. Our findings reveal a modest elasticity. To explore heterogeneity, we develop a regression-based methodology that essentially regresses whether someone is bunching on observable characteristics. This allows us to document price-elasticity heterogeneity across multiple dimensions. We find that the after-tax elasticity decreasing in income and wealth, in line with economic intuition, and further document that it is decreasing in age. Moreover, we examine the extent to which the wealth tax may affect this elasticity. Using our quasi-experimental variation in wealth-tax exposure, we find that wealth taxation increases the price sensitivity; consistent with the notion that price elasticities are decreasing in (after-tax) wealth.

Our paper thus presents a rich set of new findings related to wealth taxation and charitable giving that may be useful in guiding more comprehensive optimal taxation models.

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A Appendix

Figure A.1: Quasi-Experimental Variation and Household Income Trajectories

This figure provides the reduced-form effect of secondary-housing ownership on households' log gross taxable income. The point estimates come from estimating equation 4, simplifying $f(\cdot)$ to be year-specific linear function of $MVHS_{h,2012}$ alone. The 2010 point estimate is -0.000064 (se=0.005453) with a 95% confidence interval of [-0.001, 0.001].

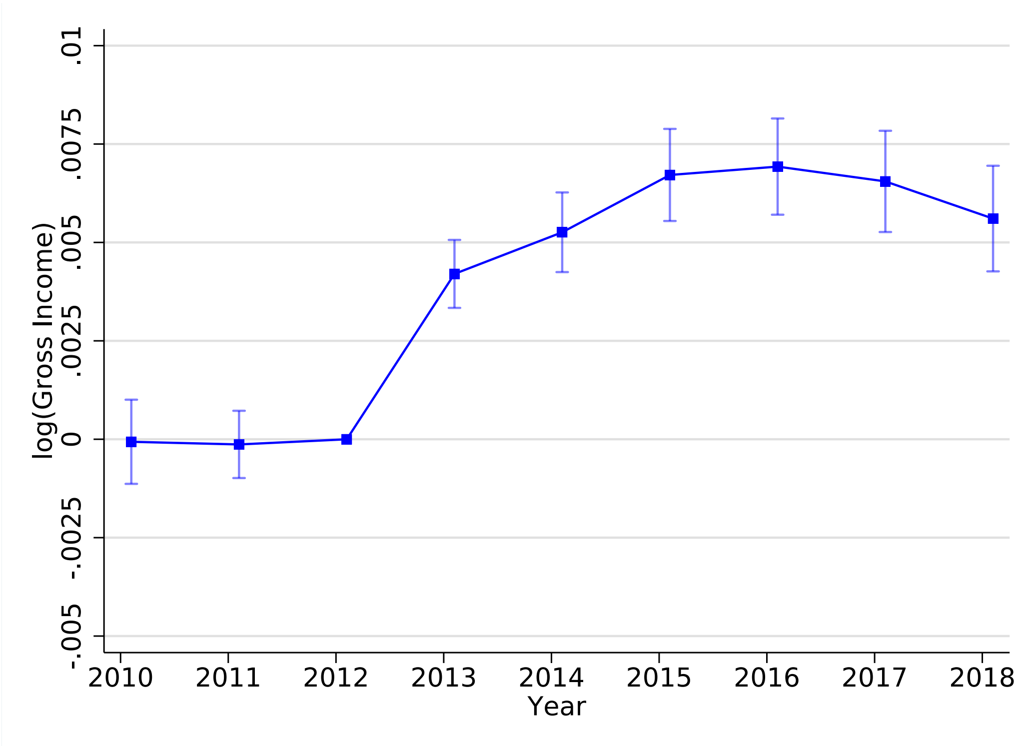

Figure A.2: Robustness to Controlling for Pre-period Differenced Secondary Housing Wealth

This figure provides the reduced-form effect of secondary-housing ownership on charitable giving. The dashed blue line provides estimates from the main specification as a reference (see Figure 2). The solid blue line provides estimates when we control for pre-period changes in secondary housing wealth. More specifically, we add the following term to the estimation equation used to produce the dynamic effects in Panel B of Figure 2: $\xi_t(MVHS_{h,2012} - MVHS_{h,2010})$.